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9. FISHERIES IMPACT ASSESSMENT

9.1 Introduction

9.1.1 This Section provides the assessment of the potential fisheries impacts associated with the construction and operation of the Project. Baseline conditions for fisheries resources in the assessment area were identified from the latest relevant literature. Potential direct, indirect, cumulative and residual impacts on fisheries resources during the construction and operation phases of the Project were identified and evaluated. Mitigation measures have been recommended, where necessary.

9.2 Environmental Legislation, Standards and Guidelines

9.2.1 The criteria for evaluating fisheries impact assessment are laid out in Annex 9 and Annex 17 of the EIAO-TM, which is for providing complete and objective identification, prediction and evaluation of potential fisheries impacts arising from the Project. Annex 17 sets out the methodology for assessment of fisheries impacts and Annex 9 provides the evaluation criteria.

9.2.2 Other local legislations that are relevant to this fisheries impact assessment include:

- Fisheries Protection Ordinance (Cap. 171) – promotes the conservation of fish and other forms of aquatic life within Hong Kong waters by regulating fishing practices to prevent detrimental activities to the fisheries industry. The authority may also make rules for the management and control of fishing in any fisheries protection area, including but not limited to the specification of any zone within any fisheries protection area and the prohibition of any fishing in the specified zone.

- Water Pollution Control Ordinance (Cap. 358) – aims to control water pollution in waters of Hong Kong. Water Control Zones (WCZs) are designated with individual water quality objectives to promote the conservation and best use of those waters in the public interest.

9.3 Assessment Area

9.3.1 The assessment area for the purpose of fisheries impact assessment included areas within 500m distance from the boundary of the Project area. This assessment area will be extended to include other areas (e.g. active or abandoned fish ponds and/or associated water systems, fishing ground and oyster culture ground) if they are also found being impacted by the construction and/ or operation of the Project. Special attention was given to fish pond culture resources and activities, as well as any watercourses which serve as water sources for fishponds.

9.4 Assessment Methodology

9.4.1 The fisheries impact assessment was assessed following the criteria and guidelines specified in Annexes 9 and 17 of the EIAO-TM and Section 3.4.6 of the EIA study brief (ESB-322/2019).

9.4.2 Collation and desktop review of available relevant fisheries baseline data, e.g. EIAs and other available relevant studies within or in the vicinity to the assessment area, were conducted. AFCD's annual reports and website provided the most updated information on the development and trends of fisheries in Hong Kong. The latest annual fisheries production was also provided. Potential direct/indirect, short term/long term, on-site/off-site and cumulative fisheries impacts arising from the Project were identified and evaluated, where appropriate. Mitigation measures and monitoring and audit programme were recommended, where necessary.

9.4.3 The collated information was evaluated to identify any information gaps relating to the assessment of potential fisheries impacts that may arise from the Project. Literature review was conducted regarding the activities and production of pond fish culture within or in vicinity of the assessment area. Verification on the status of fishponds was conducted in February and July 2020 as part of the ecological survey with additional confirmatory survey undertaken in September and November 2020. The status of fishponds was evaluated based upon the management conditions of the ponds such as presence of commercial fishes, evidence of recently used pond culture equipment, presence of fish-rearing equipment and evidence of trimming of vegetation growing on pond bund.

9.4.4 Fishponds observed were categorized as follows:

- Active fishpond: ponds that are actively managed and currently utilized for commercial aquaculture activities, including commercial fish ponds, fish fry ponds and water flea ponds; experience periodic draining for harvesting of fish, water quality control and adjustment of pond profiles. Bunds of active ponds are largely bare because of grass-cutting activities.

- Inactive fishpond: ponds that have no current commercial aquaculture activities, but no major physical constraints to its resumption in the short-term, including ponds with fish present in non-commercial quantities and ponds for casual sport fishing or water sports.

- Abandoned fishpond: ponds in which there is physical evidence that aquaculture has not taken for many years (typically ponds overgrown with vegetation) and/or where there are obvious physical constraints to the resumption of fisheries activity (for example, ponds which are fenced off and thus inaccessible); concreted landscape / ornamental ponds are also included in this category.

9.4.5 Fishing operations including stocking, feeding and harvesting, the presence of aerators and the maintenance conditions of the facilities along the pond bunds are used to determine the status of fishponds (active or inactive). Active fishponds are

identified based on evidence of management conditions of the ponds and the presence of fish farming materials and / or equipment and fish farming activities, while inactive fishponds lacked these characteristics.

9.5 Baseline Condition

9.5.1 Hong Kong fisheries industry comprises capture fisheries and aquaculture which includes marine fish culture, pond fish culture and oyster culture. In 2020, the fishing industry of Hong Kong produced an estimated 116,000 tonnes of fisheries produce valued at about HK$2.7 billion. Production from the aquaculture sector was 3,322 tonnes valued at HK$127 million which was 3% in weight and 4% in value of the total fisheries production (AFCD 2021).

Capture Fisheries

9.5.2 No capture fisheries are present within the assessment area. The fishing ground near Deep Bay is located well over 16 km away from the Project. According to AFCD Port Survey 2016/17, the highest fish yields in Hong Kong are obtained in the south-eastern waters (e.g. Po Toi) and the southwestern waters (e.g. Cheung Chau, Shek Kwu Chau and Soko Islands). The overall fishing operations and fisheries production in marine waters of Deep Bay is generally the lowest compared with other waters in Hong Kong. No important spawning ground / nursery ground for commercial fisheries resources were identified within Deep Bay Water Control Zone (WCZ) (ERM 1998).

Marine Fish Culture

9.5.3 Marine fish culture involves rearing of marine fish from fry or fingerlings to marketable size in cages suspended by floating rafts usually in sheltered coastal areas. Marine fish culture activity is operated under licence in designated fish culture zones. Currently, there are 26 fish culture zones occupying a total sea area of 209 ha (AFCD 2021). There are no fish culture zones in Deep Bay Water Control Zone (WCZ).

Pond Fish Culture

9.5.4 The pond fish culture industry in Hong Kong is mainly centred in the North West New Territories (NWNT) which is over 4 km from the Project (Figure 9.1). Fish ponds are either freshwater or brackish.

9.5.5 In 2020, the local inland ponds, covering an area of approximately 1,130 ha, produced 2,516 tonnes of freshwater fish amounting to HK$60 million. About 96% of the farms are engaged in polyculture (Bighead Carp, Grass Carp, Common Carp and Silver Carp in combination with Tilapia or Grey Mullet). The remaining 4% practised monoculture of carnivorous species such as Giant Grouper, Seabream and Spotted Scat in brackish fish ponds near to the coastline. Majority of the fry and fingerlings are imported from the Mainland and Taiwan. Some of the Grey Mullet fry may also be caught in local coastal waters. Traditionally, fry is stocked in early spring and most fish species reach marketable size in eight to twelve

months (AFCD 2021). In addition, Ping Che Aquaponics farm registered with the Voluntary Registration Scheme (VRS) is situated within the assessment area.

Oyster Culture

9.5.6 Culture of oyster has been practised along the intertidal mud flat of Deep Bay in northwestern corner of Hong Kong for at least 200 years which is well over 16 km from the Project (Figure 9.1). Traditionally, oysters are cultured by the bottom culture method with spat collected by laying rock, concrete tile or post as cultch on the mud flat in May or June. The oyster spat takes four to five years to grow to marketable size. In recent years, some farmers turned to fattening of medium size oysters imported from the Mainland. Majority of them adopt the raft culture method, i.e. oysters placed in baskets suspended from rafts. Production in 2020 was about 119 tonnes (meat only) valued at HK$15 million (AFCD 2021).

Literature Review

9.5.7 The following reports were reviewed on the fisheries resources and activities in the assessment area and in the wider NWNT area.

- AFCD Port Survey 2016/17 Report.
- Hong Kong Fisheries Resources Monitoring Report (SCSFRI 2017).
- Drainage Improvement in Northern New Territories – Package C Environmental Study.
- Regulation of Shenzhen River Stage 4 EIA (AEIAR-160/2011).
- Liantang / Heung Yuen Wai Boundary Control Point and Associated Works EIA (AEIAR-161/2011).
- Planning and Engineering Study on Development of Lok Ma Chau Loop EIA (AEIAR-176/2013).
- Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery EIA (AEIAR-198/2016).
- Yuen Long Effluent Polishing Plant EIA (AEIAR-220/2019).

9.5.8 Assessment from these reports indicated the main fisheries activity is pond fish culture located in NWNT.

9.5.9 As the oyster culture, marine fish culture and capture fisheries are away from the Project Site (i.e. >16 km), the impact on water quality from the construction

activities are likely to be minimal. Significant impacts to water quality which could affect the oyster culture, marine fish culture and capture fisheries are not expected. Hence, the present fisheries impact assessment mainly focused on the impacts on pond culture fisheries. The relevant desktop information reviewed is considered sufficient for evaluating the potential impact on pond culture fisheries within the assessment area. Therefore, no information gap on fisheries baseline conditions within the assessment area was identified and fisheries surveys were not necessary for the current EIA study.

Aerial Photograph Review and Site Surveys

9.5.10 A review of the 2018 aerial photograph of the assessment area was conducted followed by site surveys and verification. Based on the aerial photograph review, no major pond fish culture activities were observed in the Project area. Majority of the fishponds are noted in the broader NWNT area. Site surveys and verification were conducted in February and July 2020 as part of the ecological survey to verify the presence of fishponds or any pond fish culture activities. Additional confirmatory visits were conducted in September and November 2020. A total of five ponds are recorded within the 500m assessment area. Their locations are presented in Figure 9.2 and status discussed below. Photographs of the ponds are presented in Appendix 9.1. No active / inactive fishponds were recorded during the site surveys.

9.5.11 Three of the ponds (Ponds 1, 2 and 3) are identified as abandoned ponds. These ponds are scattered and mostly isolated from each other. Some of them might serve aquaculture purpose in the past but were eventually left abandoned and their bunds were eventually overgrown with weedy herb and climber species such as Bidens alba, Brachiaria mutica and Ipomoea cairica. Pond 1 is located adjacent to TKL04, but no indication of water from TKL04 is being fed into this pond. Pond 2 is located near Tai Po Tin and over 300m away from TKL05. Pond 3 is located near Ha Shan Kai Wat and over 450m from TKL05. Both ponds are not fed by water from TKL05.

9.5.12 Two of the ponds (Ponds 4 and 5) are used for non-fisheries related landscape / ornamental ponds. Pond 4 is located in Wun Chuen Sin Koon (雲泉仙館) and Pond 5 is located in Ping Che Kat Tin sitting out area. The margin and sloping banks were made of concrete and had limited growth space for vegetation. Similarly, no indication of water from TKL04 and TKL05 is being fed to these ponds.

9.6 Impact Assessment

Construction Phase

Direct Impact

9.6.1 The proposed works would be confined to the works area. There would be no loss of active / inactive fishponds within the assessment area. There would not be any

loss of oyster culture area, or fishing ground near Deep Bay. Based on literature review, aerial photograph review and site surveys, besides Ping Che Aquaponics Farm, there were no active / inactive fishponds found within the Project area. Five ponds (three abandoned and two landscape / ornamental ponds were recorded during site surveys. One of the abandoned ponds (Pond 1) is located near the Project area of TKL04 and the Project has been designed to avoid causing direct impact to this pond. Water quality mitigation measures as recommended in Section 5.7 will be provided during construction to minimize impact to this abandoned pond. The other ponds and Ping Che Aquaponics Farm are all located away from the Project area. Direct impact during construction phase is considered as negligible.

Indirect Impact

9.6.2 TKL04 drains into TKL05 which discharges into Ping Yuen River, Shenzhen River and ultimately to Deep Bay. Wastewater and site effluent generated from construction works which is generally characterized by high concentrations of suspended solids and elevated pH may impact the water quality of the downstream waterbodies and may indirectly affect the pond fish culture activities in the NWNT area.

9.6.3 As assessed in Chapter 5, no adverse water quality to the downstream waterbodies is expected with the proper implementation of the water quality mitigation measures (see Section 5.7) during construction phase of the Project. No indirect impact on pond fish culture activities in the NWNT area, oyster culture and fishing ground in the Deep Bay area due to discharge into Shenzhen River is expected.

Operation Phase

Direct Impact

9.6.4 The Project will not result in permanent loss of any ponds. Direct impact during operational phase is not expected.

Indirect Impact

9.6.5 Potential sources of indirect impacts on pond fisheries during operational phase of the Project may include blockage of access to fishponds, and degradation / deterioration of environmental conditions of fishponds due to induced-water quality impacts from the Project. However, given the current Project only involves improvement to the existing drainage channel to alleviate flood risk without generating additional pollutants, and all affected accesses will be re-provided, no significant indirect impacts are expected during operational phase.

9.7 Mitigation Measures

9.7.1 Apart from the water quality mitigation measures (see Section 5.7) during construction and operational phases of the Project, no other mitigation measures

are considered necessary.

9.8 Potential for Cumulative Impact

9.8.1 Based on the latest available information, the projects with programmes likely to overlap with the Project construction have been identified in Chapter 5 - Water Quality. Given the nature and locations of the concurrent projects, no adverse cumulative fisheries impact during both construction and operational phases are expected.

9.9 Evaluation of Residual Impact

9.9.1 There will be no loss of fishponds arising from the Project. With the implementation of the water quality mitigation measures (see Section 5.7) during construction and operational phases of the Project, no residual fisheries impact is anticipated.

9.10 Environmental Monitoring and Audit

9.10.1 As no direct or indirect impact to fishponds or pond fish culture activities were identified during construction and operation of the Project, no specific monitoring programme for fisheries impact is therefore considered necessary.

9.11 Conclusion

9.11.1 The baseline review and site surveys indicated that, besides Ping Che Aquaponics Farm, no active fishponds, pond fish culture activities have been identified within the assessment area. With proper implementation of the water quality mitigation measures during construction and operational phases of the Project, no indirect impact on pond fish culture activities in the NWNT area, oyster culture and fishing ground in Deep Bay area due to discharge into Shenzhen River is expected. Fisheries impact arising from construction and operation of the Project is therefore not anticipated.

9.12 References

AFCD (2021) Marine fish culture, pond fish culture and oyster culture. AFCD website: https://www.afcd.gov.hk/english/fisheries/fish_aqu/fish_aqu_mpo/fish_aqu_mpo.html. Accessed on 26 April 2021.

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