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10 Fisheries Impact

10.1 Legislation, Standards and Guidelines

- 10.1.1.1 The local relevant regulations, legislation and guidelines for the present fisheries impact assessment (FIA) include the following:
- Fisheries Protection Ordinance (Cap. 171) and its subsidiary legislation, the Fisheries Protection Regulations;
 - Marine Fish Culture Ordinance (Cap. 353) and its subsidiary legislation;
 - Water Pollution Ordinance (Cap. 358) and its subsidiary regulations and statements
 - Marine Parks Ordinance (Cap. 476); and
 - Environmental Impact Assessment Ordinance (Cap. 499) and the associated TM.
- 10.1.1.2 Destructive fishing practises such as the use of explosive, toxic substances, electricity, dredging, suction and trawling devices for the purpose of fishing are detrimental to fisheries and the marine ecosystem and are prohibited under the Fisheries Protection Ordinance (Cap. 171).
- 10.1.1.3 Marine fish culture is protected and regulated by the Marine Fish Culture Ordinance (Cap. 353) which required all marine fish culture activity to operate under license in designated fish culture zones (FCZs).
- 10.1.1.4 Water Pollution Control Ordinance (Cap. 358) aims to control water pollution in the waters of Hong Kong. According to the Ordinance and its subsidiary legislation, Hong Kong waters are divided into ten water control zones (WCZs). Water control zones are designated with individual water quality objectives to promote the conservation and best use of those waters in the public interest. Corresponding statements of Water Quality Objectives (WQO) are stipulated for different water regimes (marine waters, inland waters, bathing beaches subzones, secondary contact recreation subzones and fish culture subzones) in each of the WCZ.
- 10.1.1.5 Under the Marine Parks Ordinance (Cap. 476), fishing activities, including commercial fishing, inside Marine Parks are restricted, and could only be conducted with a permit issued by the Authority.
- 10.1.1.6 Annex 17 of the EIAO-TM sets out the general approach and methodology for assessments for fisheries impact arising from a project or proposal, to allow a complete and objective identification, prediction and evaluation of the potential fisheries impacts. Annex 9 recommends the criteria that can be used for evaluating fisheries impacts.

10.2 Requirements of EIA Study Brief

10.2.1 Assessment Area

10.2.1.1 While the Project covers Lam Tei, So Kwun Wat, Siu Lam, Tai Lam, Tsing Lung Tau and North Lantau, the fisheries impact assessment (FIA) would focus on the areas with marine works in particular the proposed Tsing Lung Bridge at Tsing Lung Tau and North Lantau as well as the reclamation land as its marine landing area near Tsing Lung Tau. The assessment area for the present FIA would follow that of water quality assessment which includes areas within 500 metres from the boundary of the Project and cover the North Western and Western Buffer WCZs (see **Figure 5.1** in **Section 5**).

10.2.2 Assessment Approach

10.2.2.1 The FIA made reference to the criteria and guidelines for evaluating and assessing fisheries impact as stated in Annexes 9 and 17 of the EIAO-TM. The assessment covered:

- Description of the physical environmental background;
- Description and quantification of the existing fisheries activities;
- Description and quantification as far as possible of the existing fisheries resources;
- Identification of parameters (e.g., water quality parameters) and areas that are important to fisheries and will be affected;
- Prediction and evaluation of any direct / indirect, on-site / off-site impacts on fisheries (e.g., loss or disturbance of fishing ground, water quality deterioration at sensitive receivers such as FCZs, important spawning grounds of commercial fisheries resources in the north Lantau water);
- Evaluation of cumulative impacts on fisheries;
- Where necessary, proposals of feasible, practicable and effective alternatives and/or mitigation measures; and
- Review for the requirement for monitoring during the construction and operation stages of the Project and, if necessary, propose a monitoring and audit programme.

10.2.3 Key Fisheries Issues

10.2.3.1 Besides the fishing grounds in the North Lantau waters, a number of sites of fisheries importance and key potential impacts were highlighted and listed out in the EIA Study Brief for the FIA. These include Site of Fisheries Importance and Key Potential Impacts mentioned in **Section 10.3.2**.

10.3 Methodology for Baseline Establishment and Impact Assessment

10.3.1 Methodology for Baseline Establishment - *Literature Review*

10.3.1.1 Existing information about the fisheries baseline conditions within the assessment area was reviewed. The relevant literature reviewed includes previous EIA studies,

research studies, consultancy studies, and AFCD data. The review, with focus primarily on the proposed marine landing area and secondarily on the assessment area, aimed to collect fisheries data, establish the fisheries baselines conditions and identify practices, areas and species of potential fisheries importance which may be affected by the Project for incorporation into the assessment.

10.3.1.2 This review included but was not limited to the followings:

- Port Survey 2021;
- AFCD latest Annual Report and website; and
- Other relevant reports from government and private sector.

10.3.1.3 Port Survey is a comprehensive survey conducted by AFCD from time to time to collect data on fisheries production and fishing operations in Hong Kong waters. The Hong Kong's waters are put into uniform-sized grids of 720 ha each and the information related to fisheries (e.g. production, vessel number) for each grid is presented.

10.3.1.4 The latest Port Survey 2021, which collected information of fisheries production of 2020, was carried out in 2021, and is commonly referred to as Port Survey 2021. The results of Port Survey 2021 are available on the AFCD website, which provides the most updated information on the development and trend in Hong Kong fisheries, and the latest annual fisheries production. The fisheries resources within the assessment area of the Project were evaluated mainly based upon the information from Port Survey 2021.

10.3.1.5 AFCD's latest Annual Report and website provide the most updated information on the development and trend in Hong Kong fisheries. The latest annual fisheries production is also provided.

10.3.1.6 Other fisheries studies relevant to this FIA include:

- Fisheries Resources and Fishing Operations in Hong Kong Waters (ERM 1998);
- Hong Kong Fisheries Resources Monitoring Report (SCSFRI 2017);
- Dredging, Management and Capping of Contaminated Sediment Disposal Facility to the South of the Brothers and East of Sha Chau (CEDD, 2015); and
- Expansion of Hong Kong International Airport into a Three-Runway System.

10.3.1.7 The validity of the information compiled during the literature review was assessed before it is adopted into present FIA.

10.3.2 Sites of Fisheries Importance

10.3.2.1 Besides the fishing grounds in the North Lantau waters, the following sites of fisheries importance are located in the vicinity of the Project Site.

- Ma Wan Fish Culture Zone (FCZ);
- ARs in the Brothers Marine Park (AFCD); and
- Spawning ground of commercial fisheries resources in North Lantau Waters (ERM 1998).

10.3.3 Physical Environment Background

10.3.3.1 The geological location of Hong Kong is situated at the mouth of the Pearl River, whose delta region, spanning Hong Kong, Macau and Guangdong Province of China. Based on the hydrographical conditions of Hong Kong waters and the proximity to the Pearl River Estuary, Hong Kong waters are mainly categorized into four main areas, where the assessment area of this Project located in the western waters. The marine water within the assessment area of the Project is surrounded by Ma Wan, Tsing Lung Tau and the North side of Lantau Island near Ng Kwu Leng.

10.3.4 Literature Review

10.3.4.1 Recent fisheries surveys have been conducted in 2013 during the EIA study of the Expansion of Hong Kong International Airport into a Three-Runway System, covering the North Lantau waters and Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP). During the EIA study, fish trawl surveys, purse-seine surveys, gill net surveys, handline surveys and ichthyoplankton and fish post-larvae surveys were conducted. The result of the fisheries surveys provided the general fisheries conditions of North Lantau waters. It was concluded that the North Lantau waters were of moderate fisheries production with species mainly not commercially targeted or of low commercial values, namely anchovy (*Thryssa kammalensis*) and sardine (*Sardinella albella*). Within the SCLKCMP, moderate to high fisheries production with species not commercially targeted to high commercial values were recorded, in which the dominant species were shad (*Nematalosa nasus*) and sardine (*S. albella*).

10.3.4.2 According to the results obtained from the routine marine biota monitoring from the environmental monitoring and audit of the Dredging, Management and Capping of Contaminated Sediment Disposal Facility to the South of the Brothers and East of Sha Chau, the fisheries resources of the North Lantau waters and SCLKCMP mainly consisted of species not commercially targeted or low commercial values, namely *Turritella terebra*, *Temnopleurus toreumaticus* and *Charybdis* spp.. In terms of fisheries resources, pony fish, croakers and gobies were commonly recorded, and mantis shrimp, mainly *Oratosquilla interrupta*, and shrimps (*Metapenaeus* spp. and *Penaeus* spp.) were also abundant.

10.3.5 Capture Fisheries

10.3.5.1 The fishing industry of capture fisheries makes an important contribution to Hong Kong in maintaining a steady supply of fresh marine fish to local consumers. In 2022, it produced an estimation of 77,000 tonnes of capture fisheries valued at about \$ 2.2 billion (AFCD 2022).

10.3.5.2 A comprehensive interview survey was conducted by AFCD in 2021 (Port Survey 2021) to collect updated information on fishing operations and fisheries production (adult fish and fish fry) within Hong Kong waters in 2020.

10.3.5.3 The sampling rate of port survey was about 30%, covering different types of local fishing vessels from different homeports. Particulars such as vessel length type and homeport of the fishing vessels were recorded and information about their fishing operations and fisheries production in Hong Kong waters were collected during the interviews.

- 10.3.5.4 In Port Survey 2021, grid cells were categorised into one of the six classes, in accordance with their overall adult fish production, i.e. >0 to 50 kg/ha; >50 to 100 kg/ha; >100 to 200 kg/ha; >200 to 300 kg/ha; >300 to 400 kg/ha; and >400 to 600 kg/ha. As reported in Port Survey 2021, the overall fisheries production of adult fish of the grid cell adjacent to Tsing Lung Tau and Ng Kwu Leng in North Lantau were ranked as low (>100 to 200 kg/ha) and moderate (>200 to 300 kg/ha) respectively (**Appendix 10.2**). The fisheries production of sampan of the grid cell adjacent to Tsing Lung Tau and Ng Kwu Leng in North Lantau were regarded as low, i.e. >50 to 100 kg/ha and >100 to 200 kg/ha respectively (**Appendix 10.2**). For other types of fishing vessels, the fisheries production of the grid cell adjacent to Tsing Lung Tau and North Lantau were regarded as low, i.e. both >50 to 100 kg/ha (**Appendix 10.2**).
- 10.3.5.5 In Port Survey 2021, the fishing operation in grid cells was categorised into one of the six classes, in accordance with the number of vessels as >0 to 50 number/grid, >50 to 100 number/grid, >100 to 200 number/grid, >200 to 400 number/grid, >400 to 600 number/grid, and >600 to 800 number/grid. As reported in Port Survey 2021, the overall fishing operation of the grid cell adjacent to Tsing Lung Tau and North Lantau was ranked as moderate, i.e. both ranked >200 to 400 number/grid (**Appendix 10.2**). For sampan, the fishing operation of grid cells adjacent to Tsing Lung Tau and North Lantau was ranked as moderate, i.e. both >200 to 400 number/grid (**Appendix 10.2**). For other types of fishing vessels, the fishing operation of grid cells adjacent to Tsing Lung Tau and North Lantau was ranked as low, i.e. both >0 to 50 number/grid (**Appendix 10.2**).
- 10.3.5.6 The trawling operations (including pair, stern, shrimp and hang trawling) have been banned since 31 December 2012, with the aim to protecting the precious marine resources and ecosystem, so that the damaged seabed and depleted marine resources can rehabilitate as soon as possible. Hence, AFCD conducted fisheries surveys before and after the trawl ban, to assess the changes in fisheries resources after the implementation of the trawl ban and other relevant fisheries management measures. A fisheries resources survey in the North-Western Hong Kong waters, of which the present waters of Tsing Lung Tau and North Lantau fall in, was conducted by AFCD (Report on Survey of Fisheries Resources in Hong Kong 2010-2015) to assess the effectiveness of the implementation of the trawl ban and other relevant fisheries management measures on the recovery of fisheries resources in Hong Kong waters. The study used two methods for survey, they were shrimp trawl survey and stern trawl survey. Main commercial families of fisheries resources in the North-Western Hong Kong waters by using shrimp trawl surveys include: Penaeidae, Sciaenidae, Platycephalidae, Portunidae, Clupeidae, Leiognathidae, Cynoglossidae, Squillidae, Polynemidae and Synodontidae. Main commercial families of fisheries resources in North-Western Hong Kong waters by using stern trawl survey include: Clupeidae, Sciaenidae, Engraulidae, Leiognathidae, Carangidae, Stromateidae, Penaeidae, Portunidae, Trichiuridae and Polynemidae.

10.3.6 Spawning Grounds in the northern Lantau waters

- 10.3.6.1 Consultancy paper “Fisheries Resources and Fishing Operations in Hong Kong Waters” identified important spawning and nursery grounds of fisheries resources in Hong Kong waters (ERM 1998). The Northeast Lantau area covering BMP, and the Sha Chau and Lung Kwu Chau Marine Park is identified as one of the important

fish spawning grounds of commercial fisheries resources, such as *Leiognathus brevisrostris*, *Lateolabrax japonicus* and *Clupanodon punctatus*, which is located about 4 km away from the assessment area at Tsing Lung Tau (**Appendix 10.3**).

10.3.7 Artificial Reefs (ARs)

- 10.3.7.1 ARs are widely recognized for the ability to encourage the growth and development of a great number and variety of marine organisms, providing not only shelter, but also food and protection for fish. An AR project has been implemented by AFCD since 1996, to enhance fisheries resource, restore destructed habitats, protect important nursery and spawning grounds and marine protected areas, and to improve the habitat quality of homogenous seabed. Due to the variety and abundance of reef fishes limited by the habitat, the deployment of AR is one of the effective fisheries resources enhancement tools for much of Hong Kong's open sea-bed. Besides the AFCD ARs project, there are other ARs deployed as mitigation measures compensating the impact of marine works. Over 600 units of ARs with a total volume about 180,000 m³ have been deployed at various suitable locations in Hong Kong waters, including marine parks, important fish spawning and nursery grounds, and FCZs (AFCD 2023a). According to results from underwater monitoring survey, the deployed ARs supported over 220 fish species, including many species of high commercial values, such as groupers, breams, snappers and sweetlips, which utilize the ARs for foraging, breeding and shelter (AFCD 2023b).
- 10.3.7.2 However, no AR was deployed in the waters adjacent to Tsing Lung Tau and North Lantau waters. The closest AR deployment is located within BMP to the south of the East Brother, with ARs cubical in shape with a height of about 3.5 m and a base of about 8.1 m by 8.1 m. They are located about 6 km away from the Project Site.

10.3.8 Culture Fisheries

- 10.3.8.1 The aquaculture in Hong Kong mainly includes marine fish culture, pond fish culture and oyster culture. In 2022, the production among the entire aquaculture sector was 2,764 tonnes with value of \$129 million, which was 3% in weight and 6% in value of the total fisheries production respectively (AFCD 2023c). Marine fish culture includes the rearing of marine fish from fry or fingerlings to marketable size, usually in cages suspended by floating rafts in sheltered coastal area. Depending on the availability of imported fish fry, the species cultured gradually changed over the recent year, where common species include green grouper, brown-spotted grouper, giant group, Russell's snapper, mangrove snapper, golden seabream and star snapper. The marine fish culture is protected and regulated by the Marine Fish Culture Ordinance (Cap. 353) which requires all marine fish culture activity to operate under license in designated FCZs, where 26 FCZs are currently present in Hong Kong waters occupying a total sea area of 209ha with some 913 licensed operators.
- 10.3.8.2 As there is neither fishpond nor oyster production area in the vicinity of Tsing Lung Tau and North Lantau, pond fish or oyster culture is not an issue for the Project and will not be further discussed. This Study will only focus on mariculture of culture fisheries.
- 10.3.8.3 According to the distribution map of FCZs, fish ponds and oyster production area in Hong Kong from AFCD, the nearest mariculture site is Ma Wan FCZ, which is

located outside of the 500m assessment area and about 1.5 km away from the Project Site. (**Appendix 10.4**).

10.3.9 Methodology for Baseline Establishment - Field Survey

- 10.3.9.1 Besides literature review, fisheries resources surveys were conducted in January 2019 and fishing activities surveys were conducted in August 2018 and January 2019 during the stage of feasibility study (**Table 10.1**).

Table 10.1 Fisheries Survey Conducted during the Feasibility Study Stage

Survey	Dry Season	Wet Season
Gill Netting	✓	
Cage Trapping	✓	
Fishing Activities Observation	✓	✓

- 10.3.9.2 Some of the baseline information was collected very recently and is considered to be up-to-date. To better understand the fisheries resources and fishing operations within and in the vicinity of the assessment area, field surveys at selected locations within the assessment area where potential impact could occur were conducted to update the latest fisheries baseline in these locations.
- 10.3.9.3 Four fish survey transects/stations were located to collect pelagic fauna samples (gill netting) and demersal fauna samples (cage trapping). The survey comprised of four transects located in the nearby marine waters (**Appendix 10.1**). To avoid marine traffic and for safety of sampling operation, transects were chosen within approximately 50 m from shoreline. The sampling locations were recorded by using global positioning system when conducting the field surveys. Data analysis for the mentioned fishery surveys included species composition, numerical abundance, size, biomass in wet weight and calculation of diversity index. Estimated catch value of commercial species will be mainly based on the best available data published by the Fish Marketing Organization (FMO).
- 10.3.9.4 According to the Annual Report 2021/2022 of FMO, the average wholesale prices of fresh marine fish ranged between 63 – 94 HK\$/kg. Therefore, the commercial value of fish resources in the surveys was estimated based on FMO's wholesale price of fresh marine fish and ranked into three classes: High value (> 94 HK\$/kg); Medium value (63 – 94 HK\$/kg); and Low value (< 63 HK\$/kg). For species which do not have prices provided by the FMO, their commercial value was estimated with reference to previous EIA reports and price of similar prices.

Gill Netting

- 10.3.9.5 A pair of gill nets was deployed for one hour at each sampling transect. The dimension of each net was 1 m in depth, 30 to 50 m in length, depending on commercial availability. The net comprised of three layers, with two 20 cm mesh stretches sandwiching a 5 cm mesh stretch. All fish and/or crustaceans species captured were recorded and identified to species level as far as practicable. Specimen measurements including total length, standard length, fork length and wet biomass were recorded when applicable.

Cage Trapping

- 10.3.9.6 Demersal fauna sampling was performed by cage trapping. Three sets of cage chain (with 3 traps per set), a total of 9 cages, with mesh size of approximately 2.5 cm,

50 cm in diameter and 20 cm in depth were deployed for three hours at each sampling transect, at a separation distance of about 20 m. The cage traps were baited with fish or shrimps. All species caught in the cage were identified to species level as far as practical. Specimen measurements including total length, standard length, fork length and wet biomass were recorded when available.

Fishing Activities Survey

10.3.9.7 In order to supplement the information from the Port Survey, fishing activities surveys were performed. The surveys were performed at suitable locations along the coastal area to observe the four sampling locations (**Appendix 10.1**). There were two sessions for each survey i.e. morning sessions and afternoon sessions, each session was last for 3 hours with the aid of at least 8x binocular. Both commercial and recreational fishing activities observed in the sampling locations were recorded. The fishing operation information recorded included number, types, size, and operation location of the fishing vessels. Data of the fishing activities survey is presented by observation dates with a location map showing the locations of the recorded fishing operations. Data is reported systematically in an excel format, listing the date of survey, time of survey, sampling location, type of fishing vessel, approximate size, number, and any special findings.

10.3.9.8 The programme of the fisheries survey is shown in **Table 10.2**.

Table 10.2 Survey Programme of the Fisheries Survey

Survey	Dry Season			Wet Season							Dry Season	
	2022											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Gill Netting	*		✓			✓			✓			
Cage Trapping	*		✓			✓			✓			
Fishing Activities Observation	*		✓		✓			*		✓		✓

*: Corresponding survey was conducted in the Feasibility Study stage at the corresponding month (but different year) and will be incorporated in the present Study

10.3.10 Results of Field Survey

10.3.10.1 Fisheries surveys using gill netting and caging were conducted in four sampling locations, Tai Lam, Tsing Lung Tau, Ng Kwu Leng and Tsing Chau Wan. Combining the data from fisheries resources surveys conducted during the stage of feasibility study in January 2019 and the field survey in the current stage of the Project in 2022, a total of 72 individual organisms were collected from the surveys, with 35 in the dry season surveys and 37 in the wet season surveys (**Appendix 10.5** and **Appendix 10.6**). Organisms caught represented 36 species, including 21 species of fishes, 9 species of crustaceans and 6 other species. In terms of weight, about 6.9kg (6852.5g) of catch was collected, with about 4.5kg (4459g) from dry season and 2.4kg (2393.5g) from wet season. Combining dry and wet seasons, the highest total abundance and highest total species richness were recorded in Ng Kwu Leng, and the highest biomass was recorded in Tai Lam (**Table 10.3**). 16 of the 21 fish species recorded in the survey are classified as commercial fish species (**Appendix 10.7**). Among the fish species, species not commercially targeted or of

low commercial value accounted for about 70% of total fish biomass and 67% of total fish abundance. For crustaceans, species not commercially targeted or of low commercial value accounted for about 91% of total crustacean biomass and 60% of total crustacean abundance. For species other than fish and crustaceans, all of the recorded species are considered not commercially targeted or of low commercial value. Overall, species not commercially targeted or of low commercial value accounted for about 82% of total biomass and 69% of total abundance.

Table 10.3 Summary Table for Fisheries Survey Results – Overall

Parameter	Sampling Location*											
	TL			TLT			NKL			TCW		
	Dry	Wet	Total	Dry	Wet	Total	Dry	Wet	Total	Dry	Wet	Total
Total abundance	14	6	20	10	3	13	6	15	21	5	13	18
Total biomass (g)	1595	470	2065	720	75	795	673	1377.5	2050.5	1471	471	1942
Total species richness	8	6	13	7	3	10	5	10	14	3	2	5

*Abbreviation on sampling locations: TL – Tai Lam; TLT – Tsing Lung Tau; NKL – Ng Kwu Leng; TCW – Tsing Chau Wan

Table 10.4 Summary Table for Fisheries Survey Results – by Survey Method

Survey Method/ Season	Parameter	Sampling Location*							
		TL		TLT		NKL		TCW	
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
Gill Netting	Mean abundance	2	2.5	2.5	0.5	1.5	7.5	2	0
	Mean biomass (g)	28.5	180	185.5	18	331.5	688.75	733.5	0
	Mean species richness	1	2.5	2	0.5	1.5	5	1	0
Cage Trapping	Mean abundance	5	0.5	2.5	1	1.5	0	0.5	6.5
	Mean biomass (g)	769	55	174.5	19.5	5	0	2	235.5
	Mean species richness	3	0.5	1.5	1	1	0	0.5	1

*Abbreviation on sampling locations: TL – Tai Lam; TLT – Tsing Lung Tau; NKL – Ng Kwu Leng; TCW – Tsing Chau Wan

Gill Netting

- 10.3.10.2 Combining the dry and wet seasons, the highest mean abundance, mean biomass and mean species richness were recorded in Ng Kwu Leng, where the organisms recorded ranged from not commercially targeted to of high commercial value (**Table 10.4**). Most of the organisms recorded were not commercially targeted or of low commercial value, where *Charybdis feriata*, *Harpiosquilla harpax* and *Platycephalus indicus* were the three species of high commercial value. The biomass of *Charybdis feriata*, *Harpiosquilla harpax* and *Platycephalus indicus* in Ng Kwu Leng was 252.5g, about 12% of the total biomass. Other sampling locations recorded relatively lower mean abundance, mean biomass and mean species richness. The sampling location at the reclamation site at Tsing Lung Tau was recorded as the lowest mean biomass, while the mean abundance and mean species richness of fisheries resources were both recorded relatively low. Most of the recorded organisms in Tsing Lau Tau were not commercially targeted or of low commercial value.
- 10.3.10.3 The results suggested that Tsing Chau Wan had the highest biomass of organisms caught during the dry season with mainly either not commercially targeted or of low commercial value (**Table 10.4**). Ng Kwu Leng recorded the highest mean abundance, mean biomass and mean species richness during wet season, while mean abundance and mean species richness were found similar among sampling locations during dry season. The reclamation site at Tsing Lung Tau remained as the sites of relatively low mean biomass comparing to other sites, with species generally not commercially targeted or of low commercial value.

Cage Trapping

- 10.3.10.4 Combining the dry and wet seasons, the highest mean biomass and mean species richness were recorded in Tai Lam (**Table 10.4**). Most of the organisms recorded were not commercially targeted or of low commercial value, where *Sebastiscus marmoratus* was the only species of high commercial value. The biomass of *Sebastiscus marmoratus* in Tai Lam was 55g, about 3% of the total biomass. Different from the results obtained in gill netting, Ng Kwu Leng recorded the lowest mean abundance, mean biomass and mean species richness among all sampling locations. The reclamation site at Tsing Lung Tau recorded a relatively low mean abundance and mean biomass of fisheries resources, where species recorded in Tsing Lung Tau were, in general, not commercially targeted.
- 10.3.10.5 Tai Lam, Tsing Lung Tau and Ng Kwu Leng recorded higher fisheries resources in the dry season than wet season, while Tsing Chau Wan had the opposite results (**Table 10.4**). The results also suggested that Tai Lam had the highest mean biomass of organisms caught during the dry season with species mainly not commercially targeted. Tsing Chau Wan had the highest mean biomass of organisms caught during the wet season with mainly species not commercially targeted. The reclamation site at Tsing Lung Tau and Ng Kwu Leng both remained as the sites of relatively low species richness and biomass of organisms caught comparing to other sites, with species generally of low commercial value or not commercially targeted.

Other Fishing Activities

- 10.3.10.6 A total of 37 vessels with fishing activities were recorded in the vicinity along the sampling locations within the Study Area. Fishing activities likely for recreational

purpose were observed along the coastline of Tsing Lung Tau from Ka Loon Tsuen to Sham Tseng pier, which were mainly consisted of sampans with fishing activities such as angling and hand lining. Only one sampan was recorded using gill net for fishing at the coastline outside Ka Loon Tsuen, which is considered likely for production purpose. Fishing activities likely for recreational purpose were also observed at Kap Shui Mun, from the east of Ng Kwu Leng to Kap Shui Mun, some reaching the west of Tang Lung Chau. Fishing activities at Ng Kwu Leng were relatively more crowded than Tsing Lung Tau, all fishing activities recorded were considered likely for recreational purpose involved angling and hand lining. There were some miscellaneous crafts involved where around 8 to 12 people were angling on these vessels, where sampans were the main fishing vessel observed (see **Figure 10.1**). Results indicated that recreational fishing activities was relatively low near the waters of the reclamation site at Tsing Lung Tau when comparing to the area east of Ng Kwu Leng to Kap Shui Mun.

- 10.3.10.7 Recreational fishing activities were also observed along the coastline from Tai Lam to Sham Tseng including piers and along the coastlines, where the general public easily accessed on foot. Along the coastline of Ng Kwu Leng, occasional fishing activities likely for recreational purpose were also observed with relatively less people than Tsing Lung Tau coastline due to the increased inaccessibility of the Ng Kwu Leng coastline.

10.3.11 Summary of Fisheries Baseline Conditions

- 10.3.11.1 The assessment area of the present FIA study does not directly encroach to sites of fisheries importance nearby. Results of Port Survey 2021 indicated the overall fisheries production of adult fish of the grid cell adjacent to the Project Site were ranked as low to moderate. The fisheries production of sampan and other types of fishing vessels of the grid cell adjacent to the Project Site were regarded as low to moderate and low respectively. The overall fishing operation of the grid cell adjacent to the Project Site was ranked as moderate, while sampan and other types of fishing vessels were ranked as moderate and low respectively. The nearest spawning ground of commercial fisheries resources in the Northeast Lantau area is located about 4 km away from the assessment area of the Project. The closest AR deployment is located within BMP south of the East Brother, which is located about 6 km away from the assessment area of the Project. The nearest mariculture site is Ma Wan FCZ, which is located outside the assessment area of the Project. BMP is situated in the Northern Lantau waters which is located about 6 km away. With reference to the fisheries survey conducted during the EIA study of the Expansion of Hong Kong International Airport into a Three-Runway System, moderate fisheries production with species mainly not commercially targeted or of low commercial values were recorded in North Lantau waters.
- 10.3.11.2 Combining the fisheries resources survey conducted at the stage of feasibility study in January 2019 and the present field surveys, catches of low mean abundance and low mean biomass were recorded. The majority of organisms caught are not commercially targeted or low commercial value that accounted for about 82% of total biomass and 69% of total abundance. Tai Lam and Ng Kwu Leng had relatively higher fisheries resources among the sampling locations in terms of total abundance, total biomass and total species richness (**Table 10.3**). The reclamation site at Tsing Lung Tau had the lowest total abundance and total biomass recorded, with the second lowest mean species richness among all sampling locations

throughout dry and wet seasons. Most of the species recorded in Tsing Lung Tau are not commercially targeted or of low commercial value. The results from Fishing Activities Survey indicated that the marine waters within the assessment area were utilized by a majority of recreational fishing activities with higher frequency of appearance near Kap Shui Mun instead of the reclamation site at Tsing Lung Tau, where commercial fishing activities with gill netting, hand lining and cage trapping were low.

10.3.12 Methodology for Impact Assessment

Identification of Fisheries Sensitive Receivers

10.3.12.1 Fisheries Sensitive Receivers (FSRs) are defined in this FIA as resources or sites of fisheries importance and potentially be affected directly or indirectly by the Project.

Assessment Criteria

10.3.12.2 The potential impacts due to the construction and operation of the Project were assessed (with reference to the EIAO-TM Annex 17 guidelines) and the impacts evaluated (with reference to the criteria in EIAO-TM Annex 9).

10.3.12.3 Then, the assessment concluded whether mitigation measures envisaged could alleviate any negative impacts of the Project and its components to within acceptable levels. The acceptability of the overall residual impacts was determined.

10.4 Fisheries Impact Evaluation

10.4.1 Identification of Fisheries Impacts

10.4.1.1 The proposed landing for Tsing Lung Bridge tower near Tsing Lung Tau involves seawall construction and reclamation works in the marine waters, direct encroachment of marine seabed and fishing grounds are expected due to marine works including dredging, filling activities and seawall construction.

10.4.1.2 Temporary berms in front of seawall have been proposed to enhance the seawall stability. Temporary stockpiling of reclamation fill may be required, and temporary jetty are required for marine transportation to/from work site. All temporary structures are subjected to detailed design in the next stage.

10.4.1.3 The proposed reclamation site, marine works and future operation of the Tsing Lung Bridge may affect the fisheries resources and fishing operations within the project footprint and adjacent waters. This section identifies the potential impacts on fisheries sensitive receivers, including but not limited to Ma Wan FCZ and spawning grounds of commercial fisheries resources in the Northeast Lantau area, during the construction and operational phases of the Project.

10.4.2 Construction Phase – Direct Impacts

10.4.2.1 Reclamation for Tsing Lung Bridge tower at Tsing Lung Tau has been proposed under this study. A total of approximately 4.1 ha permanent loss of marine seabed and fishing ground will be anticipated for the construction of the reclamation site including dredging and filling marine works, and construction of seawall. The reclamation site will occupy 2.2 ha of the marine seabed and fishing ground, surrounded by 1.9 ha of seawall construction. Therefore, it occupied a total of

approximately 4.1 ha permanent loss of marine seabed and fishing ground on-site upon completion of the reclamation site of the project (2.2 ha + 1.9 ha).

- 10.4.2.2 Temporary works area will be required occupying about 150m extended from the proposed reclamation area i.e. about 13 ha. It is estimated that the proposed reclamation construction works will be carried out from Q1 2026 to Q1 2028. However, no other fisheries sensitive receivers such as spawning ground of commercially important species of fish and Ma Wan FCZ will be encroached.
- 10.4.2.3 Besides, the required bridge deck erection works area is about 200m by 200m (4 ha) and a self-propelled barge capable of being dynamically positioned and not require anchoring in the marine waters would be deployed. Upon the completion of reclamation work, a portion of the marine area will be temporarily occupied during the bridge deck erection works which would involve lifting bridge segments from a barge positioned in the marine waters. The duration of each lifting operation is approximately two hours during daytime period. It is estimated that the works for the bridge deck erection will be carried out from Q1 2028 to Q4 2033. At any given time, the temporary works area of the proposed reclamation construction works will not overlap with the bridge deck erection works. Therefore, the maximum temporary works area throughout the construction period of the Project is governed by reclamation works area at about 13 ha.
- 10.4.2.4 When compared with the 1,651 km² (approximately 165,100 ha) of Hong Kong's total marine waters (EPD 2013) which is mostly available for fishing, the permanent fishing ground loss (about 4.1 ha) and temporary loss caused by the Project is considered to be of insignificant proportion. The closest spawning grounds of commercial fisheries resources is located outside 500m of the reclamation site, thus no adverse impact on destruction and disturbance of spawning grounds and nursery areas will be anticipated. The waters near Tsing Lung Tau and North Lantau contain low to moderate overall fisheries production. Considering the small area of loss of fishing ground and seabed due to reclamation, the magnitude of the impact is not severe and is ranked as minor. No specific mitigation measures are required.
- 10.4.2.5 After the setting up of the marine works area, fishermen originally use the area of marine waters as part of their fishing grounds might need to shift their operation locations to other locations/areas. Based on the information from Port Survey 2021, and the facts that the area is close to the existing coastline, it is expected that fishing vessels will operate in this area, if any, would be mainly small fishing vessels such as sampans, and the sampans are more flexible than large vessel during operation. Hence, the impact to fishing operation is considered minor. No specific mitigation measures are needed.

10.4.3 Construction Phase – Indirect Impacts

- 10.4.3.1 Reclamation will be required for constructing the bridge tower landing area at Tsing Lung Lau. Sediment plumes (suspended solids) due to construction works would be localised. High suspended solid level might block the gill of fish and other marine organisms and would affect the gaseous exchange, while the high turbidity would affect the foraging of organisms relying on eye sights. A lower oxygen level would affect stationary species, while mobile species would tend to temporarily avoid the area. The results could be a temporary reduction in abundance of fisheries resources. Nutrients and/or contaminant in the seabed

sediment might be released into the marine waters when the sediment is disturbed and might have negative effects on water quality such as increasing the chances of algal bloom or accumulation of contaminants inside organisms.

- 10.4.3.2 Dredging is required for the seawall construction for the current Project, there are concerns on potential impacts induced by dredging activities. However, the filling activities of the reclamation will be conducted after the completion of seawall. According to the water quality assessment in **Section 5**, a total of 4 scenarios were modelled to stimulate the water quality impacts induced from the reclamation works, comparing the reclamation works next to shoreline and away from shoreline under the absence and presence of silt curtain. Results of the modelling indicated that parameters including predicted suspended solids, sedimentation rate and dissolved oxygen were well within respective criteria without silt curtain, and showed further improvement in water quality after the implementation of a silt curtain. Therefore, adverse water quality impact during the reclamation is not anticipated with proper implementation of mitigation measures (e.g. deployment of silt curtain). Impacts on fisheries sensitive receivers in the vicinity of dredging related construction work were also evaluated. Considering the reduced impact after proper implementation of mitigation measures, the impact on water quality towards fisheries resources as well as other fisheries sensitive receivers including the spawning grounds of commercial fisheries resources in northern Lantau waters, Ma Wan FCZ and ARs in BMP would be localised and hence negligible.
- 10.4.3.3 Most of the structures for the landing area will be rock, sand and concrete units. Pollutants or chemical spillage from the land-based works areas might occur, but the magnitude is not expected to be significant and should be transient. The potential water quality impacts due to land works including site runoff, sewage from workforce, wastewater from various construction activities, and accidental spillage would be controlled through the implementation of best practices in **Section 5**, and no adverse water quality impacts would be anticipated due to spillage, sewage from works forces and wastewater from land-based works is ranked as negligible.
- 10.4.3.4 During the reclamation works at Tsing Lung Tau, an increase in marine traffic by construction vessels is expected for the transportation of construction materials and manpower for the reclamation works. The increased marine traffic may cause disturbance to fishes in the Study Area through the increase in underwater noise. Some studies indicated the impact on fishes by underwater noise includes possible mortality, physical injury and auditory tissue damage, while there are also studies suggesting negative correlations between the presence of fish and underwater noise. The daily marine work vessels are estimated to be around 6 trips per day from the barging facilities at Tsing Lung Tau within the reclamation site, 4 trips per day from the barging facilities at To Kau Wan and 1 trip per day from the barging facilities at Ng Kwu Leng. With the limited increase in marine vessels, the impact of underwater noise from increased marine traffic is considered negligible. Adverse underwater noise disturbance can be contributed by work activities such as underwater piling. Piling will be involved for the construction of the bridge pier and temporary barging point in Tsing Lung Tau within the reclamation site. Since the size and scale of the barging point in Tsing Lung Tau is limited and located away from fisheries sensitive receivers such as over 1.5 km away from the Ma Wan FCZ. Therefore, the impact of underwater noise induced by construction work is considered negligible.

10.4.4 Operational Phase – Direct Impacts

10.4.4.1 A total of 4.1 ha permanent marine seabed loss and fishing ground loss occur during operational phase due to the presence of the proposed landing area of Tsing Lung Bridge. Similar to the construction phase impact as discussed earlier, approximately 2.2 ha of permanent fishing ground will be lost due to the proposed reclamation site for the landing of Tsing Lung Bridge and 1.9 ha of permanent fishing ground will be lost due to the proposed seawall construction, together contributed to a total of 4.1 ha permanent fishing ground loss and fisheries habitat. Fisheries sensitive receivers such as spawning ground of commercially important species of fish and Ma Wan FCZ are located away from the proposed reclamation site and will not be encroached, hence adverse impact is not anticipated. Considering the small area of loss of fishing ground and seabed due to reclamation, the magnitude of the impact is not severe and is ranked as minor.

10.4.5 Operational Phase – Indirect Impacts

10.4.5.1 Surface run-offs would typically contain pollutants (e.g. sediments, oil and grease, heavy metals, debris, rubber, and fertilizers) that are deposited onto paved surfaces including roads, bridges, administration buildings and ventilation buildings which are then discharged to existing waterways, some may even enter the marine waters during rainfall and storms via drainage systems as a non-point source. As mentioned in **Section 5**, with the application of adequate mitigation measures such as providing adequate silt traps and oil interceptors at road drainages, any water quality impacts can be reduced to an acceptable level.

10.4.5.2 During the operational phase, sewage generated through toilet and sanitary facilities by staff and workers stationed at administration buildings proposed at Lam Tei and Ng Kwu Leng would be a pollution source. The sewage should not be discharged to waterbodies or marine waters, and instead discharged through sewers that are connected to public sewage system, to avoid adverse water quality impacts. According to **Section 5**, since no toiletry facilities are proposed for all ventilation buildings, it is considered that no sewage will be generated at the ventilation buildings, therefore adverse impacts are not anticipated.

10.4.5.3 The reclamation site at Tsing Lung Tau may affect the hydrodynamic regime of the area through narrowing the Ha Pang Fairway between Tsing Lung Tau and To Kau Wan, therefore, a quantitative hydrodynamic assessment was conducted in **Section 5** to assess the overall hydrodynamic impacts. Results of the hydrodynamic modelling, with reference to **Section 5**, indicated that the overall hydrodynamic impacts are considered negligible. No maintenance dredging would be required for the reclamation site at Tsing Lung Tau, and therefore no additional hydrodynamics impacts could be induced. Hence, no operational phase impacts to fisheries resources are anticipated from the Project. Also, due to the hydrodynamic changes induced by the reclamation, the dispersion patterns of existing pollutants may be altered which may potentially induce adverse water quality impacts. Therefore, a water quality model was conducted in **Section 5** to assess the overall water quality impacts. Results of the water quality modelling, as demonstrated in **Section 5**, concluded that the operational phase water quality impacts are negligible. Therefore, the indirect impact on water quality and fisheries sensitive resources are negligible.

Table 10.5 Evaluation of Potential Fisheries Impact during Construction and Operational Phases

Potential Impact	Nature of impact	Size of affected area	Loss of fisheries resources/ production	Destruction and disturbance of nursery and spawning grounds	Impact on fishing activity	Impact on aquaculture activity	Impact significance
Construction Phase							
Direct loss of fishing ground due to reclamation for landing area for Tsing Lung Bridge and its works area for construction	<p>Permanent loss for the footprint of the reclamation site and seawall construction</p> <p>Temporary loss for works area of landing area, and lifting bridge segments, as well as reprovision of marine facilities and its associated temporary works areas</p>	<p>Permanent loss of fishing ground (reclamation site and seawall): 4.1 ha</p> <p>Temporary loss of fishing ground (governed by reclamation works area): 13 ha</p>	Minor	No spawning grounds and nursery areas at the Project Site and hence no impact	Minor	No aquaculture activities at the Project Site and hence no impact	Minor
Marine works required for the reclamation for landing area for Tsing Lung Tau, for example, dredging and filling activities that may impact water quality	Temporary	Localized to the immediate vicinity of the works area	Negligible	Negligible	Impacts are localised with negligible impact on fishing operation	Negligible	Negligible
Underwater noise	Temporary	Localized to the immediate vicinity of the works area	Negligible	Negligible	Negligible	Negligible	Negligible

Potential Impact	Nature of impact	Size of affected area	Loss of fisheries resources/ production	Destruction and disturbance of nursery and spawning grounds	Impact on fishing activity	Impact on aquaculture activity	Impact significance
Operational Phase							
Direct loss of fishing ground due to reclamation for landing area for Tsing Lung Bridge and its works area for construction	Permanent loss for the footprint of the reclamation	Permanent loss of fishing ground (reclamation site and seawall): 4.1 ha	Minor	No spawning grounds and nursery areas at the Project Site and hence no impact	Minor	No aquaculture activities at the Project Site and hence no impact	Minor
Change of hydrodynamics and deterioration of water quality induced by the footprint of the landing area for Tsing Lung Bridge at Tsing Lung Tau	Permanent loss for the footprint of the reclamation	Not applicable	Negligible	Negligible	Negligible	Negligible	Negligible

10.5 Mitigation Measures

10.5.1 Considerations for Impact Avoidance

- 10.5.1.1 There is no fishpond or mariculture site within the proposed alignment. The proposed Tsing Lung Bridge is located in waters of low to moderate fisheries production, and also away from other sites of fisheries importance such as the ARs in the vicinity, spawning grounds for fisheries species in North Lantau waters.

10.5.2 Considerations for Impact Minimization

- 10.5.2.1 The preliminary design of the reclamation site in Tsing Lung Tau presented in the Project Profile indicated that the reclamation area above sea level would be approximately 2.7 ha. As mentioned in **Section 2**, the reclamation in Tsing Lung Tau was considered inevitable, proactive approach has been taken by the engineering design to minimize the extent of dredging as far as practicable so as to minimize the associated water quality impacts and impacts on fisheries. After scrutinising multiple aspects including engineering and environmental technicalities, the latest proposed design of the reclamation site in Tsing Lung Tau has been reduced by approximately 0.5 ha, i.e. from 2.7 ha to 2.2 ha. The total amount of dredged sediments has been reduced, which reduced the associated impacts on water quality and fisheries sensitive receivers during the construction phase.
- 10.5.2.2 During the construction phase, site runoff would need to pass through sedimentation tanks to reduce the concentration of suspended solid. In accordance with the Practice Note for Professional Persons on Construction Site Drainage, Environmental Protection Department, 1994 (ProPECC PN 1/94), best management practices should be implemented on site as far as practicable to control site runoff and drainage at all work sites during construction, so that the treated runoff will be discharged to public drainage system in compliance with the WPCO. Construction effluent, site run-off and sewage should be properly collected and/or treated. Wastewater from a construction site should be managed. Proper locations for discharge outlets of wastewater treatment facilities well away from the natural streams/rivers should be identified. Effluent monitoring should be incorporated to make sure that the discharged effluent from construction sites meets the effluent discharge guidelines. The best practices are detailed in **Section 5**.
- 10.5.2.3 The adoption of the water quality measures stated in **Section 5**, to control construction site runoff, sewage effluents, general construction activities, and accidental spillage of chemicals, would help minimize impact on fisheries. No other specific mitigation measures for fisheries are required during construction phase.
- 10.5.2.4 As discussed in **Section 10.4.5**, the changes in hydrodynamic regime and deterioration of water quality of the surrounding waters are considered negligible that no unacceptable adverse impacts on fisheries sensitive receivers and fishing grounds from the Project would be anticipated. Thus, no specific mitigation measures for fisheries impact would be required for operational phase.

10.6 Residual Impacts

10.6.1.1 Residual fisheries impact would be a total of approximately 4.1 ha permanent loss of marine seabed and fishing grounds of the Project Site upon the completion of the Project, anticipated for the construction of the reclamation site including dredging and filling marine works, and construction of seawall. 2.2 ha of marine seabed and fishing ground will be occupied by the reclamation site, surrounded by 1.9 ha of seawall construction. Given the small proportion in fishing grounds in Hong Kong waters and the small contribution on Hong Kong fisheries production, as well as the implementation of the mitigation measures for water quality, the residual impact is considered acceptable.

10.7 Cumulative Impacts

10.7.1.1 In order to assess the cumulative impacts, a review of best available information at the time of preparing this EIA report to identify a number of other projects that are undergoing planning, design, construction and/or operation within the construction and/or operational period for this Study has been conducted and a list of concurrent projects identified at this stage is provided in **Section 2** of this EIA report. The potential occurrence of cumulative impacts would be mostly determined by the nature of the projects, the project scales, and the distances between the projects. Among the concurrent projects, not all of them are relevant to fisheries. Some projects would have their marine works finished before the construction phase of the Project, and thus not relevant with cumulative impacts in construction phase, in particular water quality and fisheries resources. Some other projects would not cause permanent marine habitat loss, and thus not relevant with the cumulative impacts of permanent fishing ground loss and hydrodynamics in operational phase. A total of 6 concurrent projects, are included below, and their relevancy to fisheries resources are examined.

- Hong Kong Island West - Northeast Lantau Link;
- Reclamation for Kau Yi Chau Artificial Islands;
- Tsing Yi-Lantau Link;
- Cycle Track between Tsuen Wan and Tuen Mun (Tuen Mun to So Kwun Wat);
- Road P1 (Tai Ho – Sunny Bay Section); and
- Sunny Bay Development.

10.7.1.2 All of the above concurrent projects involve fisheries impact assessment conducted or to be conducted. The potential of occurrence of cumulative impacts would be mostly determined by the nature of the projects, the project scales and the distances between the projects. Effective and feasible mitigation measures, including compensation measures, will be investigated in other concurrent projects. Potential cumulative impacts to fisheries resources from the above listed projects were not expected to be unacceptable and evaluated as follows:

Habitat Loss and Loss of Access to fishing grounds:

10.7.1.3 Considering the extent of disturbance to fisheries resources and fishing ground contributed by the present Project is expected to be relatively small and confined

to localised works along the coastline, including permanent loss of the footprint of the reclamation site at Tsing Lung Tau for Tsing Lung Bridge and temporary loss for marine works area. The Hong Kong Island West – Northeast Lantau Link is expected to result in reclamation (permanent and/or temporary) works of more than 5 ha in size at the landing points. The reclamation for Kau Yi Chau Artificial Islands is expected to result in a tentative reclamation extent of approximately 1000 ha in size. The Tsing Yi-Lantau Link is expected to result in a reclamation works, including associated dredging works, of more than 5 ha in size. The Cycle Track between Tsuen Wan and Tsuen Mun (Tsuen Mun to So Kwun Wat) is expected to result in 0.0019 ha of permanent fishing ground loss and 0.07 ha of temporary fishing ground loss. The Road P1 (Tai Ho – Sunny Bay Section) is expected to result in a reclamation works of about 15 ha between Tai Ho Interchange and Sham Shui Kok. The Sunny Bay Development is expected to result in a tentative reclamation extent of approximately 80 ha in size. Although marine works of the present Project would be in the vicinity of Hong Kong Island West – Northeast Lantau Link, Reclamation for Kau Yi Chau Artificial Islands, Tsing Yi – Lantau Link and Road P1 (Tai Ho – Sunny Bay Section), the contribution from the proposed reclamation and marine works of the present Project is considered minor, due to the small area size of fishing ground and fisheries habitats loss.

Marine Traffic

- 10.7.1.4 Although the marine works and marine traffic might overlap with Hong Kong Island West – Northeast Lantau Link, Reclamation for Kau Yi Chau Artificial Islands, Tsing Yi – Lantau Link and Road P1 (Tai Ho – Sunny Bay Section), it is expected to involve in a relatively small marine traffic overlapping at any one point of time at the works area. As the daily marine works vessels from the present Project is expected to relatively less frequent with the barging points confined in localized waters in Tsing Lung Tau, To Kau Wan and Ng Kwu Leng. Given the waters of North Lantau, especially the busy marine traffic at Ha Pang Fairway between Tsing Lung Tau and To Kau Wan, the cumulative effects of marine traffic and associated disturbance, including but not limited to underwater noise and runoff, towards the nearby fishing operations are anticipated to be minor.

Marine Water Quality

- 10.7.1.5 For the contributions/influences related to water quality, as the water quality impact assessment, as shown in **Section 5**, has already considered the relevant projects during both construction phase (mainly the sediment release), and operational phase (mainly the influences on hydrodynamics and pollution loading), the assessment on fisheries in above sections which have made reference to water quality results have already addressed the potential cumulative impacts related to water quality, and thus those impacts would be briefly recapped but not discussed in details again in this section.

10.8 Environmental Monitoring and Audit (EM&A)

- 10.8.1.1 As no unacceptable adverse impacts have been predicted to occur during both the construction and operational phase of the Project, fisheries monitoring is not considered necessary. Site inspections with focus on water quality during construction phase should be carried out to monitor any malpractice leading to deterioration of water quality of the surrounding which may in turn affect the

fisheries sensitive receivers (i.e. a monitoring and audit programme aims to ensure that the released suspended solid concentrations from reclamation filling and stockpiling activities, also acts as a protection against impacts to fisheries sensitive receivers). Also, a water quality monitoring location has been proposed for the Ma Wan FCZ throughout the entire construction period, to monitor the water quality nearby. As there are no anticipated adverse impacts during operational phase, monitoring and audit requirements are not required.

10.9 Conclusion

- 10.9.1.1 The assessment area for the fisheries impact assessment included areas within 500m from the site boundary of the Project Site and the associated works as well as any other areas likely to be impacted by the Project. Special attention has been given to potential loss or disturbance of fishing ground, water quality deterioration at sensitive receivers such as Fish Culture Zones and important spawning grounds of commercial fisheries resources in the northern Lantau waters.
- 10.9.1.2 Information from literature and the field surveys has been incorporated in the current report, which provided sufficient information on fisheries resources and activities in the assessment area. Most of the organisms caught during the fisheries surveys were not commercially targeted to low commercial value that accounted for about 82% of total biomass and 69% of total abundance. The fisheries production in the vicinity of the proposed development is regarded as low to moderate and mariculture site, i.e. Ma Wan FCZ, is located away from the proposed alignment. As only 4.1 ha fishing ground will be lost permanently, together with the approaches for avoidance and minimization of impacts, no unacceptable impact on fisheries due to construction and operation phases is anticipated.
- 10.9.1.3 Since no unacceptable adverse impacts to fisheries are anticipated, no fisheries-specific mitigation measures are required. Mitigation measures on water quality, such as construction of seawall before reclamation work, deployment of silt curtain and effluent monitoring, will be implemented to minimise water quality impact due to reclamation. The adoption of water quality measures stated in **Section 5** would also act to minimize the impact on fisheries.

10.10 Reference

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