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9 ECOLOGICAL IMPACT (TERRESTRIAL AND MARINE)

9.1 Introduction

9.1.1.1 This section presents the baseline ecological profile within the assessment area and potential ecological impacts arising from construction and operation of the Project, which has been conducted in accordance with the criteria and guidelines as stated in Annexes 8 and 16 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) as well as the requirements given in Clause 3.4.10 and Appendix H of the EIA Study Brief (No. ESB-360/2023).

9.2 Environmental Legislations, Standards and Guidelines

9.2.1.1 This assessment makes reference to the following Hong Kong Special Administrative Region (HKSAR) Government ordinances, regulations, standards, guidelines, and documents that are relevant to ecological impact assessment:

- Environmental Impact Assessment Ordinance (EIAO) (Cap. 499)
- Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) Annexes 8 and 16
- EIAO Guidance Note No. 3/2010, 6/2010, 7/2023, 10/2023 and 11/2023
- Country Parks Ordinance (Cap. 208)
- Forest and Countryside Ordinance (Cap. 96)
- Wild Animals Protection Ordinance (Cap. 170)
- Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586)
- Town Planning Ordinance (Cap. 131)
- Chapter 10 of the Hong Kong Planning Standard and Guidelines (HKPSG)
- Water Pollution Control Ordinance (Cap. 358)
- Development Bureau (DEVB) TC(W) No. 4/2020 Tree Preservation
- ETWB TCW No. 5/2005 Protection of Natural Streams/Rivers from Adverse Impacts arising from Construction Works

9.2.1.2 This section also makes reference to the following international conventions and national legislation:

- The International Union for Conservation of Nature (IUCN) Red List of Threatened Species;
- Red List of China's Vertebrates;
- The List of Wild Plants and Wild Animals Under Special State Protection under the Law of the People's Republic of China on the Protection of Wildlife; and
- The Convention on Biological Diversity (the CBD), and an associated city-level Biodiversity Strategy and Action Plan (BSAP) developed by the Agriculture, Fisheries and Conservation Department (AFCD) under the CBD.

9.3 Assessment Methodology

9.3.1 *Assessment Area*

9.3.1.1 In accordance with Clause 3.4.10.2 of the EIA Study Brief No. ESB-360/2023, the assessment area for terrestrial ecological impact assessment includes areas within 500 m from the boundary of the proposed development and works of the Project as well as other areas likely to be impacted by the Project (refer to **Figure 9.1**). For marine ecological impact assessment, the assessment area is the same as the assessment area for Water Quality Impact Assessment (refer to **Section 5**), which covered Junk Bay Water Control Zone (WCZ), Eastern Buffer WCZ and other potentially affected area including part of Victoria Harbour WCZ, Port Shelter WCZ, Mirs Bay WCZ, and Southern WCZ.

9.3.2 *Literature Review*

9.3.2.1 The ecological characteristics of the assessment area were identified through a comprehensive review of the available relevant literature, as shown in **Table 9.1** below.

Table 9.1 Baseline Information on Ecological Resources within the Assessment Area

Relevant Literature	Terrestrial Ecology	Marine Ecology				
		Coral	Benthos	Intertidal	Marine Mammal	Seahorse and Pipefish
(1) Consultancy Study on Marine Benthic Communities in Hong Kong (AFCD, 2002)			✓			
(2) Ecological Status and Revised Species Records of Hong Kong's Scleractinian Corals (AFCD, 2004)		✓				
(3) Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate – EIA Report (AEIAR-131/2009) (ASB Biodiesel, 2008)		✓	✓	✓		
(4) Further Development of Tseung Kwan O - EIA Report (AEIAR-092/2005) (CEDD, 2005)		✓	✓	✓		
(5) Coral Translocation Plan and Monitoring Proposal – Wan Chai Development Phase II and Central - Wan Chai Bypass (CEDD, 2009a)		✓				
(6) Detailed Coral Translocation Plan – Site formation for Kai Tak Cruise Terminal Development (CEDD, 2009b)		✓				
(7) Cross Bay Link, Tseung Kwan – EIA Report (AEIAR-172/2013) (CEDD, 2013a)		✓	✓	✓		
(8) Tseung Kwan O – Lam Tin Tunnel and Associated Works – EIA Report (AEIAR-173/2013) (CEDD, 2013b)		✓	✓	✓		
(9) Monthly EM&A Report - Environmental Team for Tseung Kwan O - Lam Tin Tunnel (CEDD, 2017)		✓				
(10) Lei Yue Mun Waterfront Enhancement Project – EIA Report (AEIAR-219/2018) (CEDD, 2018)	✓	✓	✓	✓		
(11) Environmental Monitoring Works for Lei Yue Mun Waterfront Enhancement Project 4th Monthly EM&A Report. (CEDD, 2021)	✓	✓	✓	✓	✓	
(12) Ecological Survey Report for Planning and Engineering Study for Re-planning of Tseung Kwan O Area 137 – Feasibility Study (CEDD, 2023)	✓	✓	✓	✓		
(13) Revealing benthic habitats and sessile epibenthic biodiversity in Victoria Harbour – A preliminary study – Completion Report (CityU, 2023)		✓				
(14) Phase II of the "Systematic Pipefish and Seahorse Survey" (Ecological Education and Resource Centre and Green Power, 2014)						✓

Relevant Literature	Terrestrial Ecology	Marine Ecology				
		Coral	Benthos	Intertidal	Marine Mammal	Seahorse and Pipefish
(15) South East New Territories Landfill Extension (SENTX)– EIA Report (AEIAR-117/2008) (EPD, 2007)	✓	✓	✓	✓		
(16) Hong Kong Offshore Wind Farm in Southeastern Waters – EIA Report (AEIAR-140/2009) (HKOWL, 2009)		✓				
(17) Monitoring of Marine Mammals in Hong Kong Waters (2022-23) – Final Report (Hung, 2023)					✓	
(18) Report: Field Diving Surveys of Corals for the Environmental and Engineering Feasibility Assessment Studies (EEFS) in Relation to the Way Forward of the Harbour Area Treatment Scheme (HATS) (Oceanway, 2003)		✓				
(19) Desalination Plant at Tseung Kwan O – EIA Report (AEIAR-192/2015) (WSD, 2015)	✓	✓	✓	✓		
(20) Updated Vegetation Survey Report for Slope Mitigation Works (WSD, 2017)	✓					

9.3.3 *Identification of Information Gap*

9.3.3.1 Based on the available information for terrestrial and marine ecological resources, information gap is identified, given that the ecological surveys within the assessment areas were conducted more than five years ago, hence ecological field survey is considered necessary to provide up-to-date ecological profile of the assessment areas. Detailed methodology for ecological surveys listed above are discussed in the sections below. On the other hand, as waters within and adjacent to Junk Bay do not appear to be utilised by marine mammals, thus no marine mammal survey is deemed necessary.

9.3.4 *Ecological Survey Methodology*

9.3.4.1 Based on review of the findings of relevant studies and available information, terrestrial and marine ecological surveys, covering the assessment area of Potential Development Area in Tseung Kwan O Area 137 and land to be created off Tseung Kwan O Area 132 (hereafter referred to as TKO 137 and TKO 132 respectively), were carried out to fill information gaps identified, verify the information collected, to fulfil the requirements of the EIA Study according to the EIA Study Brief No. ESB-360/2023, and to facilitate the subsequent assessment of ecological value, evaluation of the potential ecological impacts resulting from the Project, and provision of appropriate mitigation measures. Terrestrial and marine ecological field surveys (covering both dry and wet seasons) of at least 9-months was undertaken from September 2023 to May 2024 for TKO 137, and from February to November 2023 for TKO 132. **Table 9.2** summarise the survey programme. The methodologies adopted for the ecological surveys are described in **Section 9.3.4.4** to **9.3.4.20** below. The relevant experience of the key ecological surveyors is listed in **Appendix 9A.**

9.3.4.2 The field surveys covered flora, fauna and any other habitats / species of conservation importance. The fauna species have been surveyed during the active period of the faunal groups. All field surveys were carried out in such ways that would not cause any unnecessary stress or damage to the existing habitats and wildlife. Where coverage by walk-transect was not possible (e.g. hillside areas with limited accessibility and safety concern), high-power binoculars were used to determine the habitat structure, general vegetation composition, at

a location as close as possible. The transects and sampling points for terrestrial and marine ecological surveys are shown in **Figure 9.1** and **9.4**.

9.3.4.3 The nomenclature of floral and faunal species (except freshwater invertebrate) followed AFCD (2023a), with reference to other literature including Hong Kong Herbarium (2012) and Hong Kong Herbarium and South China Botanical Garden (2007, 2008, 2009 and 2011) for flora; Carey *et al.* (2001), Lee *et al.* (2022) and the most recently updated list from the Hong Kong Bird Watching Society for avifauna; Shek (2006) for mammal; Lo & Hui (2010) and Chan *et al*. (2012) for butterfly; Tam *et al.* (2011) and Reels (2019) for odonate; Chan *et al.* (2005a) for amphibian; Chan *et al.* (2006) for reptile; Lee *et al*. (2004) and Dudgeon (2003) for freshwater fish, and nomenclature of freshwater invertebrate, respectively; and the firefly species followed Yiu (2023).

Habitat Mapping and Vegetation Survey

9.3.4.4 Terrestrial habitats within the assessment area were identified, sized and mapped. Ecological characteristics of each habitat type, including size, vegetation type, species present, dominant species found, species diversity and abundance, community structure, ecological value and inter-dependence of the habitats and species, and presence of any features of ecological importance were defined and characterised for consistency with the EIA Study Brief. Representative photographs of the habitat types and/or any important ecological features identified were taken. A habitat map of suitable scale (1:1000 to 1:5000) showing types and locations of terrestrial and aquatic habitats within the assessment area was prepared from digital aerial photographs. The habitat map was checked during ground truthing. Vegetation surveys were conducted by direct observation within the representative parts of the assessment area to record diversity and dominance of plant species present in different habitat types in both wet season and dry season. The location of any plant species of conservation importance were recorded. Identification of flora species and status in Hong Kong was made with reference to Xing et al. (2000), Hu et al. (2003), Lai et al. (2008), Hong Kong Herbarium (2012), and Hong Kong Herbarium and South China Botanical Gardens (2007; 2008; 2009; 2011).

Avifauna Survey

9.3.4.5 The presence and abundance of avifauna species at various habitats were recorded visually and aurally. Both daytime (during early mornings and dusk) and night-time surveys were conducted monthly during both dry and wet seasons, using transect count method along the walk transects which encompassed different habitats within the assessment area as far as possible. All birds seen or heard on either side of the transects were identified and counted up to a distance where birds were still detectable or within a fixed distance from the surveyor. The location of any avifauna species of conservation importance encountered was recorded, along with notable behaviour (e.g. breeding behaviour such as nesting and presence of recently fledged juveniles, roosting, and feeding activities).

Terrestrial Mammal Survey

9.3.4.6 Daytime and night-time surveys for terrestrial mammals covered both dry and wet seasons, conducted monthly in areas which might potentially be utilised by terrestrial mammals. The surveys were focused on searching for field signs such as droppings, footprints, diggings or burrows left by larger mammals. Mammal identification was made as accurate as possible from the field signs encountered. In addition, any mammals directly observed were identified and recorded, while surveys for nocturnal mammal species were undertaken at night-time by active searching with spotlight. Deployment of camera traps was conducted at representative locations where secure and appropriate (e.g. suitable habitat / location with field signs recorded).

9.3.4.7 Bat surveys were undertaken by surveyor(s) equipped with ultrasonic bat detector at potential roosting, commuting, foraging and drinking sites. The bat species were located upon the detected location of echolocation calls and from direct observation. The acoustic information was recorded with suitable devices (e.g. smart phone, mp3 recorder) for subsequent analysis,

supplemented with other direct observation (e.g. size, flying pattern) for species identification. Special attention had also been given to roosting or breeding sites of bat during the surveys.

Butterfly and Odonate Survey

9.3.4.8 Butterflies and odonates (dragonflies and damselflies) within the assessment area were surveyed using transect count method, which the transects encompassed different habitats within the assessment area as far as possible. Daytime surveys were conducted every two months during both dry and wet seasons. All butterflies or dragonflies observed within approximately 5m from either side of the transect were identified and counted. Attention was given to their potential habitats (e.g. stream, pond, nectaring location). The survey was conducted in suitable weather condition to avoid overcast weather when the butterflies and odonate would be less active. Relative abundance of butterfly, dragonfly and damselfly were recorded, while larvae and pupae encountered were recorded.

Herpetofauna (Amphibian and Reptile) Survey

9.3.4.9 Herpetofauna within the assessment area were surveyed along survey transects qualitatively. Daytime and night-time surveys were conducted every two months during both dry and wet seasons. Potential microhabitats (e.g. leaf litter, underneath of rotten logs) were searched. All reptiles and amphibians sighted were recorded.

9.3.4.10 Amphibian surveys were conducted whenever possible in evening, following or during periods of rainfall, and focusing on areas suitable for amphibians (e.g. forests, shrublands, grasslands, streams, catchwaters, fishponds and marshes, if any). Records of calling amphibians formed the bulk of the data collected, but this was also supplemented when possible by visual observation of eggs, tadpoles and frogs and toads.

9.3.4.11 During reptile surveys, careful searches of appropriate microhabitats and refugia (e.g. stones, pond bunds, crevices, leaf litter / debris, rotten log) were undertaken. All reptiles observed were identified. In addition to active searching, observation of exposed, basking, or foraging reptiles were also recorded.

Aquatic Communities Survey

9.3.4.12 Freshwater communities (fish and invertebrates) were surveyed every two months in both wet and dry seasons during daytime and night-time, through active searching and/or direct observation within the assessment area. To avoid driving organisms (e.g. fish and shrimps) away, and avoid disturbing the bottom substrate, direct bankside counts were conducted before active searching (e.g. netting, stone sampling) and kick sampling. Boulders within the watercourse were turned over to locate any aquatic animals beneath. Hand net was used to collect organisms along the watercourse. Organisms encountered were recorded and identified to the lowest possible taxon level. Representative sampling locations (F1-6) were chosen to cover the watercourses that will likely be directly and indirectly impacted by the assessment area (**Figure 9.1** refers). Permits for ecological surveys (e.g. possession of hand nets) were obtained from relevant government authority(ies) prior to the ecological surveys.

Firefly Survey

9.3.4.13 Fireflies within the assessment area were surveyed along survey transects qualitatively. Day and night-time surveys were conducted monthly, and the night-time survey started shortly after sunset following the time specified by Hong Kong Observatory for at least 2-3 hours. Special attention was given to potential habitats for fireflies, transects within such habitats were prioritised during night survey. Lighting devices were switched off most of the time and/or at sufficient intervals during night-time survey to enhance the detection of fireflies. Diurnal fireflies encountered during other day-time survey, if any, were also recorded. During the survey, any adult and larva firefly observed were identified to the species level, where possible. The abundance and distribution of fireflies were recorded. Notable behaviour such as mass occurrence and / or breeding was recorded with associated locations and habitats.

Dive Survey

9.3.4.14 Spot-check dive surveys were conducted within the assessment area in both wet and dry seasons, with regular zig-zag dive routes in the surveyed areas covering the shoreline and marine water within and in the vicinity of the Project boundary of TKO 137 and TKO 132, to record the presence of any coral community (refer to **Figure 9.4**). Subtidal substrata (hard substratum seabed and seawall, etc.) at the spot-check dive areas were surveyed for any presence of coral communities, including hard corals (order Scleractinia), octocorals (sub-class Octocorallia) and black corals (order Antipatharia). Seahorse and/or pipefish observed during the spot-check dive survey, if any, were recorded.

9.3.4.15 As coral communities were recorded during the spot-check dives, a more detailed Rapid Ecological Assessment (REA) was carried out with reference to DeVantier *et al.* (1998). Based on the preliminary results from the spot-check dives, representative area with higher coral coverage had been selected for the REA survey. The REA survey was conducted along eight 100m REA transects (REA 1-8) (refer to **Figure 9.4**). For each transect, the locations (Global Positioning System, GPS) of dive routes, distance surveyed, number of colonies, sizes and types of corals, their coverage, abundance, condition, translocation feasibility and the conservation status of coral species in Hong Kong waters were recorded.

Benthos Survey

9.3.4.16 To survey the marine soft bottom benthic fauna, grab sampling of seabed sediment was carried out at 11 locations (BS1-11) in the Junk Bay area during both wet and dry seasons (refer to **Figure 9.4**). At each sampling site, three replicates of grab samples over a 0.1 m^2 area seabed substrate were collected using a van Veen grab and samples were sieved through 0.5 mm sieves and stained with Rose Bengal. Collected organisms were counted, weighed, and identified to the lowest taxon as far as practicable.

9.3.4.17 Abundance, biomass, species diversity H' and evenness J would be calculated for pooled data, using the formulae:

$$H' = - \sum (Ni / N) \ln (Ni / N) \text{ ; and}$$

$$J = H' / \ln S$$

where S is the total number of species in the sample, N is the total number of individuals, and Ni is the number of individuals of the i^{th} species.

Intertidal Survey

9.3.4.18 Survey on intertidal communities were conducted at 16 survey transects and locations in the Junk Bay (IS1-16) during both wet and dry seasons (refer to **Figure 9.4**) by walk-through survey and line transect method, in order to establish an ecological profile on various intertidal habitats located within the assessment area.

9.3.4.19 At each survey location, qualitative or walk-through survey was conducted to find out the intertidal flora and fauna present and their occurrence in the survey location. It could help assess whether the sampling exercise in the later quantitative survey had collected representative data (e.g. the number and type of species encountered) and whether the sampling effort was deemed adequate. Effort spent in such qualitative or walk-through survey, such as number of surveyors involved, and the time spent were recorded and provided as appropriate.

9.3.4.20 After the walk-through survey, quantitative survey was conducted using line transect method. One line transect was deployed at each survey location. The transects were laid perpendicular to shoreline from high water mark down to low water mark during the low tide period (tide level below 1 m). Along each transect, standard ecological sampling quadrat (dimensions 0.5 m x 0.5 m) was laid at 1 m intervals (or other suitable quadrat dimension and interval distance depending on the field situation). Intertidal epifauna and flora within each quadrat were identified and enumerated. In general, mobile fauna were counted in terms of abundance per unit area. Sessile organisms such as barnacles, oysters and algae were estimated in terms of percentage cover per fixed area. Intertidal fauna were identified to species level as far as possible.

Table 9.2 Schedule of Ecological Surveys of TKO 137 and TKO 132

Survey	Dry Season		Wet Season							Dry Season					Wet Season	
	Feb 2023	Mar 2023	Apr 2023	May 2023	Jun 2023	Jul 2023	Aug 2023	Sep 2023	Oct 2023	Nov 2023	Dec 2023	Jan 2024	Feb 2024	Mar 2024	Apr 2024	May 2024
	TKO 132										-					
	-							TKO 137								
Terrestrial Ecology																
Habitat and Vegetation Survey	D				D			D^	D*				D			
Avifauna Survey	D&N	D&N	D&N	D&N	D&N	D&N	D&N	D&N^*	D&N^*	D&N^	D&N	D&N	D&N	D&N	D&N	D&N
Butterfly and Odonate Survey	D		D		D		D	D^	D*	D^				D		D
Herpetofauna Survey	D	N	D&N		D&N		D&N	D&N^	D&N*					D&N		D&N
Terrestrial Mammal Survey	D&N	D&N	D&N	D&N	D&N	D&N	D&N	D&N^*	D&N^*	D&N^	D&N	D&N	D&N	D&N	D&N	D&N
Freshwater Communities Survey		D&N	D&N		D&N		D&N	D&N^	D&N*	D&N^				D&N		D&N
Firefly Survey		D&N	D&N	D&N			D&N	D&N*	D&N^*	D&N^	D&N				D&N	D&N
Marine Ecology																
Dive Survey	D					D			D^					D		
Benthos Survey	D					D			D^	D*				D		
Intertidal Survey	D					D			D^					D		

Abbreviation:
D: Day-time survey; N: Night-time survey
For overlapping survey period (i.e. Sept to Nov 2023): ^ TKO 137 survey; * TKO 132 survey

9.4 Description of the Environment

9.4.1 *Recognised Sites of Conservation Importance*

Clear Water Bay Country Park

9.4.1.1 Clear Water Bay Country Park (CWBCP) covers the upland areas of Clear Water Bay Peninsula, including the ridge of hills (e.g. Cheung Shan and Tin Ha Shan) to the east of TKO 137, and Tit Cham Chau and Kwun Tsai located to the south of TKO 137 (refer to **Figure 9.1**). The CWBCP comprises hills, mature wooded area, coastline, and is rich in biodiversity. Common plants in the CWBCP include *Schefflera heptaphylla*, *Sterculia lanceolata*, *Garcinia oblongifolia* and pine trees. The plants in the CWBCP also provide habitat for various avifauna species such as Chinese Hwamei (*Garrulax canorus*), Chinese Francolin (*Francolinus pintadeanus*) and Greater Coucal (*Centropus sinensis*). Diverse butterfly species such as Common Mormon (*Papilio polytes*), Common Tiger (*Danaus genutia*), Large Faun (*Faunis eumeus*) and Lemon Pansy (*Junonia lemonias*) can also be found in the CWBCP (AFCD, 2023b).

Coastal Protection Areas

9.4.1.2 Coastal Protection Areas (CPAs) within the marine ecological assessment area were located along the shoreline from Joss House Bay to Clear Water Bay, and from Cape Collision to Big Wave Bay, at least 1.5 km east and 2 km southwest from the Project respectively (refer to **Figure 9.3**). A small area of CPA was also recorded near Lei Yue Mun, at least 0.5 km west of TKO 132. The CPAs consist of natural coastal habitats such as rocky cliffs and reef, flat rocks, rock outcrops, sandy bay, caves, and split islands. The CPAs are designated to conserve, protect and retain the natural coastlines and the sensitive coastal natural environment, including geological features, physical landform, and areas of high landscape, scenic or ecological value (TPB, 2021).

9.4.2 *Ecological Resources Recorded from Previous Studies*

9.4.2.1 The ecological resources recorded from previous studies in the assessment area are summarised in below sections. Terrestrial ecological resources are presented separately under the 500 m assessment area for TKO 137 and TKO 132. Marine ecological resources are presented collectively under the marine ecological assessment area, which covered the coastal area within / adjacent to both TKO 137 and TKO 132, and other area within the concerned WCZs.

Terrestrial and Aquatic Ecological Resources from TKO 137

Habitats and Flora

9.4.2.2 Terrestrial and aquatic ecological surveys were conducted within / in the vicinity under previous studies (EPD, 2007; WSD, 2015; WSD, 2017; CEDD, 2023), which partly covered the assessment area of TKO 137 (refer to **Figure 9.2**). The habitat in which the floral species of conservation importance were previously recorded, their protection status and distribution in Hong Kong are presented in **Table 9.18**. The location of these species recorded from previous studies are presented in **Figure 9.2.1** and **9.2.2**.

9.4.2.3 The TKO 137 was mainly situated in the developed area within TKO Area 137 Fill Bank, which was a reclaimed land that was flanked by Cheung Shan in the east, Fat Tong Chau in the north and Tit Cham Chau in the south. Natural habitats such as mixed woodland, shrubland, shrubby grassland / grassland and natural watercourses were mainly found in hillside area on Cheung Shan, Fat Tong Chau, Tit Cham Chau, etc. Other semi-natural and man-made habitats such as plantation and channelised watercourses were also recorded.

9.4.2.4 A total of eight habitat types were recorded within the assessment area from previous studies, including mixed woodland, shrubland, shrubby grassland / grassland, plantation, developed

area / wasteland, watercourse, rocky shore, and soft shore (EPD, 2007; WSD, 2015; WSD, 2017; CEDD, 2023). The description of each habitat within the assessment area is provided in the following section.

9.4.2.5 Mixed woodland habitat identified within the assessment area was mainly located on the hillside north and southwest of Cheung Shan within the CWBCP, and Fat Tong Chau (WSD, 2015; WSD, 2017; CEDD, 2023). Low to moderate floristic diversity were recorded, the canopy was dominated by tree species including exotic species *Leucaena leucocephala* and native species *Schefflera heptaphylla*, while native species *Psychotria asiatica* and *Ficus hirta* were observed in the understory layer. Three floral species of conservation importance including *Diospyros vaccinioides, Lilium brownii* and *Pavetta hongkongensis* were recorded in the mixed woodland at Cheung Shan within CWBCP and Fat Tong Chau respectively, while *Lilium brownii* was recorded at the slope toe north of Cheung Shan within CWBCP.

9.4.2.6 Shrubland habitat was found within the assessment area, including Tin Ha Au, hillside of Fat Tong Chau, Tit Cham Chau, and Kwun Tsai (EPD, 2007; CEDD, 2023). Except the shrubland at Fat Tong Chau, other shrublands were found within CWBCP. Typical shrub species including *Rhodomyrtus tomentosa*, *Rhaphiolepis indica*, *Ilex pubescens* and *Cratoxylum cochinchinense* were commonly recorded in this habitat. Individuals of floral species of conservation importance, *Diospyros vaccinioides*, were recorded in shrubland on Fat Tong Chau within the TKO 137.

9.4.2.7 Majority of Cheung Shan was covered by shrubby grassland / grassland which largely fall within the CWBCP (EPD, 2007; WSD, 2015; WSD, 2017; CEDD, 2023). This habitat was also recorded on the hillside of Fat Tong Chau (WSD, 2015; CEDD, 2023). The shrubby grassland / grassland was dominated by herb species including *Arundinella* spp., *Dicranopteris pedata* and *Hedyotis uncinella,* and shrub species including *Baeckea frutescens* and *Ilex pubescens*. A total of ten floral species of conservation importance (*Cynanchum paniculatum*, *Diospyros vaccinioides*, *Habenaria linguella*, *Lilium brownii*, *Marsdenia lachnostoma*, *Nepenthes mirabilis*, *Pachystoma pubescens*, *Pecteilis susannae*, *Platycodon grandiflorus*, and *Pyrenaria spectabilis*) were recorded in this habitat. Except *Pyrenaria spectabilis*, the remaining nine floral species of conservation importance were recorded in Cheung Shan within CWBCP. Individuals of *Marsdenia lachnostoma* and *Platycodon grandiflorus* were recorded in shrubby grassland / grassland at the hilltop area of Cheung Shan within both CWBCP and boundary of TKO 137 (WSD, 2017; CEDD, 2023). An individual of *Habenaria linguella*, a perennial orchid species, was recorded in shrubby grassland / grassland on the hillside north of Cheung Shan within CWBCP (WSD, 2015).

9.4.2.8 Plantation was mainly identified within the restored area of the existing SENT Landfill, and the engineering slope at the hillside of Fat Tong Chau (EPD, 2007; WSD, 2015; CEDD, 2023). This habitat was dominated by exotic plantation species including *Acacia confusa*, *Casuarina equisetifolia*, *Lophostemon confertus*, and *Eucalyptus* spp. Two floral species of conservation importance, *Pavetta hongkongensis* and *Pyrenaria spectabilis*, were recorded in plantation habitat. *Pavetta hongkongensis* and *Pyrenaria spectabilis* were recorded at Fat Tong Chau within the TKO 137.

9.4.2.9 Developed area / wasteland within the assessment area mainly comprised the existing SENT Landfill, SENTX, TKO Area 137 Fill Bank, and TKO InnoPark (EPD, 2007; WSD, 2015; WSD, 2017; CEDD, 2023). Other developed area within the assessment area comprising traffic roads, commercial / industrial buildings, and public facilities. Limited floral species were recorded within the developed area, including *Leucaena leucocephala*, *Imperata cylindrica* var. *major*, and *Bidens alba*. One floral species of conservation importance, *Diospyros vaccinioides*, was recorded in developed area adjacent to Fat Tong Chau within the TKO 137.

9.4.2.10 Watercourses including natural watercourses and modified watercourses were identified within the assessment area. A total of five natural watercourses were found at the slope toe north and east of Cheung Shan within CWBCP (EPD, 2007; WSD, 2015; CEDD, 2023), while modified watercourses were recorded along the fringes of TKO Area 137 Fill Bank (WSD, 2015; WSD, 2017; CEDD, 2023). Flora species such as *Aporosa dioica*, *Sterculia lanceolata*,

and *Uraria crinita* were recorded along the natural watercourses. No riparian vegetation community was found along the modified watercourses.

9.4.2.11 The shorelines within the assessment area of TKO 137 were covered by rocky shore, soft shore, and seawall in developed area. Rocky shore was found along the coastal area of Fat Tong Chau, Tit Cham Chau, Kwun Tsai, and the southeastern coast of Cheung Shan, (WSD, 2015; WSD, 2017; CEDD, 2023). A small section of soft shore was recorded at Tai Miu Wan (WSD, 2015; WSD, 2017). Seawall was mainly identified along the coast of TKO Area 137 Fill Bank (WSD, 2015; WSD, 2017). Shrub and herb species including *Wikstroemia indica*, *Kyllinga brevifolia*, and *Pycreus polystachyos* were found on the crevices of the rocks or extended from adjacent habitats to the rocky shore. One floral species of conservation importance, *Diospyros vaccinioides*, was recorded along the rocky shore in Tit Cham Chau within CWBCP and Fat Tong Chau.

9.4.2.12 Most of the habitats recorded within the assessment area were considered as having low or low to moderate ecological value. The shrubby grassland / grassland to the east of the TKO 137 was considered as having moderate ecological value as the habitat supported diverse flora, avifauna and butterfly species and several floral and faunal species of conservation importance.

Fauna

9.4.2.13 In general, the assessment area was recorded to support a relatively low diversity and abundance of mammal, herpetofauna, odonate, and aquatic fauna, whilst the abundance of avifauna and butterfly species were recorded in moderate diversity and abundance (EPD, 2007; WSD, 2015; CEDD, 2023). Higher fauna diversity and abundance were found within natural habitats including mixed woodland and shrubby grassland / grassland, especially those within the CWBCP and Fat Tong Chau. While majority of habitats within boundary of TKO 137 only supported low faunal abundance and diversity. A total of 34 faunal species of conservation importance were recorded within the assessment area, which mainly recorded within the CWBCP, while eleven of them were also recorded within the TKO 137 (EPD, 2007; WSD, 2015; CEDD, 2023). The habitat in which the faunal species of conservation importance were previously recorded, their protection status and distribution in Hong Kong are presented in **Table 9.18**. The location of these species recorded from previous studies are presented in **Figure 9.2.1** and **9.2.2**.

Avifauna

9.4.2.14 Moderate avifauna species diversity and abundance were found within the assessment area. Majority of the avifauna species were recorded in natural habitats including mixed woodland, shrubland and shrubby grassland / grassland within CWBCP. Most of these recorded species are common and widespread in Hong Kong, including Crested Myna (*Acridotheres cristatellus*), Black Drongo (*Dicrurus macrocercus*) and Japanese White-eye (*Zosterops japonicus*) (EPD, 2007; WSD, 2015; CEDD, 2023). A total of 17 avifauna species of conservation importance were recorded within the assessment area of TKO 137 from previous studies. Three avifauna species of conservation importance, including Black Kite (*Milvus migrans*), Collared Scops Owl (*Otus lettia*), and Greater Coucal, were found in habitats such as mixed woodland and developed area within the boundary of TKO 137. Others were mostly recorded in natural habitats (e.g. mixed woodland, shrubland and shrubby grassland / grassland) in Fat Tong Chau and Cheung Shan outside the boundary TKO 137 (EPD, 2007; WSD, 2015; CEDD, 2023).

Mammal

9.4.2.15 Mammal species including bats and terrestrial mammal species were previously recorded in shrubland, shrubby grassland / grassland, and developed area within the assessment area in low diversity and abundance (EPD, 2007; WSD, 2015; CEDD, 2023). Most mammal species that were previously identified within the assessment area were either very common or common in Hong Kong. A total of two bat species of conservation importance, Japanese Pipistrelle (*Pipistrellus abramus*) and Chinese Noctule (*Nyctalus plancyi*), were recorded in

shrubland and developed area from the previous studies. Individual(s) of Japanese Pipistrelle was also recorded in developed area within the boundary of TKO 137 (EPD, 2007; WSD, 2015; CEDD, 2023).

Herpetofauna

9.4.2.16 Low diversity and abundance of herpetofauna (amphibian and reptile) species were previously recorded in both natural and man-made habitats within the assessment area (EPD, 2007; WSD, 2015; CEDD, 2023). Most of the herpetofauna species found within the assessment area were common and widely distributed in Hong Kong. One reptile species of conservation importance, Common Rat Snake (*Ptyas mucosus*), was recorded in mixed woodland on the hillside north of Cheung Shan outside the boundary of TKO 137 (EPD, 2007).

Butterfly

9.4.2.17 Previous records of butterfly species within the assessment area were mainly made in natural habitats including mixed woodland, shrubland and shrubby grassland / grassland with moderate diversity and abundance (EPD, 2007; WSD, 2015; CEDD, 2023). Majority of the previously recorded butterfly species were either very common or common in Hong Kong, such as Common Grass Yellow (*Eurema hecabe*), Plum Judy (*Abisara echerius*), and Dark-brand Bush Brown (*Mycalesis mineus*). A total of 14 butterfly species of conservation importance were previously recorded (EPD, 2007; WSD, 2015; CEDD, 2023). Seven of which, including Common Awl (*Hasora badra*), Cornelian (*Deudorix epijarbas*), Danaid Eggfly (*Hypolimnas misippus*), Forget-me-not (*Catochrysops Strabo*), Grass Demon (*Udaspes folus*), Metallic Cerulean (*Jamides alecto*), and Painted Lady (*Vanessa cardui*) were found in various habitats in Fat Tong Chau and Cheung Shan within the boundary of TKO 137, including mixed woodland, shrubland, shrubby grassland / grassland, and modified watercourse (CEDD, 2023).

Odonate

9.4.2.18 Low diversity and abundance of odonate species were previous recorded in both natural and man-made habitats as limited watercourses were identified within the assessment area (EPD, 2007; WSD, 2015; CEDD, 2023). All recorded odonate species were abundant to common in Hong Kong, such as Asian Amberwing (*Brachythemis contaminata*), Common Blue Skimmer (*Orthetrum glaucum*) and Wandering Glider (*Pantala flavescens*). No odonate species of conservation importance were recorded in previous studies within the assessment area.

Aquatic Community

9.4.2.19 Given that the natural watercourses within the assessment area were short and only having shallow water, and the modified watercourse were concretised channels, limited aquatic fauna was recorded from the previous studies (EPD, 2007; WSD, 2015; CEDD, 2023). Since odonate species were recorded in habitats near watercourses, some nymphs of damselflies were also recorded in watercourses within the assessment area (WSD, 2015; CEDD, 2023). No aquatic species of conservation importance were recorded in previous studies within the assessment area.

Terrestrial and Aquatic Ecological Resources from TKO 132

Habitats and Flora

9.4.2.20 Terrestrial ecological surveys had been conducted within and in the vicinity of the assessment area, which partly covered the assessment area of TKO 132 (refer to **Figure 9.2**) (CEDD, 2005, 2013b and 2018). Habitats identified from previous literature are described below, while previously recorded floral species of conservation importance, their protection status and distribution in Hong Kong are presented in **Table 9.18**. The location of floral species of conservation importance recorded from previous studies are presented in **Figure 9.2.3**.

9.4.2.21 A total of six habitat types including mixed woodland, grassland / shrubland, plantation, developed area, watercourse, and shoreline habitats were identified from previous EIA studies (CEDD, 2005, 2013b and 2018).

9.4.2.22 Mixed woodland habitats were identified southwest of the portal area of Tseung Kwan O - Lam Tin Tunnel. These habitats were dominated by common native pioneer tree species, shrubs and herbs such as *Macaranga tanarius* var. *tomentosa, Manihot esculenta* and *Pteris ensiformis*. Various cultivated plant species such as *Dimocarpus longan* and *Melia azedarach* were also recorded in the previous studies, alongside native species. No floral species of conservation importance was previously recorded in this habitat.

9.4.2.23 The grassland / shrubland mosaic was the main habitat in Chiu Keng Wan Shan and hillslope along western Junk Bay, but some of which was fragmented by developed areas. The plant species recorded were similar in different areas. On hilltops and exposed slopes, the vegetation cover and species complexity were lower. Typical vegetation included young pioneer trees, shrubs, ferns, grasses, and herbs. Two floral species of conservation importance, *Arundina graminifolia* and *Diospyros vaccinioides* were recorded from the hillside grassland / shrubland behind the Tseung Kwan O Chinese Permanent Cemetery (TKO Chinese Permanent Cemetery) outside the boundary of TKO 132 (CEDD, 2005).

9.4.2.24 Plantation habitat within the assessment area mainly consisted of road-side tree planting and plantings on the engineered slopes. In general, the plantation habitat was dominated by exotic tree species typically planted in the plantation habitat elsewhere in Hong Kong, including *Acacia confusa*, *Acacia auriculiformis* and *Eucalyptus* spp. No floral species of conservation importance were recorded from the plantation habitats (CEDD, 2005 and 2013b).

9.4.2.25 Developed areas recorded within the assessment area were highly disturbed, including TKO Chinese Permanent Cemetery, roads, engineered slopes, recreational parks, recently reclaimed land, wasteland, village housing, retention pond and industrial/commercial developments. Flora communities in this habitat were generally low in diversity and dominated by common and widespread species (e.g. *Ficus macrocarpa)*. No floral species of conservation importance was recorded within the assessment area.

9.4.2.26 Three natural watercourses were previously recorded on the hillslope along western Junk Bay within the assessment area (CEDD, 2013b). These small streams have seasonal flow. The upper part of the streams runs through the cemetery, while the upper reaches were concretised. The lower reaches remain more natural, with shallow riffles and deep pools, before flowing into a rocky shore along the western Junk Bay. These watercourses were shaded by a dense canopy of *Dimocarpus longan*, *Musa* x *paradisiaca*, and *Macaranga tanarius* var. *tomentosa* from adjacent village/orchard habitat. No flora species of conservation importance was recorded in the village/orchard habitats. (CEDD, 2005 and 2013b).

9.4.2.27 The shorelines within the assessment area of TKO 132 were covered by rocky shore, soft shore, and artificial seawall. Rocky shore was found along the western coast of Chiu Keng Wan and Lei Yue Mun Point (CEDD, 2005, 2013b and 2018). Small sections of soft shore were recorded at Chiu Keng Wan and the shore along Ma Wan Tsuen (CEDD, 2005, 2013b and 2018). Seawall was mainly identified along the coast of Tseung Kwan O Waterfront Park (CEDD, 2013b). Shrub and herb species including *Hibiscus tiliaceus* and *Ipomoea pes-caprae* were found along the shore in Chiu Keng Wan and Lei Yue Mun. No flora species of conservation importance was recorded in the rocky shore habitat.

9.4.2.28 Majority of the recorded habitats within the assessment area of TKO 132 were considered as having low or very low ecological value, while mixed woodland, grassland / shrubland and natural rocky shore were considered as having low to moderate ecological value (CEDD, 2005 and 2013b).

Fauna

9.4.2.29 According to previous studies, part of the assessment area was recorded to support a low-moderate abundance of mammal, herpetofauna, odonate, and aquatic fauna, whilst relatively high species diversity and abundance of avifauna were recorded from grassland/shrubland than other habitat types (CEDD, 2013b). A total of 20 faunal species of conservation importance were recorded within the assessment area from the previous studies (CEDD, 2005 and 2013b). The habitat in which the faunal species of conservation importance were previously recorded, their protection status and distribution in Hong Kong are presented in **Table 9.18**. The location of these species recorded from previous studies are presented in **Figure 9.2.3**.

Avifauna

9.4.2.30 The avifauna assemblage recorded from previous studies was primarily composed of common and widely distributed species found in urban and disturbed habitats. Overall, the bird communities observed mainly consisted of species commonly found in disturbed habitats in Hong Kong, including the Red-whiskered Bulbul (*Pycnonotus jocosus),* Eurasian Tree Sparrow (*Passer montanus)*, and Japanese White-eye (*Zosterops japonica*). Waterbird species which utilise shoreline habitats including Grey-tailed Tattler (*Tringa brevipes*) and Sanderling (*Calidris alba*) were also recorded in the soft shore in western Junk Bay. A total of 14 species of conservation importance were identified (CEDD, 2005 and 2013b). Seven of them were recorded in developed area including Black Kite (*Milvus migrans*), Black-naped Oriole (*Oriolus chinensis*), Peregrine Falcon (*Falco peregrinus*), Grey Bush Chat (*Saxicola ferreus*), Eastern Buzzard (*Buteo japonicus*), Chinese Pond Heron (*Ardeola bacchus*), and Collared Crow (*Corvus torquatus*). The rest of them were found in natural habitats such as mixed woodland, shoreline and plantation. No notable behaviour (e.g. breeding) was recorded within the assessment area.

Mammal

9.4.2.31 Mammal species including bats and terrestrial mammal species were previously recorded within the assessment area (CEDD, 2005 and 2013b). Most of the recorded species were common and widespread in Hong Kong. A total of two mammal species of conservation importance, Japanese Pipistrelle and Pallas's Squirrel (*Callosciurus erythraeus*) were recorded in various habitats within the assessment area such as mixed woodland, grassland / shrubland and developed area.

Herpetofauna

9.4.2.32 Herpetofauna species encompassing both amphibians and reptiles were previously within the assessment area, mainly comprising common and widely distributed species, such as Bowring's Gecko (*Hemidactylus bowringii*), Changeable Lizard (*Calotes versicolor*), and Bamboo Snake (*Trimeresurus albolabris*) (CEDD, 2005 and 2013b). Two reptile species of conservation importance, namely the Chinese Cobra (*Naja atra*) and Common Rat Snake, were recorded in developed area and rocky shore habitats, respectively, within the assessment area (CEDD, 2005 and 2013b).

Butterfly

9.4.2.33 Most of the previously recorded butterfly species within the assessment area were common and widespread (CEDD, 2005 and 2013b). Three butterfly species of conservation importance, namely Large Branded Swift (*Pelopidas subochraceus*), Yellow Dart (*Potanthus pava*) and Yellow Rajah (*Charaxes marmax*), were recorded in the grassland / shrubland and mixed woodland (CEDD, 2005 and 2013b).

Odonate

9.4.2.34 Most of the previously recorded odonate species within the assessment area were common and widely distributed (CEDD, 2005 and 2013b), such as Yellow Bush Dart (*Copera marginipes*), Marsh Skimmer (*Orthetrum luzonicum*), Common Red Skimmer (*Orthetrum pruinosum neglectum*) and Green Skimmer (*Orthetrum sabina sabina*) etc. No odonate species of conservation importance was recorded within the assessment area from previous studies.

Aquatic Community

9.4.2.35 Freshwater communities previously recorded from the stream habitats within the assessment area had low species diversity and was dominated by pollution tolerant taxa (e.g. bloodworm *Chironomus* sp.) (CEDD, 2005). One species of conservation importance was recorded (CEDD, 2005). The Philippine Neon Goby (*Stiphodon atropurpureus*), a diadromous fish, was recorded in natural watercourse to the west of Chiu Keng Wan (refer to **Figure 9.2.3**). This fish is locally uncommon (Lee et al., 2004) and it has also been recorded in other areas across Hong Kong including Sai Kung, Hong Kong Island, Siu Lam and Lantau Island (AFCD, unpublished data; Chan, 2001).

Marine Ecological Resources

9.4.2.36 Various marine ecological surveys were conducted under other studies within the current marine ecological impact assessment area (ASB Biodiesel, 2008; CEDD, 2005, 2013a, 2013b and 2018; CityU, 2023; EPD, 2007a; WSD, 2015). In general, marine habitats are categorised as the intertidal zone (transitional zone between terrestrial and marine habitats, defined as the area between high and low tide), the subtidal habitat (including soft substrate and hard substrate seabed), and the pelagic zone (open water area). The soft shore, subtidal hard substrate, and pelagic habitats within Junk Bay exhibited low or low to moderate diversity and abundance of wildlife. However, the subtidal soft substrate seabed and rocky shore demonstrated moderate faunal diversity. In addition, the subtidal hard substrate in the southwest coast of Junk Bay displayed moderate to high abundance of soft coral, with coverage ranging from 25%-50%. Recorded species of conservation importance within the Junk Bay area included hard corals, black corals, and amphioxus *Branchiostoma belcheri* (HKOWL, 2009). Amphioxus is considered as a species of conservation importance due to its status as living fossil link in the evolution from marine invertebrates to vertebrates, and their crucial structure in understanding the morphology and evolution of chordates in general (Chen, 2007).

Coral Community

9.4.2.37 The waters in Hong Kong vary from turbid estuarine waters in the west to clearer oceanic waters in the east. This affects the distribution of coral communities, with higher diversity and coverage observed in the eastern waters due to the favourable oceanic environment. The assessment area includes part of the Hong Kong's eastern and southeastern coastal waters, which are considered suitable for coral growth. However, the waters in the assessment area, especially Junk Bay and Victoria Harbour, face greater human impact like pollution and reclamation compared to the eastern waters of Hong Kong (CEDD, 2013b).

Junk Bay WCZ

9.4.2.38 In the eastern Junk Bay (including shoreline along TKO InnoPark, Fat Tong Chau, Fat Tong O (i.e. the TKO 137), Joss House Bay), a total of 35 hard coral species, six soft coral species and two black coral species were recorded. In general, the coverage of hard coral was relatively low in the eastern coastline of Junk Bay (mostly less than 5%, except east Joss House Bay with 10-25% cover) (Chan et al., 2005b; CityU, 2023; WSD, 2015). Coverage of soft coral was relatively higher ranging from 10% to 50% and were occurred more frequently in middle depth zone. Most of the recorded species are common in Hong Kong, with three uncommon hard coral species *Acropora solitaryensis, Dipsastraea helianthoides* and *Favites flexuosa,* and a hard coral species *Coscinaraea* sp. with undescribed distribution (CEDD, 2013a; CityU, 2023; EPD, 2007; WSD, 2015; Chan et al., 2005b). Two recorded hard coral

species, *Acropora solitaryensis* and *Duncanopsammia peltata* were listed as "Vulnerable" in the IUCN Red List (IUCN, 2024). The shoreline along the TKO 137 only supported very low diversity and coverage (<1%) of both hard and soft coral (ASB Biodiesel, 2008; EPD, 2007).

9.4.2.39 In the western Junk Bay, a total of 23 hard coral species, 13 soft coral species and three black coral species were recorded. The abundance and coverage of hard coral were considered as low to moderate in general (<10%-20%) (CEDD, 2005, 2013b and 2018). Some area in Lei Yue Mun Point outside the boundary of TKO 132 was observed to have higher soft coral and gorgonian coverage (mostly 0-10% with area up to 20-50%) (CEDD, 2013b; CityU, 2023). Coverage of soft coral was relatively higher in the western Junk Bay, especially in Chiu Keng Wan. Soft and gorgonian corals were particularly prevalent in the middle and deep depth zones with <1 – 25% cover in Chiu Keng Wan and 25 – 50% cover in southwestern coast of Junk Bay according to previous studies (CEDD, 2005 and 2013b). Several black coral colonies were also recorded (coverage less than 1%). Most of the recorded species are common in Hong Kong, with four uncommon hard coral species *Acropora solitaryensis, Dipsastraea helianthoides, Favites flexuosa* and *Montipora mollis,* and a hard coral species *Coscinaraea* sp. with undescribed distribution (CEDD, 2013a; EPD, 2007; WSD, 2015; Chan et al., 2005b). Three recorded hard coral species, *Acropora solitaryensis, Duncanopsammia peltata* and *Pavona decussata* were listed as "Vulnerable" in the IUCN Red List (IUCN, 2024).

9.4.2.40 Most hard coral colonies previously recorded in Junk Bay were small (<5 cm in diameter), of encrusting growth form and attached to bedrock with occasional records of larger colonies (20-30 cm in diameter). These hard corals were mainly recorded in shallow coastal area (>2 m to 5 m) with sparse coverage (less than 10%). The cover of octocoral was relatively higher than hard coral (0% to 10%) with distribution of colonies largely confined to deeper water (>4.5 m). Several colonies of black coral were also recorded in deep water zone (6 m to 8 m).

9.4.2.41 Two coral recipient sites for translocated corals were identified in the southwestern coast of Junk Bay (under three EIA studies; CEDD, 2009a; 2009b and 2014) and the southwest coast of Fat Tong Chau (under EIA study CEDD, 2018) as indicated in **Figure 9.3.** Various hard coral species including *Cyphastrea serailia, Favia favus, Bernardpora stutchburyi,* etc. were translocated to the recipient sites. The post-translocation monitoring indicated that most of the translocated coral colonies were in good condition. Coral bleaching and mortality rate were considered as low in general (CEDD, 2009b; 2017; 2021).

Victoria Harbour and Eastern Buffer WCZ

9.4.2.42 Generally, the coral assemblages found in Victoria Harbour outside Junk Bay but within the assessment area were characterised by a scarcity of coral coverage and a limited number of tolerant coral species. Several coral surveys were conducted (CEDD, 2007a; CEDD, 2007b; MTR Corporation Ltd., 2009; CityU, 2023) revealed that the presence of tolerant coral species (e.g. *Oulastrea crispata, Echinomeuricia* spp. and *Balanophyllia* spp.) with low coverage (<1% to 5%) on the artificial seawall below the waterline in the Harbour Area. Natural shoreline on the eastern edge of Victoria Harbour, including those along Cape Collinson Lighthouse and Hong Kong Museum of Coastal Defence, was found to support higher coral species diversity and coverage (mostly 0-10% with some area up to 11-20%) (CityU, 2023). The recorded coral species are well-suited to challenging environments and can be found in various locations throughout Hong Kong. Potential factors contributing to low coral species diversity and coverage in Victoria Harbour include high degree of water turbidity, pollution and the absence of natural hard substrates.

Benthos

9.4.2.43 In general, the soft benthos communities with relatively lower species diversity and abundance characterised by pollution tolerant polychaetes were recorded within the Victoria Harbour than within Junk Bay and Tathong Channel (CEDD, 2013b).

9.4.2.44 Subtidal benthic surveys were previously conducted at the coastal water of western Junk Bay (i.e. Chiu Keng Wan area) suggested that the marine water having moderate species diversity and high evenness of benthic organisms (CEDD, 2013b). The most diverse faunal group in this area was polychaeta (35 species) followed by of crustacea (12 species). The diversity of benthos community recorded from CEDD (2013b) was similar to the result of other subtidal benthic surveys (CEDD, 2005) conducted in this area, but the species evenness had considered to be increased.

9.4.2.45 Benthic surveys conducted at coastal water of eastern Junk Bay (including TKO InnoPark, Fat Tong Chau, Fat Tong O (i.e. TKO 137). The benthic community in this area was dominated by polychaete *Amaeana trilobata, Prionospio ehlersi, amphipod Byblis* sp., bivalve *Theora lata* and the phyla Annelida and Arthropoda. Except for the sea southwest of Fat Tong O which is mainly dominated by shrimp larvae and nemertean species. Most of the species are common and widespread in Hong Kong (CEDD, 2013a; HKOWL, 2009; WSD, 2015). The sea to the west of TKO InnoPark was considered as having moderate species diversity and high evenness (CEDD, 2013a; WSD, 2015), while the sea southwest of Fat Tong O was considered as having low species diversity and evenness (HKOWL, 2009). Two amphioxus species of conservation importance, *Branchiostoma belcheri* and *Branchiostoma japonicum*, were recorded in sampling points from the shoreline south of Fat Tong O (CEDD, 2023; WSD, 2015). Their occurrence in the area was likely a result of their drift with the seasonally fluctuating current (CEDD, 2023).

9.4.2.46 Several benthic surveys were previously conducted within the Victoria Harbour (AFCD, 2002; CEDD, 2007; EPD, 2004). The benthic community in the harbour was dominated by polychaete (61%) and crustacean (36%) including *Eunice indica, Capitella capitata, Mediomastus* sp., *Cirriformia* sp. and *Glycinde gurjanovae.* All the species recorded are common and widespread in Hong Kong waters.

Intertidal Communities

9.4.2.47 The intertidal zone within the assessment area consists of rocky shore and soft shore along natural shoreline, and artificial seawalls (i.e. artificial vertical and sloping seawall) along the developed areas. The majority of rocky shore habitat were found along the western Junk Bay and on the west coast of Fat Tong Chau (within Junk Bay WCZ), along Victoria Harbour fringing the east coast of Hong Kong Island (within Eastern Buffer WCZ), and along the shoreline from the Joss House Bay to Clear Water Bay (extending across Eastern Buffer, Mirs Bay, and Port Shelter WCZ).

9.4.2.48 Soft shore habitats are only a small part of the overall shoreline in the assessment area, they were found scattered along the western and eastern Junk Bay and near Fat Tong Chau (within Junk Bay WCZ), a small sandy stretches at Lei Yue Mun (Victoria Harbour WCZ), and various locations within Eastern Buffer WCZ such as Joss House Bay, Cape Collison, and Tung Lung Chau. Farther away in other WCZs, soft shores can be found in Clear Water Bay, Big Wave Bay, and Shek O on the east coast of Hong Kong Island. Soft shores in Hong Kong have limited intertidal life due to the constant movement of water and waves, which make the sandy substrate unstable. Only a few burrowing organisms, such as crabs and worms, can be found in these habitats (CEDD, 2005).

9.4.2.49 The artificial seawall in developed areas is the main habitat in the intertidal zone of Victoria Harbour and eastern Junk Bay (which is located across Junk Bay, Victoria Harbour, and Eastern Buffer WCZ), covering most of the shoreline. However, it supports a less diverse and complex intertidal community compared to natural rocky shores. On the other hand, artificial rockfills or sloping rubble mound seawalls provide a more diverse and abundant intertidal community, offering a contrast to the uniformity of vertical seawalls.

9.4.2.50 Some intertidal surveys have been conducted within the Junk Bay WCZ. The western shoreline of Junk Bay starting from Chiu Keng Wan southward to Lei Yue Mun mainly comprised natural rocky shore with the occurrence of several intermittent sandy beaches. A total of 67 taxa of intertidal organisms were recorded during the latest intertidal surveys

(CEDD, 2013b). The most frequently recorded species included rock oyster (*Saccostrea cucullata*), littorina snails (*Echinolittorina trochoides* and *E. radiata*), limpets (*Patelloida pygmaea* and *P. saccharina*), barnacle (*Tetraclita japonica* and *Balanus amphitrite*), sea anemone (*Spheractis cheungae*), crab (*Hemigrapsus sanguineus*), and algae (*Corallina* spp. and *Pseudulvella applanata).* Only limited fauna species was recorded on soft shore. No species of conservation importance was recorded (CEDD, 2005 and 2013b).

9.4.2.51 Intertidal surveys conducted along the shoreline of eastern Junk Bay from TKO InnoPark to Joss House Bay suggested that the species diversity and evenness in this habitat was low. Common species recorded including barnacles *Balanus amphitrite*, *Tetraclita japonica*, rock oyster *Saccostrea cucullata*, and snails *Echinolittorina* spp. were recorded. No species of conservation importance was previously recorded (ASB Biodiesel, 2008; CEDD, 2013a; WSD, 2015).

Marine Mammal

9.4.2.52 Chinese White Dolphin (*Sousa chinensis*) and Finless Porpoise (*Neophocaena phocaenoides*) are marine mammals that reside in Hong Kong (Hung, 2023). Among these two species, only Finless Porpoise could be found in the eastern waters (i.e. Mirs Bay, Sai Kung and Ninepins, etc) which partially fall within the marine ecological assessment area. Nonetheless, the water column within and adjacent to Junk Bay within the assessment area do not appear to be utilised by Finless Porpoise and thus not considered as important habitat to this species.

9.5 Survey Findings

9.5.1 *Terrestrial and Aquatic Ecological Resources in TKO 137 and TKO 132*

Habitat and Vegetation

9.5.1.1 The ecological field survey of the Project (hereafter referred to as "recent survey") suggested that habitats within boundary of TKO 137 and its 500 m assessment area were largely unchanged compared with previous studies. Majority of the assessment area was made up of developed area, including TKO Area 137 Fill Bank, while most of the natural habitats including mixed woodland, shrubby grassland / grassland and natural watercourse were found on hillside area including Cheung Shan and Fat Tong Chau. The CWBCP was identified in the immediate east and south of TKO Area 137 Fill Bank.

9.5.1.2 TKO 132 is located along the western shore of Junk Bay. The recent survey suggested that habitats within boundary of TKO 132 and its 500 m assessment area were largely unchanged compared with previous studies, except some grassland / shrubland and orchards were observed to have matured to a mixed woodland. In terms of area, the predominant terrestrial habitat types include developed area, mixed woodland, and shrubland, with small areas of scattered soft shore and rocky shore. The proposed reclamation area is situated near the shoreline between Lei Yue Mun Point and Chiu Keng Wan.

9.5.1.3 A total of nine habitats were recorded within the 500 m assessment area of TKO 137 and TKO 132 during recent surveys, comprising mixed woodland, shrubland, shrubby grassland / grassland, plantation, developed area, natural watercourse, modified watercourse, rocky shore and soft shore (**Table 9.3** refers). Habitat map and representative photographs of habitats recorded within the assessment area are shown in **Figure 9.5.1 – 9.5.3** and **Appendix 9.1** respectively.

9.5.1.4 A comprehensive list of flora species recorded during the ecological surveys is presented in **Appendix 9.2**. A total of three floral species of conservation importance were recorded within the assessment area of TKO 137 and TKO 132. The indicative locations of the floral species of conservation importance are presented in **Figure 9.5.1 – 9.5.3**. A summary of floral species of conservation importance recorded within the assessment area are presented in **Table 9.18.**

Table 9.3 Terrestrial Habitats and Habitat Sizes within the Project Boundary and Assessment Area of TKO 137 and 132

Habitat Type	Project boundary of TKO 137 (ha) (% of Total Area)	Assessment Area of TKO 137 (ha) (% of Total Area)	Project boundary of TKO 132 (ha) (% of Total Area)	Assessment Area of TKO 132 (ha) (% of Total Area)
Mixed Woodland	2.28 (2.11%)	13.92 (5.61%)	20.76 (65.61%)	30.01 (13.33%)
Shrubland	16.90 (15.64%)	22.33 (9.01%)	1.44 (4.55%)	35.46 (15.41%)
Shrubby Grassland / Grassland	4.40 (4.07%)	34.85 (14.05%)	N/A	N/A
Plantation	4.01 (3.71%)	24.02 (9.69%)	0.46 (1.45%)	23.57 (10.27%)
Developed Area	80.47 (74.46%)	147.86 (59.63%)	6.05 (19.12%)	136.06 (59.15%)
Natural Watercourse	N/A	Length: 0.75 km	N/A	Length: 1.80 km
Modified Watercourse	Length: 1.50 km	Length: 2.52 km	N/A	N/A
Rocky Shore	<0.01	4.48 (1.81%)	2.63 (8.31%)	4.17 (1.81%)
Soft Shore	-	-	0.3 (0.95%)	0.77 (0.33%)
Total	**108.06 (100%)**	**247.46 (100%)**	**31.64 (100%)**	**230.04 (100%)**

Remark: The size and percentage included in this table is subject to rounding adjustments. Any discrepancies between total and sums of individual numbers listed therein are due to rounding.

Mixed Woodland

9.5.1.5 Mixed woodland in TKO 137 was found on downslope area of Cheung Shan and Fat Tong Chau. While mixed woodland in TKO 132 was primarily found on hillside along the coast of western Junk Bay and behind Ma Wan Tsuen, two smaller patches were scattered on the hillslope of Devil's Peak (**Figure 9.5.1 – 9.5.3** refer). This habitat was mostly connected to other vegetated habitats such as shrubland and plantation nearby. As some patches of mixed woodland were identified near the existing TKO Area 137 Fill Bank, and along the roads and hiking trails in TKO 132, these patches of mixed woodland were subjected to disturbance including human activities and traffic.

9.5.1.6 The mixed woodland patch on the downslope area of Cheung Shan falls entirely within the CWBCP in TKO 137. Two smaller patches of mixed woodland were also recorded on the northern side of Fat Tong Chau outside the CWBCP, but partially encroached on the Project boundary of TKO 137. The mixed woodlands displayed a moderate floral diversity, hosting a combination of native flora species and a few exotic or plantation tree species. Over time, natural succession facilitated the growth of canopy and the establishment of an understorey within the woodlands. The canopy was about 8-12 m, comprising common pioneer native trees like *Mallotus paniculatus*, *Sterculia lanceolata*, and *Zanthoxylum avicennae*. Some exotic tree species such as *Acacia confusa* was also recorded, especially in the patches in Fat Tong Chau which are adjacent to plantation habitat. The understory was well developed and predominantly composed of seedlings and saplings of native tree and shrub species, including *Ficus hispida*, *Sageretia thea*, and *Schefflera heptaphylla*. Climbers and herbs like *Gnetum luofuense*, *Heterosmilax gaudichaudiana*, and *Lygodium scandens* were also recorded. No floral species of conservation importance were identified in this habitat.

9.5.1.7 Mixed woodland patches found on hillside along the coast of western Junk Bay, behind Ma Wan Tsuen, and the hillslope of Devil's Peak share similar characteristics. These patches have relatively simple structure, with a semi-open canopy of around 6 to 8 m consisting of common and widespread native pioneer tree species, such as *Celtis sinensis*, *Macaranga tanarius* var. *tomentosa* and *Schefflera heptaphylla*. The understorey was characterised by

a simple composition of herb and shrub species, including shrub *Ficus hirta* and *Sageretia thea*, and herbs *Liriope spicata* and *Microstegium ciliatum*. Two floral species of conservation importance, namely *Brainea insignis* and *Diospyros vaccinioides*, were recorded in this habitat in TKO 132.

Shrubland

9.5.1.8 This habitat was mainly recorded on hillslope within the assessment area, including the patches in Fat Tong Chau, Tit Cham Chau and Kwun Tsai in TKO 137, and patches in Devil's Peak and Chiu Keng Wan Shan in TKO 132 (**Figure 9.5.1 – 9.5.3** refers).

9.5.1.9 The patches of shrublands found on hillslope of Fat Tong Chau, Tit Cham Chau and Kwun Tsai partially fall within CWBCP. Common shrubs (e.g. *Eurya nitida*, *Rhodomyrtus tomentosa*, and *Tadehagi triquetrum*), climbers (e.g. *Dalbergia benthamii*), and herb (e.g. *Lygodium scandens*) were recorded in this habitat. Individuals of floral species of conservation importance, *Diospyros vaccinioides*, were found in Fat Tong Chau within the Project boundary of TKO 137.

9.5.1.10 Shrubland observed at Devil's Peak and Chiu Keng Wan Shan consisted of both short shrubland and tall shrubland. Short shrubland was found on the upper hillside, mid-level, Lei Yue Mun Point and eastern slope toe of Devil's Peak. Within this habitat, the vegetation was generally short with simple overall structure, with no well-formed canopy observed. The dominant species were *Dicranopteris pedata* while shrub species such as *Breynia fruticosa* and *Rhodomyrtus tomentosa*, and climbers such as *Embelia laeta* and *Millettia nitida* were also commonly recorded.

9.5.1.11 Tall shrubland was predominantly observed near the village areas on the western slope toe of Devil's Peak. Trees such as *Cratoxylum cochinchinense* and *Glochidion wrightii*, ranging in height from 4 to 8 m, formed a shaded understorey that supported other herbaceous species. The shrubland in this area is susceptible to anthropogenic disturbances, such as frequent construction activities and traffic noise, due to its proximity to nearby roads, hiking trails, and a cemetery. One floral species of conservation importance, *Diospyros vaccinioides*, was recorded in shrubland habitat in the southern part of the assessment area of TKO 132.

Shrubby Grassland / Grassland

9.5.1.12 A large, continuous patch of shrubby grassland / grassland was identified at Cheung Shan, which fall within the CWBCP. Part of this shrubby grassland / grassland fell within boundary of TKO 137. Two small patches of shrubby grassland / grassland were also recorded on the hillslope of Fat Tong Chau (**Figure 9.5.1 – 9.5.2** refers). The shrubby grassland / grassland supported moderate floral diversity and was predominantly occupied by pioneering herb species such as *Bidens alba*, *Indocalamus herklotsii*, and *Dicranopteris pedata*, with some pioneer shrubs and small trees such as *Rhodomyrtus tomentosa*, *Baeckea frutescens*, and *Macaranga tanarius* var. *tomentosa*. Two floral species of conservation importance, *Diospyros vaccinioides* and clusters of *Marsdenia lachnostoma*, were recorded in Cheung Shan within CWBCP. While *Habenaria linguella* was recorded from previous studies, the species was not identified within the assessment area during current ecological surveys.

Plantation

9.5.1.13 Plantations were found scattered within the assessment area. Plantation patches in TKO 137 were found in the restored area of the existing SENTX and northern hillslope of Fat Tong Chau. While plantation patches in TKO 132 were mainly recorded along Wilson Trail near Yau Tong, and along O King Road in Tiu Keng Leng (**Figure 9.5.1 – 9.5.3** refers). This habitat was subjected to disturbances from traffic and human activities and no floral species of conservation importance was identified.

9.5.1.14 The plantation patch in the restored area of the existing SENTX formed a large proportion of this habitat within TKO 137. Two smaller patches of plantation found on the northern hillslope

of Fat Tong Chau partially fell within the Project boundary of TKO 137 (**Figure 9.5.1 – 9.5.2** refers). These plantation patches were dominated by exotic tree species such as *Acacia confusa*, *Eucalyptus tereticornis*, and *Leucaena leucocephala*. The understory only supported sparse vegetation, including herbs like *Dianella ensifolia*, *Lygodium japonicum*, *Psychotria serpens*, and *Wedelia trilobata*.

9.5.1.15 Plantation recorded along Wilson Trail near Yau Tong, and along O King Road in Tiu Keng Leng were formed with simple structure. The canopy of this habitat was mainly composed of plantation species of 2 to 5 m height. The dominant species were exotic tree *Acacia confusa* and *Acacia auriculiformis*. Shrub species were also commonly recorded, such as *Bridelia tomentosa, Litsea rotundifolia* var. *oblongifolia* and *Rhodomyrtus tomentosa*. The understorey was rather bare or with simple structure, covered with some weedy species such as *Aster baccharoides*, and *Schizostachyum dumetorum*.

Developed Area

9.5.1.16 Developed area was the most dominant habitat type recorded within assessment area of TKO 137 and 132, as well as Project site of TKO 137. It consisted of artificial facilities / structures such as the existing TKO Area 137 Fill Bank, traffic roads, commercial / industrial buildings, residential buildings, the TKO Chinese Permanent Cemetery and artificial seawall along the existing 137 Fill Bank (**Figure 9.5.1 – 9.5.3** refers). In addition, several man-made concrete water retention ponds were recorded within the TKO Chinese Permanent Cemetery, these ponds served as a flood prevention measure to store the surface runoff from the Cemetery. Some village houses and temporary structures were also scattered within the mixed woodland along Chiu Keng Wan in TKO 132. This habitat was subject to heavy disturbance such as traffic noise and human activities. Limited vegetation was recorded in this habitat. Exotic tree *Leucaena leucocephala*, exotic climber *Mikania micrantha*, and native vine *Cayratia corniculata* were the dominant plant species recorded in this habitat. Other planted trees such as *Acacia auriculiformis* and *Acacia mangium* were also recorded. Additionally, orchard plantings, such as *Dimocarpus longan*, *Litchi chinensis* and *Mangifera indica*, were also identified near village houses in TKO 132. No floral species of conservation importance were found in this habitat.

Natural Watercourse

9.5.1.17 Within the assessment area, there were total of nine natural watercourses recorded, namely W1-W4 and S1-S5, recorded within the assessment area of TKO 137 and TKO 132, respectively. W1-W4 in TKO 137 all fall within CWBCP (**Figure 9.5.1** to **9.5.2** refers). All these watercourses were predominantly natural hill streams with about 0.5-1 m width and shallow water depths and slow water flow, with substratum mainly formed by boulders and cobbles. The overall water quality appeared to be clean and unpolluted. Vegetation such as *Blechnum orientale*, *Dicranopteris pedata*, and *Schefflera heptaphylla* were recorded at the riparian zone of these watercourses. Detailed description on natural watercourse W1 – W4 were discussed in **Sections 9.5.1.19** to **9.5.1.20** below.

9.5.1.18 Natural watercourses S1-S5 in TKO 132 were situated on the hillslope of western Junk Bay, which all fall within the Project boundary of TKO 132 (**Figure 9.5.3** refers). These watercourses were predominantly natural, but some human modification such as concrete-paved section was also observed. The width of the watercourses ranged from approximately 1 to 1.5 m, with shallow water depths and slow water flow. The substratum varied from rocky to muddy, and the overall water quality appeared to be fair to poor, including observable pollutants in the watercourses from adjacent settlement. Native herb such as *Pogonatherum crinitum, Alocasia macrorrhizos* and *Alpinia zerumbet* were recorded within riparian zone of these watercourses. Detailed description on natural watercourse S1 – S5 were discussed in **Sections 9.5.1.22** to **9.5.1.24** below. No floral species of conservation importance were recorded in this habitat in TKO 132.

W1

9.5.1.19 W1 was recorded at the western slope of Cheung Shan which fall within CWBCP. W1 was a perennial watercourse with water depth of less than 5 cm and moderate water flow, flowing northwest into TKO Area 137 Fill Bank. The upper section of the watercourse was observed with human activities and disturbance including the installation of small PVC pipes. Limited vegetation was recorded at the riparian zone of the watercourse. No floral species were recorded at this natural watercourse.

W2 and W3

9.5.1.20 W2 and W3 were recorded to the east of the TKO 137, more than 400m away. Both were located at the southwestern slope of Tin Ha Shan within CWBCP. Both are seasonal natural watercourses flowing southward, running along shrubby grassland / grassland habitat and largely remains natural, and share similar ecological attributes. W2 was observed to be seasonally dry during the time of survey, while W3 carried shallow water (approximately 1 cm of depth). Limited vegetation, such as *Blechnum orientale* and *Dicranopteris pedata*, were recorded at the riparian zone of the watercourse. No floral species were recorded at the watercourses.

W4

9.5.1.21 W4 was recorded to the east of the TKO 137, more than 400m away. It was located at the southwestern slope of Tin Ha Shan within CWBCP. It is a perennial watercourse flowing southward, running along shrubby grassland / grassland habitat and largely remains natural, and they share similar ecological attributes. The water depth was about 1-3 cm.

S1

9.5.1.22 S1, located on a steep and exposed slope with sparse vegetation cover, was the narrowest among the natural watercourses in TKO 132 with less than 1 m in width. S1 was identified to be a seasonal watercourse, flowing towards the southeast but mostly dry during survey. Natural boulders were present in the riverbed. There were some concrete modifications that directed adjacent drainage into S1, which eventually discharges into Junk Bay through an intertidal rock pool.

S2, S3, S4 and S5

9.5.1.23 All S2 – S5 are identified as perennial watercourses. Some sections of S2, S3 and S4 have been subjected to modification, while the lower sections of these watercourses running along mixed woodland habitat largely remains natural. The upper section of S2 consists of some drainage ditches that merge into a natural stream, ultimately flowing towards the southeast onto a rocky shore along the coast. Water quality was inferior with garbage and human disturbance observed from neighbouring settlements. S3 received the surface runoff and discharge from the water retention ponds located above a columbarium and nearby villages. The natural section of S3 features shallow riffles and deep pools. This natural stream flows into a rocky shore in the southern area of Chiu Keng Wan. However, the water flow within these watercourses is hindered by low water volume and blockages caused by debris in upper section where village housing and human activities were observed nearby, including litter and discarded waste. As a result, the low water flow and the adjacent human disturbance result in relatively inferior water quality of these watercourse.

9.5.1.24 S4 and S5 were situated in closer proximity to Lei Yue Mun Point, with their tributaries flowing through mixed woodland and developed area. Among them, S4 was identified as the longest stream within the assessment area. Both S4 and S5 eventually flow into a rocky shore of southern coast of the assessment area.

Modified Watercourse

9.5.1.25 Modified watercourses were recorded along the northern fringe of the TKO Area 137 Fill Bank, within the Project boundary of TKO 137, flowing westward into Junk Bay. Modified watercourses were also recorded within SENT Landfill (**Figure 9.5.1 – 9.5.2** refers). All recorded modified watercourses were permanent concretised channels with gentle gradient, thus they had limited potential to support vegetation. No floral species of conservation importance was recorded along the modified watercourses.

Rocky Shore

9.5.1.26 Rocky shore was recorded along the shoreline of Fat Tong Chau, Tit Cham Chau, Kwun Tsai, and Cheung Shan in TKO 137 (**Figure 9.5.1 – 9.5.2** refers), and majority of the shoreline along the western Junk Bay from Chiu Keng Wan to Lei Yue Mun Point in TKO 132. Limited vegetation was recorded on the crevices of the rocks or extended from the adjacent habitats to the rocky shore, limited to species such as tree *Cerbera manghas*, *Hibiscus tiliaceus*, shrub *Scaevola taccada*, *Premna serratifolia* and climber *Ipomoea pes-caprae* were recorded. Individuals of floral species of conservation importance, *Diospyros vaccinioides*, were recorded along the rocky shore of Tit Cham Chau within CWBCP.

Soft Shore

9.5.1.27 Three small soft shores situated between Lei Yue Mun Point and Chiu Keng Wan in TKO 132 were observed, characterised by limited vegetation cover. One soft shore was identified at Lei Yue Mun Point near Lei Yue Mun Lighthouse, while the other two were located at Chiu Keng Wan near the Tseung Lam Highway. The backshore vegetation was predominantly composed of salt-tolerant species, including *Ipomoea pes-caprae* and *Clerodendrum inerme*. No floral species of conservation importance was recorded in this habitat.

Terrestrial Fauna

9.5.1.28 The sections below outline the findings of recent fauna surveys. Lists of fauna species recorded from the assessment area are provided in **Appendix 9.3**. The habitat in which the species of conservation importance were recorded, their protection status and distribution in Hong Kong are presented in **Table 9.18**. Their indicative locations are presented in **Figure 9.5.1 – 9.5.3**. Representative photos of the recorded species of conservation importance area presented in **Appendix 9.1c**.

Avifauna

9.5.1.29 A total of 68 avifauna species were recorded in the assessment area of TKO 137 and TKO 132. Majority of the recorded species were abundant and common resident that are widespread in Hong Kong, such as Eurasian Tree Sparrow, Red-whiskered Bulbul and Spotted Dove *(Spilopelia chinensis)*. Some migrant and visitor avifauna species were recorded seasonally, but these species were also abundant and common, and widespread in Hong Kong, such as Olive-backed Pipit (*Anthus hodgsoni*) and Yellow-browed Warbler (*Phylloscopus inornatus*). Avifauna species were mostly recorded in shrubland, shrubby grassland / grassland, and developed area in TKO 137, and mixed woodland, shrubland and developed area in TKO 132. General abundance of avifauna was low to moderate within the assessment area and was dominated by woodland / shrubland-associated bird species, and/or generalist species that are highly adapted to urbanised settings, such as Masked Laughingthrush (*Pterorhinus perspicillatus*) and Red-billed Blue Magpie (*Urocissa erythrorynchа*).

9.5.1.30 Among the avifauna species found within the assessment area in TKO 137, a total of 11 species of conservation importance were recorded, while six species were recorded within the boundary of TKO 137, namely Black Kite, Black-throated Laughingthrush (*Pterorhinus chinensis*), Collared Scops Owl, Eastern Buzzard (*Buteo japonicus*), Greater Coucal (*Centropus sinensis*), and Kentish Plover (*Charadrius alexandrinus*). Some other avifauna species of conservation importance were recorded in natural habitats outside the boundary of TKO 137 such as Chinese Hwamei, which was recorded in shrubland in Fat Tong Chau. Most of the recorded species of conservation importance are either common residents or

visitors that are widely distributed in Hong Kong. No breeding and roosting behaviour of bird species were recorded within the assessment area for TKO 137.

9.5.1.31 A total of 14 avifauna species of conservation importance were recorded within the assessment area of TKO 132, while 11 species were recorded within the boundary of TKO 132, namely Black Kite, Black-throated Laughingthrush, Chinese Pond Heron (*Ardeola bacchus*), Collared Crow (*Corvus torquatus)*, Collared Scops Owl (*Otus lettia*), Crested Goshawk (*Accipiter trivirgatus),* Greater Coucal, Indochinese Yuhina (*Staphida torqueola*), Little Egret *(Egretta garzetta)*, Pacific Reef Heron (*Egretta sacra*), and White-shouldered Starling (*Sturnia sinensis*). Majority of these species were recorded in mixed woodland within the boundary of the TKO 132. Species of conservation importance recorded outside the TKO 132 boundary include Common Emerald Dove (*Chalcophaps indica*), Grey Heron (*Ardea cinerea*), and Rufous-capped Babbler (*Cyanoderma ruficeps*), which are also mainly recorded in mixed woodland. Nesting behaviour of Black Kite was observed in mixed woodland habitat near the natural watercourse S2 during dry season survey. Studies have indicated that the breeding season for Black Kites mainly occurs in winter and spring, specifically from October to May (HKBWS, 2024).

Mammal

9.5.1.32 A total of 18 mammal species were recorded within the assessment area of TKO 137 and 132, majority of which were bat species. Most of the recorded mammal species are common and widely distributed in Hong Kong, including urban or suburban areas, such as Japanese Pipistrelle and Chinese Noctule. The mammal species were observed in low abundance within the assessment area. Thirteen species of conservation importance, including 11 bat species and two non-flying mammal species were recorded. In addition, no bat roosts were recorded within the assessment area.

9.5.1.33 A total of six bat species of conservation importance was recorded in TKO 137. Individuals of Japanese Pipistrelle was recorded flying over developed area within the Project boundary of TKO 137. Other bat species, including Chinese Noctule, Himalayan Leaf-nosed Bat (*Hipposideros armiger*) and Least Horseshoe Bat (*Rhinolophus pusillus*), were mainly recorded flying above habitats in Fat Tong Chau.

9.5.1.34 A total of ten bat species of conservation importance was recorded in TKO 132. Most of these species were recorded in mixed woodland and / or developed area, such as bat Chinese Noctule, Intermediate Horseshoe Bat (*Rhinolophus affinis*) and Lesser Bent-winged Bat *(Miniopterus pusillus)*. Some individuals of these species, such as Intermediate Horseshoe Bat, were recorded in habitats within the boundary of TKO 132.

9.5.1.35 Non-flying mammals were recorded with low diversity and abundance within the assessment area of TKO 137 and TKO 132. Two species of conservation importance, Leopard Cat (*Prionailurus bengalensis*) and Pallas's Squirrel were recorded. Leopard Cat utilised a wide range of habitats within both CWBCP and Fat Tong Chau in TKO 137. This includes sightings of individuals and / or scats of Leopard Cat identified in shrubby grassland / grassland and shrubland in Fat Tong Chau, rocky shore and shrubland in Tit Cham Chau, and developed area at the slope toe of Cheung Shan. In particular, Leopard Cat was also recorded within the boundary of TKO 137, in mixed woodland at Cheung Shan which is also part of the CWBCP. No notable movement corridors were observed during ecological survey. Pallas's Squirrel was recorded in mixed woodland and developed area on the hillslope along western Junk Bay in TKO 132.

Herpetofauna

9.5.1.36 A total of eight species of amphibian and eight species of reptile were recorded within the assessment area of TKO 137 and TKO 132. Majority of the herpetofauna species are widespread throughout Hong Kong, such as Bamboo Snake (*Trimeresurus albolabris)*, Bowring's Gecko (*Hemidactylus bowringii)*, Asiatic Painted Frog (*Kaloula pulchra)* and Asian Common Toad (*Duttaphrynus melanostictus)*, etc. They were predominantly observed in

shrubland and plantation in TKO 137 and developed area and plantation in TKO 132 with low abundance. Two reptile species of conservation importance were recorded in shrubland and developed area outside the Project boundary of TKO 132, namely Common Rat Snake and Four-clawed Gecko (*Gehyra mutilata)*, while no amphibian species of conservation importance were recorded. No herpetofauna species of conservation importance were recoded within the assessment area of TKO 137.

Butterfly

9.5.1.37 A total of 62 butterfly species were recorded within the assessment area. Majority of the recorded species were generalist species which are common and widely distributed in Hong Kong, such as Common Mormon, Plum Judy, Red-base Jezebel (*Delias pasithoe*) and Common Bluebottle (*Graphium sarpedon)*. Most of the butterfly species were recorded in shrubland, shrubby grassland / grassland, and plantation habitats in TKO 137 and mixed woodland and shrubland in TKO 132 with low to moderate abundance.

9.5.1.38 Within the assessment area of TKO 137, a total of four species of conservation importance were recorded. Individuals of three species, namely Metallic Cerulean, Small Cabbage White (*Pieris rapae*), and Swallowtail (*Papilio xuthus*), were also recorded within the boundary of TKO 137. In addition, hill-topping behaviour of both Danaid Eggfly and Swallowtail were observed in the shrubby grassland / grassland in Cheung Shan.

9.5.1.39 Within the assessment area of TKO 132, a total of four species of conservation importance were recorded. Individuals of two species, namely Grass Demon and Metallic Cerulean were also recorded in mixed woodland habitat within the boundary of TKO 132. Paintbrush Swift (*Baoris farri)* and Forget-me-not were recorded in shrubland habitat near Lei Yue Mun outside the TKO 132 boundary.

Odonate

9.5.1.40 A total of 11 odonate species were recorded within the assessment area of TKO 137 and TKO 132. Most of the recorded species are either common or abundant, and widely distributed in Hong Kong, such as such as Black Threadtail (*Prodasineura autumnalis)*, Black-banded Gossamerwing (*Euphaea decorata*), Common Blue Skimmer *(Orthetrum glaucum).* The assessment area only supports limited diversity and abundance of odonate species, potentially due to the inferior water quality (e.g. presence of pollution and human disturbance) in natural watercourses within the assessment area of TKO 132, while most watercourses identified within the Project boundary of TKO 137 were modified and heavily concretised, with limited amount of suitable substratum and habitat for odonate usage. No odonate species of conservation importance was recorded within the assessment area.

Freshwater Communities

9.5.1.41 A total of 22 freshwater fauna species were recorded at natural watercourses on Cheung Shan and Tin Ha Shan within the assessment area in TKO 137. The freshwater community was largely dominated by freshwater shrimp (*Caridina* sp.), mosquito larva (*Culicidae* sp.), and copepod (*Copepoda* sp.). Low to moderate diversity and abundance of other macroinvertebrates were recorded. No freshwater fish nor fauna species of conservation importance were recorded within the assessment area of TKO 137.

9.5.1.42 A total of five aquatic fauna species were recorded within the assessment area of TKO 132. The recorded aquatic fauna species are common and widespread in Hong Kong, such as Guppy (*Poecilia reticulata*), Mosquito Fish (*Gambusia affinis*), Water Skater (*Ptilomera tigrina*) and Long-armed Freshwater Shrimp (*Macrobrachium formosense*). All the watercourses within the assessment area support limited species diversity and abundance. There was no record of the *Stiphodon atropurpureus* after the CEDD (2005) study, including the recent survey. As discussed in **Section 9.5.1.14**, S2, the stream where the fish species was previously observed, was found to be highly disturbed by human activities in adjacent village

area, and supported little to no wildlife. No species of conservation importance was recorded within the assessment area.

Firefly

9.5.1.43 Very low diversity of firefly species was recorded within the assessment area, with only one species Rimmed Window Firefly (*Pyrocoelia analis*), recorded in developed area with low abundance in TKO 132. This species is commonly seen in the countryside, open habitats, wetlands and even in the city, and is not considered a species of conservation importance.

9.5.2 *Marine Ecological Resources*

Coral Communities

9.5.2.1 Various coral communities were recorded throughout the marine ecological assessment area, identified from previous studies (**Section 9.4.2.36** refers). Under the current study, dive surveys were conducted to check and update the existing condition, focusing on hard substrata subtidal habitat along the western and eastern shoreline of Junk Bay (covering the boundary of TKO 132 and TKO 137 respectively), particularly the area that would likely be impacted by marine works (e.g. reclamation) of the Project.

Western Junk Bay

9.5.2.2 Spot-check dive surveys were conducted along the shoreline of western Junk Bay (refer to **Figure 9.4**). Based on the environmental conditions (e.g. substrate type and coral coverage) obtained from the spot check dive surveys, the subtidal marine environment was divided into four general indicative areas (Z1a, 1b, 2 and 3) (refer to **Figure 9.4**). A total of 41 coral species were recorded from spot-check dive surveys, including 25 hard coral species, four soft coral species, nine gorgonian species and three black coral species. **Table 9.4** summarised the coral species recorded in each spot-check dive area.

9.5.2.3 Following the result from spot-check dive surveys, REA surveys were conducted at key areas to collect more detailed quantitative information on the coral communities recorded during the spot-check dive. A total of three 100m REA transects (REA 1-3) were deployed in western Junk Bay. The ecological and substratum attributes recorded from the REA surveys are presented in **Appendix 9.4a**. The details of recorded coral colonies (including sizes and types of corals, coral coverage, coral condition and translocation feasibility, etc.) are included in **Appendix 9.4b**.

9.5.2.4 In terms of substratum and coral coverage, the substratum of Z1a and 1b in western Junk Bay mainly consisted of bedrocks and boulders at shallow waters with water depth ranging from 0m - 13m. The presence of hard substratum and sufficient sunlight at shallow water provided favourable conditions for the growth of hard coral species. At deeper areas (9m – 13m) within Z1a and 1b, the species composition was dominated by octocoral (soft coral and gorgonian) and black coral species. The overall coral coverage (hard coral, octocoral and black coral) in Z1a and Z1b was “low to moderate coverage”, ranging from 6 - 30%. Among all the different coral species, relatively higher coverage of hard coral was observed within Zone Z1b, and in particular near REA 2, with coverage ranging from 6 - 10%. In addition, black coral was only recorded in Z1b with coverage of 1 - 5%.

9.5.2.5 In terms of species composition, a total of 39 coral species were recorded in Z1a and 1b, including 25 hard coral species, two soft coral species, nine gorgonian species, and three black coral species. Z1b showed relatively higher diversity (with 33 coral species) than Z1a (with 21 coral species). The majority of coral species recorded at Z1a and 1b are abundant and common in Hong Kong water. While no rare species were observed, two hard coral species, *Acropora solitaryensis* and *Duncanopsammia peltata*, which are listed as “Vulnerable” in the IUCN Red List (IUCN, 2024), were recorded with low abundance and coverage. Dominant coral species in Z1a and 1b include *Dipsastraea speciosa, Oulastrea crispata*, and cup coral *Cladopsammia gracilis*. Most coral colonies recorded from the REA

survey were of small to moderate sizes (about 10 cm – 20 cm in diameter) and in good and healthy condition. In terms of translocation feasibility, given that only coral colonies attached on movable boulders (less than 50 cm in diameter) are considered suitable for translocation, around 4-5% of coral colonies recorded during the REA survey (REA 1-3) were considered as translocatable (refer to **Appendix 9.4**).

9.5.2.6 Zone Z2 is located further offshore than Zones Z1a and Z1b. The substratum of Z2 consisted of mainly sand and fine muddy silt, with average water depth of around 10m – 12m. Limited sunlight availability and lack of hard substratum restricted the growth of hard coral. No coral species were observed within Z2 during the spot-check dive, as such no REA survey was further conducted in Z2.

9.5.2.7 Zone Z3 is located furthest offshore, with substratum dominated by sand and fine silt with sparse rocks and cobbles. The water depth was around 13m – 14m. A total of two soft coral species, three gorgonian species and two black coral species were recorded. No hard coral species was recorded, likely due to the limited sunlight and unfavourable seabed substrate composition. The overall coral coverage (i.e. octocoral and black coral) in Z3 ranged from 1 - 5%. Most of coral colonies recorded from the REA3 in Z3 were in moderate size (about 30cm in diameter) and in fair or good condition.

9.5.2.8 Other benthic non-coral species with low diversity were also recorded during the REA surveys in western Junk Bay. Common marine organisms including bivalve *Septifer virgatus* and sea urchin *Anthocidaris crassipina* and *Diadema setosum* were recorded. Aside from coral species, no other species of conservation importance was recorded at the subtidal hard substrate habitat.

Eastern Junk Bay

9.5.2.9 Spot-check dive surveys were conducted in five area (i.e. D1-5) along the shoreline of eastern Junk Bay (refer to **Figure 9.4**), covering the sub-tidal zone from Lohas Park to Joss House Bay. A total of 23 hard coral species and one octocoral species were recorded. **Table 9.4** summarised the coral species recorded in each spot-check dive zone.

9.5.2.10 Following the spot-check dive surveys, REA surveys were conducted at key areas to collect more detailed quantitative information on the coral communities recorded during the spot-check dive. A total of five 100m REA transects were deployed along eastern Junk Bay (REA 4-8). The ecological and substratum attributes recorded from the REA surveys are presented in **Appendix 9.4a**. The details of recorded coral colonies (including sizes and types of corals, coral coverage, coral condition and translocation feasibility, etc.) are included in **Appendix 9.4b**.

9.5.2.11 The sub-tidal zone in eastern Junk Bay was dominated by hard substrata, such as natural bedrock and boulders along Fat Tong Chau and Tit Cham Chau, and artificial seawall and sloping boulders along TKO 137 Fill Bank. Soft substrata (sandy and muddy bottom) were found at deeper depths. The maximum water depths ranged from 5m – 8m. Overall coral coverage along the eastern Junk Bay was low (about <1-10%) due to limited extent of natural hard substrate shoreline. Higher coral coverage (5-10%) was observed along the natural shoreline of Tit Cham Chau to Joss House Bay. Among the surveyed area, D5 was found to support higher coral species diversity (21 coral species), while area D1, D2 and D4 only supported 8-11 coral species, and only one coral species was recorded in D3. Majority of the recorded coral species are common in Hong Kong, including *Cyphastrea serailia*, *Favites chinensis*, and *Oulastrea crispata*. While no rare species were observed, three hard coral species, *Acropora solitaryensis*, *Duncanopsammia peltata* and *Pavona decussata*, which are listed as “Vulnerable” in the IUCN Red List (IUCN, 2024), were recorded with low abundance and coverage. Most of the coral colonies were of small to moderate sizes (about 10 cm – 25 cm in diameter) and in good condition.

9.5.2.12 Other benthic non-coral species with low diversity were also recorded during the REA surveys. Common marine organisms including snail *Thais luteostoma*, bivalve *Septifer virgatus* and

sea urchin *Anthocidaris crassispina* were recorded. Aside from coral species, no other species of conservation importance was recorded at the subtidal hard substrate habitat.

Table 9.4 Coral Species Recorded in the Survey Area during Spot-check Dive Surveys

Species Name	Spot-check Dive Area								
	Western Junk Bay				Eastern Junk Bay				
	Z1a	Z1b	Z2	Z3	D1	D2	D3	D4	D5
Hard Coral									
Acropora solitaryensis	✓								✓
Balanophyllia sp. ^							✓	✓	
Bernardpora stutchburyi	✓	✓			✓	✓		✓	✓
Cladopsammia gracilis ^		✓							
Coscinaraea n sp.		✓			✓	✓			✓
Cyphastrea serailia	✓	✓						✓	✓
Cyphastrea sp.	✓								
Dipsastraea sp.	✓								
Dipsastraea favus									✓
Dipsastraea speciosa	✓	✓							✓
Dipsastraea rotumana	✓	✓							✓
Duncanopsammia peltata	✓	✓							✓
Favites abdita		✓				✓			✓
Favites chinensis									✓
Favites flexuosa									✓
Favites paraflexuosus	✓	✓							
Favites pentagona		✓							✓
Goniopora sp.	✓	✓							
Goniastrea aspera						✓		✓	✓
Hydnophora exesa	✓								
Leptastrea purpurea		✓							✓
Montipora peltiformis	✓	✓			✓				✓
Montipora sp.	✓								
Oulastrea crispata	✓	✓			✓	✓		✓	✓
Pavona decussata								✓	✓
Platygyra carnosa		✓			✓			✓	✓
Plesiastrea versipora	✓	✓			✓	✓		✓	✓
Porites sp.		✓							
Porites lutea								✓	✓
Psammocora profundacella	✓	✓			✓	✓		✓	✓
Psammocora sp.		✓							
Tubastraea sp. ^	✓	✓			✓	✓		✓	
Soft Coral - except Gorgonian									

Species Name	Spot-check Dive Area								
	Western Junk Bay				Eastern Junk Bay				
	Z1a	Z1b	Z2	Z3	D1	D2	D3	D4	D5
Chironephthya sp.				✓					
Dendronephthya sp.	✓	✓							
Nephthyigorgia sp.				✓					
Paraminabea sp.	✓								
Gorgonian									
Acanthogorgia sp.		✓							
Anthogorgia sp.		✓							
Dichotella gemmacea	✓	✓		✓					
Echinogorgia sp.		✓		✓					
Echinomuricea sp.		✓		✓		✓			
Ellisella sp.	✓	✓							
Euplexaura sp.		✓							
Guaiagorgia sp.		✓							
Menella sp.		✓							
Black coral									
Antipathes curvata		✓		✓					
Cirrhipathes sinensis		✓		✓					
Cirrhipathes sp.		✓							
Total	**21**	**33**	**0**	**7**	**8**	**9**	**1**	**11**	**21**

Note: ^ Non reef-building hard coral species

Intertidal Community

9.5.2.13 Intertidal surveys were conducted in western and eastern Junk Bay within the assessment area (refer to **Figure 9.4**). The shoreline in the western Junk Bay was primarily characterised by natural rocky shore, with the presence of two small soft shores located at Chiu Keng Wan, and one soft shore at Lei Yue Mun Point. In the eastern Junk Bay, the shoreline consists mainly of artificial seawall, except those in Fat Tong Chau and Tit Cham Chau. **Appendix 9.5** and **9.6** provides a full list of organisms recorded from both the qualitative walk-through and quantitative transect surveys during both wet and dry seasons.

9.5.2.14 A total of 45 and 58 intertidal organisms were recorded along the western Junk Bay (IS1 to IS8) during dry and wet seasons, respectively. In both seasons, the number of species was higher in IS4. The dominant species recorded in the Junk Bay tidal area were snails *Echinolittorina malaccana, Monodonta labio,* and rock oyster *Saccostrea cucullata***.** All recorded intertidal species are commonly found in Hong Kong, and no species of conservation importance was observed.

9.5.2.15 A total of 25 and 26 species of intertidal organisms were recorded across the transects of the eastern Junk Bay (IS9-16) during dry and wet seasons. The natural rocky shore at IS12 and IS16 support relatively higher number of intertidal species (24 – 25 species) than the artificial seawall (IS9-11 and 13-15) which support only 16 – 19 species. The most frequently recorded species within eastern Junk Bay included encrusting algae *Kyrtuthrix maculans* and *Hildenbrandia rubra*, limpet *Cellana toreuma* and *Patelloida saccharina.* All recorded intertidal species are commonly found in Hong Kong, and no species of conservation importance was observed.

9.5.2.16 Based on the intertidal survey, the natural shoreline along western Junk Bay was observed with relatively higher diversity of intertidal organisms compared to the artificial seawall

(developed area) on eastern Junk Bay which showed limited habitat complexity. Nonetheless, all recorded intertidal organisms are common species with no species of conservation importance.

Benthos Community

9.5.2.17 Benthos surveys (marine grab samplings) were carried out at seven sampling points in western and northeastern Junk Bay (BS1 – BS7) and four sampling points (BS8 – BS11) in southeastern Junk Bay (refer to **Figure 9.4**). A complete list of recorded organisms is shown in **Appendix 9.7**. All the species recorded were common in Hong Kong. The total number of species, abundance, biomass, species diversity and evenness at each sampling point is presented in **Table 9.5** below. One amphioxus species of conservation importance were found from the benthos survey.

9.5.2.18 The benthic substrata in western and northeastern Junk Bay were similar in texture and composition. The sediments were grey, consisted of silty mud with shell debris at all sampling sites. From the benthos surveys in western and northeastern Junk Bay (BS1-7), a total of 401 specimen (across 70 species) and 619 specimen (across 60 species) were collected during dry season and wet season respectively (**Appendix 9.7**). Most of the recorded species are commonly found and widely distributed in Hong Kong. The most diverse phylum group was Annelida (34 and 29 species recorded in dry and wet season respectively). In terms of abundance of collected specimen, the majority of organisms in the subtidal soft bottom habitat was also dominated by Annelida, accounting for 42.64% and 60.58% during the dry and wet season respectively. No species of conversation importance was recorded during benthos surveys in western and northwestern Junk Bay.

9.5.2.19 The benthic substrata in southeastern Junk Bay were composed of a mixture of soft mud and fine sand in sampling BS8, BS9 and BS11 which were within or close to the boundary of TKO 137. While further away from the TKO 137 (i.e. BS10), the benthic substrata were composed of fine and coarse sand. A total of 558 specimen (across 50 species) and 619 specimen (across 60 species) were collected from the benthos surveys during the dry season and wet season respectively (**Appendix 9.7**). Most of the recorded species are commonly found and widely distributed in Hong Kong. The most diverse phylum group was Annelida (25 and 29 species recorded in dry and wet season respectively). In terms of abundance of collected specimen, the majority of organisms in the subtidal soft bottom habitat was also dominated by Annelida, accounting for 42.64% and 56.53% during the dry and wet season respectively. One species of conservation importance, amphioxus *Branchiostoma belcheri*, was recorded at very low densities (12 ind. m^{-2}) in sampling point BS10 outside the boundary of TKO 137. However, it could not be determined as an important nursery and breeding ground for amphioxus as no sexually mature individuals were found. Their occurrence in the area in the wet season is likely a result of their drift with the seasonally fluctuating current.

9.5.2.20 For the Shannon diversity index (H'), a value of < 1 indicates low diversity, 1-2 indicates moderate diversity and a value of > 2 indicates higher diversity. The overall species diversity (H') from the sampling locations ranged from 1.98-2.93 in dry season and 2.33-3.12 in wet season, indicated moderate to relatively high species diversity (**Table 9.6** refers). The biodiversity value of the sampling locations was generally similar or higher than those measured in Eastern and Southern waters (2.82 - 2.87) and higher than those measured in Victoria Harbour (1.64 to 1.79).

9.5.2.21 The evenness index (J) reflects how similar the abundance values for each species are within an assemblage, a value of 1 indicates that all species occur in equal abundance whereas a value close to zero indicates that one species has very high abundance and the other species are recorded at very low abundance. The evenness index (J) was relatively high for all sampling locations, ranging from 0.67-0.92 in dry season and 0.81-0.94 in wet season (**Table 9.5** refers), with slightly lower value in BS1 and BS2 in dry season, suggesting an evenly distributed benthic community. The species evenness of the sampling locations was generally similar or higher with those measured in Eastern and Southern waters (0.81 - 0.82) and higher than those measured in Victoria Harbour (0.44 to 0.47).

Table 9.5 Total Number of Species, Abundance, Biomass, Species Diversity and Evenness at Each Sampling Point Recorded During the Benthos Surveys

	Season	Western Junk Bay					Northeastern Junk Bay		Southeastern Junk Bay			
		BS1	BS2	BS3	BS4	BS5	BS6	BS7	BS8	BS9	BS10	BS11
Total no. of species	**Dry**	24	19	23	20	24	23	20	25	33	35	34
	Wet	31	31	32	18	18	17	18	23	45	42	42
Total abundance (individual m^{-2})	**Dry**	81	66	58	40	52	43	61	114	135	151	158
	Wet	119	149	101	40	111	38	61	133	158	199	161
Total biomass (g m^{-2})	**Dry**	0.98	2.57	1.61	0.81	1.15	0.58	3.55	0.98	1.62	1.57	1.14
	Wet	3.67	1.73	1.9	0.71	3.31	1.2	1.11	2.26	1.74	2.47	1.32
Species diversity (H')	**Dry**	2.12	1.98	2.63	2.67	2.93	2.84	2.61	3.05	3.40	3.48	3.37
	Wet	2.96	2.82	3.12	2.73	2.33	2.46	2.57	2.99	3.56	3.62	3.60
Species evenness (J)	**Dry**	0.67	0.67	0.84	0.89	0.92	0.91	0.87	0.95	0.97	0.98	0.96
	Wet	0.86	0.82	0.90	0.94	0.81	0.87	0.89	0.96	0.95	0.95	0.96

9.6 Evaluation of Ecological Value

9.6.1.1 The ecological importance of recorded habitats within the assessment area was evaluated in accordance with the EIAO-TM Annex 8 criteria and presented in **Table 9.6** to **Table 9.16**. Terrestrial and marine species of conservation importance identified / recorded from previous studies and recent surveys are summarised in **Table 9.18** and **Table 9.19** below. The indicative locations of terrestrial species of conservation importance are presented in **Figure 9.5.1 - 9.5.3**.

Table 9.6 Ecological Evaluation of Mixed Woodland within the Assessment Area

Criteria	Mixed Woodland
Naturalness	Moderate
Size	Moderate (43.93 ha)
Diversity	TKO 137: Moderate floral diversity and low faunal diversity TKO 132: Moderate floral and faunal diversity
Rarity	Common habitat in Hong Kong Recent Surveys Two floral species of conservation importance (*Brainea insignis* and *Diospyros vaccinioides*) was recorded. 23 faunal species of conservation importance (Black Kite, Black-throated Laughingthrush, Collared Crow, Collared Scops Owl, Common Emerald Dove, Crested Goshawk, Greater Coucal, Indochinese Yuhina, Rufous-capped Babbler, White-shouldered Starling, Grass Demon, Metallic Cerulean, Himalayan Leaf-nosed Bat, Intermediate Horseshoe Bat, Japanese Pipistrelle, Lesser Bent-winged Bat, *Miniopterus* sp., Rickett's Big-footed Myotis, unknown Vespertilionidae species 1, unknown Vespertilionidae species 2 , Least Horseshoe Bat, Leopard Cat and Pallas's Squirrel) were recorded. Previous Studies Three floral species of conservation importance (*Diospyros vaccinioides, Lilium brownii* and *Pavetta hongkongensis*) were recorded previously but not found in recent surveys. 12 faunal species of conservation importance (Black Kite, Black-naped Oriole, Collared Scops Owl, Eastern Buzzard, Greater Coucal, Japanese Pipistrelle, Pallas's Squirrel, Forget-me-not, Grass Demon, Metallic Cerulean, Yellow Rajah and Common Rat Snake) were recorded previously but not found in recent surveys.
Re-creatability	Low - Decades required for the habitat to become mature
Fragmentation	TKO 137: Moderate TKO 132: Low to Moderate
Ecological linkage	TKO 137: Part of the mixed woodland fell within CWBCP. Structurally and functionally connected to the natural watercourse and shrubby grassland / grassland that located at CWBCP TKO 132: Not structurally or functionally linked to any highly valued habitats.
Potential value	Moderate
Nursery / Breeding ground	TKO 137: No notable nursery and breeding behaviour TKO 132: Black Kite was observed nesting during dry season survey
Age	Relatively mature
Abundance / Richness of Wildlife	Low to moderate
Ecological value	**Low to moderate**

Table 9.7 Ecological Evaluation of Shrubland within the Assessment Area

Criteria	Shrubland
Naturalness	Moderate to High
Size	Moderate (57.79 ha)
Diversity	Low to moderate floral diversity Moderate faunal diversity
Rarity	Common habitat in Hong Kong <u>Recent Surveys</u> One floral species of conservation importance (*Diospyros vaccinioides*) was recorded. 17 faunal species of conservation importance (Black Kite, Black-throated Laughingthrush, Chinese Hwamei, Eastern Buzzard, Collared Scops Owl, Greater Coucal, Rufous-capped Babbler, Chinese Noctule, Himalayan Leaf-nosed Bat, Japanese Pipistrelle, Leopard Cat, Common Rat Snake, Forget-me-not, Metallic Cerulean, Paintbrush Swift, Small Cabbage White, Swallowtail) were recorded. <u>Previous Studies^</u> Two floral species of conservation importance (*Arundina graminifolia* and *Diospyros vaccinioides*) were recorded previously but not found in recent surveys. Eight faunal species of conservation importance (Black Kite, Chinese Hwamei, Collared Crow, Greater Coucal, Common Awl, Cornelian, Large Branded Swift, Yellow Dart) were recorded previously but not found in recent surveys. ^ Note: Shrubland under recent survey of TKO 132 includes grassland / shrubland habitat in previous studies
Re-creatability	Moderate
Fragmentation	TKO 137: Moderate TKO 132: Low to Moderate
Ecological linkage	A small area of shrubland fell within CWBCP in TKO 137. No notable ecological linkage with highly valued habitat for other areas
Potential value	Low to Moderate
Nursery / Breeding ground	No notable nursery and breeding behaviour
Age	N/A
Abundance / Richness of Wildlife	Low to moderate
Ecological value	**Low to moderate**

Table 9.8 Ecological Evaluation of Shrubby Grassland / Grassland within the Assessment Area

Criteria	Shrubby Grassland / Grassland (only recorded at TKO 137 assessment area)
Naturalness	Moderate to high
Size	Moderate (34.85 ha)
Diversity	CWBCP: Moderate floral and faunal diversity Fat Tong Chau: Low floral and faunal diversity
Rarity	Common habitat in Hong Kong <u>Recent Surveys</u>

Criteria	Shrubby Grassland / Grassland (only recorded at TKO 137 assessment area)
	Two floral species of conservation importance (*Diospyros vaccinioides*, *Marsdenia lachnostoma*) were recorded. Five faunal species of conservation importance (Chinese Hwamei, Collared Scops Owl, Leopard Cat, Danaid Eggfly, Swallowtail) were recorded. Previous Studies Nine floral species of conservation importance (*Cynanchum paniculatum*, *Diospyros vaccinioides, Habenaria linguella*, *Lilium brownii*, *Nepenthes mirabilis*, *Pachystoma pubescens*, *Pecteilis susannae*, *Platycodon grandiflorus*, *Pyrenaria spectabilis*) were recorded previously but not found in recent surveys. 22 faunal species of conservation importance (Black Kite, Chinese Francolin, Chinese Hwamei, Collared Crow, Common Emerald Dove, Common Kestrel, Eastern Buzzard, Greater Coucal, Lesser Coucal, Northern Boobook, White-bellied Sea Eagle, Leopard Cat, Common Dart, Danaid Eggfly, Grass Demon, Lesser Band Dart, Metallic Cerulean, Painted Lady, Pale Palm Dart, Plain Palm Dart, Swallowtail and Vagrant) were recorded previously but not found in recent surveys.
Re-creatability	Low
Fragmentation	Low
Ecological linkage	Part of the shrubby grassland / grassland fell within CWBCP Structurally and functionally connected to the mixed woodland and natural watercourse that are located at CWBCP. No notable ecological linkage with highly valued habitat for the shrubby grassland / grassland in Fat Tong Chau.
Potential value	Moderate
Nursery / Breeding ground	No notable nursery and breeding behaviour
Age	N/A
Abundance / Richness of Wildlife	Shrubby Grassland / Grassland within CWBCP: Moderate Shrubby Grassland / Grassland on Fat Tong Chau: Low
Ecological value	**Moderate:** Shrubby Grassland / Grassland within CWBCP **Low to Moderate:** Shrubby Grassland / Grassland on Fat Tong Chau

Table 9.9 Ecological Evaluation of Plantation within the Assessment Area

Criteria	Plantation
Naturalness	Low, Man-made habitat
Size	Moderate (47.59 ha)
Diversity	TKO 137: Low to moderate floral and faunal diversity TKO 132: Low floral and faunal diversity
Rarity	Common habitat in Hong Kong Recent Surveys No floral species of conservation importance was recorded. Three faunal species of conservation importance (Black Kite; unknown Vespertilionidae species 2, Metallic Cerulean) was recorded. Previous Studies Two floral species of conservation importance (*Pavetta hongkongensis* and *Pyrenaria spectabilis*) were recorded previously but not found in recent surveys.

Criteria	Plantation
	Four faunal species of conservation importance (Black Kite; Greater Coucal, Japanese Pipistrelle, Broad Spark) were recorded previously but not found in recent surveys.
Re-creatability	High
Fragmentation	Moderate
Ecological linkage	A small area of plantation in TKO 137 fell within the CWBCP No notable ecological linkage for other areas
Potential value	Low
Nursery / Breeding ground	No notable nursery and breeding behaviour
Age	20 to 30 years
Abundance / Richness of Wildlife	Low
Ecological value	**Low**

Table 9.10 Ecological Evaluation of Developed Area within the Assessment Area

Criteria	Developed Area
Naturalness	Low
Size	Large (283.92 ha)
Diversity	TKO 137: Low floral and faunal diversity TKO 132: Low floral diversity and moderate faunal diversity Artificial Seawall: Low floral and faunal diversity
Rarity	Very common habitat in Hong Kong <u>Recent Surveys</u> No floral species of conservation importance was recorded. 15 faunal species of conservation importance (Black Kite, Collared Scops Owl, Greater Coucal, Kentish Plover, White-throated Kingfisher, Japanese Pipistrelle, Chinese Noctule, Short-nosed Fruit Bat, Leopard Cat, Rickett's Big-footed Myotis, unknown Vespertilionidae species 1, Pallas's Squirrel, unidentified *Miniopterus* sp., Four-clawed Gecko, Small Cabbage White) were recorded. <u>Previous Studies</u> One floral species of conservation importance (*Diospyros vaccinioides*) was recorded previously but not found in recent surveys. 12 faunal species of conservation importance (Black Kite, Chinese Pond Heron, Collared Crow, Collared Scops Owl, Eastern Buzzard, Greater Coucal, Grey Bush Chat, Little Egret, Peregrine Falcon, Chinese Noctule, Japanese Pipistrelle, Chinese Cobra) were recorded previously but not found in recent surveys. Sparse coverage of hard coral species such as *Oulastrea crispata* were recorded on artificial seawall under current and previous studies.
Re-creatability	High
Fragmentation	Low
Ecological linkage	TKO 137: A narrow strip of developed area fell within the CWBCP TKO 132: Not functionally linked to any highly valued habitat in close proximity Artificial seawall: Structurally linked to subtidal hard substrata habitat
Potential value	Low
Nursery / Breeding ground	No notable nursery and breeding behaviour

Criteria	Developed Area
Age	N/A
Abundance / Richness of Wildlife	Low
Ecological value	**Low**

Table 9.11 Ecological Evaluation of Natural Watercourse within the Assessment Area

Criteria	Natural Watercourse
Naturalness	W1-4: Moderate to high S1-5: Low to moderate – modification observed in upstream section. Disturbed by pollution and fragmentation
Size	Very small (W1-4 Approx. 0.75 km; S1-5 Approx. 1.8 km)
Diversity	Low floral and faunal diversity
Rarity	Common habitat in Hong Kong <u>Recent Surveys</u> One faunal species of conservation (Chinese Pond Heron) was recorded <u>Previous Studies</u> One faunal species of conservation importance (Philippine Neon Goby) was recorded previously but not found in recent surveys.
Re-creatability	Low
Fragmentation	W1-4: Low S1-5: Moderate
Ecological linkage	W1-4: fell within CWBCP Structurally and functionally connected to the adjacent mixed woodland and shrubby grassland / grassland that are located within CWBCP S1-5: Structurally linked and located upstream to coastal area of western Junk Bay including subtidal hard substrata
Potential value	W1-4: Moderate S1-5: Low
Nursery / Breeding ground	No notable nursery and breeding behaviour
Age	N/A
Abundance / Richness of Wildlife	Low
Ecological value	**W1-4: Low to moderate** **S1-5: Low**

Table 9.12 Ecological Evaluation of Modified Watercourse within the Assessment Area

Criteria	Modified Watercourse
Naturalness	Low
Size	Small (Approx. 4.02 km)
Diversity	Low floral and faunal diversity
Rarity	Common habitat in Hong Kong <u>Recent Surveys</u> No floral/faunal species of conservation importance was recorded. <u>Previous Studies</u>

Criteria	Modified Watercourse
	One faunal species of conservation importance (Danaid Eggfly) was recorded previously but not found in recent surveys.
Re-creatability	High
Fragmentation	High
Ecological linkage	The upper course of the modified watercourse at SENT Landfill fell within CWBCP
Potential value	Low
Nursery / Breeding ground	No notable nursery and breeding behaviour
Age	20 to 30 years
Abundance / Richness of Wildlife	Low
Ecological value	**Low**

Table 9.13 Ecological Evaluation of Intertidal Habitat (Rocky Shore) within the Assessment area

Criteria	Intertidal Habitat (Rocky Shore)
Naturalness	Moderate to high
Size	Small (8.65 ha)
Diversity	TKO 137: Low floral and faunal diversity TKO 132: Low floral diversity and low to moderate faunal diversity
Rarity	Common habitat in Hong Kong <u>Recent Surveys</u> One floral species of conservation importance (*Diospyros vaccinioides*) and three faunal species of conservation importance (Pacific Reef Egret, White-throated Kingfisher, Leopard Cat) was recorded. <u>Previous Studies</u> Five faunal species of conservation importance (Black Kite, Chinese Pond Heron, Pacific Reef Egret, Little Egret and Common Rat Snake) were recorded previously but not found in recent surveys.
Re-creatability	Habitat is moderately re-creatable. Intertidal biota may recolonise hard substrata shores
Fragmentation	TKO 137: Moderate, natural rocky shore fragmented by artificial seawall TKO 132: Low
Ecological linkage	No notable ecological linkage
Potential value	Low to moderate
Nursery / Breeding ground	No notable ecological nursery and breeding behaviour
Age	N/A
Abundance / Richness of Wildlife	TKO 137: Low TKO 132: Moderate
Ecological value	**Low to Moderate**

Table 9.14 Ecological Evaluation of Intertidal Habitat (Soft Shore) within the Assessment area

Criteria	Intertidal Habitat (Soft Shore)
Naturalness	Moderate to high
Size	Small (0.77 ha)
Diversity	Low floral and faunal diversity
Rarity	Common habitat in Hong Kong

Criteria	Intertidal Habitat (Soft Shore)
	Recent Surveys No floral/faunal species of conservation importance was recorded. Previous Studies Two faunal species of conservation importance (Grey-tailed Tattler and Sanderling) were recorded previously but not found in recent surveys.
Re-creatability	Moderate
Fragmentation	Moderate, soft shores form a small portion of intertidal habitat along the coastline of western Junk Bay
Ecological linkage	No notable ecological linkage
Potential value	Low
Nursery / Breeding ground	No notable ecological nursery and breeding behaviour
Age	N/A
Abundance / Richness of Wildlife	Low
Ecological value	**Low**

Table 9.15 Ecological Evaluation of Sea Area (Subtidal Hard Substrata) within the Assessment area

Criteria	Sea Area (Subtidal Hard Substrata)	
	Western Junk Bay	**Eastern Junk Bay**
Naturalness	Natural	Mostly natural in the subtidal zone but part of this habitat was formed by artificial seawall (developed area) along the existing Fill Bank
Size	Moderate, occupied the subtidal zone along the coastal area	Moderate, occupied the subtidal zone along the coastal area
Diversity	Moderate faunal diversity	Along natural shoreline Moderate faunal diversity Along artificial seawall Low faunal diversity
Rarity	Common habitat in Hong Kong water Recent Surveys Low or low to moderate coverage of a total of 25 hard coral species and low coverage of a total of three black coral species of conservation importance were recorded Previous Studies Low or low to moderate coverage of a total of 23 hard coral species were recorded	Common habitat in Hong Kong water Recent Surveys Low coverage of a total of 23 hard coral species of conservation importance were recorded Previous Studies Low coverage of a total of 35 hard coral and two black coral species of conservation importance were recorded
Re-creatability	Low to moderate, coral recolonisation may occur and take 5 -10 years to recover to the natural communities. Seawall with suitable enhancement features may facilitate recolonisation.	
Fragmentation	Not fragmented	Not fragmented
Ecological linkage	No notable ecological linkage	No notable ecological linkage
Potential value	Low to moderate	Low to moderate
Nursery / Breeding ground	No notable nursery and breeding behaviour	No notable nursery and breeding behaviour

Criteria	Sea Area (Subtidal Hard Substrata)	
	Western Junk Bay	**Eastern Junk Bay**
Age	N/A	N/A
Abundance / Richness of Wildlife	Low	Low
Ecological value	**Moderate**	Subtidal Hard Substrata along Natural Shoreline: **Moderate** Subtidal Hard Substrata along Artificial Seawall: **Low**

Table 9.16 Ecological Evaluation of Sea Area (Subtidal Soft Substrata) within the Assessment area

Criteria	Sea Area (Subtidal Soft Substrata)	
	Western Junk Bay	**Eastern Junk Bay**
Naturalness	Natural but with human disturbed by pollution, fisheries operation and coastal development	Natural but habitat disturbed by pollution, fisheries operation and coastal development
Size	Large, likely occupied majority of the subtidal zone in western Junk Bay	Large, likely occupied majority of the subtidal zone in eastern Junk Bay
Diversity	Low	Low
Rarity	Common habitat in Hong Kong water <u>Recent Surveys</u> A total of three black coral species of conservation importance were recorded in low coverage.	Common habitat in Hong Kong water <u>Recent Surveys</u> A benthic species of conservation importance, *Branchiostoma belcheri,* was recorded. <u>Previous Studies</u> One amphioxus species of conservation importance, *Branchiostoma japonicum,* was previously but not found in recent surveys.
Re-creatability	High, benthic organisms may recolonise disturbed seabed area.	
Fragmentation	Not fragmented	Not fragmented
Ecological linkage	No notable ecological linkage	No notable ecological linkage
Potential value	Low	Low
Nursery / Breeding ground	No notable ecological nursery and breeding behaviour	No notable ecological nursery and breeding behaviour
Age	N/A	N/A
Abundance / Richness of Wildlife	Low	Low
Ecological value	**Low**	**Low**

Table 9.17 Ecological Evaluation of Sea Area (Water Column) within the Assessment area

Criteria	Sea Area (Water Column)	
	Western Junk Bay	**Eastern Junk Bay**
Naturalness	Natural but with disturbance due to vessel activities	Natural but with disturbance due to vessel activities
Size	Large	Large

Criteria	Sea Area (Water Column)	
	Western Junk Bay	**Eastern Junk Bay**
Diversity	Low	Low
Rarity	Common habitat in Hong Kong water No marine mammal and other species of conservation importance was recorded.	Common habitat in Hong Kong water No marine mammal and other species of conservation importance was recorded.
Re-creatability	Not re-creatable	Not re-creatable
Fragmentation	Not fragmented	Not fragmented
Ecological linkage	Functionally linked with the intertidal and subtidal habitats.	
Potential value	Low	Low
Nursery / Breeding ground	No notable ecological nursery and breeding behaviour	No notable ecological nursery and breeding behaviour
Age	N/A	N/A
Abundance / Richness of Wildlife	Low	Low
Ecological value	**Low**	**Low**

9.6.2 *Species of Conservation Importance*

9.6.2.1 A summary of floral and faunal species of conservation importance recorded within the assessment area of TKO 137 and TKO 132 gathered from previous studies and from recent surveys was presented in the following table (**Table 9.18** and **Table 9.19**).

Table 9.18 Species of Conservation Importance Recorded within the Terrestrial Ecological Assessment Area

Species	Distribution in Hong Kong [1]	Rarity [1]	Protection / Conservation Status	Habitat(s) Recorded in TKO 137		Habitat(s) Recorded in TKO 132	
				Previous Studies [10]	Recent Survey	Previous Studies [10]	Recent Survey
Flora							
Bamboo Orchid *Arundina graminifolia*	Common in Hong Kong	Common	Cap. 96 [2]; Cap. 586 [2]	-	-	Shrubland	-
Cycad-fern *Brainea insignis*	Restricted	-	Cat.2 (VU) [3]	-	-	-	Mixed Woodland
Paniculate Swallow Wort *Cynanchum paniculatum*	Clear Water Bay, Ko Lau Wan	Very rare	-	Shrubby Grassland / Grassland	-	-	-
Small Persimmon *Diospyros vaccinioides*	Common in Hong Kong	Common	CR [2], EN [3]	Shrubland*, Shrubby Grassland / Grassland, Developed Area, Rocky Shore	Shrubland*, Shrubby Grassland / Grassland, Rocky Shore	Mixed Woodland *	Mixed Woodland, Shrubland
Tongue Habenaria *Habenaria linguella*	Hong Kong Island, Tai Mo Shan, Ma On Shan, Pat Sin Leng, Fanling, Yuen Long, Lantau Island	Restricted	Cap. 96 [2]; Cap. 586 [2]	Shrubby Grassland / Grassland	-	-	-
Chinese Lily *Lilium brownii*	Mount Violet, Kowloon Peak, Shing Mun, Tai Mo Shan, Clear Water Bay, Tsing Yi	Very common	Cap. 96 [2]	Shrubby Grassland / Grassland, Mixed Woodland	-	-	-
Hairy-throat Condorvine *Marsdenia lachnostoma*	North Point, Ma On Shan, Tung Lung Chau	Common	Cat. 4 (CR) [3]	Shrubby Grassland / Grassland*	Shrubby Grassland / Grassland*	-	-
Pitcher Plant *Nepenthes mirabilis*	Tai Lam Chung, So Kwun Wat, Castle Peak, Lantau Island	Common	Cap. 96 [2]; Cap. 586 [2]; Cat. 4 (VU) [3], VU [3]	Shrubby Grassland / Grassland	-	-	-

Species	Distribution in Hong Kong [1]	Rarity [1]	Protection / Conservation Status	Habitat(s) Recorded in TKO 137		Habitat(s) Recorded in TKO 132	
				Previous Studies [10]	Recent Survey	Previous Studies [10]	Recent Survey
Pubescent Pachystoma *Pachystoma pubescens*	Mount Kellet, Ma On Shan, Fanling, Luk Keng, Sai Kung, Nai Chung, Lantau Island	-	Cap. 96 [2]; Cap. 586 [2]	Shrubby Grassland / Grassland	-	-	-
Hong Kong Pavetta *Pavetta hongkongensis*	Common in Hong Kong	Common	Cap. 96 [2]	Mixed Woodland, Plantation*	-	-	-
Common Pecteilis *Pecteilis susannae*	Hong Kong Island, Kowloon Peak, Tai Mo Shan, Pat Sin Leng, Clear Water Bay, Lantau Peak	-	Cap. 96 [2]; Cap. 586 [2]	Shrubby Grassland / Grassland	-	-	-
Balloon Flower *Platycodon grandiflorus*	Hong Kong Island, Castle Peak, Long Ke	-	Cap. 96 [2], Cat. 4 (LC) [3]	Shrubby Grassland / Grassland*	-	-	-
Common Tutcheria *Pyrenaria spectabilis*	Hong Kong Island, Ma On Shan, Tao Po, Kwai Tau Leng, Wu Kau Tang, Lantau Island	Restricted	Cap. 96 [2]	Shrubby Grassland / Grassland, Plantation*	-	-	-
Avifauna							
Black Kite[4] *Milvus migrans*	Widely distributed in Hong Kong	Common resident and winter visitor	Cap.170 [2], Cap.586 [2], (RC) [2], Class II [5]	Shrubland, Shrubby Grassland / Grassland*, Developed Area*, Rocky Shore	Developed Area*, In-flight	Mixed Woodland*; Plantation; Developed Area; Grassland / Shrubland*	Mixed Woodland*; Shrubland; Plantation*; Developed Area; In Flight
Black-naped Oriole *Oriolus chinensis*	Widely distributed in Hong Kong	Common autumn passage migrant	Cap.170 [2], (LC) [2],	-	-	Mixed Woodland*	-
Black-throated Laughingthrush *Pterorhinus chinensis*	Widely distributed in woodland and shrubland throughout Hong Kong	Common resident	Cap.170 [2], (LC) [2], Class II [5]	-	Shrubland*	-	Mixed Woodland*
Chinese Francolin	Widely distributed in grassland	Common resident	Cap.170 [2]	Shrubby Grassland / Grassland	-	-	-

Species	Distribution in Hong Kong [1]	Rarity [1]	Protection / Conservation Status	Habitat(s) Recorded in TKO 137		Habitat(s) Recorded in TKO 132	
				Previous Studies [10]	Recent Survey	Previous Studies [10]	Recent Survey
Francolinus pintadeanus	throughout Hong Kong						
Chinese Hwamei *Garrulax canorus*	Widely distributed in hillside shrubland throughout Hong Kong.	Common resident	Cap.170 [2], Cap.586 [2], Class II [5]	Shrubland, Shrubby Grassland / Grassland	Shrubland, Shrubby Grassland / Grassland	-	-
Chinese Pond Heron[4] *Ardeola bacchus*	Widely distributed in Hong Kong	Common resident	Cap.170 [2], PRC (RC) [2]	Rocky Shore	-	Developed Area; In Flight	Natural Watercourse*
Collared Crow[4] *Corvus torquatus*	Found in Inner Deep Bay area, Nam Chung, Kei Ling Ha, Tai Mei Tuk, Pok Fu Lam, Chek Lap Kok, Shuen Wan, Lam Tsuen.	Locally common resident	Cap.170 [2], LC [2], VU [2]	Shrubland, Shrubby Grassland / Grassland	-	Developed Area; In flight	Mixed Woodland*
Collared Scops Owl *Otus lettia*	Widely distributed in shrubland throughout Hong Kong.	Common resident	Cap.170 [2], Cap.586 [2], Class II [5]	Mixed Woodland*, Developed Area*	Shrubby Grassland / Grassland*	Mixed Woodland	Mixed Woodland*; Shrubland; Developed Area*
Common Emerald Dove *Chalcophaps indica*	Widely distributed in woodland throughout Hong Kong.	Uncommon but widespread resident	Cap.170 [2], Vulnerable [6]	Shrubby Grassland / Grassland	-	-	Mixed Woodland*
Common Kestrel *Falco tinnunculus*	Widely distributed in Hong Kong	Common autumn migrant and winter visitor	Cap.170 [2], Cap.586 [2], Class II [5]	Shrubby Grassland / Grassland	In-flight	-	-
Crested Goshawk *Accipiter trivirgatus*	Widely distributed in woodlands and shrublands throughout Hong Kong	Common resident	Cap.170 [2], Cap.586 [2], Class II [5], Rare [6]	-	-	-	Mixed Woodland
Eastern Buzzard[4] *Buteo japonicus*	Widely distributed in Hong Kong	Common winter visitor	Cap.170 [2], Cap.586 [2], Class II [5]	Shrubby Grassland / Grassland	Shrubland*; In-flight	Mixed Woodland; Developed Area	-
Eastern Cattle Egret	Widely distributed in Hong Kong	Common resident	Cap.170 [2], (LC) [2]	-	-	In Flight	-

Species	Distribution in Hong Kong [1]	Rarity [1]	Protection / Conservation Status	Habitat(s) Recorded in TKO 137		Habitat(s) Recorded in TKO 132	
				Previous Studies [10]	Recent Survey	Previous Studies [10]	Recent Survey
Bubulcus coromandus							
Greater Coucal *Centropus sinensis*	Widely distributed in Hong Kong	Common resident	Cap.170 [2], Class II [5], Vulnerable [6]	Mixed Woodland*, Shrubby Grassland / Grassland, Plantation*, Developed Area*	Mixed Woodland*	Grassland / Shrubland*	Mixed Woodland*; Shrubland; Developed Area*
Grey Bush Chat *Saxicola ferreus*	Widely distributed in open cultivated fields throughout Hong Kong	Scarce passage migrant and winter visitor	Cap.170 [2], (LC) [2]	-	-	Developed Area*	-
Grey Heron[4] *Ardea cinerea*	Found in Deep Bay area, Starling Inlet, Kowloon Park, Cape D'Aguilar	Common winter visitor	Cap.170 [2], PRC (RC) [2]	-	-	-	In Flight
Grey-tailed Tattler[4] *Tringa brevipes*	Found in Deep Bay area	Common passage migrant	Cap.170 [2], LC [2]	-	-	Soft Shore*	-
Indochinese Yuhina *Yuhina torqueola*	Uncommon but increasing winter visitor, scarce and localised in summer	-	Cap.170 [2], LC [2]	-	-	-	Mixed Woodland*
Kentish Plover[4] *Charadrius alexandrinus*	Found in Deep Bay area, Chek Lap Kok, Shuen Wan, Sai Kung, Lantau Island.	Abundant winter visitor	Cap.170 [2], RC [2]	-	Developed Area*	-	-
Lesser Coucal *Centropus bengalensis*	Widely distributed in Hong Kong.	Uncommon resident	Cap.170 [2], Class II [5], Vulnerable [6],	Shrubby Grassland / Grassland	-	-	-
Little Egret[4] *Egretta garzetta*	Widely distributed in coastal area throughout Hong Kong.	Common resident, migrant and winter visitor	Cap.170 [2], PRC (RC) [2]	Developed Area	-	Rocky Shore*	In Flight
Northern Boobook *Ninox japonica*	Found in Stanley, Cheung Chau, Hong Kong University,	Uncommon passage migrant	Cap.170 [2], Cap.586 [2], Class II [5]	Shrubby Grassland / Grassland	-	-	-

Species	Distribution in Hong Kong [1]	Rarity [1]	Protection / Conservation Status	Habitat(s) Recorded in TKO 137		Habitat(s) Recorded in TKO 132	
				Previous Studies [10]	Recent Survey	Previous Studies [10]	Recent Survey
	Zoological and Botanical Gardens, Mount Nicholson, Magazine Gap Road, Barker Road, Tai Koo Shing, Shek Wu Wai, Cloudy Hill, Tung Chung, Mirs Bay.						
Pacific Reef Heron[4] *Egretta sacra*	Widely distributed in coastal area throughout Hong Kong.	Common resident	Cap.170 [2], (LC) [2], Class II [5], Rare [6],	Rocky Shore	In-flight	Rocky Shore*	Rocky Shore*
Peregrine Falcon[4] *Falco peregrinus*	Widely distributed in Hong Kong	Locally common resident and winter visitor	Cap.170 [2], Cap.586 [2], (LC) [2], Class II [5]	In-flight	In-flight	Developed Area	-
Rufous-capped Babbler *Cyanoderma ruficeps*	Found in Shing Mun, Tai Po Kau, Tai Mei Tuk, Ng Tung Chai, Fo Tan, Tai Mo Shan, The Peak, Kadoorie Agricultural Research Centre	Common resident	LC [2]	-	-	-	Mixed Woodland*; Shrubland
Sanderling[4] *Calidris alba*	Found in Deep Bay area, Tai Long Wan, Sai Kung	Uncommon passage migrant	(LC) [2]	-	-	Soft Shore*	-
White-bellied Sea Eagle[4] *Haliaeetus leucogaster*	Widely distributed in coastal areas throughout Hong Kong	Locally common resident	Cap.170 [2], Cap.586 [2], (RC) [2], Class I [5], Vulnerable [7]	Shrubby Grassland / Grassland	-	-	-
White-throated Kingfisher[4] *Halcyon smyrnensis*	Widely distributed in coastal areas throughout Hong Kong.	Common resident	Cap.170 [2], (LC) [2], Class II [5]	Developed Area	Developed Area, Rocky Shore	-	-

Species	Distribution in Hong Kong [1]	Rarity [1]	Protection / Conservation Status	Habitat(s) Recorded in TKO 137		Habitat(s) Recorded in TKO 132	
				Previous Studies [10]	Recent Survey	Previous Studies [10]	Recent Survey
White-shouldered Starling *Sturnia sinensis*	Found in Kam Tin, Deep Bay area, Po Toi Island, Long Valley, Victoria Park, Ho Chung, Ma Tso Lung, Mui Wo, Lam Tsuen Valley.	Locally common passage migrant and uncommon winter visitor.	Cap.170 [2], (LC) [2]	-	-	-	Mixed Woodland
Mammal (Bats)							
Chinese Noctule *Nyctalus plancyi*	Fairly widely distributed	Common	Cap.170 [2], PRC (RC) [2]	Developed Area	Shrubland	-	Developed Area*
Himalayan Leaf-nosed Bat *Hipposideros armiger*	Widely distributed	Very common	Cap.170 [2], (LC) [2]	-	Shrubland	-	Mixed Woodland*
Intermediate Horseshoe Bat *Rhinolophus affinis*	Widely distributed	Uncommon	Cap.170 [2], (LC) [2]	-	-	-	Mixed Woodland*
Japanese Pipistrelle *Pipistrellus abramus*	Widely distributed	Very Common	Cap.170 [2]	Shrubland, Developed Area*	Shrubland, Developed Area*	Developed Area, Mixed Woodland, Plantation, Shrubland	Mixed Woodland*
Lesser Bent-winged Bat *Miniopterus pusillus*	Fairly widely distributed	Uncommon	Cap.170 [2], (LC) [2]	-	-	-	Mixed Woodland*
Least Horseshoe Bat *Rhinolophus pusillus*	Widely distributed	Uncommon	Cap.170 [2], PRC (RC) [2]	-	Mixed Woodland	-	-
Rickett's Big-footed Myotis *Myotis ricketti*	Fairly widely distributed	-	Cap.170 [2], (LC) [2]; VU [2]	-	-	-	Mixed Woodland*; Developed Area
Short-nosed Fruit Bat	Very widely distributed	Very Common	Cap.170 [2]	-	-	-	Developed Area

Species	Distribution in Hong Kong [1]	Rarity [1]	Protection / Conservation Status	Habitat(s) Recorded in TKO 137		Habitat(s) Recorded in TKO 132	
				Previous Studies [10]	Recent Survey	Previous Studies [10]	Recent Survey
Cynopterus sphinx							
Unidentified *Miniopterus* sp	-	-	Cap.170 [2]	-	-	-	Mixed Woodland*; Developed Area
Unknown Vespertilionidae species 1	-	-	Cap.170 [2]	-	Developed Area	-	Mixed Woodland*; Developed Area
Unknown Vespertilionidae species 2	-	-	Cap.170 [2]	-	Plantation	-	Mixed Woodland
Mammal (Non-flying Mammals)							
Leopard Cat *Prionailurus bengalensis*	Widely distributed	Uncommon	Cap.170 [2], Cap.586 [2], Class II [5], Vulnerable [6][7]	-	Mixed Woodland*, Shrubland, Shrubby Grassland / Grassland, Developed Area, Rocky Shore	-	-
Pallas's Squirrel *Callosciurus erythraeus*	Fairly widely distributed	Very Common	Cap.170 [2]	-	-	Mixed Woodland*	Mixed Woodland*; Developed Area
Butterfly							
Broad Spark *Sinthusa chandrana*	Widely distributed	Rare	-	Plantation	-	-	-
Common Awl *Hasora badra*	Wu Kau Tan, Lai Chi Wo, Hong Kong Wetland Park	Very rare	LC [2]	Shrubland*	-	-	-
Common Dart *Potanthus pseudomaesa*	Hok Tau	Rare	LC [2]	Shrubby Grassland / Grassland	-	-	-
Cornelian *Deudorix epijarbas*	Lam Tsuen, Shan Liu, Wu Kau Tang, Pak Sha O, Fung Yuen	Rare	-	Shrubland*	-	-	-
Danaid Eggfly *Hypolimnas misippus*	Ngau Ngak Shan, Lung Kwu Tan, Hong Kong Wetland Park, Mount Parker,	Uncommon	LC [2]	Shrubby Grassland / Grassland, Modified Watercourse*	Shrubby Grassland / Grassland	-	-

Species	Distribution in Hong Kong [1]	Rarity [1]	Protection / Conservation Status	Habitat(s) Recorded in TKO 137		Habitat(s) Recorded in TKO 132	
				Previous Studies [10]	Recent Survey	Previous Studies [10]	Recent Survey
	Cloudy Hill, Lin Ma Hang						
Forget-me-not *Catochrysops strabo*	Pui O, Tai Po Kau, Fung Yuen, Shing Mun, Sha Lo Wan	Very rare	Species of conservation concern [2]	Mixed Woodland*	-	-	Shrubland
Grass Demon *Udaspes folus*	Widely distributed	Rare	-	Mixed Woodland*, Shrubby Grassland / Grassland	-	-	Mixed Woodland*
Large Branded Swift *Pelopidas subochraceus*	Clear Water Bay Country Park	Very rare	-	-	-	Grassland / Shrubland*	-
Lesser Band Dart *Potanthus trachala*	Widely distributed	Rare	-	Shrubby Grassland / Grassland	-	-	-
Metallic Cerulean *Jamides alecto*	Victoria Peak, Fung Yuen, Chuen Lung, Mui Wo	Very rare	-	Mixed Woodland*, Shrubby Grassland / Grassland	Shrubland*, Plantation	-	Mixed Woodland*
Painted Lady *Vanessa cardui*	Widely distributed	Rare	LC [2]	Shrubby Grassland / Grassland*	-	-	-
Paintbrush Swift *Baoris farri*	Deep Water Bay, Shing Mun, Lam Tsuen, Fung Yuen, Wu Kau Tang, Lai Chi Wo	Rare	-	-	-	-	Shrubland
Pale Palm Dart *Telicota colon*	Widely distributed	Rare	LC [2]	Shrubby Grassland / Grassland	-	-	-
Plain Palm Dart *Cephrenes acalle*	Ngong Ping	Very rare	-	Shrubby Grassland / Grassland	-	-	-
Small Cabbage White *Pieris rapae*	Shek Mun Kap, Fan Lau, Ngong Ping, Kam Tin, Ho Chung, Luk Keng, Tuen Mun Ash Lagoon	Rare	-	-	Shrubland*, Developed Area*	-	-
Swallowtail *Papilio xuthus*	Kap Lung, Ma On Shan, Tai Tam, Sha Lo Wan, Kat O, Lung Kwu Tan, Wu Kau Tang, Lung Kwu Chau	Rare	-	Shrubby Grassland / Grassland	Shrubland*, Shrubby Grassland / Grassland	-	-

Species	Distribution in Hong Kong [1]	Rarity [1]	Protection / Conservation Status	Habitat(s) Recorded in TKO 137		Habitat(s) Recorded in TKO 132	
				Previous Studies [10]	Recent Survey	Previous Studies [10]	Recent Survey
Vagrant *Vagrans egista*	Lam Chuen, Plover Cove, Kadoorie Farm and Botanic Garden	Very rare	Species of conservation concern [2]	Shrubby Grassland / Grassland	-	-	-
Yellow Dart *Potanthus pava*	Plover Cove	Very rare	Very rare	-	-	Grassland / Shrubland*	-
Yellow Rajah *Charaxes marmax*	Cloudy Hill, Ma On Shan, Shing Mun, Yung Shue O, Fung Yuen, Ngong Ping	Uncommon	LC [2]	-	-	Mixed Woodland	-
Herpetofauna (Reptile)							
Chinese Cobra *Naja atra*	Widely distributed	Common	PRC [2] Vulnerable [2] [7] [8]	-	-	Developed Area*	-
Common Rat Snake *Ptyas mucosus*	Widely distributed	-	Cap.586 [2], PRC [2], Endangered [6][7]	Mixed Woodland	-	Rocky Shore*	Shrubland
Four-clawed Gecko *Gehyra mutilata*	Widely distributed	-	Vulnerable [7]	-	-	-	Developed Area
Fish							
Philippine Neon Goby *Stiphodon atropurpureus*	Records from New Territories, Hong Kong Island and Lantau Island.	-	GC [2]	-	-	Natural Watercourse*	-

Table 9.19 Species of Conservation Importance Recorded within the Marine Ecological Assessment Area

Species	Distribution in Hong Kong [1]	Rarity	Protection / Conservation Status	Western Junk Bay		Eastern Junk Bay	
				Previous Studies [10]	Recent Study	Previous Studies [10]	Recent Study
Hard Coral							
Acanthastrea echinata	Occurrence is highest in the northeastern waters of Hong Kong with isolated records made in eastern and western waters.	Common	Cap. 586 [2]; Class II [5]	-	-	✓	-
Acropora solitaryensis	Strong geographic distribution pattern. Tally restricted to the oceanic offshore islands in the eastern Hong Kong and the coastline of exposed eastern mainland bays.	Uncommon	Cap. 586 [2]; Vulnerable [2]; Class II [5]	✓	✓	✓	✓
Balanophyllia sp.	-	-	Cap. 586 [2]; Class II [5]	-	-	-	✓
Bernardpora stutchburyi	This is a widely distributed coral species in Hong Kong. However, higher occurrence is associated with deeper coral communities.	Common	Cap. 586 [2]; Class II [5]	✓	✓	✓	✓
Cladopsammia gracilis	-	-	Cap. 586 [2]; Class II [5]	✓	✓	✓	-
Coscinaraea n sp.	-	-	Cap. 586 [2]; Class II [5]	✓	✓	✓	✓
Cyphastrea serailia	Dominant. Ubiquitously recorded from all locations of Hong Kong's inshore waters. One of the few species that exhibit high tolerance to harsh physical environments, and so can exist in marginal coral habitats within Hong Kong waters	Dominant	Cap. 586 [2]; Class II [5]	✓	✓	✓	✓

Species	Distribution in Hong Kong [1]	Rarity	Protection / Conservation Status	Western Junk Bay		Eastern Junk Bay	
				Previous Studies [10]	Recent Study	Previous Studies [10]	Recent Study
Cyphastrea sp.	-	-	Cap. 586 [2]; Class II [5]	-	✓	✓	-
Dipsastraea sp.	-	-	Cap. 586 [2]; Class II [5]	-	✓	-	-
Dipsastraea speciosa	Found mainly in the northeastern coral communities, but also recorded in the eastern waters.	Abundant	Cap. 586 [2]; Class II [5]	✓	✓	✓	✓
Dipsastraea favus	It is one of the most commonly recorded species in Hong Kong, having wide geographical distribution. It is particularly common in the northeastern Hong Kong waters, as well as in the eastern waters.	Abundant	Cap. 586 [2]; Class II [5]	-	-	✓	✓
Dipsastraea helianthoides	This species is mainly found in the deeper coral communities of the eastern Hong Kong waters. Although records have also been made from the northeastern Marine Parks.	Uncommon	Cap. 586 [2]; Class II [5]	✓	-	✓	-
Dipsastraea lizardensis	Generally found in the northeastern waters, but also occasionally recorded in the eastern regions.	Common	Cap. 586 [2]; Class II [5]	-	-	✓	-
Dipsastraea veroni	Mostly recorded in the northeastern waters.	Common	Cap. 586 [2]; Class II [5]	-	-	✓	-
Dipsastraea rotumana	Predominantly associated with well-established coral communities in the southern, southeastern, eastern and northeastern waters. This species is especially tolerant to harsh	Abundant	Cap. 586 [2]; Class II [5]	-	✓	✓	✓

Species	Distribution in Hong Kong [1]	Rarity	Protection / Conservation Status	Western Junk Bay		Eastern Junk Bay	
				Previous Studies [10]	Recent Study	Previous Studies [10]	Recent Study
	environments. It is one of the coral species recorded in the western waters.						
Duncanopsammia peltata	It is mostly found in Hong Kong's northeastern and eastern waters, but can occasionally found in the southern and even western waters.	Common	Cap. 586 [2]; Vulnerable [2]; Class II [5]	✓	✓	✓	✓
Favites abdita	Recorded from locations all around Hong Kong waters. Particularly common in the eastern and northeastern waters, associated with well-established coral communities. It is also one of the few species recorded in Hong Kong's western waters	Dominant	Cap. 586 [2]; Class II [5]	-	✓	✓	✓
Favites chinensis	Found commonly throughout Hong Kong waters, but predominantly in the eastern and northeastern waters. Hong Kong is recorded as the location of the type specimen.	Dominant	Cap. 586 [2]; Class II [5]	✓	-	✓	✓
Favites flexuosa	Occurs throughout the southern, eastern and northeastern waters of Hong Kong, and is found in both shallow and deep coral habitats.	Uncommon	Cap. 586 [2]; Class II [5]	✓	-	✓	✓
Favites acuticollis	Recorded from the eastern, northeastern and southern waters of Hong Kong. This is a new species record for Hong Kong.	Common	Cap. 586 [2]; Class II [5]	✓	-	✓	-

Species	Distribution in Hong Kong [1]	Rarity	Protection / Conservation Status	Western Junk Bay		Eastern Junk Bay	
				Previous Studies [10]	Recent Study	Previous Studies [10]	Recent Study
Favites paraflexuosus	Distribution is, so far, restricted to the eastern waters of Hong Kong only. This is a new species recorded for Hong Kong.	Uncommon	Cap. 586 [2]; Class II [5]	-	✓	-	-
Favites pentagona	Predominantly associated with well-established coral communities in the southern, southeastern, eastern and northeastern waters of Hong Kong.	Dominant	Cap. 586 [2]; Class II [5]	✓	✓	✓	✓
Goniopora sp.	-	-	Cap. 586 [2]; Class II [5]	✓	✓	✓	-
Goniastrea aspera	Records are made from both the eastern water as well as the northeastern part of Hong Kong. Occasionally recorded in the southern part, but not common.	Common	Cap. 586 [2]; Class II [5]	-	-	✓	✓
Goniopora stutchuryi	This is a widely distributed coral species in Hong Kong. However, higher occurrence is associated with deeper coral communities.	Common	Cap. 586 [2]; Class II [5]	-	-	✓	-
Hydnophora exesa	This coral species can be found all over Hong Kong, but is more commonly recorded in the eastern part. A fairly large community is also recorded in northeastern waters.	Abundant	Cap. 586 [2]; Class II [5]	-	✓	-	-
Leptastrea purpurea	Predominant in the eastern and northeastern waters of Hong Kong. One of the few species that can survive in western waters.	Abundant	Cap. 586 [2]; Class II [5]	-	✓	✓	✓

Species	Distribution in Hong Kong [1]	Rarity	Protection / Conservation Status	Western Junk Bay		Eastern Junk Bay	
				Previous Studies [10]	Recent Study	Previous Studies [10]	Recent Study
Montipora peltiformis	Recorded from northeastern, eastern, and southern waters of Hong Kong. High occurrence in shallow water areas.	Common	Cap. 586 [2]; Class II [5]	-	✓	✓	✓
Montipora sp.	-	-	Cap. 586 [2]; Class II [5]	-	✓	✓	-
Montipora mollis	Recorded from northeastern and eastern waters of Hong Kong.	Uncommon	Cap. 586 [2]; Class II [5]	✓	-	-	-
Oulastrea crispata	Found in many places in Hong Kong.	Common	Cap. 586 [2]; Class II [5]	✓	✓	✓	✓
Pavona decussata	Higher occurrence in northeastern and eastern waters.	Abundant	Cap. 586 [2]; Vulnerable [2]; Class II [5]	✓	-	✓	✓
Platygyra carnosa	One of the most common *Platygyra* species recorded in Hong Kong. It is dominant in northeastern and eastern waters as well as the southern and southeastern coral communities	Common	Cap. 586 [2]; Class II [5]	✓	✓	✓	✓
Plesiastrea versipora	This species is very common in Hong Kong waters. Records have been made in northeastern. eastern, southern and even western waters.	Abundant	Cap. 586 [2]; Class II [5]	✓	✓	✓	✓
Porites sp.	-	-	Cap. 586 [2]; Class II [5]	✓	✓	✓	-
Porites lutea	This coral species is widespread, recorded from all regions of Hong Kong, with higher abundance and larger sized colonies recorded from the eastern and northeastern waters.	Dominant	Cap. 586 [2]; Class II [5]	-	-	✓	✓

Species	Distribution in Hong Kong [1]	Rarity	Protection / Conservation Status	Western Junk Bay		Eastern Junk Bay	
				Previous Studies [10]	Recent Study	Previous Studies [10]	Recent Study
Psammocora profundacella	Found in coral communities in eastern water of Hong Kong, although records have been recorded in northeastern and southern waters.	Abundant	Cap. 586 [2]; Class II [5]	✓	✓	✓	✓
Psammocora sp.	-	-	Cap. 586 [2]; Class II [5]	-	✓	✓	-
Tubastraea sp.	-	-	Cap. 586 [2]; Class II [5]	✓	✓	✓	✓
Tubastraea diaphana	-	-	Cap. 586 [2]; Class II [5]	✓	-	✓	-
Tubastraea robusta	-	-	Cap. 586 [2]; Class II [5]	✓	-	-	-
Black Coral							
Antipathes curvata	A very common species found on sandy or rocky substratum in shallow to deep water and mainly distributed in the eastern, northeastern, southeastern and southern parts of Hong Kong.	Common	Cap. 586 [2]	✓	✓	-	-
Cirrhipathes sinensis	A very common species mainly distributed in deeper (>5m) waters in the eastern, northeastern, southeastern and southern parts of Hong Kong.	Common	Cap. 586 [2]	✓	✓	✓	-
Cirrhipathes sp.	-	-	Cap. 586 [2]	✓	✓	✓	-
Amphioxus							
Branchiostoma belcheri	Distributed in eastern waters near Sai Kung (Nam She Wan, Tai Long Wan, Long Ke Wan and Pak Lap Wan.	-	Class II [5]; Endangered [9]	-	-	✓	✓

Species	Distribution in Hong Kong (1)	Rarity	Protection / Conservation Status	Western Junk Bay		Eastern Junk Bay	
				Previous Studies (10)	Recent Study	Previous Studies (10)	Recent Study
Branchiostoma japonicum	Distributed in eastern waters near Sai Kung (Nam She Wan, Tai Long Wan, Long Ke Wan and Pak Lap Wan.	-	Vulnerable (9)	-	-	✓	-

*Notes for **Table 9.18** to **Table 9.19**:*

1 Distribution in Hong Kong and Rarity follows:
Flora: Hong Kong Herbarium (2007-2011); Wu and Lee (2000); Xing and Chau (2000); Siu (2000).
Fauna: AFCD (2011); AFCD (2023a); Karsen et al. (1998); Shek (2006); Reels (2019).
Coral: Chan et al. (2005b), AFCD (2018)
Amphioxus: Chen (2007)

2 Cap. 96: Protected under the Forests and Countryside Ordinance (Cap. 96)
Cap. 170: Protected under the Wild Animals Protection Ordinance (Cap. 170)
Cap. 586: Protected under the Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586)
Fellowes et al. (2002): GC = Global Concern; LC = Local Concern; RC = Regional Concern; PRC = Potential Regional Concern; PGC = Potential Global Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in nesting and/or roosting sites rather than in general occurrence
IUCN (2024). The IUCN Red List of Threatened Species (2023.1): VU = Vulnerable; CR = Critically Endangered

3 Protection Status of Flora follows: Fu (1992); Hu et al. (2003); Qin et al. (2017): VU = Vulnerable, EN = Endangered, CR = Critically Endangered.

4 Wetland-dependent species (including wetland-dependent species and waterbirds).

5 List of Wild Animals and Plants Under State Protection (promulgated by State Forestry Administration and Ministry of Agriculture in 2021).

6 Zheng & Wang (1998). China Red Data Book of Endangered Animals.

7 Jiang et al. (2016). Red List of China's Vertebrates.

8 Zhao (1998). China Red Data Book of Endangered Animals: Amphibia & Reptilia.

9 Wang & Xie (2005). China Species Red List. Vol. III Invertebrates.

10 EPD (2007); WSD (2015); WSD (2017); CEDD (2005, 2013a, 2013b, 2018, 2023)

Habitat types: Habitat with * = recorded within Project boundary or recorded within both Project boundary and assessment area

9.7 Identification and Evaluation of Environmental Impacts

9.7.1 *Assessment Approach*

9.7.1.1 The criteria and guidelines as stated in Annexes 8 and 16 of the EIAO-TM were followed for evaluating and assessing ecological impact arising from the construction and operation of the Project. The comprehensive ecological baseline collaborated from both literature review and terrestrial and marine ecological field surveys provided adequate information for the impact assessment and evaluation. Potential direct / indirect, cumulative, and residual ecological impacts arising from the construction and operation of the Project were identified and evaluated where possible. Mitigation measures and monitoring and audit programme were recommended, where necessary.

9.7.2 *Identification of Potential Environmental Impacts*

9.7.2.1 As detailed in **Section 2** of this report, the Project comprises the following key construction and operation activities:

Works in TKO 137

- Reclamation of seabed abutting the coastal area and associated site formation works to form about 20 ha of land for the development
- Site formation works of the existing area at TKO 137
- Engineering infrastructure works including roads, drainage, sewerage including sewage pumping stations, waterworks including pumping stations, service reservoirs and the associated water mains, access roads, and other facilities to support the proposed developments
- An Effluent Polishing Plant (EPP) at TKO 137 and associated effluent outfall
- Freshwater service reservoir (FWSR) and saltwater service reservoir (SWSR) and associated access road
- Ground investigation (GI) and natural terrain hazard mitigation measures (NTHMM)
- Landscaping, streetscaping and ancillary works

Works for land be created off TKO 132

- Formation of about 20 ha of land off TKO 132 through reclamation and slope-cutting / site formation
- Infrastructure and ancillary works at TKO 132
- Construction of marine viaducts to connect the land to be created off TKO 132 to existing Tseung Lam Highway
- Engineering infrastructure works including roads, drainage, sewerage, and waterworks to support the development
- Ground investigation (GI) and natural terrain hazard mitigation measures (NTHMM)

9.7.2.2 It is anticipated that the major sources of ecological impact would be associated with areas where reclamation, site formation works, and NTHMMs will be conducted during construction phase. Potential ecological impacts that may arise during the construction and operational phase are outlined below.

Construction Phase

Potential Direct Impact – Terrestrial

- Direct Impact on Recognised Sites of Conservation Importance
- Direct Loss of Terrestrial Habitats and Impacts on Associated Wildlife
- Direct Impact on Species of Conservation Importance
- Direct Injury / Mortality to Wildlife
- Habitat Fragmentation and Impact on Wildlife Movement

Potential Direct Impact – Marine

- Direct Impact on Recognised Sites of Conservation Importance and Other Ecologically Sensitive Sites
- Direct Impact on Marine Intertidal and Subtidal habitats
- Direct Injury / Mortality to Marine Organism including Species of Conservation Importance

Potential Indirect Impact – Terrestrial

- Disturbance Impacts on Recognised Sites of Conservation Importance
- Disturbance Impacts on Habitats and Associated Wildlife
- Water Quality Impact to Natural Watercourse and Modified Watercourse

Potential Indirect Impact – Marine

- Indirect Impact on Recognised Sites of Conservation Importance and Other Ecologically Sensitive Sites
- Disturbance Impact from Marine Construction Activities
- Marine Water Quality / Hydrodynamic Changes

Operational Phase

Potential Direct Impact – Terrestrial

- Direct Impact on Recognised Sites of Conservation Importance and Terrestrial Habitats
- Habitat Fragmentation and Impact on Wildlife Movement
- Direct Injury / Mortality to Wildlife and Bird Collision

Potential Direct Impact – Marine

- Direct Impact on Recognised Sites of Conservation Importance and Other Ecologically Sensitive Sites
- Direct Impact on Subtidal Habitats, and Associated Wildlife

Potential Indirect Impact – Terrestrial

- Disturbance Impacts on Recognised Sites of Conservation Importance, Natural Habitats and Associated Wildlife
- Night-time Glare and Light Pollution

Potential Indirect Impact – Marine

- Changes in Hydrodynamic Regime and Water Quality Pattern
- Marine Water Quality Impact to Marine Habitats and Associated Marine Organisms
- Maintenance Sediment Removal for TKO 132

9.7.3 *Construction Phase – Direct Impact*

Potential Direct Impacts – Terrestrial Ecology

Impact on Recognised Sites of Conservation Importance

9.7.3.1 A site of conservation importance, CWBCP, was identified within the assessment area for terrestrial ecology. Potential ecological impact from the direct encroachment on the CWBCP may arise, if unmitigated. To avoid the ecological impacts to the CWBCP, all proposed works (including permanent structures, NTHMM such as flexible barriers, and temporary works such as GI works) would be conducted outside the CWBCP. Thus, it is expected that no permanent and temporary habitat loss would occur within the CWBCP.

Habitats Loss and Impacts on Associated Wildlife due to Land-based Construction Works

9.7.3.2 Direct permanent loss (about 90.11 ha) and temporary loss (about 4.57 ha) of both natural and man-made terrestrial habitats are anticipated. A summary of the terrestrial habitat loss arising from key construction works and the estimated area of loss are presented in **Table 9.20** and **Table 9.21** respectively. Based on the latest design developed under the current study, the permanently and temporary affected areas within the assessment area are shown in **Figure 9.6.1** to **Figure 9.6.2**. Permanently affected areas refers to area with works that lead to permanent habitat loss, while temporarily affected areas refers to area with temporary works that lead to temporary habitat loss. The extent / area of the key land-based construction works can also refer to **Figure 9.6.3** and **9.6.4**.

Table 9.20 Summary of Habitat Loss due to Land-based Construction Works

Key Land-based Construction Works	TKO 137		TKO 132	
	Permanent Habitat Loss	Temporary Habitat Loss	Permanent Habitat Loss	Temporary Habitat Loss
Site Formation Works (Including Slope Cutting in TKO 132)	Shrubland; Shrubby Grassland / Grassland; Modified Watercourse; Developed Area	Shrubland; Developed Area	Mixed Woodland; Rocky Shore	Mixed Woodland; Rocky Shore
Construction of Marine Viaduct	Nil		Plantation; Rocky Shore; Developed Area	Plantation; Rocky Shore; Developed Area
Engineering Infrastructure Works	Entirely fall within the extent of site formation works, thus not anticipated to cause additional habitat loss other than those caused by the site formation works		Entirely fall within the extent of site formation works, thus not anticipated to cause additional habitat loss other than those caused by the site formation works	
Construction of Effluent Polishing Plant	Entirely fall within the extent of site formation works, thus not anticipated to cause additional habitat loss other than those caused by the site formation works		Nil	
Construction of Freshwater Service Reservoir and Saltwater Service Reservoir and Associated Access Road	Entirely fall within the extent of site formation works, thus not anticipated to cause additional habitat loss other than those caused by the site formation works		Nil	
Ground Investigation and Natural Terrain	Shrubland; Shrubby Grassland /	Shrubland; Shrubby Grassland /	Mixed Woodland; Plantation;	Mixed Woodland; Plantation;

Key Land-based Construction Works	TKO 137		TKO 132	
	Permanent Habitat Loss	Temporary Habitat Loss	Permanent Habitat Loss	Temporary Habitat Loss
Hazard Mitigation Measures	Grassland; Developed Area	Grassland; Developed Area	Rocky Shore; Soft Shore	Soft Shore
Mainlaying works	Nil	Developed Area	Nil	Developed Area
Temporary Works	Nil	Shrubland; Developed Area	Nil	Mixed Woodland; Plantation; Developed Area; Rocky Shore; Soft Shore

Table 9.21 Area of Habitat Loss due to Land-based Construction Works

Habitats (1)	Area of Permanent Loss (ha)			Area of Temporary Loss (ha)		
	Within TKO 137	Within TKO 132	Total	Within TKO 137	Within TKO 132	Total
Mixed Woodland	-	1.23	1.23	-	0.86	0.86
Shrubland	7.24	-	7.24	0.60	-	0.60
Shrubby Grassland / Grassland	0.21	-	0.21	-	-	-
Plantation	-	0.01	0.01	-	<0.01	<0.01
Developed Area	79.21	0.01	79.22	0.28	2.33	2.61
Natural Watercourse	-	-	-	-	-	-
Modified Watercourse	1.34 (~1.4 km)	-	1.34 (~1.4 km)	-	-	-
Rocky Shore	-	0.82	0.82	-	0.41	0.41
Soft Shore	-	0.01	0.01	-	0.08	0.08
Total	**88.03**	**2.08**	**90.11**	**0.88**	**3.69**	**4.57**

Notes:

1 The size and percentage included in this table is subject to rounding adjustments. Any discrepancies between total and sums of individuals numbers listed therein are due to rounding.

9.7.3.3 The land-based construction works within TKO 137 would result in direct permanent loss of terrestrial habitats. Majority of the loss (about 90%) would occur in artificial habitats including developed area (about 79.22 ha) and modified watercourse (about 1.34 ha / 1.4 km) (refer to **Figure 9.6.1**), which have been subject to constant disturbance from human activities and operation of facilities nearby, such as the existing TKO Area 137 Fill Bank and construction activities of SENTX. Other natural habitats at Fat Tong Chau including shrubland (about 7.24 ha), shrubby grassland / grassland (about 0.21 ha) and associated vegetation would also be subject to permanent loss. One floral species of conservation importance, *Diospyros vaccinioides*, located in shrubland in Fat Tong Chau would be directly affected (refer to **Figure 9.6.1**). Detailed impact evaluation on the floral species of conservation will be discussed in **Section 9.7.3.7 – 10** below.

9.7.3.4 Construction works within TKO 132 include site formation and slope cutting, construction of marine viaduct, engineering infrastructure works and NTHMMs (rigid barriers, flexible barriers, and soil anchorage). This would result in direct permanent loss of terrestrial habitats along the shoreline of western Junk Bay, including mixed woodland (about 1.23 ha), and 0.01 ha of plantation, 0.01 ha of developed area near Tseung Lam Highway, and 0.82 ha of rocky

shore and 0.01 ha of soft shore (refer to **Figure 9.6.2**). Individuals of a flora species of conservation importance *Diospyros vaccinioides* was recorded within the Project area, at mixed woodland near the shoreline. While this species is no longer recorded from recent surveys, their previous presence suggests potential direct impact from slope cutting and site formation works (refer to **Figure 9.6.2**), further discussed below.

9.7.3.5 The direct loss of terrestrial habitats and associated vegetation would also result in reduction in available natural habitat for wildlife utilisation. Nonetheless, the affected natural habitats in TKO 137 were mainly shrubland and shrubby grassland / grassland in Fat Tong Chau, while the affected natural habitats in TKO 132 were mainly the fringe area of the mixed woodland. The affected rocky shore supported some common intertidal species, while the affected soft shore only supported very limited abundance of common intertidal wildlife. As the ecological values of the affected natural habitats are low to moderate, it is expected that the direct impact on the loss of natural habitats in TKO 137 and 132 would be low. Whilst, given that the affected artificial habitats (developed area, plantation and modified watercourses) only supported limited floral and faunal diversity and abundance and having low ecological value, the direct impact is also expected to be low.

9.7.3.6 Temporary loss of terrestrial habitats in TKO 137 and TKO 132 would arise from temporary works (such as setting up of site hoardings, temporary material and equipment storage and stockpiling, construction access, etc.) associated with site formation works and construction of marine viaduct, and GI works for NTHMMs. This results in temporary loss of about 0.6 ha of shrubland and 0.28 ha developed area in TKO 137, as well as about 0.86 ha of mixed woodland, <0.01 ha of plantation and 2.33 ha of developed area in TKO 132 (refer to **Table 9.21**, **Figure 9.6.1** and **Figure 9.6.2**). In addition, installation of water mains such as drainage pipes, freshwater distribution mains and twin rising mains in TKO 137 and TKO 132 would cause temporary affect development area. Nonetheless, these temporary works and GI works are relatively small in scale and transient in nature, while vegetation clearance and tree felling would also be avoided / minimised as far as possible. Direct impact to the temporarily affected habitats is expected to be low. Proper measures would be recommended to further minimise the impact of temporary habitat loss.

Impact on Species of Conservation Importance

9.7.3.7 Direct impact on floral species of conservation importance would arise for those individuals situated within the permanently and temporarily affected areas as shown in **Figure 9.6.1** and **Figure 9.6.2**. In addition, faunal species of conservation importance that are sedentary, with lower mobility, or are restricted to a particular habitat niche could be subjected to direct injury or mortality.

9.7.3.8 One floral species of conservation importance (*Diospyros vaccinioides*) was recorded with low abundance from recent survey in shrubland habitats within the Project boundary of TKO 137 in Fat Tong Chau, and also from past studies within the Project boundary of TKO 132, at a location currently identified as mixed woodland habitat. These individuals of floral species of conservation importance would be directly affected by the construction works, resulting in moderate ecological impacts, if unmitigated. Proper mitigation measures (e.g. in-situ preservation, and/or pre-construction site check with transplantation) would be further proposed for this floral species of conservation importance, detailed in **Section 9.10.3.13-14**.

9.7.3.9 Other floral species recorded previously or recently within the assessment area include *Marsdenia lachnostoma*, *Pavetta hongkongensis* and *Habenaria linguella* in assessment area of TKO 137, as well as *Arundina graminifolia* and *Brainea insignis* in assessment of TKO 132. These individuals were located outside the permanently or temporary affected area (refer to **Figure 9.6.1**-**9.6.2**), thus no direct impact on other floral species of conservation importance is expected.

9.7.3.10 Faunal species of conservation importance recorded within the Project boundary of TKO 137 and TKO 132 include avifauna, butterflies, and mammal species. All of these faunal species are highly mobile and did not demonstrate any notable breeding and/or roosting behaviour

within the Project boundary, except the single nesting record of Black Kite at mixed woodland in TKO 132 outside the permanently and temporarily affected area (refer to **Figure 9.6.2**). Except Black Kite, all other recorded faunal species of conservation importance did not show particular dependence on the affected natural habitats within TKO 137 and TKO 132. Alternative habitats are also available in the vicinity for these species to utilise. Hence, direct impact to the faunal species of conservation importance is expected to be low.

Injury / Mortality to Wildlife

9.7.3.11 Construction equipment and structures with transparent / reflective materials (e.g. portable noise barrier) or difficult to see (e.g. cables, wires) may result in potential collision of the commuting birds. Given that the assessment area is not known to support any important roosting and breeding sites, (e.g. egretry and night roost), and only a single sighting of the Black Kite nest was observed in dry season survey in TKO 132, the impact on bird collision due to construction activities is expected to be low. However, under a conservative approach, precautionary measures including pre-construction site check on the presence of Black Kite nest would be recommended in **Section 9.10.3.15** below.

9.7.3.12 In addition to bird collision, construction phase activities (e.g. site clearance and formation) may cause potential direct injury / mortality to wildlife within the permanently and temporarily affected area, particularly faunal species with lower mobility such as amphibians and freshwater communities. Nonetheless, majority of the faunal species recorded within / adjacent to the Project boundary of TKO 137 and TKO 132 are relatively mobile (e.g. avifauna, flying mammals), and they are not highly dependent on habitats within the permanently and / or temporarily affected area. Moreover, the species diversity and abundance were not high in the affected habitats, thus the construction works are unlikely to cause major direct injury or mortality to wildlife, and the impact is expected to be low.

Habitat Fragmentation and Impact on Wildlife Movement

9.7.3.13 During construction phase, certain construction works and activities could result in fragmentation and isolation effects on habitats, particularly if they are extensive and occur across the same or different natural habitats thus creating separate patches of natural habitats upon development. The fragmentation and isolation effects can also lead to obstruction of wildlife movement between habitats.

9.7.3.14 No impact or fragmentation of natural terrestrial habitat would occur within CWBCP, while habitats including mixed woodland, shrubland and shrubby grassland / grassland at Fat Tong Chau and Tit Cham Chau would continue to remain surrounded by developed area, similar to their current condition (refer to **Figure 9.6.1**). Thus additional fragmentation of natural terrestrial habitats due to TKO 137 development is low.

9.7.3.15 Works including slope-cutting and NTHMMs in TKO 132 would permanently and temporarily affect the mixed woodland, rocky shore, and soft shore habitats (refer to **Figure 9.6.2**). Nonetheless, these works would only affect the edge of the mixed woodland instead of the core area or transitional area between natural habitats. As the affected rocky shore and soft shore only supported low or low to moderate faunal diversity and abundance, significant disruption to wildlife movement is not anticipated. No additional fragmentation and/or isolation of natural habitats would arise. As a result, the ecological impact arising from habitat fragmentation and obstruction of wildlife movement is expected to be low.

9.7.3.16 The downstream of the natural watercourses within TKO 132 were connected to the coastal water in Junk Bay. The proposed construction activities may result in potential disruption on movement of diadromous fish species, in particular the Philippine Neon Goby which have been previously recorded in S2. Nonetheless, the proposed works has been designed to avoid any direct impacts and blockage on S2, including its downstream section in Chiu Keng Wan. Although the construction works near the downstream of the S2 would involve construction of a section of elevated marine viaducts, the associated foundation and pier of the marine viaduct would be located away from the downstream section to avoid direct impact and

blockage of S2. Although the linkage between S3 and the coastal water would be directly affected by the reclamation of TKO 132, no records of diadromous fish species in S3 had been made from current and previous studies. Furthermore, only limited abundance and diversity and wildlife were recorded at natural watercourses at TKO 132. Thus, no adverse ecological impact on the movement of diadromous fish species, or general wildlife at natural watercourses at TKO 132 is anticipated.

Potential Direct Impacts – Marine Ecology

Impact on Recognised Sites of Conservation Importance and Other Ecologically Sensitive Sites

9.7.3.17 The CPAs within the marine ecological assessment area were identified outside the Project boundary of TKO 137 and TKO 132. The closest CPA include a short section of shoreline at Lei Yue Mun (about 500 m west of TKO 132) and the shoreline from Joss House Bay to Clear Water Bay (about 1.2 km northeast) from TKO 137. No direct impacts to the CPAs are anticipated.

9.7.3.18 One of the coral recipient sites is located outside the TKO 132 Project boundary, immediately adjacent to the southwestern boundary (**Figure 9.3**). The footprint of reclamation and associated works has been designed to avoid direct encroachment on the coral recipient site (**Figure 9.6.2**). As such, no direct impact to the coral recipient site is expected from the Project.

Habitats Loss / to be Temporary Affected due to Marine Works

9.7.3.19 Based on the latest reclamation design, the proposed marine works would lead to direct permanent and temporary loss of intertidal and subtidal habitats. A summary of marine habitat loss and the area of loss are presented in **Table 9.22** and **Table 9.23**, respectively. The permanently and temporarily affected area are shown in **Figure 9.6.1** to **Figure 9.6.2**. The extent / area of the key marine works can also refer to **Figure 9.6.3** to **Figure 9.6.4**.

Table 9.22 Summary of Habitat Loss / to be Temporary Affected due to Marine Works

Key Marine Works	TKO 137		TKO 132		
	Permanent Habitat Loss	Temporary Habitat Loss	Permanent Habitat Loss	Temporary Affected	
				Temporary Habitat Loss	Temporary Occupied
Reclamation (including Construction of Seawall Toe below Sea Surface)	Water Column; Artificial Seawall (Developed Area); Subtidal Hard and Soft Substrata	-	Water Column; Rocky and Soft Shore; Subtidal Hard Substrata and Soft Substrata	-	-
Sediment Removal	Subtidal Hard Substrata	Subtidal Soft Substrata	Subtidal Hard Substrata	Subtidal Soft Substrata	-
Construction of Marine Viaduct Pier	N/A		Water Column; Rocky Shore; Subtidal Hard Substrata and Soft Substrata	-	Water Column; Subtidal Hard and Soft Substrata (Temporary Occupied for the Construction of Viaduct Pier)

Table 9.23 Area of Habitat Loss due to Marine Works

Types of Marine Works	Habitats (1)	Area of Permanent Loss (ha) (2)	Area of Temporary Loss (ha) (2)	Area of Temporary Occupied (ha) (2)

		Within TKO 137	Within TKO 132	Total	Within TKO 137	Within TKO 132	Total	Within TKO 132
Intertidal – Reclamation Works	Rocky Shore	-	0.24 (~0.85 km)	0.24	-	-	-	-
	Artificial Seawall (Developed Area)	0.10 (~2 km)	-	0.10	-	-	-	-
Intertidal – Construction of Marine Viaduct Pier	Rocky Shore	-	0.03	0.03	-	-	-	-
Total (Intertidal)		**0.10**	**0.27**	**0.37**	-	-	-	-
Sea Surface – Reclamation Works	Water Column	19.77	19.80	39.57	-	-	-	-
Sea Surface – Construction of Marine Viaduct Pier	Water Column	-	0.19	0.19	-	-	-	1.25
Total (Sea Surface)		**19.77**	**19.99**	**39.76**	**-**	**-**	**-**	**1.25**
Subtidal – Reclamation Works (*Construction of Seawall Toe below Sea Surface)	Subtidal Hard Substrata	4.44 (*0.42)	4.29 (*0.19)	8.73	-	-	-	-
	Subtidal Soft Substrata	20.49 (*4.79)	17.32 (*1.47)	37.81	-	-	-	-
Subtidal – Construction of Marine Viaduct Pier	Subtidal Hard Substrata	-	0.11	0.11	-	-	-	0.5
	Subtidal Soft Substrata	-	0.1	0.1	-	-	-	0.75
Subtidal – Sediment Removal	Subtidal Hard Substrata	0.27	0.27	0.54	-	-	-	-
	Subtidal Soft Substrata	-	-	-	0.34	7.54	7.88	-
Total (Subtidal)		**25.20**	**22.09**	**47.29**	**0.34**	**7.54**	**7.88**	**1.25**

Notes:

1 The size and percentage included in this table is subject to rounding adjustments. Any discrepancies between total and sums of individuals numbers listed therein are due to rounding.

2 The area of loss included all marine works listed in Table 9.22.

9.7.3.20 As presented in **Table 9.22** and **Table 9.23**, marine habitat loss in TKO 137 mainly arises from reclamation (where the extent of habitat loss extends to the toe of the seawall). In addition, sediment removal works would be carried out adjacent to the reclamation footprint during the construction stage. To facilitate deep cement mixing (DCM), obstacles such as boulders and other artificial materials will be removed, resulting in permanent loss of subtidal hard substrata, and temporary loss of subtidal soft substrata (as soft substrata is expected to re-settle in the area upon the completion of construction activities).

9.7.3.21 These marine works would result in the permanent loss of total about 0.1 ha (~2 km) of artificial seawall (developed area) along existing TKO 137 Fill Bank. The sea surface (water column) to be reclaimed would be about 19.77 ha. Total permanent loss of subtidal habitats would be about 4.71 ha of subtidal hard substrata and about 20.49 subtidal soft substrata. Permanent loss of subtidal hard substrata (4.71 ha) arises from 4.44 ha of reclamation

footprint (which include 0.42 ha of seawall toe below sea surface) and about 0.27 ha subtidal hard substrata to be lost due to the sediment removal. Subtidal soft substrata loss (20.49 ha) arises from 20.49 ha of subtidal soft substrata permanent loss from reclamation footprint (which include 4.79 ha subtidal soft substrata loss from construction of seawall toe below sea surface). Aside from permanent loss, the temporary loss of subtidal soft substrata would also arise from sediment removal works. Aside from the direct habitat loss, associated marine organisms, including benthic and intertidal organism and species of conservation importance (i.e. hard corals recorded from previous and recent studies) would also be directly affected. The marine habitat loss within TKO 137 is shown in **Figure 9.6.1**. Detailed description on the direct impact arising from the reclamation and sediment removal are presented in **Section 9.7.3.21** and **9.7.3.22** below.

9.7.3.22 The affected marine habitats would be largely replaced by the reclaimed land of TKO 137. Associated marine organisms, including benthic and intertidal organism and species of conservation importance (i.e. hard corals recorded from previous and recent studies) would also be directly affected. Nonetheless, the general benthic and intertidal organisms recorded within or in the vicinity of the proposed reclamation area are mostly common and abundant in Hong Kong waters. The diversity (11 hard coral species) and coverage (<5%) of corals was considered relatively low along eastern Junk Bay (spot-check dive area D3, D4 and REA 6), with very low density of amphioxus recorded. The water column was also not known to be utilised by any marine mammal and concerned fish species, such as seahorse and pipefish.

9.7.3.23 Aside from permanent loss from the reclamation in TKO 137, some permanent and temporary loss would also arise from sediment removal works to be carried out adjacent to the reclamation footprint during the construction stage (refer to **Figure 9.6.1**). Obstacles to the deep cement mixing (DCM), such as boulders and other artificial materials, will be removed and result in marine habitat loss. Sediment removal outside the reclamation footprint will lead to a permanent loss of approximately 0.27 ha of subtidal hard substrata and a temporary loss of around 0.34 ha of soft substrata.

9.7.3.24 The aforementioned habitats including artificial seawall (developed area), and sea area (water column, and subtidal hard substrata along the artificial seawall and soft substrata) at TKO 137 are considered to be of generally low value. The permanent loss of these habitats form reclamation is anticipated to be of low ecological impact. Furthermore, the proposed area for sediment removal would be limited to a small size, and is expected to be short-term in nature (only during construction phase to facilitate reclamation works). Thus, the ecological impact of the permanent and temporary loss on subtidal habitats in TKO 137 is anticipated to be low.

9.7.3.25 For the reclamation in TKO 132, although the revised reclamation layout has significantly reduced the reclamation area as mentioned in **Section 2.10.1.12** to **2.10.1.14**, due to engineering and other constraints, including the need of direct land access of public facilities (**Section 2.6.4.2** to **2.6.4.3** refers) and the distance requirement between certain facilities and residential area nearby (**Section 2.2.1.4** refers), there would still be unavoidable impacts on the natural intertidal and sea area along the western Junk Bay. As presented in **Table 9.22** and **Table 9.23,** marine habitat loss in TKO 132 would arise from reclamation (where the extent of habitat loss extends to the toe of the seawall) and construction of marine viaduct piers. In addition, removal of sediment and obstacles (e.g. boulders and other artificial materials) would be carried out adjacent to the reclamation footprint during the construction stage to facilitate DCM (as described in **Section 9.7.3.20**). Such removal works of sediment and obstacles would result in permanent loss of subtidal hard substrata, and temporary loss of subtidal soft substrata.

9.7.3.26 These marine works would result in the permanent loss of intertidal rocky shore (about 0.27 ha), while the permanent loss of sea surface (water column) from reclamation would be about 19.99 ha. A total of about 4.67 ha of subtidal hard substrata and about 17.42 ha of subtidal soft substrata would also be permanently lost. Permanent loss of subtidal hard substrata (4.67 ha) arises from 4.29 ha of reclamation footprint (which includes 0.19 ha of the seawall toe below the sea surface), about 0.11 ha of loss due to the construction of marine viaduct pier, and about 0.27 ha of subtidal hard substrata loss due to sediment removal. On the other

hand, permanent loss of subtidal soft substrata (17.42 ha) arises from 17.32 ha of reclamation footprint (which includes 1.47 ha of the seawall toe below the sea surface), and 0.1 ha loss due to the construction of marine viaduct pier. Aside from permanent loss, temporary loss of about 7.54 ha of subtidal soft substrata would also arise from sediment removal. Aside from permanent and temporary loss, some marine habitats would also be temporarily occupied by temporary works area for installation of marine viaduct piers, including about 1.25 ha of water column on the sea surface, and also about 0.5 ha subtidal hard substrata and about 0.75 ha of subtidal soft substrata. Aside from the direct habitat loss, associated marine organisms, including benthic and intertidal organism and species of conservation importance (i.e. hard and black corals recorded from previous and recent studies) would also be directly affected. The marine habitat loss within TKO 132 is shown in **Figure 9.6.2**. Detailed description on the direct impact arising from the reclamation, construction of marine viaduct piers and sediment removal are presented in **Section 9.7.3.27** and **9.7.3.31** below.

9.7.3.27 The rocky shore in western Junk Bay supported common marine organism species, while shorebirds were recorded traversing and occasionally foraging along the shoreline but only in low diversity and abundance. However, similar habitats in close proximity allow for shorebirds to continue traversing and foraging. On the other hand, while the rocky shore supported certain intertidal organisms, the recorded organisms were considered common in Hong Kong. Considering the ecological value (low to moderate for rocky shore) and the high commonness of this habitat and associated wildlife, and the relatively small area of direct loss, the ecological impact of the loss of rocky shore is expected to be low.

9.7.3.28 The water column along the western Junk Bay was not known to be utilised by any marine mammal and concerned fish species, such as seahorse and pipefish. The subtidal soft substrata habitat along western Junk Bay (spot-check dive area Z2 and Z3 in **Figure 9.4**) was mainly made up of sand, mud and silt, which only supported low diversity and abundance of marine organisms. Sparse coverage (1-5%) of corals including octocorals and two black coral species of conservation importance were also recorded subtidal soft substrate habitat in nearby waters, which predominantly included common and abundant species in Hong Kong waters. About 17.32 ha of subtidal soft substrata habitat would be directly affected from reclamation. Due to low ecological value and limited wildlife recorded, the ecological impact of the loss of water column and subtidal soft substrata habitat is expected to be low.

9.7.3.29 The subtidal hard substrata habitat along western Junk Bay (spot-check dive area Z1a and Z1b), however, supported low to moderate coral diversity (including 25 hard coral and three black coral species) and coverage (6-30%). A total of about 4.40 ha of this habitat would be directly impacted due to reclamation and construction of marine viaduct pier (**Table 9.23** refers). It is noteworthy, that the majority of the recorded coral species, while not considered rare, are predominantly common and abundant within Hong Kong waters, especially in the eastern waters, such as *Dipsastraea speciosa* and *Cladopsammia gracilis*. In particular, *Oulastrea crispata* was common and widespread in Hong Kong, and this species was known to be highly adaptive, able to colonise a variety of substrata as a pioneer species, even in turbid and unfavourable conditions (Chan et al., 2005). Among the recorded corals, only two hard coral species, *Acropora solitaryensis* and *Favites paraflexuosus*, are considered as uncommon species. Additionally, *Acropora solitaryensis* and *Duncanopsammia peltata* are both listed as "Vulnerable" in the IUCN Red List (IUCN, 2024). Considering the coral diversity and coverage it supported, the natural subtidal hard substrata habitat in the western Junk Bay was considered as having moderate ecological value. Although the affected habitat and the associated coral community are considered as having certain ecological value, yet it is not supporting rare coral species or species with restricted distribution in Hong Kong waters. Thus, the ecological impact of the loss of subtidal hard substrata habitat is expected to be low to moderate if unmitigated.

9.7.3.30 Other than the reclamation and construction of marine viaduct in TKO 132, sediment removal would be carried out adjacent to the reclamation footprint during the construction stage (refer to **Figure 9.6.2**). These marine works would result in habitat loss on 0.27 ha subtidal hard substrata outside the reclamation footprint, as obstacles to the DCMs such as boulders and other obstructive materials would be removed. Although the sediment removal at the subtidal

hard substrata would also result in potential direct loss of marine organism (e.g. coral species of conservation importance) on the hard substrata, as only a small proportion of this habitat would be affected by the sediment removal, the ecological impact is expected to be low. On the other hand, the temporary loss of about 7.54 ha subtidal soft substrata due to sediment removal works would involve removal of a thin layer of marine deposit. It is anticipated that the subtidal soft substrate (e.g., sandy, muddy, and silty seabed) would re-settle over time.

9.7.3.31 Moreover, the installation of marine viaduct piers would temporarily occupy about 1.25 ha of sea area (including 0.5 ha of subtidal hard substrata and 0.75 ha of subtidal soft substrata) by vessels and works platform. While some black coral species of conservation importance were recorded from subtidal soft substrata habitat in nearby water (spot-check dive Z3), they were recorded in very low and sparse coverage. Given the small area and temporary nature of the impact, and the subtidal soft substrata habitat to be affected by sediment removal only supported low diversity and abundance of marine organisms, the ecological impact of temporary marine habitat loss is anticipated to be low.

Injury / Mortality to Marine Organisms including Species of Conservation Importance

9.7.3.32 Coral species of conservation importance were recorded in the subtidal habitats within the reclamation extent of TKO 137 and 132 and associated marine works area, including construction of sea wall and sediment removal, all of which would be subjected to direct injury / mortality. Hard coral species were recorded in low coverage (<5%) within the reclamation extent for TKO 137, and with low to moderate coverage (6-10%) within the reclamation extent and associated marine works area for TKO 132. Nonetheless, as majority of the affected hard coral species are either common, abundant or dominant species in Hong Kong waters, thus the overall ecological impact of the direct loss of hard coral colonies for TKO 137 and 132 are anticipated to be low and low to moderate respectively. For black coral species recorded in subtidal soft substrata habitat within the temporary loss area of TKO 132, considering its low coverage (1-5 %) and the temporary nature of the impact, the potential ecological impact on black coral would be low. Further mitigation measures are proposed to minimise potential ecological impact on the affected coral communities in **Section 9.10.3.9**.

9.7.3.33 Two amphioxus species, *Branchiostoma belcheri* and *Branchiostoma japonicum*, were recorded in the subtidal habitat south of Fat Tong O from the benthos survey of recent and previous studies. Both species were recorded outside the Project boundary of TKO 137 and TKO 132, and not likely subject to direct mortality from proposed marine works. Both species were recorded in low density only in wet season and was not recorded to be reproductive (without gonad development nor any presence of larva). Furthermore, previous studies have suggested that amphioxus species are generally confined to sediments containing a high percentage of sand and granule (Chen, 2007). This suggests that the habitat condition and substrata composition in the assessment area (which mostly comprise subtidal hard substrate or subtidal soft / muddy substrate) are unlikely preferred habitats for both amphioxus species and their occurrence was likely stochastic. The potential direct ecological impact from the loss of habitat for amphioxus is also expected to be low.

9.7.3.34 Other intertidal / benthic organisms that are not movable or with low mobility including soft corals would also subject to unavoidable direct injury / mortality due to the marine works. Nonetheless, as majority of the recorded species at the intertidal and benthic communities are common and abundant in Hong Kong waters, and no species of conservation importance was recorded, the ecological impact of direct impact on other intertidal / benthic organisms are anticipated to be low.

9.7.4 *Construction Phase – Indirect Impact*

Potential Indirect Impacts – Terrestrial Ecology

Disturbance Impacts on Recognised Sites of Conservation Importance

9.7.4.1 During the construction phase, disturbances in various forms including noise, glare, dust, vibration, and other human activities created by the construction works could pose indirect impacts on the surrounding areas, including sites of conservation importance.

9.7.4.2 The CWBCP has been subject to certain level of indirect impacts including noise, dust, glare and light and disturbances from human activities from the operation of existing TKO Area 137 Fill Bank, SENT Landfill, SENTX, and other adjacent developed areas. Given that the proposed sites of both the EPP and NTHMMs are immediately outside the CWBCP, the disturbance impacts on the CWBCP arising from the construction activities of TKO 137 is anticipated to be low to moderate, if unmitigated. Precautionary measures and good site practices (**Section 9.10.3.16 – 9.10.3.21** refers) should be strictly followed to minimise disturbance impacts on the CWBCP.

Disturbance Impacts on Habitats and Associated Wildlife

9.7.4.3 Disturbance impacts would be generated from the construction works in TKO 137 and TKO 132, such as the emission of noise, dust, glare and light, as well as increased traffic and human activities within the Project area. This results in indirect impact on adjacent habitats, due to habitat quality deterioration and displacement of fauna species that reside in nearby habitats.

9.7.4.4 Habitats recorded in close vicinity to TKO 137 (e.g. Cheung Shan, Fat Tong Chau, and Tit Cham Chau) and TKO 132 (such as Devil's Peak and Chiu Keng Wan) include both artificial man-made habitats (e.g. developed area such as TKO Area 137 Fill Bank, SENTX at TKO 137, TKO Chinese Permanent Cemetery and On Luen Village at TKO 132), and vegetated natural habitats on adjacent slopes including mixed woodland, shrubland, shrubby grassland / grassland, etc. Considering that these natural habitats have been constantly disturbed by existing human activities in adjacent developed areas, additional disturbance from the construction works and human activities is unlikely to intensify the impact level significantly. In addition, as majority of the recorded species are predominantly common and widespread species which are relatively tolerant to disturbance, and most species of conservation importance recorded within the assessment area are of higher mobility (e.g. bird, bat, butterfly species, etc.), they would be able to move to other readily available habitats in the vicinity. Thus, it is expected that majority of these species could withstand the additional disturbance from the construction works, and significant displacement of fauna inhabiting within nearby habitats is not expected.

9.7.4.5 Glare and light pollution arising from the construction activities in TKO 137 and TKO 132 may affect the nocturnal or light-sensitive species which are particularly susceptible to these impacts. The consequences may include disruptions to migration patterns, foraging, predation, and breeding behaviours of various species. However, nocturnal or light-sensitive species including amphibians and fireflies were only recorded in very low diversity and abundance within the assessment area. The majority of recorded bat species in Hong Kong are common and widely distributed. They are frequently found in close proximity to disturbed habitats, such as the edges of wooded areas and developed regions. This suggests a certain level of tolerance to disturbance from urbanised areas. Furthermore, habitats within TKO 132 are subject to some existing glare / lighting disturbance from adjacent urbanised and developed area (e.g. Tseung Lam Highway, TKO InnoPark, SENTX, TKO Chinese Permanent Cemetery). Thus, further disturbance impact arising from the glare and lighting from construction works within TKO 137 and TKO 132 is anticipated to be low. With the precautionary measures in place (**Section 9.10.3.16 – 9.10.3.21** refers), no unacceptable disturbance impacts are expected.

Water Quality Impact to Natural Watercourse and Modified Watercourse

9.7.4.6 During the construction phase, improper discharge of construction effluent, uncontrolled site run-off and improper construction effluent and sewage discharge would lead to potential deterioration in the water quality of nearby water bodies. The increase in both the suspended solids (SS) and turbidity may cause harm to aquatic communities by blocking their gills. Also,

untreated effluent which contain excessive nutrients like nitrate and phosphate may result in eutrophication and oxygen depletion, and cause suffocation or fatal impact to aquatic communities.

9.7.4.7 These potentially uncontrolled water quality impacts may affect natural watercourse W1 and two short sections of modified watercourses in close proximity to the works area in TKO 137, as well as natural watercourses S2 and S3 which are in close proximity to the works area in TKO 132. Nonetheless, given that the land-based construction works of TKO 137 and TKO 132 are downstream of the natural watercourses, deterioration of water quality is not expected. For the two short sections of modified watercourses in TKO 137, as it only supported limited aquatic faunal diversity and abundance, with high existing disturbance (adjacent TKO 137 Fill Bank), the ecological impact on these watercourses is expected to be low.

9.7.4.8 Appropriate mitigation measures to control runoff from the construction site, as well as the adoption of guidelines and good site practices for handling and disposal of construction discharges (**Section 5.12** refers) would be recommended to prevent adverse ecological impact arising from deterioration of water quality during the construction phase.

Potential Indirect Impacts – Marine Ecology

Disturbance Impact to Recognised Sites of Conservation Importance and Other Ecologically Sensitive Sites

9.7.4.9 CPAs within the marine ecological assessment area were located along the shoreline at Lei Yue Mun, from Joss House Bay to Clear Water Bay, and from Cape Collision to Big Wave Bay, at least 0.5 km away from the Project. Potential deterioration of water quality due to marine works of TKO 137 and TKO 132 may affect the habitat and associated marine organism, including coral species that habituate in the CPAs. However, according to the result of water quality impact evaluation in **Section 5.8**, it is anticipated that no adverse water quality impact would be caused by the marine works. Additionally, the CPAs are located at a considerable distance from the marine works area, and therefore, no adverse disturbance impacts on the CPAs are expected.

9.7.4.10 The two coral recipient sites identified within the marine ecological assessment area could be indirectly affected by potential water quality impact. Coral colonies situated within the coral recipient sites could be subjected to impact including reduced sunlight due to elevated SS and lethal or sub-lethal effects due to contamination. Details of marine water quality impact on coral species are discussed in **Section 9.7.4.17**.

Marine Water Quality Impact to Marine Habitats and Associated Marine Organisms

9.7.4.11 Indirect impacts on marine habitats and associated marine organisms resulting from the construction of the Project would mainly be associated with the changes in water quality due to marine works including reclamation activities, sediment removal, construction of marine viaduct, and site runoff from land-based construction works. During the dredging and filling activities associated with the marine works, there is a potential for increased release of SS, sediments, and contaminants from the sea bottom into the water column. Additionally, there may be potential accidental waste and chemical spillage from marine barges, fleets, and workers operating in the area. These released sediments, particles, or spills could affect the turbidity of the water and the levels of sedimentation and dissolved oxygen (DO) in the water, which are all factors determining habitat quality and the health and survival of marine organisms. In addition, increase in level of contaminants could cause lethal or sub-lethal effects to marine organisms.

9.7.4.12 The marine works during the construction stage would temporarily elevate the SS level and create sediment plumes. Marine organisms particularly sessile filter feeders such as hard corals are potentially subjected to the impacts from elevated SS level through smothering and clogging their respiratory and feeding apparatus. The elevated SS could also affect the

turbidity in water and thus reduce the amount of light reaching beneath the water surface. Light-dependent marine organisms, in particular hard corals, could be affected. The threshold value of local corals to SS adopted by AFCD is 30% increase of ambient level (AFCD, 2005b). In addition, an upper limit of 100 g/m^2/day was used in this Study to protect any sensitive areas. As per the modelling result from **Section 5.8.2.6** and **Table 5.7**, under the unmitigated scenarios, the SS deposition could exceed the upper limit of 100 g/m^2 /day in the western Junk Bay, which could affect the coral communities nearby, the indirect impact arising from the SS elevation could be considered as low to moderate if unmitigated. Nonetheless, under the mitigated scenarios, the SS deposition at all coral sites and coral recipient sites under all scenarios are comply with the upper limit of 100 g/m^2/day (**Section 5.8.2.8** to **5.8.2.10** and **Table 5.8**).

9.7.4.13 For other corals in the subtidal habitats including soft corals, gorgonians and black corals, they are considered to have greater tolerance of turbid conditions. Owing to their flexible branches and erect growth forms, these corals are not prone to sediment accumulation. They feed independently without contributions from algal associates and therefore are unlikely to affected by light reduction due to increased turbidity.

9.7.4.14 Depletion of DO could increase the chance of suffocation of marine organism, including corals and amphioxus. According to the Water Quality Impact Assessment (**Section 5.8.5** refers), the marine works including sediment removal would only result in a maximum depletion of less than 0.1 mg/L at all water sensitive receivers, including coral communities and amphioxus. Hence, this depletion of DO is anticipated to be minimal. Full DO compliances with the assessment criteria are also predicted during the construction phase (**Section 5.8.5** refers). Thus, no adverse indirect impacts on marine organisms, including corals and amphioxus, are anticipated.

9.7.4.15 The marine works can cause the release of contaminants from marine sediments. Increase in level of contaminants could cause lethal or sub-lethal effects to marine fauna, which could potentially result in alteration of behaviour, reproduction failure and increase susceptibility to diseases. Nonetheless, based on the estimated dilution rates, the water quality modelling result showed full compliances with the assessment criteria on the release of sediment-bound contaminants in all water sensitive receivers (WSRs) (**Section 5.8.6.1** to **5.8.6.5** refers). Thus, it is expected that no adverse ecological impact would be arise from the release of contaminants.

9.7.4.16 Accidental spillage of oils, other chemicals and contaminated water from marine barges and the proposed land-based works could affect adjacent subtidal habitat and associated marine organisms, including coral colonies, resulting in lethal / sublethal impacts (e.g. direct mortality, reproductive retardation). Larger particles could cause physical injury to marine organisms, while small particles could clog the respiratory and feeding systems of fish and invertebrates. Nonetheless, with the good practices and mitigation measures to control accidental spillage and surface runoff as stated in **Section 5.11** to **5.12**, no adverse ecological impact on the subtidal habitats and associated marine organisms is expected.

Marine Water Quality Impact to Species of Conservation Importance

9.7.4.17 The growth rate and health of zooxanthellate hard corals could be affected due to change in marine water quality (e.g. reduced light condition from sedimentation, affecting photosynthesis). Although hard corals possess mechanisms to expel and reject sediment from their surfaces, employment of these mechanisms expend energy and may cause stress ultimately leading to bleaching or tissue necrosis. In addition, due to the filter-feeding behaviour of amphioxus species, their oral cirri could be damaged by elevated SS concentration of 100 mg/L or above (Chen, 2007). Reduced water movement and increased silt deposition might also bring potential impacts to amphioxi (Wang *et al*., 1989; Konsulova, 1992). Nonetheless, as discussed in above sections, marine water quality impact is anticipated to meet the corresponding water quality assessment criteria, the ecological impact from marine water quality on marine species of conservation importance is expected to be low. Regarding the disturbance impact on the coral recipient sites, given the relatively close

distance between the coral recipient sites and marine works area of TKO 137 and 132, the disturbance impact on the coral recipient sites is expected to be low to moderate. Good practices and measures as stated in **Section 5.11** would be implemented to further ensure that no adverse ecological impact on the species of conservation importance would be caused by the deterioration of marine water quality.

9.7.5 *Operational Phase – Direct Impact*

Potential Direct Impact

Direct Impact on Recognised Sites of Conservation Importance and Terrestrial Habitats

9.7.5.1 Since there would be no additional works required during the operational phase of TKO 137 and TKO 132, no further direct impact including habitat loss and fragmentation on the recognised sites of conservation importance (i.e. CWBCP) and natural terrestrial habitats within the assessment area is anticipated during the operational phase.

Habitat Fragmentation and Impact on Wildlife Movement

9.7.5.2 Habitat fragmentation and impact on wildlife movement during the operational phase is expected to be similar to that in the construction phase, though in lower impact magnitude. Since the boundary of TKO 137 largely follows the existing TKO Area 137 Fill Bank, the utilisation of TKO 137 as a movement corridor by fauna is considered to be minimal as discussed in **Section 9.5.1.29 – 9.5.1.43**. On the other hand, the proposed development at TKO 132 includes a traffic road along the shoreline of Chiu Keng Wan, connecting to the existing traffic network. The operation of this traffic road may create a barrier that hinders the passage between the stream habitat and the coastal water, which may affect the potential migration route of diadromous fish, if any. However, the design of the marine viaduct has largely avoided the aforementioned impact, as the passage between the stream habitat and the coastal habitat would remain unobstructed. Thus, the ecological impact of habitat fragmentation and wildlife movement during operational phase is considered low.

Direct Injury / Mortality to Wildlife and Bird Collision

9.7.5.3 During the operational phase, activities at TKO 137 (e.g. community at the housing sites, traffic and infrastructures with other specified uses) and at TKO 132 (public facilities and associated marine viaduct) may impose a risk of direct injury / mortality to wildlife, and bird collision.

9.7.5.4 During the operational phase, population of common generalist species which are adapted to urbanised area would likely establish in TKO 137 and TKO 132, while other wildlife may continue utilising the natural habitats in CWBCP, Fat Tong Chau and western Junk Bay. As such, direct injury / mortality to wildlife such as roadkill would be a potential challenge to the wildlife in TKO 137, TKO 132, and their immediately proximity during operational phase, especially those with higher mobility which travel across large foraging range (i.e. ground-dwelling mammals, birds and reptiles) or with low mobility and restricted niche (i.e. amphibians). Nonetheless, majority of the wildlife in the vicinity were already subjected to high level of existing disturbance (e.g. operation of TKO Area 137 Fill Bank and associated traffic flow), and potentially adapted to the disturbance and nearby human activities and traffic flow. On the other hand, the development in TKO 132 which are mainly public facilities, and the proposed marine viaduct are not anticipated to support significant population of wildlife. However, some direct injury or mortality to wildlife due to accidental entry into at-grade road sections may be possible. Therefore, the direct impact to the wildlife inhabiting in the surroundings during operational phase is expected to be low to moderate, if unmitigated.

9.7.5.5 The building facades of the aboveground structures with materials that are excessively transparent or reflective (i.e. glass, windows) or difficult to see (e.g. cables, wires) and moving vehicles may potentially cause bird collision thus injury / mortality to birds. Nonetheless, given that only low to moderate diversity and abundance of avifauna species were recorded within

the assessment area of TKO 137 and TKO 132, while no egretry, night roost, or major flight paths were identified, the impact on bird collision is expected to be low. Precautionary measures such as using non-transparent or non-glazing materials as discussed in **Section 9.10.3.15** would be in place to further minimise any potential bird injury and collision.

Potential Direct Impact – Marine Ecology

Direct Impact on Recognised Sites of Conservation Importance and Other Ecologically Sensitive Sites

9.7.5.6 There would be no additional works during the operational phase of TKO 137, and the maintenance sediment removal in TKO 132 would not affect the CPAs and coral recipient sites within the marine ecological assessment area. No direct impact on the captioned sites during the operational phase is anticipated.

Direct Impact on Marine Intertidal and Subtidal Habitats, and Associated Wildlife

9.7.5.7 Subject to the sedimentation conditions and siltation rate of the site, regular sediment removal would be required to maintain adequate water depth for safe navigation of vessels for Concrete Batching Plant (CBP) berthing operation, particularly at the western front of TKO 132 (as shown in **Figure 7.4** and **9.6.2**). Nonetheless, the area of sediment removal during operational phase would be confined within the same sediment removal area during construction phase. Any mitigation measures including coral translocation for affected coral colonies, if required, would have already been implemented during the construction phase. There would also be no anchorage on the seabed for vessel berthing in TKO 132. No additional loss of habitat and associated marine organisms (including coral colonies) would be anticipated during the operational stage.

9.7.6 ***Operational Phase – Indirect Impact***

Potential Indirect Impact – Terrestrial Ecology

Disturbance Impacts on Recognised Sites of Conservation Importance, Natural Habitats and Associated Wildlife

9.7.6.1 The proposed new community in TKO 137 comprising housing sites, traffic and infrastructures with other specified uses, etc, and the public facilities in TKO 132 and associated marine viaduct may increase the number of vehicles and traffic flow, human activities, and disturbance (e.g. noise, lighting, glare, and dust). These disturbances may result in habitat quality deterioration in nearby recognised sites of conservation importance, adjacent terrestrial habitats, and displacement of associated wildlife inhabiting near TKO 137 and TKO 132.

9.7.6.2 The proposed new community in TKO 137 is expected to generate disturbances during operational phase, including the increase in human activities, noise, and glare. Adjacent natural habitats within and near CWBCP (e.g. mixed woodland, shrubland, shrubby grassland / grassland, and natural watercourse) are expected to be affected. Other infrastructures situated outside the core developments in TKO 137 includes EPP, FWSR, SWSR, and NTHMMs are in close proximity to CWBCP and natural habitats. Nonetheless, these natural habitats are already subjected to disturbance from the operation of the existing TKO Area 137 Fill Bank as well as the construction of SENTX and desalination plant. As discussed in other relevant chapters such as **Section 3.7.2** to **3.7.4**, **4.7.2.5** to **4.7.2.9** and **4.7.4.4** to **4.7.4.6** the disturbance level (e.g. air and noise) during the operational phase of the proposed new community in TKO 137 is comply with the criteria stated in respective guidelines such as AQO and EIAO-TM with the implementation of proper mitigation measures (e.g. screening). Infrequent disturbance arising from the NTHMMs during the operational phase would also only occur during routine maintenance and inspection. Thus, the ecological impact from the operation disturbance of the proposed new community and other infrastructures in TKO 137 is considered to be low.

9.7.6.3 The main sources of operation disturbance from the TKO 132 would be the increase in noise level, ground-borne vibration and glare generated from the public facilities and traffic (including traffic at the marine viaduct). Moreover, dust generated during the operational phase (e.g. concrete batching plant and construction waste handling facility) may affect photosynthesis, respiration and transpiration of adjacent vegetation. Other infrastructures situated outside the core developments in TKO 132 includes NTHMMs are in close proximity to natural habitats. Nonetheless, the adjacent natural habitats (e.g. mixed woodland, shrubland, natural rocky shore and natural watercourse) are already subjected to certain level of disturbance impacts such as from TKO Chinese Permanent Cemetery and On Luen Village nearby, the increase of human presence and traffic flow during the operational phase is expected to be insignificant. In addition, the public facilities in TKO 132 would be located on reclaimed land, downslope of the concerned natural habitats, and the marine viaduct would be elevated and located away from the natural habitats. Infrequent disturbance arising from the NTHMMs during the operational phase would also only occur during routine maintenance and inspection. Thus, the ecological impact from the operation disturbance of the public facilities, marine viaduct, and NTHMMs in TKO 132 is considered to be low.

9.7.6.4 Site runoff and discharge of sewage from the EPP in TKO 137 and accidental spillage / discharge of wastewater and sewage from public facilities in TKO 132 could affect adjacent habitats especially the water quality of natural watercourses and modified watercourses. Domestic sewage and sludge would be generated from the EPP during the operational phase. Given that proper sewage discharge and treatment facilities would be in place, and no sewage and sludge would be discharged directly into the natural watercourses and modified watercourses adjacent to the EPP, the sewage and sludge generated is not expected to cause water quality impact. Moreover, given that majority of the natural habitats were situated in the hillslope area, while the proposed developments at TKO 137 and TKO 132 are located on the reclaimed land and/or coastal area to the downhill of the terrestrial natural habitats, ecological impact arising from the deterioration of water quality is not expected.

Night-time Glare and Light Pollution

9.7.6.5 Night-time glare and light pollution may cause negative impacts on fauna group (notably bat and other nocturnal species) utilising the surrounding habitats. According to the findings from previous studies and recent surveys, bat species were recorded utilising habitats such as mixed woodland, shrubland, plantation, and developed area near TKO 137 and TKO 132. Nonetheless, the majority of recorded species are common and widespread in Hong Kong, and they are also observed to show some tolerance to urbanised and disturbed habitats. In addition, other nocturnal species such as amphibians and fireflies were only recorded in low abundance. Thus, the ecological impact of light and glare during the operation of TKO 137 and TKO 132 is anticipated to be low, if unmitigated. Furthermore, mitigation measures such as lighting control or design shall be implemented to further minimise the glare effects and light pollution to the surrounding natural habitats and CWBCP. Optimal lighting would be adopted for safety and security during night-time subject to further detailed design.

Potential Indirect Impact – Marine Ecology

Changes in Hydrodynamic Regime and Water Quality Pattern

9.7.6.6 Altered coastal morphology due to reclamation in TKO 137 and 132 may affect the hydrodynamic properties and water quality pattern in Junk Bay. In addition, embayed water could also be formed which lead to potential marine refuse entrapment and accumulation of pollutants. The potential deterioration of water quality due to the altered coastal morphology could have negative impact on the intertidal and subtidal habitats and associated marine organisms.

9.7.6.7 Based on the modelling results from the water quality impact assessment (**Section 5.10.3** and **5.10.4** refers), the changes of coastline configurations would not lead to adverse changes in the tidal flow vectors and water quality patterns as compared to the baseline conditions. The degrees of water quality compliances are the same with or without this Project. For the

issue of embayed water, the embayed water formed near the northern corner of TKO 132 reclamation was predicted to have annual 10 percentile bottom Dissolved Oxygen (DO) and annual 10 percentile depth-averaged DO in > 4 mg/L and > 5 mg/L respectively, which complied well with the WQOs of ≥ 2 mg/L and ≥ 4 mg/L and thus no hypoxia condition would be expected. Hence, the ecological impact of changes in hydrodynamic regime and water quality pattern are expected to be low.

Marine Water Quality Impact to Marine Habitats and Associated Marine Organisms

9.7.6.8 The discharge of sewage from the EPP in TKO 137, accidental spillage / discharge of wastewater and sewage from public facilities in TKO 132 would have the potential to degrade the water quality in the surrounding marine waters. This could result in negative impacts on intertidal and subtidal habitats, as well as the associated marine organisms. The elevated SS and contaminants resulted from the sewage discharge and accidental spillage could affect factors that are critical to marine organisms, such as turbidity, DO and levels of sedimentation, etc. These impacts can negatively affect the health of marine organisms, potentially leading to mortality in severe cases.

9.7.6.9 Nonetheless, according to **Section 5.10.5**, under the normal operation of the EPP in TKO 137, discharge will be treated to secondary plus level, which would not cause any significant impact on the water quality, including DO, *E. coli*, sedimentation rate, etc. Emergency discharge of untreated sewage from the EPP under the situations of loss of power supply or failures of treatment units would disrupt the water quality of surrounding marine waters. Although the parameters including DO, SS, TIN, etc. are not expected to be significantly impacted, very high concentration of *E. coli* from the emergency discharge is expected (**Section 5.10.2.41** to **5.10.2.51** refers). The increased concentration of *E. coli* could have negative impact on some marine organisms, such as fish species, as pathogenic strains of *E. coli* could adhere to the gill surface and cause altered behaviour of even mortality. However, given that the increase of *E. coli* due to the emergency discharge is expected to be transient and would be restored within 2 days, and the subtidal habitats in TKO 137 area only support low diversity and abundance of marine organisms. In addition, as according to **Section 5.5.2.12**, the proposed EPP would involve seawall outfall only, which would be located at the seawall of the proposed reclamation and away from the natural shoreline along Fat Tong Chau and Tit Cham Chau where higher coral coverage were observed. No submarine intake nor submarine outfall would be constructed under the Project. Thus it is expected that the ecological impact due to the discharge of EPP would be low.

9.7.6.10 Wastewater and sewage generated from public facilities in TKO 132 is expected to be diverted to the public sewerage system and then conveyed to the existing TKO Preliminary Treatment Works (PTW) for subsequent disposal at the existing HATS. Thus, no treated or untreated wastewater / sewage would be discharged at TKO 132. Although emergency overflow / bypass of sewage may occur in the new SPS in TKO 132 which convey the sewage and wastewater to TKO PTW, the quantity of the emergency discharge is expected to be small and transient, the impact on water quality would be minor. Thus it is expected that the wastewater and sewage generated from public facilities in TKO 132 would not lead to adverse ecological impacts.

Maintenance Sediment Removal for TKO 132

9.7.6.11 As per **Section 5.10**, it is expected that the scale of maintenance sediment removal would be smaller compared to the sediment removal or capital dredging in the construction stage, with an estimated dredging depth of about 0.5 m for navigation of vessels. The estimated dredging volume would be 10 times smaller than that generated from the sediment removal or capital dredging (700 m^3/day) with a dredging depth of 5 m. As such, the maintenance dredging operations in TKO 132 is not expected to cause adverse water quality impact. Mitigation measures including the use of closed grab, restriction of dredging production rate and deployment of silt curtains should be implemented. With the adoption of the recommended mitigation measures, the impact on marine ecology due to the deterioration in water quality as a result of maintenance sediment removal works is expected to be low.

9.8 Evaluation of Potential Ecological Impact

9.8.1.1 Potential ecological impacts associated with the construction and operation of the Project on the identified habitats within the assessment area were evaluated in accordance with the Annex 8 of the EIAO-TM, as presented in **Table 9.24** to **Table 9.34**.

Table 9.24 Evaluation of Potential Ecological Impacts to Mixed Woodland

Criteria	Mixed Woodland	
	TKO 137	TKO 132
Habitat Quality	Low to Moderate	
Species	TKO 137: Moderate floral diversity and low faunal diversity TKO 132: Moderate floral and faunal diversity <u>Recent Surveys</u> Two floral and 23 faunal species of conservation importance were recorded. <u>Previous Studies</u> Three floral and 12 faunal species of conservation importance were recorded previously but not found in recent surveys.	
Size / Abundance	Habitat would not be subjected to direct loss	1.23 ha of habitat would be subjected to permanent loss. 0.86 ha of habitat would be subjected to temporary loss.
Duration	<u>Indirect Impact</u> Disturbance impact (e.g. noise, dust, glare, water quality) during the construction phase would be temporary. Disturbance impact (e.g. noise, glare, water quality) during the operational phase would be permanent.	<u>Direct Impact</u> Loss of habitat within the footprint of proposed works would be permanent. Loss of habitat within the footprint of temporary works would be temporary. <u>Indirect Impact</u> Disturbance impact (e.g. noise, dust, glare, water quality) during the construction phase would be temporary. Disturbance impact (e.g. noise, glare, water quality) during the operational phase would be permanent.
Reversibility	Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.	Permanent habitat loss would be irreversible. Temporary habitat loss would be reversible. Construction phase disturbance would be temporary and reversible. Operational phase disturbance would be permanent and irreversible.
Magnitude	Low	Low
Regional significance	The impacted area contributes to only a small proportion of this habitat in Hong Kong. Recorded species are mostly common and widespread in Hong Kong. Impact on ecological connectivity between habitats and species population is not anticipated.	Only a small proportion of this habitat was impacted in Hong Kong. No species with restricted distribution. Not significance breeding ground for Black Kite No impact on ecological connectivity between habitats and species population
Overall Impact Significance	**Low**	**Low**

Table 9.25 Evaluation of Potential Ecological Impacts to Shrubland

Criteria	Shrubland	
	TKO 137	**TKO 132**
Habitat Quality	Low to Moderate	
Species	Low to moderate floral diversity Moderate faunal diversity <u>Recent Surveys</u> One floral and 17 faunal species of conservation importance were recorded. <u>Previous Studies</u> Two floral and eight faunal species of conservation importance were recorded previously but not found in recent surveys.	
Size / Abundance	7.24 ha of habitat would be subjected to permanent loss. 0.60 ha of habitat would be subjected to temporary loss.	Habitat would not be subjected to direct loss
Duration	<u>Direct Impact</u> Loss of habitat within the footprint of proposed works would be permanent. Loss of habitat within the footprint of temporary works would be temporary. <u>Indirect Impact</u> Disturbance impact (e.g. noise, dust, glare, water quality) during the construction phase would be temporary. Disturbance impact (e.g. noise, glare, water quality) during the operational phase would be permanent.	<u>Indirect Impact</u> Disturbance impact (e.g. noise, glare, human, construction dust and site runoff) during the construction phase would be temporary. Disturbance impact (e.g. noise, glare, water quality) during the operational phase would be permanent.
Reversibility	Permanent habitat loss would be irreversible. Temporary habitat loss would be reversible. Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.	Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.
Magnitude	Low	Low
Regional significance	The impacted area contributes to only a small proportion of this habitat in Hong Kong. Recorded species are mostly common and widespread in Hong Kong. No rare species was recorded. Impact on ecological connectivity between habitats and species population is not anticipated.	
Overall Impact Significance	**Low**	**Low**

Table 9.26 Evaluation of Potential Ecological Impacts to Shrubby Grassland / Grassland

Criteria	Shrubby Grassland / Grassland
	TKO 137
Habitat Quality	Within CWBCP: Moderate Fat Tong Chau: Low to moderate
Species	Within CWBCP: Moderate floral and faunal diversity Fat Tong Chau: Low floral and faunal diversity

Criteria	Shrubby Grassland / Grassland
	TKO 137
	Recent Surveys Three floral and five faunal species of conservation importance were recorded. Previous Studies Nine floral and 22 faunal species of conservation importance were recorded previously but not found in recent surveys.
Size / Abundance	0.21 ha of habitat would be subjected to permanent loss.
Duration	Direct Impact Loss of habitat within the footprint of proposed site formation works would be permanent. Indirect Impact Disturbance impact (e.g. noise, dust, glare, water quality) during the construction phase would be temporary. Disturbance impact (e.g. noise, glare, water quality) during the operational phase would be permanent.
Reversibility	Permanent habitat loss would be irreversible. Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.
Magnitude	Low
Regional significance	The impacted area contributes to only a small proportion of this habitat in Hong Kong. Recorded species are mostly common and widespread in Hong Kong. No rare species was recorded. Impact on ecological connectivity between habitats and species population is not anticipated.
Overall Impact Significance	**Low**

Table 9.27 Evaluation of Potential Ecological Impacts to Plantation

Criteria	Plantation	
	TKO 137	TKO 132
Habitat Quality	Low	
Species	TKO 137: Low to moderate floral and faunal diversity TKO 132: Low floral and faunal diversity Recent Surveys Three faunal species of conservation importance were recorded. Previous Studies Three floral and four faunal species of conservation importance were recorded previously but not found in recent surveys.	
Size / Abundance	Habitat would not be subjected to direct loss	0.01 ha of habitat would be subjected to permanent loss. <0.01 ha of habitat would be subjected to temporary loss.
Duration	Indirect Impact Disturbance impact (e.g. noise, dust, glare, water quality) during the construction phase would be temporary. Disturbance impact (e.g. noise, glare, water quality) during the operational phase would be permanent.	Direct Impact Loss of habitat within the footprint of proposed works would be permanent. Loss of habitat within the footprint of temporary works would be temporary. Indirect Impact Disturbance impact (e.g. noise, glare, human, construction dust and site

Criteria	Plantation	
	TKO 137	TKO 132
		runoff) during the construction phase would be temporary. Disturbance impact (e.g. noise, glare, water quality) during the operational phase would be permanent.
Reversibility	Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.	Permanent habitat loss would be irreversible. Temporary habitat loss would be reversible. Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.
Magnitude	Low	Low
Regional significance	The impacted area contributes to only a small proportion of this habitat in Hong Kong. Recorded species are mostly common and widespread in Hong Kong. No rare species was recorded. Impact on ecological connectivity between habitats and species population is not anticipated.	
Overall Impact Significance	**Low**	**Low**

Table 9.28 Evaluation of Potential Ecological Impacts to Developed Area

Criteria	Developed Area	
	TKO 137	TKO 132
Habitat Quality	Low	
Species	TKO 137: Low floral and faunal diversity TKO 132: Low floral diversity and moderate faunal diversity Artificial seawall: Low floral and faunal diversity <u>Recent Surveys</u> No floral species of conservation importance was recorded. 15 faunal species of conservation importance were recorded. <u>Previous Studies</u> One floral and 12 faunal species of conservation importance was recorded previously but not found in recent surveys. Sparse coverage of hard coral species such as *Oulastrea crispata* were recorded on artificial seawall under current and previous studies.	
Size / Abundance	79.21 ha of habitat (including 0.01 ha of artificial seawall) would be subjected to permanent loss. 0.28 ha of habitat would be subjected to temporary loss.	0.01 ha of habitat would be subjected to permanent loss. 2.33 ha of habitat would be subjected to temporary loss.
Duration	<u>Direct Impact</u> Loss of habitat within the footprint of proposed works and reclamation would be permanent. Loss of habitat within the footprint of temporary works would be temporary. <u>Indirect Impact</u> Disturbance impact (e.g. noise, dust, glare, water quality) during the	<u>Direct Impact</u> Loss of habitat within the footprint of proposed works would be permanent. Loss of habitat within the footprint of temporary works would be temporary. <u>Indirect Impact</u> Disturbance impact (e.g. noise, glare, construction dust and site runoff) during the construction phase would be temporary.

Criteria	Developed Area	
	TKO 137	TKO 132
	construction phase would be temporary. Disturbance impact (e.g. noise, glare, water quality) during the operational phase would be permanent.	Disturbance impact (e.g. noise, glare, water quality) during the operational phase would be permanent
Reversibility	Permanent habitat loss would be irreversible. Temporary habitat loss would be reversible. Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.	Permanent habitat loss would be irreversible. Temporary habitat loss would be reversible. Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.
Magnitude	Low	Low
Regional significance	Artificial habitat and very common in Hong Kong. Recorded species are mostly common and widespread in Hong Kong. Impact on ecological connectivity between habitats and species population is not anticipated.	
Overall Impact Significance	**Low**	**Low**

Table 9.29 Evaluation of Potential Ecological Impacts to Natural Watercourse

Criteria	Natural Watercourse
Habitat Quality	W1-4: Low to moderate S1-5: Low
Species	Low floral and faunal diversity <u>Recent Surveys</u> One faunal species of conservation importance were recorded. <u>Previous Studies</u> One faunal species of conservation importance was previously but not found in recent surveys.
Size / Abundance	Habitat would not be subjected to direct loss
Duration	<u>Indirect Impact</u> Disturbance impact (e.g. noise, dust, glare) during the construction phase would be temporary. Disturbance impact (e.g. noise, glare) during the operational phase would be permanent.
Reversibility	Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.
Magnitude	Low
Regional significance	No direct loss of habitat is anticipated. Recorded species are mostly common and widespread in Hong Kong. No rare species was recorded. Impact on ecological connectivity between habitats and species population is not anticipated.
Overall Impact Significance	**Low**

Table 9.30 Evaluation of Potential Ecological Impacts to Modified Watercourse

Criteria	Modified Watercourse
Habitat Quality	Low

Criteria	Modified Watercourse
Species	Low floral and faunal diversity Recent Surveys No floral / faunal species of conservation importance was recorded. Previous Studies One faunal species of conservation importance was recorded previously but not found in recent surveys.
Size / Abundance	1.34 ha of habitat would be subjected to permanent loss.
Duration	Direct Impact Loss of habitat within the footprint of proposed works would be permanent. Indirect Impact Disturbance impact (e.g. noise, dust, glare, water quality) during the construction phase would be temporary. Operational phase impact not anticipated as this habitat would be replaced by developed area.
Reversibility	Permanent habitat loss would be irreversible. Construction phase indirect impacts would be reversible.
Magnitude	Low
Regional significance	Artificial habitat and common in Hong Kong. Recorded species are mostly common and widespread in Hong Kong. Impact on ecological connectivity between habitats and species population is not anticipated.
Overall Impact Significance	**Low**

Table 9.31 Evaluation of Potential Ecological Impacts to Intertidal Habitat (Rocky Shore)

Criteria	Intertidal Habitat (Rocky Shore)	
	Western Junk Bay	**Eastern Junk Bay**
Habitat Quality	Low	
Species	TKO 137: Low floral and faunal diversity TKO 132: Low floral diversity and low to moderate faunal diversity Recent Surveys One floral species of conservation importance was recorded. three faunal species of conservation importance was recorded. Previous Studies No floral species of conservation importance was recorded. Five faunal species of conservation importance were recorded previously but not found in recent surveys.	
Size / Abundance	1.04 ha (0.80 ha due to land-based works and 0.24 ha due to marine works) of habitat would be subjected to permanent loss. 0.41 ha (due to land-based works) of habitat would be subjected to temporary loss.	Habitat would not be subjected to direct loss.
Duration	Direct Impact Loss of habitat within the footprint of proposed reclamation and other works would be permanent.	Direct Impact Loss of habitat within the footprint of proposed works would be permanent. Indirect Impact

Criteria	Intertidal Habitat (Rocky Shore)	
	Western Junk Bay	**Eastern Junk Bay**
	Loss of habitat within the footprint of temporary works would be temporary. <u>Indirect Impact</u> Disturbance impact (e.g. noise, dust, glare, water quality) during the construction phase would be temporary. Disturbance impact (e.g. noise, glare, water quality) during the operational phase would be permanent.	Disturbance impact (e.g. noise, dust, glare, water quality) during the construction phase would be temporary. Disturbance impact (e.g. noise, glare, water quality) during the operational phase would be permanent.
Reversibility	Permanent habitat loss would be irreversible. Temporary habitat loss would be reversible. Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.	Permanent habitat loss would be irreversible. Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.
Magnitude	Low	Low
Regional significance	The impacted area contributes to only a small proportion of this habitat in Hong Kong. Recorded species are mostly common and widespread in Hong Kong. No rare species was recorded. Impact on ecological connectivity between habitats and species population is not anticipated.	
Overall Impact Significance	**Low**	**Low**

Table 9.32 Evaluation of Potential Ecological Impacts to Intertidal Habitat (Soft Shore)

Criteria	Intertidal Habitat (Soft Shore)
	Western Junk Bay
Habitat Quality	Low
Species	Low floral and faunal diversity <u>Recent Surveys</u> No floral/faunal species of conservation importance was recorded. <u>Previous Studies</u> Two faunal species of conservation importance were recorded previously but not found in recent surveys.
Size / Abundance	0.01 ha (due to land-based works) of habitat would be subjected to permanent loss. 0.08 ha (due to land-based works) of habitat would be subjected to temporary loss.
Duration	<u>Direct Impact</u> Loss of habitat within the footprint of proposed reclamation and other works would be permanent. Loss of habitat within the footprint of temporary works would be temporary. <u>Indirect Impact</u> Disturbance impact (noise, dust, glare, water quality) during the construction phase would be temporary. Disturbance impact (changes in hydrodynamic regime and water quality pattern) during the operational phase would be permanent.

Criteria	Intertidal Habitat (Soft Shore)
	Western Junk Bay
Reversibility	Permanent habitat loss would be irreversible. Temporary habitat loss would be reversible. Construction phase indirect impacts (deterioration of marine water quality) would be reversible. Operational phase indirect impacts (changes in hydrodynamic regime and water quality pattern) would be irreversible.
Magnitude	Low
Regional significance	The impacted area contributes to only a small proportion of this habitat in Hong Kong. Recorded species mostly common and widespread in Hong Kong. No rare species was recorded. Impact on ecological connectivity between habitats and species population is not anticipated.
Overall Impact Significance	**Low**

Table 9.33 Evaluation of Potential Ecological Impacts to Sea Area (Subtidal Hard Substrata)

Criteria	Sea Area (Subtidal Hard Substrata)	
	Western Junk Bay	**Eastern Junk Bay**
Habitat Quality	Subtidal Hard Substrata along Natural Shoreline: Moderate	Subtidal Hard Substrata along Natural Shoreline: Moderate Subtidal Hard Substrata along Artificial Seawall: Low
Species	Moderate faunal diversity and abundance A total of 28 hard coral and three black coral species of conservation importance were recorded from previous and current studies, mainly with low to moderate coverage	Moderate faunal diversity and abundance A total of 37 hard coral species of conservation importance were recorded from previous and current studies, mainly with low coverage
Size / Abundance	4.67 ha of habitat would be subjected to permanent loss. 0.50 ha of habitat would be temporary occupied during construction stage.	4.71 ha of habitat would be subjected to permanent loss.
Duration	<u>Direct Impact</u> Loss of habitat within footprint of proposed reclamation and other works would be permanent. <u>Indirect Impact</u> Disturbance impact (deterioration of marine water quality) during the construction phase would be temporary. Disturbance impact (changes in hydrodynamic regime and water quality pattern) during the operational phase would be permanent.	<u>Direct Impact</u> Loss of habitat within footprint of proposed reclamation and other works would be permanent. <u>Indirect Impact</u> Disturbance impact (deterioration of marine water quality) during the construction phase would be temporary. Disturbance impact (changes in hydrodynamic regime and water quality pattern) during the operational phase would be permanent.
Reversibility	Permanent habitat loss would be irreversible. Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible	Permanent habitat loss would be irreversible. Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible

Criteria	Sea Area (Subtidal Hard Substrata)	
	Western Junk Bay	**Eastern Junk Bay**
Magnitude	Moderate	Low to moderate
Regional significance	Considered as small size in extent thus contributes to only a small proportion of this habitat in Hong Kong. Recorded species including hard coral and black coral species of conservation importance are mostly common and widespread in Hong Kong. No rare species was recorded. Impact on ecological connectivity between habitats and species population is not anticipated.	Considered as small size in extent thus contributes to only a small proportion of this habitat in Hong Kong. Recorded species including hard coral species of conservation importance are mostly common and widespread in Hong Kong. No rare species was recorded. Impact on ecological connectivity between habitats and species population is not anticipated.
Overall Impact Significance	**Low to Moderate**	**Low**

Table 9.34 Evaluation of Potential Ecological Impacts to Sea Area (Subtidal Soft Substrata)

Criteria	Sea Area (Subtidal Soft Substrata)	
	Western Junk Bay	**Eastern Junk Bay**
Habitat Quality	Low	
Species	Low diversity and abundance *Recent Surveys* A total of three black coral species of conservation importance were recorded in low coverage	Low diversity and abundance *Recent Surveys* One amphioxus species of conservation importance was recorded. *Previous Studies* One amphioxus species of conservation importance were recorded previously but not found in recent surveys.
Size / Abundance	17.42 ha of habitat would be subjected to permanent loss. 7.54 ha of habitat would be subjected to temporary loss. 0.75 ha habitat would be temporary occupied during construction stage.	20.49 ha of habitat would be subjected to permanent loss. 0.34 ha of habitat would be subjected to temporary loss.
Duration	Direct Impact Loss of habitat within footprint of proposed reclamation and other works would be permanent. Loss of habitat due to sediment removal would be temporary. Indirect Impact Disturbance impact (deterioration of marine water quality) during the construction phase would be temporary. Disturbance impact (changes in hydrodynamic regime and water quality pattern) during the operational phase would be permanent.	Direct Impact Loss of habitat due to sediment removal would be temporary. Indirect Impact Disturbance impact (deterioration of marine water quality) during the construction phase would be temporary. Disturbance impact (changes in hydrodynamic regime and water quality pattern) during the operational phase would be permanent.
Reversibility	Permanent habitat loss would be irreversible.	Construction phase indirect impacts would be reversible.

Criteria	Sea Area (Subtidal Soft Substrata)	
	Western Junk Bay	Eastern Junk Bay
	Temporary habitat loss would be reversible. Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.	Operational phase indirect impacts would be irreversible.
Magnitude	Low	Low
Regional significance	Considered as small size in extent thus contributes to only a small proportion of this habitat in Hong Kong. Recorded species are common and widespread in Hong Kong. Impact on ecological connectivity between habitats and species population is not anticipated.	Considered as small size in extent thus contributes to only a small proportion of this habitat in Hong Kong. Recorded species are common and widespread in Hong Kong. Impact on ecological connectivity between habitats and species population is not anticipated.
Overall Impact Significance	**Low**	**Low**

Table 9.35 Evaluation of Potential Ecological Impacts to Sea Area (Water Column)

Criteria	Sea Area (Water Column)	
	Western Junk Bay	Eastern Junk Bay
Habitat Quality	Low	
Species	Low diversity and abundance No marine mammal and other species of conservation importance was recorded	Low diversity and abundance No marine mammal and other species of conservation importance was recorded
Size / Abundance	19.99 ha of habitat would be subjected to permanent loss. 1.25 ha habitat would be temporary occupied during construction stage.	19.77 ha of habitat would be subjected to permanent loss.
Duration	<u>Direct Impact</u> Loss of habitat within footprint of proposed reclamation and other works would be permanent. Loss of habitat within the footprint of temporary works would be temporary. <u>Indirect Impact</u> Disturbance impact (deterioration of marine water quality) during the construction phase would be temporary. Disturbance impact (changes in hydrodynamic regime and water quality pattern) during the operational phase would be permanent.	<u>Direct Impact</u> Loss of habitat within footprint of proposed reclamation and other works would be permanent. Loss of habitat within the footprint of temporary works would be temporary. <u>Indirect Impact</u> Disturbance impact (deterioration of marine water quality) during the construction phase would be temporary. Disturbance impact (changes in hydrodynamic regime and water quality pattern) during the operational phase would be permanent.
Reversibility	Permanent habitat loss would be irreversible. Temporary habitat loss would be reversible. Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.	Permanent habitat loss would be irreversible. Temporary habitat loss would be reversible. Construction phase indirect impacts would be reversible. Operational phase indirect impacts would be irreversible.
Magnitude	Low	Low

Criteria	Sea Area (Water Column)	
	Western Junk Bay	**Eastern Junk Bay**
Regional significance	Considered as small size in extent thus contributes to only a small proportion of this habitat in Hong Kong. Recorded species are common and widespread in Hong Kong. Impact on ecological connectivity between habitats and species population is not anticipated.	Considered as small size in extent thus contributes to only a small proportion of this habitat in Hong Kong. Recorded species are common and widespread in Hong Kong. Impact on ecological connectivity between habitats and species population is not anticipated.
Overall Impact Significance	**Low**	**Low**

9.9 Cumulative Impacts

9.9.1.1 According to latest available construction programme, the construction of Project is to begin tentatively in Q4 of 2025 and would last until Q4 of 2041. A number of committed and planned developments (proposed commencement and completion date of the concurrent projects refer to **Table 2.19**) that would likely interface with the construction / operation of TKO 137 and TKO 132 were identified in the vicinity of the Project. These include:

- Second Stage of Desalination Plant at TKO
- Implementation of a Large Scale Solar Farm at South East New Territories Landfill for Supplying Renewable Energy to the TKO Desalination Plant
- Existing SENTX
- Construction of New Berthing Facilities and Associated Structures within Tseung Kwan O Area 137 Fill Bank
- Cavern Development in Area around Tseung Kwan O
- Proposed TKO Line Southern Extension (TKLSE)

9.9.1.2 The proposed works of the second stage of Desalination Plant at TKO would be conducted within the Project boundary of the Desalination Plant and would not overlap within the Project site of TKO 137. Nonetheless, potential cumulative disturbance to adjacent natural habitats, including those within CWBCP, could arise from the construction works of TKO 137 and proposed works of the Desalination Plant. Given that the Desalination Plant is already under construction, the concerned habitats are already subjected to disturbance from the construction works and operation of the existing TKO 137 Fill Bank. Moreover, adverse disturbance impacts are neither identified in EIA study of the Desalination Plant (WSD, 2015) nor this Project. Thus, the ecological impact from cumulative disturbance impact is expected to be low and would be acceptable with the implementation of proper mitigation measures.

9.9.1.3 The implementation of solar farm comprises the construction and operation of a solar farm in existing SENT Landfill. Cumulative disturbances may arise from the construction and operation of the solar farm and TKO 137 to adjacent natural habitats, including those within CWBCP. However, the concerned natural habitats and the CWBCP are generally disturbed by the existing operation of the SENT Landfill and Fill bank in TKO 137. The solar farm and development of TKO 137 would also be largely confined with the boundary of the landfill and fill bank. Thus, the cumulative disturbance impact is expected to be acceptable with the implementation of proper mitigation measures from the respective projects.

9.9.1.4 The operation and restoration works of the existing SENTX Landfill would overlap with the construction phase of this Project. Potential cumulative disturbance to adjacent natural habitats, including those within CWBCP, could arise from the construction works of TKO 137 and operation/restoration works of the existing SENTX landfill. Nonetheless, as these habitats are generally disturbed by the existing construction works and operation of the SENTX Landfill and Fill bank in TKO 137, the additional disturbance arising from the Project is not expected to significantly increase the impact magnitude. Thus, the ecological impact from cumulative disturbance impact is expected to be low and would be acceptable with the implementation of proper mitigation measures.

9.9.1.5 The construction of new berthing facilities and associated structures within Tseung Kwan O Area 137 fill bank would locate near the southern end of TKO Area 137 Fill Bank and will be use from October 2026 to December 2031. The construction will commence in October 2025 and target to complete in October 2026, which would overlap with the reclamation works in TKO 137. Nonetheless, as the new berthing facilities and associated structures would be constructed within the extend of the reclamation area in TKO 137, the direct and indirect ecological impacts including marine habitat loss and the disturbance arising from water quality impact are unlikely to excess the impact magnitude of the reclamation work in TKO 137. Thus, the cumulative impact is expected to be acceptable with the implementation of proper mitigation measures from the respective projects.

9.9.1.6 The Cavern Development in Area around Tseung Kwan O would mainly be located inside an underground cavern, but some loss of habitats in Fat Tong Chau would be expected due to aboveground works associated with the cavern development. Nonetheless, according to the best available information, only limited loss of mixed woodland, plantation and developed area in the north of Fat Tong Chau would be expected from the proposed aboveground works (i.e. cavern portal and slope cutting) of the cavern development. The loss of natural habitats from TKO 137 and Cavern Development are both expected to be small in size, and the cumulative loss is expected to be minor. Some cumulative disturbance impact during the construction and operation of the Cavern Development and TKO 137 to natural habitats on Fat Tong Chau is also anticipated. Nonetheless, given that these habitats are already subjected to disturbance nearby and the fauna diversity and abundance is relatively low, the cumulative disturbance impact is expected to be minor. Thus, the ecological impact from cumulative direct and indirect impacts from the respective projects is expected to be acceptable with the implementation of proper mitigation measures.

9.9.1.7 The alignment and construction details of the TKO Line Southern Extension (TKLSE) is yet to be confirmed. The only currently known information is that part of the TKLSE alignment would be located within the development area of TKO 137, while the alignment would be generally located underground. The construction programme and details of TKLSE are currently not available. Detailed impacts of TKLSE will be assessed under a separate EIA study, which will take into account other concurrent construction activities and, where necessary, recommend mitigation measures to minimise potential impacts. Nonetheless, given that the reclamation of the TKO 137 is also unlikely to cause adverse ecological impact, the cumulative impact is expected to be acceptable with the implementation of proper mitigation measures from the respective projects.

9.10 Mitigation of Adverse Ecological Impacts

9.10.1 Mitigation Approach

9.10.1.1 According to the Annex 16 of EIAO-TM and EIAO Guidance Note. 3/2010, ecological impacts on important habitats and the associated wildlife caused by the proposed Project should be mitigated by, in order of priority, avoidance, minimisation, and compensation approaches to the maximum practical extent.

9.10.1.2 The potential impacts arising from the construction and operation of the Project and the mitigation measures requirements are summarised in **Table 9.36** to **Table 9.37**. Additional mitigation measures are also proposed under this project to further minimise and reduce the effect of the impact, where applicable.

Table 9.36 Summary of Potential Impacts and Mitigation Measure Requirements of the Construction of the Project

Potential Impact	Unmitigated Level of Impacts	Mitigation Measures Required/ Proposed (✓/×)	Implementation of Proposed Mitigation Measures			
			Implement Location and Arrangement	Resources Requirement (Key Personnel / Implementation Agent)	Subsequent Management and Maintenance	Feasibility and Effectiveness
Direct Impact						
Impact on Recognised Sites of Conservation Importance and Other Ecologically Sensitive Sites						
– *Clear Water Bay Country Park*	None	×	-	-	-	-
– *Coastal Protection Area*	None	×	-	-	-	-
– *Coral Recipient Sites*	None	×	-	-	-	-
Permanent and Temporary Loss of Terrestrial and Marine Habitats and Impact on Associated Wildlife						
– *Mixed Woodland, Shrubland, Shrubby Grassland / Grassland; Developed Area, Intertidal Habitats (Rocky Shore and Soft Shore)*	Low	×	-	-	-	-
– *Subtidal Habitat (Soft Substrata)*	Permanent Loss: Low; Temporary Loss: Low	×	-	-	-	-
– *Subtidal Habitat (Hard Substrata) for TKO 132*	Low to Moderate	✓	Within Project boundary; Implemented in	Project Proponent / Design stage consultant	Not required	Reduction of reclamation extent considered to be feasible in

Potential Impact	Unmitigated Level of Impacts	Mitigation Measures Required/ Proposed (✓/×)	Implementation of Proposed Mitigation Measures			
			Implement Location and Arrangement	Resources Requirement (Key Personnel / Implementation Agent)	Subsequent Management and Maintenance	Feasibility and Effectiveness
		Minimisation (Refinement of reclamation extent) (**Section 9.10.3.5** to **9.10.3.8**)	reclamation design			**Section 2.11,** and effectively minimise the loss of subtidal hard substrata
Impact on Species of Conservation Importance						
– *Species with high mobility, flight ability and/or with low site fidelity, e.g. avifauna, mammals, reptiles and butterflies*	Low	×	-	-	-	-
– *Species with lower mobility, or with restricted habitat niche,*						
• Flora (*Diospyros vaccinioides*)	Moderate	✓ Minimisation (In-situ preservation and/or transplantation) (**Section 9.10.3.13** to **9.10.3.14**)	Within Project boundary; before commencement of site clearance	Qualified ecologist / botanist (s) / Project Proponent / Design stage consultant / Contractor/	Post-mitigation monitoring programme if transplantation / compensatory planting deemed necessary	Proven to be feasible and effective in previous studies: DSD (2016)
• Corals (hard and black coral species) for TKO 132	Low to Moderate for hard coral Low for black coral	✓ Minimisation (Translocation)	Within Project boundary; before commencement of reclamation / marine works	Marine ecologist(s) / Project Proponent / Design stage	Post-mitigation monitoring programme for translocated coral colonies	Proven to be feasible and effective in previous studies:

Potential Impact	Unmitigated Level of Impacts	Mitigation Measures Required/ Proposed (✓/×)	Implementation of Proposed Mitigation Measures			
			Implement Location and Arrangement	Resources Requirement (Key Personnel / Implementation Agent)	Subsequent Management and Maintenance	Feasibility and Effectiveness
		(**Section 9.10.3.9** to **9.10.3.11**)		consultant / Contractor		CEDD (2013b); CEDD (2021)
• Amphioxus	Low	×	-	-	-	-
Direct Injury / Mortality to Wildlife and Bird Collision	Low	×	-	-	-	-
– *Terrestrial fauna*	Low	×	-	-	-	-
– *Corals (hard and black coral species) for TKO 132*	Low to Moderate for hard coral Low for black coral	✓ Minimisation (Translocation) (**Section 9.10.3.9** to **9.10.3.11**)	Within Project boundary; before commencement of reclamation / marine works	Marine ecologist(s) / Project Proponent / Design stage consultant / Contractor	Post-mitigation monitoring programme for translocated coral colonies	Proven to be feasible and effective in previous studies: CEDD (2013b); CEDD (2021)
– *Other intertidal / benthic organisms (including soft corals)*	Low	×	-	-	-	-
Habitat Fragmentation and Impact on Wildlife Movement	Low	×	-	-	-	-
Indirect Impact						
Disturbance Impacts on Recognised Sites of Conservation Importance and Other Ecologically Sensitive Sites						

Potential Impact	Unmitigated Level of Impacts	Mitigation Measures Required/ Proposed (✓/×)	Implementation of Proposed Mitigation Measures			
			Implement Location and Arrangement	Resources Requirement (Key Personnel / Implementation Agent)	Subsequent Management and Maintenance	Feasibility and Effectiveness
– *Clear Water Bay Country Park*	Low to Moderate	✓ Minimisation (Disturbance Impact Control (Air, Noise, Water Quality, etc.)) (**Section 9.10.3.16** to **9.10.3.21**)	Within Project boundary; during construction and operation phase	Project Proponent / Contractor	Environmental monitoring and audit	Refer to **Section 3.8, 4.8** and **5.11-5.13**
– *Coastal Protection Area*	Low	×	-	-	-	-
– *Coral Recipient Sites*	Low to Moderate	✓ Minimisation (Water Quality Impact Control) (**Section 9.10.3.22** to **9.10.3.25**)	Within Project boundary; during construction and operation phase	Project Proponent / Contractor	Environmental monitoring and audit	Refer to **Section 5.11-5.13**
Disturbance Impacts on Terrestrial Habitats and Associated Wildlife	Low	×	-	-	-	-
Water Quality Impact on Aquatic and Marine Habitats and associated wildlife / organisms						
– *On watercourses and associated freshwater fauna*	Low	×	-	-	-	-

Potential Impact	Unmitigated Level of Impacts	Mitigation Measures Required/ Proposed (✓/×)	Implementation of Proposed Mitigation Measures			
			Implement Location and Arrangement	Resources Requirement (Key Personnel / Implementation Agent)	Subsequent Management and Maintenance	Feasibility and Effectiveness
– *On marine habitats and associated fauna*	Low to Moderate	✓ Minimisation (Water Quality Impact Control) (**Section 9.10.3.22** to **9.10.3.25**)	Within Project boundary; during construction and operation phase	Project Proponent / Contractor	Environmental monitoring and audit	Refer to **Section 5.11-5.13**
Water Quality Impact on Species of Conservation Importance	Low	×	-	-	-	-

Table 9.37 Summary of Potential Impacts and Mitigation Measures Requirements of the Operation of the Project

Potential Impact	Unmitigated Level of Impacts	Mitigation Measures Required/ Proposed (✓/×)	Implementation of Proposed Mitigation Measures			
			Implement Location and Arrangement	Resources Requirement (Key Personnel / Implementation Agent)	Subsequent Management and Maintenance	Feasibility and Effectiveness
Direct Impact						
Impact on Recognised Site of Conservation Importance, Other Ecologically Sensitive Sites and Terrestrial and Marine Habitats						

Potential Impact	Unmitigated Level of Impacts	Mitigation Measures Required/ Proposed (✓/×)	Implementation of Proposed Mitigation Measures			
			Implement Location and Arrangement	Resources Requirement (Key Personnel / Implementation Agent)	Subsequent Management and Maintenance	Feasibility and Effectiveness
- *Clear Water Bay Country Park*	None	×	-	-	-	-
- *Coastal Protection Area*	None	×	-	-	-	-
- *Coral Recipient Sites*	None	×	-	-	-	-
- *Terrestrial Natural Habitats*	None	×	-	-	-	-
- *Subtidal hard substrata*						
○ TKO 137	Low	×	-	-	-	-
○ TKO 132	Low	×	-	-	-	-
- *Subtidal soft substrata*	Low	×	-	-	-	-
Impact on Species of Conservation Importance (Hard Coral)	Low	×	-	-	-	-
Habitat Fragmentation and Impact on Wildlife Movement	Low	×	-	-	-	-
Direct Injury / Mortality to Wildlife and Bird Collision						
- *Direct Injury / Mortality*	Low to Moderate	✓ <u>Minimisation</u> (Minimise injury / mortality through vegetation buffers	Within Project boundary; Implemented in detailed design	Project Proponent / Design stage consultant	Not required	Proven to be feasible and effective in relevant literature:

Potential Impact	Unmitigated Level of Impacts	Mitigation Measures Required/ Proposed (✓/×)	Implementation of Proposed Mitigation Measures			
			Implement Location and Arrangement	Resources Requirement (Key Personnel / Implementation Agent)	Subsequent Management and Maintenance	Feasibility and Effectiveness
		and / or other feasible design) (**Section 9.10.3.15**)				Kautz et al.(2010)
- *Bird Collision*	Low	×	-	-	-	-
Indirect Impact						
Disturbance Impacts on Recognised Sites of Conservation Importance and Other Ecologically Sensitive Sites	Low	×	-	-	-	-
Disturbance Impacts on Terrestrial Habitats and Associated Wildlife	Low	×	-	-	-	-
Changes in Hydrodynamic Properties and Water Quality Pattern	Low	×	-	-	-	-
Marine Water Quality Impact to Marine Habitats and Associated Marine Organisms	Low	×	-	-	-	-
Maintenance Sediment Removal for TKO 132	Low	×	-	-	-	-

9.10.2 *Avoidance*

Avoidance of Adverse Impacts to Recognised Sites of Conservation Importance and Associated Floral Species of Conservation Importance

9.10.2.1 Recognised sites of conservation importance within the Project boundary includes CWBCP. The development of the TKO 137 and associated works such as the NTHMM has avoided encroaching on the CWBCP, as such avoiding direct impact.

Avoidance of Adverse Impacts to Coral Recipient Sites

9.10.2.2 Two coral recipient sites were identified at Fat Tong Chau and western Junk Bay within the marine assessment area of the Project. The reclamation of TKO 137 and 132 are designed to avoid encroachment on these coral recipient sites, as such avoiding direct impacts.

Avoidance of direct impact on Black Kite and other breeding avifauna

9.10.2.3 During ecological survey conducted in the dry season, a nest of the Black Kite, an avifauna species of conservation importance, was identified in the mixed woodland to the west of Chiu Keng Wan in the assessment area of TKO 132. Studies have indicated that the breeding season for Black Kites occurs from October to May (HKBWS, 2024). To prevent any direct impact on Black Kite, especially during their breeding period, construction activities involving vegetation clearance would be avoided in habitat where the nest was recorded. The temporarily affected area for construction works was located about 35m away from the location of the recorded nest. Prior to any vegetation clearance work in TKO 132, thorough pre-construction survey is recommended to ensure that no nests of the Black Kite or other avifauna species would be affected.

Avoidance of blockage on downstream of S2 in Chiu Keng Wan

9.10.2.4 The latest alignment option avoided fragmentation (a direct impact on the connectivity) between the coastal area Chiu Keng Wan and the natural watercourse S2, where a diadromous fish of conservation importance, Philippine Neon Goby, was previously recorded. Although this species has not been recorded in recent surveys, its potential passage between the stream habitat and coastal water has been preserved to allow potential migration. Works including NTHMMs and construction of marine viaduct would be conducted at least 20 m away from S2 and located at the downstream area as to avoid any potential ecological impacts.

9.10.3 *Minimisation*

9.10.3.1 To minimise habitat loss of the habitats and associated wildlife in the vicinity, the following mitigation measures shall be implemented.

Minimisation of Adverse Impacts to Recognised Sites of Conservation Importance and Natural Habitats

9.10.3.2 Through careful design consideration, the loss of natural habitats and associated vegetation was minimised and largely avoided habitat with higher ecological value such as mixed woodland and shrubby grassland / grassland. Provision of screening (e.g. by erection of hoarding) during construction phase is recommended to confine the proposed Project footprint to avoid any unnecessary encroachment of construction works and unintended access by workers on the adjacent sensitive natural habitats, including those within CWBCP. Other mitigation measures to minimise disturbance impact as stated in **Section 9.10.3.16** – **9.10.3.21** below would also minimise the disturbance impact to the CWBCP.

9.10.3.3 Potential NTHMMs may be undertaken at natural habitats such as mixed woodland and shrubland adjacent to the Project site of TKO 137 and 132, the extent of NTHMMs have been

carefully reviewed to minimise the potential direct ecological impact (i.e. habitat and vegetation loss) to the maximum practicable extent under the current design.

9.10.3.4 As per **Section 11.8** of the Landscape and Visual Impact Assessment, to minimise unnecessary impacts on trees in mixed woodland and other natural habitats, appropriate protection measures shall be implemented. Upon the completion of the construction works, vegetation area will also be reinstated as far as possible. Such mitigation measures could also minimise the ecological impact on natural habitats arising from the Project.

Minimisation of Direct Impact of Terrestrial and Marine Natural Habitats and Associated Wildlife

9.10.3.5 To minimise the extent of terrestrial and marine habitat loss and its ecological impact, the proportion and extent of land-based (e.g. site formation, NTHMMs) and marine works (e.g. reclamation) were minimised and strategically positioned along existing developed area or habitat edges where the habitat quality was considerably lower, to avoid and/or minimise the loss of habitats with higher ecological value and the potential of habitat fragmentation.

9.10.3.6 The proposed development in TKO 137 and TKO 132 have been carefully designed to minimise the direct loss of terrestrial (e.g. mixed woodland) and marine habitats (e.g. subtidal hard bottom habitats) and coral communities as far as practicable. The land-based development of TKO 137 would be largely confined within the existing Fill Bank with encroachment on shrubland and shrubby grassland / grassland with lower ecological value in Fat Tong Chau, while the reclamation in TKO 137 has been confined to the coastal area along the existing artificial seawall of the existing Fill Bank where only limited coral communities was recorded. Direct impact to area with higher coral diversity and coverage including the natural shoreline Fat Tong Chau and Tit Cham Chau have also been avoided (refer to **Figure 9.6.1**).

9.10.3.7 The land-based works (e.g. slope-cutting, NTHMMs) in TKO 132 would encroach on both rocky shore, soft shore and mixed woodland habitats, while impact on shrubland habitat due to land-based works is not expected in TKO 132 (refer to **Table 9.21**). Direct impact to mixed woodland has been confined along the edges these habitats at the hillslope of western Junk Bay, while further encroachment on the uphill areas of the mixed woodland has been minimised (refer to **Figure 9.6.2**). The scale and extent of land-based works on rocky shore and soft shore have also been minimised due to the reduction of reclamation extent in TKO 132.

9.10.3.8 To minimise encroachment on marine habitats including intertidal and subtidal habitats and direct impact on associated marine organisms including corals, the land to be created through reclamation in TKO 132 have been significantly reduced by around 25% comparing to the original scheme with 25 ha reclamation (see **Table 2.7**). With consideration to engineering and other constraints posed by the site conditions and the inherent requirement of the proposed public facilities (e.g. site layout, connection with existing facilities, etc.), the current layout has been minimised as best as possible. Thus, the potential direct impact to the marine habitats and associated marine organisms in western Junk Bay from reclamation has been minimised. In addition, sediment removal for CBP berthing operation would be confined to area with water depth more than 8m, to minimise direct impact on the subtidal hard substrata in shallow water (4-8m) where most hard coral colonies were recorded.

9.10.3.9 While the extent of reclamation in TKO 132 has been reduced, some colonies of hard corals and black coral identified within the reclamation extent and / or area of sediment removals would still be inevitably affected. To minimise the unavoidable direct loss/damage to the coral colonies due to the reclamation and sediment removal (including the sediment removal area for both construction and operational phase), translocation will be implemented as a mitigation measure during construction phase, for affected coral colonies of high ecological value. In addition, the reclamation in TKO 137 would also directly affect the coral colonies within or adjacent to the reclamation extend. Although the impact on hard coral in TKO 137 was considered as low due to low coral coverage and species diversity, as a precautionary

measure, translocation of affected corals is also recommended when necessary. To facilitate the coral translocation and assess the translocation feasibility of the affected coral colonies, a pre-construction detailed survey shall be conducted to identify the location, condition, number, and translocation feasibility of coral colonies within the affected subtidal habitats. Identified coral colonies should be sized, mapped and tagged. The survey shall be conducted by qualified coral ecologist(s) prior to the commencement of marine works. The result of the coral mapping shall be presented in the Coral Mitigation Plan. The translocation feasibility of the affected coral colonies of high ecological value should be determined during the coral mapping and stated in the Coral Mitigation Plan. All translocatable coral colonies (e.g. attach on moveable substrate with diameter <50 cm with particular size and health condition suitable for translocation) should be translocated. Attention should be given to coral species of high ecological value that are habitat sensitive, uncommon, and/or threatened (e.g. listed Vulnerable or above in IUCN Red List), which shall be translocated as far as possible. Innovative / non-standard translocation method including detachment of coral colonies from unmovable boulders or bed rock should also be explored for these concerned species, subject to detailed formulation in the Coral Mitigation Plan. For example, detachment of non-encrusting coral species shall be considered.

9.10.3.10 The coral translocation is recommended to be undertaken during the winter season (November-March) in order to avoid disturbance to the spawning period (i.e. July to October) of the affected coral colonies. A detailed Coral Mitigation Plan, including the result of pre-construction detailed coral survey, description of methodology including translocation (e.g. pre-translocation survey, identification / proposal of coral recipient site(s)) and/or other best practicable mitigation measures, and post-mitigation and/or post-translocation monitoring programme should be prepared with reference to recently approved EIA, and submit to AFCD for approval before commencement of coral mitigation. All the coral mitigation exercises should be conducted by a qualified marine ecologist(s) with SCUBA diving qualification and at least 5 years of relevant experience.

9.10.3.11 The recipient site of coral translocation should have the following characteristics:

- In the vicinity of Junk Bay where the marine conditions e.g. water depth, flow rate and temperature etc. are similar to the donor site.
- Presence of healthy coral communities of the same species or similar species in the same family.
- Sufficient space available for the newly translocated coral
- Not to be impacted by construction works of this Project and other planned/committed projects.

The Joss House Bay has been preliminary identified as the potential coral recipient site, as it located in the vicinity of Junk Bay where the marine conditions e.g. water depth, flow rate and temperature etc. are similar to the donor site. In addition, based on the study of WSD (2015), healthy coral communities of the same species as the donor site were recorded. It is also expected that the Joss House Bay would have sufficient space available (around 2 km of natural shoreline compare with 0.85 km to be affected by the Project; affected coral colonies with low and low to moderate coverage) for the newly translocated coral and not to be impacted by construction works. The suitability of the Joss House Bay or other locations, such as Cape Collinson and the shore off Hong Kong Museum of Coastal Defence, as the coral recipient site(s) shall be further studied in the future stage. The assessment criteria and rationale on the site section shall be stated in the Coral Translation Plan, and submit to AFCD for approval before commencement of coral mitigation.

9.10.3.12 In addition, land requirement for temporary works was also optimised and minimised to avoid additional clearing of land beyond the works area. Majority of the temporary works area would be a 10 m setback from the works area, which would be the minimum that would be necessary for supporting the construction of TKO 137 and TKO 132. Temporary works area shall be reinstated to its original condition as far as possible. Hydroseeding and planting of plant

species found in the original habitat should be prioritised to maximise and achieve a reinstated condition that resembles the original habitat condition as close as possible.

Minimisation of Impact on Floral Species of Conservation Importance

9.10.3.13 For floral species of conservation importance identified within / adjacent to the Project works footprint, including low abundance of *Diospyros vaccinioides* within the footprint of site formation in TKO 137, proper mitigation measure including in-situ preservation and transplantation shall be implemented.

9.10.3.14 Detailed vegetation survey shall be conducted by qualified ecologist / botanist (s) with at least 5 years of relevant experience to identify, tag and demarcate any floral species of conservation importance located within / adjacent to the footprint of proposed works prior to site clearance. All the identified floral species of conservation importance shall be preserved on site as far as possible with provision of plant protection zones with sturdy fencing. Plant protection zones of at least 1.5 m setback from the floral species of conservation importance would be set up as far as possible during the construction phase. No trimming of the flora species of conservation importance would be allowed. No access and construction activities would be allowed within the plant protection zones. In case in-situ preservation is found to be impractical during the later design phase, appropriate alternative mitigation measures (e.g. transplantation / compensatory planting of the same species of conservation importance where practical) should be considered. Considering the anticipated low abundance of floral species of conservation importance that are expected to be unavoidably impacted, the affected individuals could be transplanted to / compensatory planting could be carried out in adjacent shrubland habitats. Transplantation proposal for the affected individuals (including details on the individuals to be transplanted, methodologies, and associated post-translocation monitoring) would be prepared if necessary and submitted for AFCD's approval.

Minimisation of Direct Mortality of Wildlife

9.10.3.15 Direct injury and mortality of wildlife is anticipated to be low to moderate from the proposed development, some design features would be considered to further minimise any potential direct injury / mortality. For instance, implementation of vegetation buffers along traffic roads with dense vegetation could prevent access and guide wildlife away from the roads. Depends on feasibility, other potential design features such as wildlife underpasses and wider road shoulders could also be explored in the planning design of the development. As these designs could minimise the likelihood of wildlife mortality due to roadkill (Kautz et al.,2010) and other incidences. In addition, precautionary measures such as using non-transparent or non-glazing materials in noise barrier, if any, and / or windows of other buildings could be implemented to minimise the potential of bird collisions.

Minimisation of Disturbance Impacts during Construction and Operational phase

9.10.3.16 Mitigation measures to be recommended in **Section 3.8**, **4.8** and **5.11** to **5.13** for controlling air, noise and water quality impact during the construction and operational phases would serve also to minimise the ecological impact arising from disturbance on natural habitats adjacent to TKO 137 and 132, including those within the CWBCP.

9.10.3.17 Proper implementation of the dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation (Cap. 311R) would avoid and minimise impacts to the surrounding habitats and the associated wildlife arising from the construction activities. Good site practices (refer to **Section 3.14**) should also be adopted, such as proper storage of construction materials; and covering trucks or transporting wastes in enclosed containers to minimise windblown litter and dust during transportation of waste.

9.10.3.18 The relevant noise control standards stipulated in the Annex 5 of the EIAO-TM should be implemented as recommended in **Section 4.8**. The provision of movable noise barriers or enclosures would be erected to provide screening from the construction plant. The implementation of noise control requirements stated in the "Recommended Pollution Control

Clauses for Construction Contracts" is also recommended (EPD, 2019). In order to reduce the disturbance to the ecologically sensitive habitats adjacent to the Project footprint, the noise impact during construction phase should be avoided and minimised by the use of Quality Powered Mechanical Equipment (QPME) and orientating noisy machines / plant away from these habitats.

9.10.3.19 To avoid any adverse water quality impacts to surrounding terrestrial and marine habitats, mitigation measures and good site practices for water quality impacts during construction and operational phases are suggested in **Section 5.11** to **5.13** and should be implemented accordingly. For example, during construction phase, surface runoff from construction sites should be discharged into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sedimentation basins. Channels or earth bunds or sandbag barriers should be provided on site during construction works to properly direct stormwater to such silt removal facilities.

9.10.3.20 The glare from construction works should be controlled and minimised taking into account the presence of natural habitats, especially those within CWBCP. Proper implementation of mitigation measures, such as good site practices, restriction of construction hours from 07:00 to 19:00 (in particular, at construction activities near country park areas), night-time lighting control and lining hoarding at the Project boundary would further minimise potential ecological impacts. The intensity of artificial light from construction and operation activities should also be controlled to the lowest possible level. Unnecessary lighting should be turned off outside the working hours of the construction sites and developments in the operational phase. A balance between lighting for safety and avoiding excessive lighting can be achieved by using directional lighting.

9.10.3.21 Good site practices should also be strictly followed to minimise the disturbance impacts arising from the construction activities. Recommendations for good site practices during the construction phase include:

- Confining the works within the Project boundary;
- Erection of hoarding to avoid trespassing into nearby habitats;
- Storage of equipment or stockpile in the existing urbanised area within the Project boundary of the Project to minimise disturbance to vegetated areas;
- Nomination of approved personnel, such as a site manager, to be responsible for implementation of good site practices, arrangements for waste collection and effective disposal to an appropriate facility;
- Training of site personnel in site cleanliness, concepts of waste reduction, reuse and recycling, proper waste management and chemical waste handling procedures;
- Provision of sufficient waste reception / disposal points, and regular collection of waste;
- Adoption of appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers;
- Provision of regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors;
- Adoption of a recording system for the amount of waste generated, recycled and disposed (including the disposal sites); and
- Preparation of Waste Management Plan (WMP), as part of the Environmental Management Plan (EMP).

Minimisation of Marine Water Quality Impact during Construction and Operational phase

9.10.3.22 The DCM method enables in-situ stabilisation of the underlaying marine mud within the proposed reclamation footprint. It is capable to treat sediment in deep layer without excavation,

dredging, shoring or dewatering, and thus there is less exposure of sediment and waste to the water environment. By deployment of silt curtain and placing a layer of sand blanket on top of the DCM works areas before the DCM treatment, release of fines and cement slurry from the DCM operation would be negligible. Furthermore, reclamation filling would only be carried out following the completion of blockwork seawall and coping, such that reclamation filling would be confined within seawall coping, minimising the loss/escape of reclamation filling into adjacent waters outside the seawall coping.

9.10.3.23 Mitigation measures recommended in the water quality impact assessment for controlling water quality impact during the construction and operational phases would serve also to minimise the indirect water quality impacts on marine ecological resources, particularly coral communities and the coral recipient sites. **Section 5.11** of this EIA report detailed the good practices which shall be applied for the filling works, which are the largest potential sources for marine water quality impacts. Some of the relevant mitigation measures are listed below:

- Double silt curtain should be deployed to surround the underwater filling, removal of marine deposit / sediment and sand blanket laying works of TKO 132 development;
- Single layer silt curtain should be deployed to surround the underwater filling, removal of marine deposit / sediment and sand blanket laying works of TKO 137 development;
- Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation;
- Bored piling and any excavation for construction of the marine viaducts should be enclosed and carried out within steel casings or cofferdams or other equivalent systems that can effectively contain the material, debris and wastewater generated from the process. Plants should not be operated with leaking pipes, and any pipe leakages shall be repaired quickly;
- All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash;
- Perimeter drainage systems should be provided in the open areas to collect stormwater runoff;
- Regular collection and removal of floating refuse should be performed along the waterfront of TKO 132 during operational phase; and
- Maintenance sediment removal should be carried out by closed grab dredger.

9.10.3.24 Besides the above good site practices for filling works, there are also good site practices to control and minimise pollution generated from general construction works and sewage from workforce (see **Section 5.12**). Effluent monitoring and marine water quality monitoring as proposed in relevant chapters would make sure that the discharged effluent from construction sites meets the effluent discharge and marine water quality guidelines.

9.10.3.25 Restrictions prohibiting dumping of rubbish, food, oil, or chemicals should be strictly enforced. This should also be covered in the contractor briefings. There will also be a spill response plan if vessels operating in the works areas will be transporting oil or other hazardous chemicals. The oil spill response plan will have specific provisions for protecting marine ecological resources. With the proper implementation of these measures, the marine habitat and associated organisms in the area would be protected.

9.10.4 *Compensation*

9.10.4.1 With the implementation of avoidance and mitigation measures stated in **Section 9.10.2** to **9.10.3** above, the mitigated ecological impacts are expected to be low and thus no compensation is required for the identified ecological impacts.

9.10.5 *Enhancement Opportunities*

Enhancement Measures for Marine Habitat Loss

9.10.5.1 Enhancement measures including eco-shoreline / ecological enhanced seawall would be implemented to enhance the ecological function of the marine habitats adjacent to the TKO 137 and TKO 132. Deployment of subtidal artificial structures has also been explored in the following sections.

Eco-shoreline / Ecological Enhanced Seawall

9.10.5.2 The new vertical seawall along the TKO 132 would provide additional hard substrata for the recolonisation of intertidal fauna and corals. Ecological features (e.g. seawall enhanced with rough texture and irregular pattern) would be incorporated into the design of vertical seawall as far as practicable. Such features could increase the surface complexity of the seawall to provide shades and refuge marine organisms, including intertidal organisms. Comparing with traditional smooth concrete seawall, rough texture such as holes and crevices can increase the heterogeneity / complexity of the habitat and improve the water retention ability of the seawall surfaces. These features could reduce the chance of dehydration of the intertidal organisms during the low tide. A submission on the detailed design of the ecological features to be adopted will be prepared, subject to comment by the AFCD prior to the installation of the ecological features.

9.10.5.3 Eco-shoreline would be implemented along the seawall of the TKO 137, which provides beneficial functions to the local ecosystems, whilst providing coastal protection. The eco-shoreline is also anticipated to improve the ecological functionality along the shoreline of TKO 137 compared to the current seawall along the Fill Bank. The design of the eco-shoreline would emphasise on providing subtidal hard substrate which would be suitable for coral colonisation and could also support other intertidal and subtidal epifauna and pelagic fauna (e.g. provide shelter for juveniles of marine fauna, and grazing / feeding opportunities), thereby effectively enhancing the ecological function of the new seawalls. It is therefore recommended that during the detailed design of the reclamation, a study should be conducted to investigate the proper form of eco-shoreline to be adopted for the artificial seawall along the reclamation for TKO 132 and 137, and to devise the implementation scheme for incorporation into the reclamation construction programme. An eco-shoreline study report covering the recommendations of the proper form of eco-shoreline to be adopted, the detailed design of the eco-shoreline and the implementation programme will be submitted for the approval of AFCD before the commencement of reclamation works.

Deployment of Subtidal Artificial Structures

9.10.5.4 Artificial reef is tool that aim to provide a stable growing habitat for corals, fishes and other marine organisms. It made from a variety of natural or synthetic materials with variety of shapes and styles. Deployment of artificial reef in marine area which are unfavourable for the colonisation of coral, such as sandy bottom, could enhance the ecological function of that area by increasing the habitat diversity. It is suggested that artificial reef with proper materials such as concrete, steel, clay, etc., which proven to be ideal material for coral and other marine organisms for colonisation, should be selected. Innovative design / technology adopted in Hong Kong such as 3D printing technology to construct artificial coral reef shall be considered. The feasibility of the artificial reef deployment shall be further studied in the later stage of the Project. If found to be feasible, the location of deployment shall be properly selected by marine ecologist with at least 5 years relevant experience. The detailed design of the artificial coral reef and the implementation programme will be submitted for the approval of AFCD before commencement of reclamation works.

9.10.5.5 Oyster basket is another artificial structure which could be deployed in the subtidal habitats. The oyster cultivation could ecologically benefit the marine ecosystem, such as providing hard substrata in soft sediment shore or unstructured mudflat for marine organisms, which eventually increase the species diversity and biomass of the marine habitat. Nonetheless, as majority of the oyster cultivation in Hong Kong is situated in the western water of Hong Kong, which is also the lower basin of Pearl River Delta with estuarine conditions that are

favorable for natural oyster reefs and aquaculture. While the marine environment in the Junk Bay is found to be different from the western water as there are lack estuarine habitat such as mangrove and mudflat, which may not be favorable for oyster growth and cultivation. Hence, if feasible, the artificial reef would be a more preferable option for enhancing the marine environment in the Junk Bay area.

Enhancement Measures for Terrestrial Habitat Loss

Greening Opportunity

9.10.5.6 Greening opportunities should be explored to promote the overall habitat quality and ecological connection. Native tree, shrub and herb species should be considered as far as possible, with consideration of market availability, for landscape planting and buffer planting in the Project area. Furthermore, native host plants and nectar plants should preferentially be considered in the planting plan to provide a butterfly-friendly environment. Beside planting host and nectar plant for attracting butterfly, native fruits trees with food sources (e.g. *Ficus microcarpa, F. subpisocarpa, F. variegata, Dimocarpus longan, Clausena lansium*) can also be planted to attract birds. Buffer planting together with nectar plants and host plants is highly recommended especially in area close to CWBCP, where a higher faunal diversity and abundance were recorded.

9.11 Residual Ecological Impacts

9.11.1.1 With full implementation of the above recommended avoidance and minimisation mitigation measures, no unacceptable residual ecological impact is anticipated from the project. The level of impacts after mitigation for unmitigated impact with low to moderate / moderate level would be low.

9.12 Environmental Monitoring and Audit

9.12.1.1 Implementation of mitigation measures described in **Section 9.10** will be monitored and inspected regularly as part of the ecological monitoring programme during the construction period to ensure strict adherence to and the effectiveness of the implemented mitigation measures, as well as operational phase to ensure proper establishment, where necessary. Procedures and requirements for the implementation of mitigation measures on species of conservation importance are described below.

Mitigation Measures on Protection of Flora Species of Conservation Importance

9.12.1.2 As described in **Section 9.10.3.12** to **9.10.3.13**, a pre-construction detailed vegetation survey should be conducted by a qualified ecologist / botanist (s) with at least 5 years of relevant experience prior to the commencement of site clearance and construction works to identify the presence of any individuals of floral species of conservation importance within the works area, including but not limited to *Diospyros vaccinioides*, *Marsdenia lachnostoma*, and any other floral species of conservation importance recorded in the previous studies and the ecological survey. The curriculum vitae of the qualified ecologist / botanist (s) should be submitted to AFCD for review and approval beforehand. Each identified individuals should be tagged and mapped, with photographs and information including their height, diameter at breast height, spread, condition, form, amenity value, transplantation feasibility and survival of transplantation and proposed treatment etc. recorded and presented in the pre-construction detailed vegetation survey report. Prior to transplantation, the result of the pre-construction detailed vegetation survey and transplantation proposal should be prepared and submitted to AFCD for review and approval. The proposal shall include the proposed methodologies of plant preservation, transplantation and compensation, identification of suitable receptor site, implementation programme and post-transplantation monitoring and maintenance programme. In the case where some directly affected floral species of conservation importance were deemed infeasible for preservation or transplantation, legitimate justifications shall be provided. Compensation planting of the species could be considered and implemented. The compensation ratio of affected individuals should be in the ratio of 1:1,

unless agreed otherwise with AFCD. A planting proposal shall be prepared for agreement with AFCD containing information on the recommended planting quantity, planting location, planting methodologies as well as provision of a post-planting monitoring programme.

Translocation of Affected Coral Colonies

9.12.1.3 A pre-construction detailed coral survey shall be conducted in the marine works area prior to the commencement of marine works by a qualified marine ecologist(s) with SCUBA diving qualification and at least 5 years of relevant experience, the curriculum vitae of whom shall be submitted to AFCD along with the scope and methodology of the detailed coral survey for review and agreement prior to commencement of the survey. The survey should investigate the number and location of coral colonies to be directly affected by the construction of the marine viaduct piers, the reclamation and associated sediment removal works. Identified coral colonies should be sized, mapped and tagged. An assessment of the suitability of translocation for each identified coral colony should be presented in the coral translocation plan, along with the proposed recipient site, translocation methodology and programme, monitoring methodology and programme for the translocation of coral colonies. The potential translocation recipient site (e.g. Joss House Bay or other locations, such as Cape Collinson and shoreline off Hong Kong Museum of Coastal Defence) should possess a coral colony composition similar to that of the existing affected site and should be located well outside areas where direct and indirect impacts from the marine works of the Project, as well as of other planned/committed projects nearby, are expected. Post-translocation monitoring survey shall be conducted. Information gathered during post-translocation monitoring survey should include observations on the presence, survival, health condition and growth of the translocated coral colonies. These parameters should then be compared with the baseline results collected from the pre-translocation survey to assess the effectiveness of the translocation works.

Monitoring of Mitigation Measures for Disturbance Impact

9.12.1.4 To minimise the indirect disturbance impact (e.g. glare, air quality, noise and water quality and disturbance) to sites of conservation importance and natural habitats and associated wildlife, the implementation of the mitigation measures for minimisation of glare, air quality, noise, water quality and disturbance impact recommended in **Section 9.10** should be checked by regular site audit. Site audit should be carried out at least once per week throughout the construction phase by Environmental Team. In case of non-compliance, the Contractor should be informed to strengthen the proposed mitigation measures accordingly, following the procedures stated in **Section 16** of the EM&A Manual.

9.13 Conclusion

9.13.1.1 This section of the EIA addresses the terrestrial and marine ecological impacts associated with the construction and operation of the Project in TKO 137 and 132. The ecological impact assessment is to assess the acceptability of predicted impacts on terrestrial and marine ecological resources and sensitive receivers. The findings from previous studies and dedicated baseline field surveys have provided information for evaluating species of conservation importance and the ecological importance of various habitats within the assessment area and the Project area.

9.13.1.2 The CWBCP, CPA and coral recipient sites are identified as recognised sites of conservation importance / ecologically sensitive sites within the assessment area. A total of 12 habitat types were identified within the assessment area, including mixed woodland, plantation, shrubby grassland / grassland, shrubland, developed area, natural watercourse, modified watercourse, rocky shore and soft shore, water column, and subtidal hard substrata and soft substrata. The Project area in TKO 137 was largely comprised of developed area and subtidal hard substrata in the reclamation area, while majority of the TKO 132 would be formed by reclamation thus the Project area largely comprised of water column with subtidal hard and soft substrata. All habitats within the assessment were considered as having low or low to moderate ecological value, except for shrubby grassland / grassland within CWBCP and subtidal hard substrata

in western and eastern Junk Bay along natural shoreline were considered as having moderate ecological value.

9.13.1.3 The flora and fauna recorded were generally common and widespread species. In terms of species of conservation importance, the current ecological surveys recorded three flora species, 20 bird species, 13 mammal species, seven butterfly species and two reptile species from the terrestrial survey, and 32 hard coral species, three black coral species and one amphioxus species from the marine survey. Some of these species were found within the Project area, for instance, hard coral communities with low to moderate coverage were found within the reclamation footprint in TKO 132.

9.13.1.4 The design of the development of TKO 137 and TKO 132 would avoid direct encroachment on any sites of conservation importance including CWBCP and ecologically sensitive sites. Furthermore, several adjustments and engineering options had been made to avoid and further minimise the significance of direct and indirect ecological impacts arising from the Project, including the reduction of reclamation area in TKO 132. Unavoidable ecological impacts included direct and indirect impacts such as habitat loss, impact on species of conservation importance and disturbance impact (e.g. noise, human disturbance, light and glare, etc.), majority of these impacts were assessed to have magnitude ranged between low and low to moderate. Nonetheless, direct impact on floral species of conservation importance, subtidal hard substrata and associated hard and black coral communities were considered as low to moderate if unmitigated.

9.13.1.5 Mitigation measures were recommended to avoid and minimise for any identified ecological impacts rated with an impact severity of low to moderate and above. For instance, transplantation / translocation of floral / hard coral species of conservation importance was proposed. Some recommendations of precautionary measures and enhancement opportunities were also provided to further alleviated any potential ecological impacts and promote the ecological value of the Project, such as the eco-shoreline. With full implementation of the recommended mitigation measures, no unacceptable adverse residual ecological impacts are expected to arise from the Project.

9.14 References

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