



Agreement No. CE 54/2020 (DS)
Drainage Improvement Works in Mui Wo – Investigation

Contract No. PM 03/2021 Ecological Survey in Mui Wo

Baseline Ecological Survey & Evaluation Report

(Issue 1)

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1 METHODOLOGY

1.1 Assessment Area for Terrestrial Ecology and Aquatic Ecology

1.1.1 The Assessment Area (AA) for terrestrial ecological field surveys included all area within 500m distance from the boundary of the project, any associated works as well as areas likely to be impacted by the project. The Assessment Area is illustrated in **Figure 1**.

1.2 General

1.2.1 The methodology followed those outlined in the Brief (detailed in the following paragraphs) received. The ecological surveys also addressed the requirements in establishing the ecological baseline profile and followed the requirements of the pertinent of Annexes 8 and 16 of the Technical Memorandum as well as Environmental Impact Assessment Ordinance Guidance Note No. 7/2010 “Ecological Baseline Survey for Ecological Assessment” and No. 10/2010 “Methodologies for Terrestrial and Freshwater Ecological Baseline Survey.

1.3 Literature Review

1.3.1 Findings of relevant studies or surveys, including but not limited to relevant Environmental Impact Assessment reports, newsletter related to local ecology and conservation (such as Hong Kong Biodiversity by Agricultural, Fisheries, and Conservation Department (AFCD) and Connections by Kadoorie Farm and Botanic Garden (KFBG)), published scientific papers, as well as the Biodiversity Database and other publications on the conservation status and distribution of local flora and fauna etc. were reviewed.

1.3.2 All available information were collated and evaluated to identify information gap relating to the establishment of the ecological profile of the aquatic and terrestrial environment, and to determine the ecological surveys needed for an ecological impact assessment.

1.3.3 The survey results from the following sources are reviewed:

- Environmental assessments reports done in Mui Wo from various sources by aec (2018), Arup & aec (2018) and CEDD (2009).
- EIA reports submitted by M&EL (2005) and MLAL & CLL (2016).
- Surveys on specific taxa at Mui Wo done by local experts, institutes and organizations – Lau & Dudgeon (1999); Carey *et al.* (2001) and the University of Hong Kong (2001), referenced by M&EL (2005).
- Published field guide – Field Guide to the Dragonflies of Hong Kong. 2nd Ed. (2004)
- List of fauna recorded by AFCD within the survey area provided on request.

1.3.4 The Assessment Area of EIA studies carried out by Metcalf & Eddy Limited (M&EL) (2005) and Maurice Lee & Associates Ltd. & Cinotech Consultants Limited (MLAL&CCL) (2016) overlaps with the current Assessment Area.

1.3.5 While MLAL&CCL (2016) only focused on the area surrounding the new Wang Tong River bridge (including Butterfly Hill), the study by M&EL covers the Pak Ngan Heung, Tai Tei Tong and Luk Tei Tong Rivers and their surrounding areas.

1.3.6 A checklist of the collective list of fauna gathered from the literature review can be found in Appendix I.

1.4 Ecological Field Surveys

1.4.1 A survey programme of the Study is summarised below in **Table 1**:

Table 1. Ecological Survey Programme

Tasks	2021			2022								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Habitat and Vegetation Surveys						✓			✓			
Terrestrial Mammal Surveys (Day-time + Night-time)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bird Surveys (Day-time + Night-time)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Herpetofauna Surveys (Day-time + Night-time)		✓				✓		✓	✓	✓	✓	
Butterfly and Odonate Surveys		✓				✓		✓	✓	✓	✓	
Aquatic Assemblages Survey		✓				✓			✓			✓

NOTES:

1. Wet season months are highlighted in blue and dry season months are highlighted in orange.
2. ✓ = survey conducted.

1.4.2 The ecological field surveys involved a Assessment Area of 500m from the proposed works boundary (see **Figure 1**). The surveys will cover the ecological context (both fauna and flora) associated with the Assessment Area and will cover various fauna groups as required.

1.4.3 All floral and faunal species of conservation importance recorded during the surveys will be photographed as far as possible and the locations of the records will be marked with a GPS device and indicated on the habitat maps.

1.4.4 A comprehensive species list of each taxa surveyed (including both flora and fauna) was compiled, with the conservation status, protection status, and other relevant information (such as distribution, rarity, nativeness, etc.) for each species reported. The flora and fauna species list of each taxa surveyed is presented in **Appendix 1** and **Appendix 2**, respectively under different habitats within the Site and within the Assessment Area outside the Site respectively.

Habitat and Vegetation Survey

1.4.5 Habitats within the Assessment Area were identified by making reference to the latest available aerial photographs obtained from Lands Department and also ground-truthing. Habitats identified were illustrated on a habitat map as shown in **Figure 2**.

1.4.6 Ecological characteristics of each identified habitat type, such as size, vegetation type, dominant floral species present, species abundance and diversity, community structure, naturalness, seasonal patterns and inter-dependence of habitats and species, and presence of any features of ecological importance, is discussed. Representative photographs of each habitat type and any importance ecological features will be provided.

1.4.7 Vegetation survey were conducted via transects once per season. Floral species observed during the surveys were identified to species level, with their relative abundance recorded.

1.4.8 A plant species list presenting the recorded plant species and presence of species of conservation concern was established for the Assessment Area. Conservation status, form (e.g. herbaceous, shrub, tree) and category of whether the species is native or exotic is presented on the list. Nomenclature and conservation status of floral species follows Xing *et al.* (2000), Wu & Lee (2000), Barretto *et al.* (2011) as well as AFCD (2003, 2007, 2008, 2009, 2011 and 2012).

Mammal Survey

- 1.4.9 Mammal surveys (including day and night-time surveys) were carried out monthly via transects. Since most mammalian species in Hong Kong occur at low densities, surveys for mammals included both direct observation and active searching for signs of mammal occurrence (including potential roost, footprints and droppings). Night-time surveys were also conducted to supplement the findings from day-time surveys. Bat surveys will be conducted using bat recorders along transects.
- 1.4.10 Nomenclature of species follows AFCD's Hong Kong Biodiversity Database. A comprehensive list of species recorded from the Assessment Area is summarised in **Appendix 2**, with conservation and protection status indicated.

Bird Survey

- 1.4.11 Surveys for birds were conducted monthly by transect count with the aid of a pair of binoculars at a suitable time (usually in early morning) when birds are most active. Surveys have also covered both high-tide and low-tide periods. Night-time surveys were also conducted to detect presence of nocturnal species. Bird species were detected either by direct sighting or by their call. Species recorded were identified and quantified, with special reference to behaviors such as feeding, roosting and breeding. Special attention was given to Tai Wai Yuen night roost which was discovered within the Assessment Area since the commencement of the Project.
- 1.4.12 Nomenclature of species follows the updated List of Hong Kong Birds published by the Hong Kong Bird Watching Society. A comprehensive list of species recorded from the Assessment Area was prepared, with conservation and protection status indicated in **Appendix 2**.

Herpetofauna Survey

- 1.4.13 Herpetofauna surveys (including day and night-time surveys) was conducted four times in the wet season and twice in the dry season. Any herpetofauna species observed in other surveys are also recorded for the sake of comprehensiveness. All potential habitats for herpetofauna will be actively searched throughout the survey. Microhabitats such as stones, crevices or rotten log were deliberately examined and uncovered to reveal the presence of the herpetofauna hiding under these covers. Active searching for eggs and tadpoles of amphibians in aquatic habitats were also conducted to indicate breeding activities. All life form of amphibians, including adult, tadpole, juvenile and egg, were recorded to indicate the breeding potential in the survey site. Particular focus was given to Romer's Tree Frog.
- 1.4.14 Nomenclature of species follows AFCD Hong Kong Biodiversity Database. The commonness and conservation status (including status from Red List of China's Vertebrates, the latest IUCN red list and other scientific research study e.g. Fellowes *et al.* (2002)) for each species were presented in **Appendix 2**.

Butterfly and Odonate Survey

- 1.4.15 Odonates and butterflies survey were conducted four times in the wet season and twice in the dry season. For butterflies, active searching for larvae and pupae within 5m of the transects was conducted. For odonates, special attention was paid to aquatic habitats such as watercourses. All species observed were identified to species level and quantified. Species occurring outside 5m of the transects but within the Assessment Area was also be recorded. The surveys were conducted under suitable weather conditions to avoid overcast weather when butterfly and odonates are less active and less easy to be detected.
- 1.4.16 Nomenclature of butterfly and odonate species follows AFCD Hong Kong Biodiversity Database. The commonness and conservation status (including status from China Red Data Book, the latest IUCN

red list and other scientific research study e.g. Fellowes *et al.* (2002)) for each species were provided in **Appendix 2**.

Aquatic Assemblages Survey

- 1.4.17 Aquatic fauna, including freshwater/brackish macro-invertebrates and fishes at sizeable streams, notable water bodies (e.g. ponds) and other wetlands in the terrestrial / estuarine areas were focused. The species were surveyed by direct observation and active searching by hand nets, baited traps and other standard field sampling techniques as appropriate, depending on the actual site conditions.
- 1.4.18 Within each stream/channel, surveys were conducted sampling points indicated on **Figure 1**, to cover different sections of the stream/channel. Aquatic fauna surveys were conducted twice in the wet season and twice in the dry season, each survey covering the entire Assessment Area. During each survey, all sampling locations for aquatic fauna were covered. Special attention was given to the tidal sections of the watercourses. Surveys were conducted during both high tide and low tide to fully capture the wildlife usage.
- 1.4.19 Nomenclature of species follows AFCD Hong Kong Biodiversity Database. The commonness and conservation status (including status from Red List of China's Vertebrates, the latest IUCN red list and other scientific research study e.g. Fellowes *et al.* (2002) and KFBG (2019)) for each species will be presented in **Appendix 2**.

2 BASELINE ECOLOGICAL CONDITION

2.1 Habitat and Vegetation

Findings from Literature Review

- 2.1.1 A total of 13 habitat types were recognised in the study by M&EL (2005), and their description is summarised below. It is noted that the construction of Luk Tei Tong Bypass Channel, and the associated pumping stations, floodwalls, and bunds following M&EL (2005) have altered the ecology of the affected streams and surrounding areas, causing some information from this literature review to become obsolete.

Semi-natural Watercourse

- 2.1.2 The Assessment Area covers four major rivers, namely Pak Ngan Heung River (PNHR), Tai Tei Tong River (TTTR), Luk Tei Tong River (LTTR) and River Silver. The former three rivers flow from the surrounding mountain range and merges into the latter at Mui Wo Town Centre, which then flows into the Silver Mine Bay. In addition to these three rivers, the Wang Tong River (WTR) is situated in the Northern part of the Assessment Area.
- 2.1.3 The lower sections of PNHR, TTTR and LTTR has undergone modifications under previous drainage improvement works. In Particular, PNHR and TTTR has undergone significant changes, where bypass channels were constructed for both of these rivers.
- 2.1.4 Prior to these changes, PNHR was a large stream with mostly natural substrate. Riverbanks of the upper section are natural and supports natural riffle/pool formation, while the middle section was lined with gabion, and the lower section was described to have good water quality but received considerable raw household sewage.
- 2.1.5 TTTR had mostly natural substrate as well, with its middle section lined with concrete embankment, while the lower and upper sections of the river had relatively undisturbed pool/riffle formations .
- 2.1.6 LTTR is divided into two major sections, the western side of the river was lined with gabion and underwent extensive dredging work, while the Eastern tributary flowed through the Luk Tei Tong Marsh, nurturing expansive riparian vegetation.
- 2.1.7 River Silver is channelised and is under frequent human disturbances, as fishers and boat owners will sail in and out of the estuary and park their sampans along the wall of the river. Ardeids were seen foraging and resting on the river wall or on Sampans.
- 2.1.8 The lower section of WTR flows from the North side of the Assessment Area into the Silver Mine Bay. MLAL & CCL (2016) described the upper sections to be fully channelised, becoming semi-channelised by the middle and lower sections. The streambed of the upper section is modified to be concrete, but slowly becomes more natural as the stream flows towards the sea. In particular, the substrate of middle and lower sections consists of sand and gravel, with silt and mud accumulated towards the seaward end, resulting in an alluvial fan at the river mouth. The lower section is under tidal influence and part of the stream bed would be exposed during low tide.
- 2.1.9 A gradient of vegetation is also observed along WTR . The upper section has limited vegetation, while the middle section is flanked by a woodland on the eastern side with species such as *Hibiscus tiliaceus* and *Litsea glutinosa*, while exotic landscape and fruit plants were found on the West side bank. Finally, true mangroves and mangrove associates were found at the estuary.

Secondary Woodland

- 2.1.10 The Assessment Area covers two large patches of secondary woodland located in the hillsides surrounding Mui Wo Valley and in Butterfly Hill. These woodlands are described to be mostly structurally complex, with a semi-closed to closed canopy of approximately 10m to 14m. Human disturbances within the woodland are limited, and plant communities were diverse, supporting numerous tree, shrub, herb and climber species.
- 2.1.11 M&EL (2005) recorded two plant species of conservation interest within this habitat: *Aquilaria sinensis*, a tree common in Hong Kong but endemic to China and threatened by habitat loss, and *Diospyros vaccinioides*, a very common and widespread shrub in Hong Kong but listed as a Critically Endangered species in the IUCN Red List due to heavy exploitation in Taiwan.

Active Agriculture (Dry & Wet)

- 2.1.12 Active agricultural lands were recorded throughout the Assessment Area, with most of the lands being dry. Crop plants, grasses and common weeds dominated the habitat, leading to low species and structural diversity.

Inactive Agriculture (Dry & Wet)

- 2.1.13 Inactive agricultural lands were more widespread within the Assessment Area when compared to active agricultural lands. Most of the inactive wet agricultural land were moderately fragmented, amongst active agricultural land, villages, orchards and other habitat types. These agricultural lands supports a moderate diversity of vegetation, with most of species being common wetland species.
- 2.1.14 A large area of wet inactive agricultural land was recorded Northeast of Luk Tei Tong Village, and was classified as wetland by M&EL (2005), with wetlands directly to the North of Luk Tei Tong Village being drier, with less established wetland vegetation and when compared to the wetlands in the North-east and North-west of the village which has more established wetland vegetation.

Shrubland

- 2.1.15 Shrublands were recorded in small patches around Pak Ngan Heung Village and at the peak of Butterfly hill, although the vegetation recorded was similar to adjacent secondary woodlands. *Diospyros vaccinioides* was recorded in this habitat as well.

Plantation

- 2.1.16 Plantations are limited to roadside slopes of South Lantau Road. This habitat mostly consists of commonly planted exotic species, with some patches of common native pioneer tree species in the sub-canopy.

Orchard

- 2.1.17 Orchards were recorded in scattered patches around Tai Tei Tong Village and the lower course of Luk Tei Tong River, dominated by fruiting tree species and poor in species diversity due to active management.

Developed Land, Bare Ground and Wasteland

2.1.18 These habitats covered a large portion of the lowlands of the Mui Wo Valley and were grouped together as they are highly disturbed as a result of intensive human activities, and covered only by weedy or ephemeral vegetation. Subsequently, the ecological interest of these habitats are considered to be low.

Species of Conservation Importance

2.1.19 A total of eleven species of conservation importance were recorded from previous studies, which includes:

- Environmental assessments reports done in Mui Wo from various sources by aec (2018), Arup & aec (2018) and CEDD (2009).
- EIA reports submitted by M&EL (2005) and MLAL & CLL (2016).
- A study on plant diversity of Feng Shui Woods in a thesis by Chu (1998).

2.1.20 The species are summarised in the following table:

Table 2. Floral Species of Conservation Importance Recorded in Literature

Scientific Name	Status in Hong Kong ¹	Habitat Occurrence ²
<i>Ailanthus fordii</i>	Rare ^(f) , Cap. 96., Near Threatened ^(a)	DA, GL, Mar, VA
<i>Aquilaria sinensis</i>	Cap. 586; Near Threatened ^(a) ; Wild plant under State Protection (Category II) ^(a) ; Vulnerable ^{(g)(h)(i)}	FSW, SW, N/A
<i>Aralia chinensis</i>	Vulnerable ^(g)	FSW
<i>Artocarpus hypargyreus</i>	Status in China as Near Threatened ^(a) ; Vulnerable ^(g)	FSW
<i>Azolla imbricata</i>	Rare ^(f)	DA, GL
<i>Camellia</i> sp.	Cap. 96	DA, V/A/M
<i>Canthium dicoccum</i>	Vulnerable ^(g)	FSW, N/A
<i>Diospyros vaccinioides</i>	Critically Endangered ^(g) , Endangered ⁽ⁱ⁾	FSW, SW, V/A/M
<i>Pavetta hongkongensis</i>	Cap. 96A	FSW, SW, N/A
<i>Rhododendron simsii</i>	Cap. 96A	N/A
<i>Rhododendron</i> sp.	Cap. 96	DA, V/A/M

Notes:

1. Conservation and Protection Status, and Status in Hong Kong refer to the below literatures.

- AFCD (2003);
- AFCD (2007);
- AFCD (2008);
- AFCD (2009);
- AFCD (2011);
- Corlett *et al.* (2000);
- IUCN (2022);
- Pang *et al.* (2011);
- Qin *et al.* (2017).

2. DA = Developed Area; FSW = Feng Shui Woodland; GL = Grassland; SW = Secondary Woodland; V/A/M = Village/Agriculture/Marsh Mosaic; VA = Village Area; N/A = habitat not specified in literature.

Field Survey Results

- 2.1.21 Within the 500m Assessment Area, a total of 12 habitats were identified, including Agricultural Land, Channelised Watercourse, Mangrove, Marsh, Plantation, Pond, Sandy Shore, Sea, Secondary Woodland, Semi-natural Watercourse, Shurbland/Grassland and Village/Developed Area. A habitat map is provided in **Figure 2**. Representative photographs of these habitats are provided in **Appendix 3**. A list of floral and fauna species recorded during the surveys with their relative abundance within each habitat are provided in **Appendix 1** and **Appendix 2**, respectively.

Agricultural Land

- 2.1.22 The lowland area of Mui Wo, including the Proposed Works Limit of the Proposed Storm water Pumping Station, is largely covered by abandoned agricultural land with dry soil layer. This habitat is dominated by herbaceous vegetation, such as *Alocasia macrorrhizos*, *Amaranthus viridis*, *Cynodon dactylon*, *Oxalis corniculata*, *Plantago major*, and exotic weeds, *Axonopus compressus*, *Hydrocotyle verticillata*, *Mimosa pudica*, *Oxalis debilis* subsp. *Corymbosa*, *Wedelia trilobata* and *Panicum maximum*. Individuals and small groups of young native trees, including *Ficus hispida*, *Macaranga tanarius* var. *tomentosa* and *Mallotus paniculatus*, are scattered in the abandoned agricultural land. Several minor areas of active agricultural lands and orchards are also present with the cultivation of common crops and fruit trees, for example, *Beta vulgaris* var. *rapacea*, *Brassica rapa chinensis*, *Carica papaya*, *Musa x paradisiaca*, *Dimocarpus longan* and *Clausena lansium*.
- 2.1.23 An individual of climber *Malaisia scandens*, which is assessed as Rare in Hong Kong (Corlett *et al.* 2000), was found North of Tai Tei Tong Village. Other known localities were mainly located on Lantau and nearby islands, including Tai O, Fan Lau, Shui Hou, Tong Fuk, Tai A Chau, Soko Islands and Tai A Chau (Corlett *et al.* 2000, AFCD 2007).

Channelised Watercourse

- 2.1.24 Channelised Watercourse are present in the lower courses of three main streams of Mui Wo (Pak Ngan Heung, Tai Tei Tong and Luk Tei Tong), in which the section of Luk Tei Tong is included in the Extent of River Revitalisation within the Proposed Works Limit. Vegetation is limited in the section influenced by tidal motion. Plant species recorded in this habitat are mainly grasses and herbs, including native aquatic plants *Ludwigia hyssopifolia*, *Colocasia esculenta*, *Panicum repens*, grasses *Neyraudia reynaudiana*, *Microstegium ciliatum*, and exotic species *Alternanthera philoxeroides*, *Bidens alba*, *Myriophyllum aquaticum* and *Panicum maximum*.

Semi-natural Watercourse

- 2.1.25 The upper sections of the three abovementioned main streams in Mui Wo plus Wang Tong Stream are the main semi-natural watercourses present in the Assessment Area. The Proposed Works Limits of River Reprofiling are located along a section of Tai Tei Tong Stream. The diversity and abundance of native aquatic species are not high given that many of the stream sections are either shaded by trees such as *Macaranga tanarius* var. *tomentosa* and *Sterculia lanceolate*, or overgrown with terrestrial plants, including *Alocasia macrorrhizos*, *Bidens alba*, *Boehmeria nivea*, *Microstegium ciliatum*, *Mikania micrantha* and *Neyraudia reynaudiana*. The lower courses of Wang Tong Stream are influenced by tidal motion, favouring the growth of mangroves and mangrove associates, for example, *Acanthus ilicifolius*, *Acrostichum aureum* and *Solanum torvum*.

Mangrove

- 2.1.26 Mangrove stands are only found near the Wang Tong Stream in the Assessment Area. The vegetation structure of this habitat is very simple that is formed by several species favouring brackish habitat, including *Acanthus ilicifolius*, *Aegiceras corniculatum*, *Cyperus malaccensis* var. *brevifolius*, *Gymnanthera oblonga*, *Hibiscus tiliaceus* and *Pandanus tectorius*.

Marsh

- 2.1.27 Patches of marsh are mainly situated near Wang Tong, Pak Ngan Heung and Luk Tei Tong. A very small area at the fringe of the marsh along Luk Teng Tong Stream is zoned within the Extent of River Revitalisation in the Proposed Works Limit. This habitat is naturally turned from abandoned agricultural lands in low-lying areas receiving water from streams and rainwater. Aquatic plants are extensively distributed in marshes. Dominant species include *Colocasia esculenta*, *Cyclosorus interruptus*, *Hedychium coronarium*, *Hydrocotyle sibthorpioides*, *Phragmites australis* and *Panicum repens*. However, some of the areas begins to dry out with the invasion of terrestrial or exotic species, such as *Alocasia macrorrhizos*, *Bidens alba*, *Brachiaria mutica*, *Lantana camara* and *Mikania micrantha*.
- 2.1.28 Aquatic fern *Azolla imbricata*, which is assessed as Rare by Corlett *et al.* (2000), was found in Luk Tei Tong Marsh, within the Assessment Area.

Pond

- 2.1.29 One active and several abandoned ponds are found in the Assessment Area. The active pond, located near Luk Tei Tong, was found to be used for recreational fishing. Vegetation is very limited in active ponds which are frequently managed by owners. Crops are found on the pond bund, for example, *Musa x paradisiaca* and *Carica papaya*. Most of the abandoned ponds are overgrown. Dominant species include native aquatic plants *Acrostichum aureum*, *Phragmites australis*, *Lemna minor*, terrestrial grass *Microstegium ciliatum*, and exotic species *Brachiaria mutica*, *Eichhornia crassipes* and *Panicum maximum*.

Sandy Shore

- 2.1.30 Silvermine Bay Beach is the only Sandy shore habitat identified in the Assessment Area, as well as a very small portion (about 0.03ha) of the Proposed Works Limit of Proposed Pumping Station (~0.03ha). Floristic diversity and abundance are very limited in this artificial habitat. A number of individual trees are present on the beach, including *Casuarina equisetifolia*, *Hibiscus tiliaceus* and *Terminalia catappa*.

Secondary Woodland

- 2.1.31 Extensive hillside areas are covered by woodlands, however, most of them are located in the outer part of the Assessment Area. These woodlands are generally preserved in good condition, supporting moderate richness of native plant species. The overstorey is occupied by mature trees of *Alangium chinense*, *Aporosa dioica*, *Celtis sinensis*, *Litsea glutinosa*, *Machilus chekiangensis*, *Schefflera heptaphylla*, *Sterculia lanceolata* etc., forming a semi-close tree canopy of 8-12m tall on average. The understorey is vegetated with common ferns *Blechnum orientale*, *Cyclosorus parasiticus*, climbers *Desmos chinensis*, *Tetracera asiatica*, shrubs *Ficus hirta*, *Psychotria asiatica*, *Phyllanthus cochinchinensis*, and saplings of the overstorey trees.
- 2.1.32 Trees *Aquilaria sinensis* and *Artocarpus hypargyreus*, which are considered of conservation concern, were found in secondary woodland north of Mui Wo town. Though *Artocarpus hypargyreus* is assessed as common in Hong Kong by Corlett *et al.* (2000), it is listed as Vulnerable globally and Near Threatened nationally (IUCN 2022, AFCD 2003).

Shrubland/Grassland

- 2.1.33 Shrubland/grassland, which is a densely vegetated habitat on hillside, is not commonly found within the Assessment Area. A high proportion of native species are present in shrubland/grassland. The more mature area of shrubland consists of shrubs and small trees of 3-6m tall in general, for example, *Alangium chinense*, *Aporosa dioica*, *Ilex asprella* and *Litsea rotundifolia* var. *oblongifolia*. The exposed area is dominated by fern *Dicranopteris pedata*, small shrubs *Glochidion eriocarpum*, *Rhodomyrtus tomentosa* and *Sapium discolor*.
- 2.1.34 Two small individuals of protected tree *Aquilaria sinensis* are recorded on the shrubland/grassland north of Mui Wo town. This species is listed as Vulnerable in China Plant Red Data Book and under State protection (Category II) in China (AFCD 2003). It is also assessed as Vulnerable globally by IUCN (2022). However, it is commonly found in lowland forests and fung shui woods in Hong Kong (Corlett *et al.* 2000).

Plantation

- 2.1.35 Only a few small areas of plantation were identified on the engineering slopes in the southern part of the Assessment Area. Vegetation of this habitat comprises of the widely cultivated exotic tree species *Acacia confusa*, however, some naturally colonised tree and shrub species such as *Bridelia tomentosa*, *Celtis sinensis*, *Cratoxylum cochinchinense*, *Ficus hispida*, *Macaranga tanarius* var. *tomentosa*, *Mallotus paniculatus* and *Sterculia lanceolate*. The understorey is vegetated by small herbs and ferns instead, most abundant species includes *Blechnum orientale*, *Cyclosorus parasiticus*, *Dicranopteris pedata* and *Lygodium scandens*.

Village/Developed Area

- 2.1.36 Developed area comprises the town and several villages in Mui Wo. A small area near Silvermine Bay Beach is zoned for the Proposed Pumping Station within the Proposed Works Limit. Vegetation found in this habitat included a lot of exotic species cultivated for ornamental or gardening purposes, such as *Aglaia odorata*, *Calliandra haematocephala*, *Dypsis lutescens* and *Rhododendron pulchrum*. Self-seeded invasive species are also abundant in this habitat, for example, *Bidens alba*, *Leucaena leucocephala*, *Ligustrum sinense*, *Lantana camara* and *Mikania micrantha*. The vegetation is usually of lower ecological value.
- 2.1.37 An individual of protected tree *Aquilaria sinensis* was found on the roadside adjacent to a secondary woodland in the southern part of the Assessment Area.

Floral Species of Conservation Importance

- 2.1.38 Floral species of conservation importance recorded in the survey are summarised in **Table 3** below:

Table 3. List of plant species of conservation importance recorded during the survey period

Species	Conservation and Protection Status ¹	Recorded in:	
		Proposed Works Limit ²	500m Assessment Area ²
<i>Aquilaria sinensis</i>	Cap. 586; Near Threatened ^(a) ; Wild plant under State Protection (Category II) ^(a) ; Vulnerable ^{(e)(h)(i)}	/	SW, S/G, V/D
<i>Artocarpus hypargyreus</i>	Status in China as Near Threatened ^(a) ; Vulnerable ^(e)	/	SW
<i>Azolla imbricata</i>	Rare ^(f)	/	M
<i>Malaisia scandens</i>	Rare ^(f)	/	AL

Note:

1. Conservation and Protection Status, and Status in Hong Kong refer to the below literatures.
 - a. AFCD (2003);
 - b. AFCD (2007);
 - c. AFCD (2008);

- d. AFCD (2009);
 - e. AFCD (2011);
 - f. Corlett *et al.* (2000);
 - g. IUCN (2022);
 - h. Pang *et al.* (2011);
 - i. Qin *et al.* (2017).
2. Habitats: AL = Agricultural Land; M = Marsh; S/G = Shrubland/Grassland; SW = Secondary Woodland; V/D = Village/Developed Area.

2.2 Mammals

Findings from Literature Review

- 2.2.1 According to the literature, 16 species of mammals were recorded within the Assessment Area. Among them ten are species of conservation concern, which includes the Red Muntjac and nine species of bats. All mammalians were “Very Common” to “Uncommon” according to Hong Kong Biodiversity Database by AFCD (2022).
- 2.2.2 The only mammal species with a specific location given was the Short-nosed Fruit Bat that was recorded within the developed land in Mui Wo Town (Arup & aec 2018). While the location of other bat species records are unknown, all bat species recorded aside from the Short-nosed Fruit Bat prefers to roost in caves, with only the Himalayan Leaf-nosed Bat occasionally roosting in buildings in the Summer (Shek, 2006). Thus it is expected that the bats utilises the Silver Mine Cave as a roost and its surrounding areas as foraging grounds.

Table 4. Mammal Species of Conservation Importance Recorded in Literature

Species	Conservation and Protection Status ¹	Status in Hong Kong ²	Habitat of Occurrence ³
Short-nosed Fruit Bat <i>Cynopterus sphinx</i>	RLCV(NT); Cap.170	Very Common	UA, N/A
Chinese Horseshoe Bat <i>Rhinolophus sinicus</i>	Cap.170	Very Common	N/A
Intermediate Horseshoe Bat <i>Rhinolophus affinis</i>	(LC); Cap.170	Uncommon	N/A
Least Horseshoe Bat <i>Rhinolophus pusillus</i>	PRC (RC); Cap.170	Uncommon	N/A
Himalayan Leaf-nosed Bat <i>Hipposideros armiger</i>	(LC); Cap.170	Very Common	N/A
Pomona Leaf-nosed Bat <i>Hipposideros pomona</i>	(LC); Cap.170	Very Common	N/A
Chinese Myotis <i>Myotis chinensis</i>	(LC); RLCV(NT); Cap.170	Uncommon	N/A
Rickett's Big-footed Myotis <i>Myotis ricketti</i>	(LC); IUCN(NT); Cap.170	Uncommon	N/A
Lesser Bent-winged Bat <i>Miniopterus pusillus</i>	(LC); RLCV(NT); Cap.170	Uncommon	N/A
Red Muntjac <i>Muntiacus muntjak</i>	PRC	Very Common	N/A

Notes:

1. Conservation and Protection Status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016), CSIS (2022), CITES (2022), Cap. 170 and Cap. 586.
 - a. Conservation status by Fellowes *et al.* (2002): LC: Local Concern, PRC = Potential Regional Concern, RC = Regional Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
 - b. Conservation status by International Union for Conservation of Nature (IUCN): NT = Near Threatened.
 - c. Conservation status by Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016): NT = Near Threatened.
 - d. Cap. 170 = Chapter 170. Wild Animals Protection Ordinance.
2. Status in Hong Kong follows Hong Kong Biodiversity Database (AFCD 2022).
3. Habitat: UA = Urban Area, N/A = habitat not provided in literature
4. Note that habitat classification may be inconsistent between studies

Field Survey Results

- 2.2.3 One species of mammal was recorded from the Proposed Works Limit and 15 were recorded within the 500m Assessment Area. Among the mammals recorded, 11 species are considered to be of conservation importance. Species of conservation importance recorded in the survey are presented below in **Table 5** with habitat(s) where they were recorded.
- 2.2.4 Two roosts of Short-nosed Fruit Bat were recorded during the survey period, one located in Mui Wo Town Centre next to the Mui Wo Swimming Pool, and the other within the Pak Ngan Heung Village area. Active usage of the Town Centre roost was observed during October 2021, June and July 2022, with a maximum of 10 bats during October, while the Pak Ngan Heung Village roost was observed to be active in December 2021, January and February 2022 with a maximum of 13 bats during December.

The maximum count of all mammal species recorded within the Proposed Works Limit and the Assessment Area has been reported in **Appendix 2**.

Table 5. List of mammal species of conservation importance recorded during the survey

Species	Conservation and Protection Status ¹	Status in HK ²	Recorded in:	
			Proposed Works Limit ³	500m Assessment Area ³
Short-nosed Fruit Bat <i>Cynopterus sphinx</i>	RLCV(NT); Cap.170	Very Common	/	AL, IF, V/D
Himalayan Leaf-nosed Bat <i>Hipposideros armiger</i>	(LC); Cap.170	Very Common	/	IF
Chinese Noctule <i>Nyctalus plancyi</i>	PRC (RC); Cap.170	Common	/	IF
Japanese Pipistrelle <i>Pipistrellus abramus</i>	Cap.170	Very Common	/	IF
Least Pipistrelle <i>Pipistrellus tenuis</i>	RLCV(NT); Cap.170	Uncommon	/	IF
Chinese Pipistrelle <i>Hypsugo pulveratus</i>	(LC); RLCV(NT); Cap.170	Rare; Species of Conservation Concern	/	IF
Lesser Bamboo Bat <i>Tylonycteris pachypus</i>	(LC); Cap.170	Very Common	/	IF
Lesser Yellow Bat <i>Scotophilus kuhlii</i>	(LC); Cap.170	Uncommon	/	IF
Greater Bent-winged Bat <i>Miniopterus magnater</i>	PRC (RC); RLCV(NT); Cap.170	Data Deficient	/	IF
Lesser Bent-winged Bat <i>Miniopterus pusillus</i>	(LC); RLCV(NT); Cap.170	Uncommon	/	IF
Red Muntjac <i>Muntiacus muntjak</i>	PRC	Very Common	/	SW

Notes:

- Conservation and protection status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (Jiang *et al.* 2016), China Species Red List (Wang & Xie, 2004), IUCN (2022), China State Major Protection Status, CITES (2022), Native fish of conservation concern in HK (KFBG, 2019), Cap. 170 and Cap. 586.
 - Conservation status by Fellowes *et al.* (2002): LC = Local Concern; PRC = Potential Regional Concern; RC = Regional Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
 - Conservation status by Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016): NT = Near Threatened.
 - Cap. 170 = Wild Animals Protection Ordinance. All wild bats and birds in Hong Kong are protected under Cap. 170.
- Distribution and Rarity follows AFCD (2022) in general and the latest Hong Kong Bird Report for avifauna and AFCD Hong Kong Biodiversity Database (2014) for other fauna.
- Habitat: AL = Agricultural Land, IF = In Flight, SW = Secondary Woodland, V/D = Village/Developed Area

2.3 Birds

Findings from Literature Review

- 2.3.1 A total of 109 species of birds were recorded from the Assessment Area, 42 of which were considered to be species of conservation concern. Most of these species of conservation interest are wetland dependent, which suggests that the marsh and wetland habitats within the Assessment Area were once important foraging habitats for these birds.
- 2.3.2 According to the breeding bird survey conducted by the Hong Kong Bird Watching Society and reported by Carey *et al.* (2001), the current Assessment Area is situated within the two 1km squares listed in the Mui Wo Area of the report, and supports a high diversity of 46 breeding bird species. However, most of these species were common and widespread in Hong Kong and thus the Mui Wo Area was not listed as one of the 22 sites of ornithological importance to breeding birds. It is noticed that a number of rare and restricted species such as the Black Bittern and Watercock were only recorded in the breeding bird survey in 2001 and were not recorded in subsequent studies.

Table 6. Bird Species of Conservation Importance Recorded in Literature

Species	Conservation and Protection Status ¹	Status in Hong Kong ²	Habitat of Occurrence ³
Falcated Duck <i>Anas falcata</i>	RC; RLCV(NT); IUCN(NT)	Uncommon winter visitor. Found in Mai Po, Shuen Wan, Long Valley.	N/A
Eurasian Teal <i>Anas crecca</i>	RC	Common winter visitor. Found in Deep Bay area, Shuen Wan, Tai Lam Chung Reservoir, Victoria Harbour, Urban Park.	WL
Chinese Francolin <i>Francolinus pintadeanus</i>	RLCV(NT)	Common resident. Widely distributed in grassland throughout Hong Kong.	S/G, N/A
Yellow Bittern <i>Ixobrychus sinensis</i>	(LC)	Uncommon summer visitor and passage migrant. Found in Deep Bay area, Chek Keng, Tai Long Wan.	N/SW, N/A
Cinnamon Bittern <i>Ixobrychus cinnamomeus</i>	LC	Scarce passage migrant. Found in Deep Bay area, Long Valley, Tai Yuen (Sheung Shui), Pui O.	N/A
Black Bittern <i>Dupetor flavicollis</i>	LC	Scarce passage migrant. Found in Deep Bay area, Tai Long Wan, Tap Mun, Long Valley, Sha Lo Tung, Mui Wo, Ma Tso Lung.	N/A
Black-crowned Night Heron <i>Nycticorax nycticorax</i>	(LC)	Common resident and winter visitor. Widely distributed in Hong Kong.	CW
Striated Heron <i>Butorides striata</i>	(LC)	Present all year, locally uncommon in summer and scarce in winter. Widely distributed in Hong Kong.	R/S, N/A
Chinese Pond Heron <i>Ardeola bacchus</i>	PRC (RC)	Common resident. Widely distributed in Hong Kong.	ADA, IWA, N/SW, PO, R/S, SW, T/O, N/A
Eastern Cattle Egret <i>Bubulcus coromandus</i>	(LC)	Resident and common passage migrant. Widely distributed in Hong Kong.	DL, IWA, Mar, SW, V/A/M, W, N/A
Grey Heron <i>Ardea cinerea</i>	PRC	Common winter visitor. Found in Deep Bay area, Starling Inlet, Kowloon Park, Cape D'Aguilar.	Man, R/S, SS, S, N/A
Great Egret <i>Ardea alba</i>	PRC (RC)	Common resident and winter visitor. Widely distributed in Hong Kong.	R/S, SS, S, V/A/M, N/A
Little Egret <i>Egretta garzetta</i>	PRC (RC)	Common resident. Widely distributed in coastal area throughout Hong Kong.	BG, CW, DL, Man, Mar, R/S, SS, S, V/A/M. N/A
Pacific Reef Heron <i>Egretta sacra</i>	(LC); CSMPS(II)	Uncommon resident. Widely distributed in coastal area throughout Hong Kong	SS, S
Western Osprey <i>Pandion haliaetus</i>	RC; RLCV(NT); CITES(II); CSMPS(II); Cap.586	Common winter visitor. Widely distributed in coastal areas throughout Hong Kong	N/A
Crested Serpent Eagle <i>Spilornis cheela</i>	(LC); RLCV(NT); CITES(II); CSMPS(II); Cap.586	Uncommon resident. Widely distributed in shrublands on hillsides throughout Hong Kong.	SW, N/A
Black Kite <i>Milvus migrans</i>	(RC); CITES(II); CSMPS(II); Cap.586	Common resident and winter visitor. Widely distributed in Hong Kong.	DA, S, SW, S/G, VA, V/A/M, N/A
Eastern Buzzard <i>Buteo japonicus</i>	CSMPS(II); CITES(II); Cap.586	Common winter visitor. Widely distributed in Hong Kong.	N/A
Slaty-legged Crane <i>Rallina eurizonoides</i>	RLCV(VU)	Common summer visitor. Found in Shuen Wan, Tai Mei Tuk catchment, Kadoorie Agricultural Research Centre and Kadoorie Farm & Botanic Garden, Kau To Shan, Ting Kok, Mong Tseng, Lung Fu Shan, Shing Mun Country Park, Hok Tau and Tai Tam Country Park.	SW, S/G, N/A

Species	Conservation and Protection Status ¹	Status in Hong Kong ²	Habitat of Occurrence ³
Slaty-breasted Rail <i>Gallirallus striatulus</i>	RC	Scarce resident. Found in Deep Bay area, Luk Keng, Chek Keng, Tung Chung, Tai O, Pui O.	N/A
Western Water Rail <i>Rallus aquaticus</i>	LC	Scarce winter visitor and passage migrant. Found in Mai Po, Nam Chung, Wu Kau Tang, Mui Wo, Tai O.	N/A
Brown Crake <i>Amaurornis akool</i>	LC	Scarce resident. Found in Tai Long Wan, Ho Chung, Luk Keng, Mui Wo, Kat O Chau, Shuen Wan, Wu Kau Tang.	N/A
Watercock <i>Gallixrex cinerea</i>	RC	Scarce passage migrant and summer visitor. Found in Lantau Island, Tai Long Wan, Luk Keng, Nam Chung, Shuen Wan, Shek Kong, Sai Kung.	N/A
Little Ringed Plover <i>Charadrius dubius</i>	(LC)	Common winter visitor and passage migrant. Widely distributed in freshwater areas throughout Hong Kong.	CW, N/A
Greater Painted-snipe <i>Rostratula benghalensis</i>	LC	Passage migrant and winter visitor. Found in Ha Tsuen, Lok Ma Chau, Kam Tin, Long Valley, Hong Kong Wetland Park.	N/A
Pintail/Swinhoe's Snipe <i>Gallinago stenura/G. megala</i>	LC for Swinhoe's Snipe	N/A	N/A
Far Eastern Curlew <i>Numenius madagascariensis</i>	LC; RLCV(VU); IUCN(EN)	Scarce passage migrant. Found in Deep Bay area.	N/A
Greater Coucal <i>Centropus sinensis</i>	CSMPS(II)	Common resident. Widely distributed in Hong Kong.	Mar, SW, S/G, V/A/M, N/A
Lesser Coucal <i>Centropus bengalensis</i>	CSMPS(II)	Common resident. Widely distributed in Hong Kong.	S/G, N/A
Collared Scops Owl <i>Otus lettia</i>	CITES(II); CSMPS(II); Cap.586	Common resident. Widely distributed in shrubland throughout Hong Kong.	SW, N/A
Pacific Swift <i>Apus pacificus</i>	(LC)	Common spring migrant and summer visitor. Widely distributed in Hong Kong.	N/A
White-throated Kingfisher <i>Halcyon smyrnensis</i>	(LC)	Common resident. Widely distributed in coastal areas throughout Hong Kong.	ADA, CW, DL, IWA, Mar, N/SW, R/S, N/A
Common Kestrel <i>Falco tinnunculus</i>	CITES(II); CSMPS(II); Cap.586	Common autumn migrant and winter visitor. Widely distributed in Hong Kong.	N/A
Chinese Penduline Tit <i>Remiz consobrinus</i>	RC	Common passage migrant and winter visitor. Found in Deep Bay area, Tai O, Mui Wo, Long Valley, Luk Keng, Chek Lap Kok.	N/A
Zitting Cisticola <i>Cisticola juncidis</i>	LC	Common passage migrant and winter visitor. Widely distributed in grassland throughout Hong Kong.	IWA, N/A
Red-billed Starling <i>Spodiopsar sericeus</i>	GC	Common winter visitor. Widely distributed in Hong Kong	Mar, V/A/M, N/A
Daurian Starling <i>Agropsar sturninus</i>	LC	Scarce passage migrant. Found in Mai Po, Long Valley, Kam Tin, Lam Tsuen, Tolo Harbour area, Kowloon Park, Mui Wo, Ho Chung.	N/A
White-shouldered Starling <i>Sturnia sinensis</i>	(LC)	Common passage migrant. Found in Kam Tin, Deep Bay area, Po Toi Island, Long Valley, Victoria Park, Ho Chung, Ma Tso Lung, Mui Wo, Lam Tsuen Valley.	DL, N/A
Common Starling <i>Sturnus vulgaris</i>	LC	Scarce winter visitor. Found in Deep Bay area, Lok Ma Chau, Shatin, Mui Wo, Kam Tin.	N/A
Plumbeous Water Redstart <i>Phoenicurus fuliginosus</i>	LC	Scarce winter visitor. Widely distributed in rocky streams throughout Hong Kong.	R/S
Chinese Grosbeak <i>Eophona migratoria</i>	LC	Uncommon winter visitor. Found in Kam Tin, Nam Chung, Shek Kong, Deep Bay area. Ho Chung, Lam Tsuen, Hok Tau, Island House, Kowloon Park.	N/A
Yellow-breasted Bunting <i>Emberiza aureola</i>	RC; RLCV(EN); IUCN(EN)	Common passage migrant. Widely distributed in agriculture land and reed beds throughout Hong Kong.	WL

Notes:

1. Conservation and Protection Status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016), CSIS (2019), CITES (2019), Cap. 170 and Cap. 586.
 - a. Conservation status by Fellowes *et al.* (2002): LC: Local Concern, PRC = Potential Regional Concern, RC = Regional Concern, GC = Global Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
 - b. Conservation status by International Union for Conservation of Nature (IUCN): NT = Near Threatened, EN = Endangered.
 - c. Conservation status by Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016): NT = Near Threatened; VU = Vulnerable; EN = Endangered.
 - d. Protection status by China State Major Protection Status (CSMPS) (CSIS 2019): (II) = Class II Protected Species in China.
 - e. Protection status by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 2019): (II) = Listed in Appendix II of CITES.
 - f. Cap. 586 = Chapter 586. Protection of Endangered Species of Animals and Plants Ordinance.

2. Status in Hong Kong follows the most updated Hong Kong Bird Report.
3. Habitat: ADA = Active Dry Agriculture, BG = Bare Ground, CW = Channelised Watercourse, DA = Developed Area, DL = Developed Land, IWA = Inactive Wet Agriculture, Man = Mangrove, Mar = Marsh, N/SW = Natural / Semi-natural Watercourse, PO = Pond, R/S = River / Stream, S = Sea, S/G = Shrubland / Grassland, SS = Sandy Shore, SW= Secondary Woodland, T/O = Tree / Orchard, V/A/M = Village / Agriculture / Marsh Mosaic, VA = Village Area, WL = Wasteland, N/A = habitat not provided in literature
4. Note that habitat classification may be inconsistent between studies

Field Survey Results

2.3.3 The maximum count of all bird species recorded within the Proposed Works Limit and the Assessment Area has been reported in **Appendix 2**, with their habitat(s) and conservation and protection status presented.

2.3.4 A total of ten species of birds were recorded from the Proposed Works Limit and 64 were recorded within the 500m Assessment Area. Among the birds recorded, 17 species are considered to be of conservation importance. Species of conservation importance recorded in the survey are presented below in **Table 7** with habitat(s) where they were recorded.

Table 7. List of bird species of conservation importance recorded during the survey

Species	Conservation and Protection Status ¹	Status in HK ²	Recorded in:	
			Proposed Works Limit ³	500m Assessment Area ³
Black-crowned Night Heron <i>Nycticorax nycticorax</i>	(LC)	Common resident and migrant mainly in Deep Bay wetlands and at scattered breeding colonies, mostly around Starling Inlet and Tolo Harbour	/	AL, CWC, MG, PO, S
Chinese Pond Heron <i>Ardeola bacchus</i>	PRC (RC)	Common in wetlands and damp areas, with winter, migrant and breeding populations	CWC, SWC	CWC, PO
Eastern Cattle Egret <i>Bubulcus coromandus</i>	(LC)	Common in widespread freshwater wetlands and short grassland areas, with winter, migrant and breeding populations	CWC	AL, CWC, MG, M, PO, SS
Grey Heron <i>Ardea cinerea</i>	PRC	Common in wetlands and some coastal areas, mainly in the Deep Bay area, present all year with highest numbers in winter and very low numbers in summer	/	CWC, MG, M, PO, S
Great Egret <i>Ardea alba</i>	PRC (RC)	Abundant, present all year in wetlands, mainly in the Deep Bay area although breeding populations are found mainly around Starling Inlet and Tolo Harbour, migrants and winter visitors occur	SWC	CWC, MG, M, PO, S
Intermediate Egret <i>Ardea intermedia</i>	RC	Uncommon, present all year, though rather few in summer, mainly in freshwater wetlands in the Deep Bay area	CWC	CWC, MG, M
Little Egret <i>Egretta garzetta</i>	PRC (RC)	Abundant, present all year in wetland areas throughout HK, mostly in the Deep Bay area	SWC	CWC, IF, MG, M, PO, SS, S, V/D
Pacific Reef Heron <i>Egretta sacra</i>	(LC); CSMPS(II)	Locally common resident in rocky coastal areas	/	IF, S
Crested Serpent Eagle <i>Spilornis cheela</i>	(LC); RLCV(NT); CITES(II); CSMPS(II); Cap.586	Locally common, present all year and probably the largest resident, in woodland	/	IF
Crested Goshawk <i>Accipiter trivirgatus</i>	RLCV(NT); CITES(II); CSMPS(II); Cap.586	Common resident in woodland throughout HK	/	IF
Besra <i>Accipiter virgatus</i>	CSMPS(II); CITES(II); Cap.586	Common resident and migrant in shrubland and wooded areas	/	IF
Black Kite <i>Milvus migrans</i>	(RC); CITES(II); CSMPS(II); Cap.586	Abundant, present all year and widespread, with increased numbers in winter between October and March	/	IF
Watercock <i>Gallicrex cinerea</i>	RC	Scarce passage migrant, mostly in Autumn, with a few summer records to freshwater wetlands. A return to normal numbers after a good year in 2015, 3 recorded this year	/	M
Greater Coucal <i>Centropus sinensis</i>	CSMPS(II)	Widespread and common resident in lowland shrubland areas	/	SW
Collared Scops owl <i>Otus lettia</i>	CITES(II); CSMPS(II); Cap.586	Common and widespread resident in lowland areas of closed-canopy shrubland and woodland	/	SW
Peregrine Falcon	(LC); RLCV(NT);	Locally common resident subspecies peregrinator	/	IF

Species	Conservation and Protection Status ¹	Status in HK ²	Recorded in:	
			Proposed Works Limit ³	500m Assessment Area ³
<i>Falco peregrinus</i>	CITES(I); CSMPs(II); Cap.586	with migrant northerly taxa in winter		
Chinese Grosbeak <i>Eophona migratoria</i>	LC	Common winter visitor and scarce breeding species in recent years, in wooded, open-country habitats	/	SW, V/D

Notes:

- Conservation and protection status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (Jiang *et al.* 2016), IUCN (2022), China State Major Protection Status, CITES (2022), Cap. 170 and Cap. 586.
 - Conservation status by Fellowes *et al.* (2002): LC = Local Concern, RC = Regional Concern, PRC = Potential Regional Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
 - Conservation status by Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016): NT = Near Threatened.
 - Protection status by CITES (2022): I = Listed in CITES Appendix I, II = Listed in CITES Appendix II.
 - Protection status by China State Major Protection Status (CSMPs): II = Class II Protection Species.
 - Cap.586. Protection of Endangered Species of Animals and Plants Ordinance.
 - Cap. 170. Wild Animal Protection Ordinance. All wild birds in Hong Kong are protected under Cap. 170
- Principal Status follows Carey *et al.* (2001). R = Resident; W = Winter Visitor; Su = Summer Visitor; M = Migrant; A = Autumn; Sp = Spring; P = Present all year, exact composition unknown.
- Status in Hong Kong follows the most updated Hong Kong Bird Report.
- Habitats: AL = Agricultural Land, CWC = Channelised Watercourse, IF = In Flight, M = Marsh, MG = Mangrove, PO = Pond, SS = Sandy Shore, S = Sea, SW = Secondary Woodland, SWC = Semi-natural Watercourse, V/D = Village/Developed Area.

2.3.5 The Tai Wai Yuen night roost is located at the estuary of Wang Tong River next to the Wang Tong Bridge. Since the commencement of the Project, Eastern Cattle Egret, Grey Heron, Great Egret, Intermediate Egret and Little Egret had been observed to arrive at the night roost starting earliest from 30 minutes before sunset to 20 minutes after sunset. Eastern Cattle Egret, Grey Heron, Great Egrets, Intermediate Egret and Little Egret were observed land on top of the clumps of *Hibiscus tiliaceus* and slowly move inwards into the canopy, which makes room for more individuals to enter the roost. Meanwhile, individuals of Black-crowned Night Heron, which are primarily nocturnal, had been observed to emerge from the ardeid roost within the *Hibiscus tiliaceus* usually at sunset, and begin foraging at the Wang Tong River estuary, or flying Southward towards the sea if the tide is high. No breeding behaviour was recorded.

2.3.6 Little Egret is the most abundant species at the roost of from October 2021 to July 2022, with only April being an exception where the most abundant species observed was Eastern Cattle Egret. Usage of the night roost have drastically decreased towards the end of the survey period, with only one Little Egret observed during the September survey and no roosting diurnal Ardeids observed in the September survey. The diurnal Ardeids are suspected to have found a new night roost but no such roost were found in the Assessment Area within the remaining surveys. The reason for the apparent abandonment of the roost was not known.

Table 8. Activity of Tai Wai Yuen Night Roost during the survey period

Month	2021			2022								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Black-crowned Night Heron <i>Nycticorax nycticorax</i>	20	13	15	2	3	5	10	5	3	4	9	6
Eastern Cattle Egret <i>Bubulcus coromandus</i>		7	17	6	10	9	80	13	11			
Grey Heron <i>Ardea cinerea</i>	3	3	1		2							
Great Egret <i>Ardea alba</i>	88	23	3	6	21	18	7	7	5			
Intermediate Egret <i>Ardea intermedia</i>			1									
Little Egret <i>Egretta garzetta</i>	64	104	179	66	71	64	23	22	36	19	1	
Total	175	150	216	80	107	96	120	47	55	23	10	6

2.4 Hepetofauna

Findings from Literature Review

- 2.4.1 Literature review revealed 13 species of amphibians occurring in the Assessment Area, with five species of conservation importance. While most species are widely distributed in Hong Kong, the Three-striped Grass Frog is only found in marshy areas of Lantau Island and New Territories, and the Romer's Tree Frog (listed as Endangered by IUCN) is restricted to woodlands on Lantau Island, Po Toi Island, Lamma Island and select localities in Hong Kong Island and New Territories where it was introduced.
- 2.4.2 A total of 21 species of reptiles were recorded within the Assessment Area, in which ten are species of conservation importance. In these ten species, eight are snakes including Chinese Water Snake, which is only found in freshwater or brackish wetlands, and the Plumbeous Water Snake and Buff-striped Keelback which are only found in lowlands.

Table 9. Herpetofauna Species of Conservation Importance Recorded in Literature

Species	Conservation and Protection Status ¹	Status in Hong Kong ²	Habitat of Occurrence ³
Reptiles			
Four-clawed Gecko <i>Gehyra mutilata</i>	RLCV(VU)	Widely but thinly distributed throughout Hong Kong.	DA, N/A
Tokay Gecko <i>Gekko gekko</i>	RC; RLCV(CR); CSMPS(II)	Distributed in rocky areas in Tung Chung and Sham Wat on Lantau Island, Lion Rock Country Park. Population on Hong Kong Island are considered as escaped from snake shops.	SW, N/A
Common Wolf Snake <i>Lycodon aulicus</i>	RLCV(NT)	Widely distributed at low elevations throughout Hong Kong Island, Lantau Island and Lamma Island. Several individuals recorded in New Territories.	N/A
Taiwan Kukri Snake <i>Oligodon formosanus</i>	RLCV(NT)	Widely distributed throughout Hong Kong.	DA, VA, V/A/M
Common Rat Snake <i>Ptyas mucosus</i>	PRC; RLCV(EN); CITES(II); Cap.586	Widely distributed throughout Hong Kong.	N/SW
Chinese Cobra <i>Naja atra</i>	PRC; RLCV(VU); IUCN(VU); CITES(II); Cap.586	Found throughout the territory.	N/A
Chinese Water Snake <i>Myrrophis chinensis</i>	RLCV(VU)	Distributed in freshwater or brackish wetlands in central and northern New Territories.	N/A
Plumbeous Water Snake <i>Hypsiscopus plumbea</i>	RLCV(VU)	Widely distributed in aquatic lowland throughout Hong Kong.	N/A
Buff-striped Keelback <i>Amphisma stolatum</i>	LC	Distributed in lowland in central and northern New Territories and Lantau Island.	WC
Burmese Python <i>Python bivittatus</i>	PRC; RLCV(CR); IUCN(VU); CITES(II); CSMPS(I); Cap.170; Cap.586	Widely distributed throughout Hong Kong.	N/A
Amphibians			
Short-legged Toad <i>Megophrys brachykolos</i>	PGC; RLCV(VU); IUCN(EN)	Widely distributed in upland forest streams throughout Hong Kong.	G/S, N/SW, SW
Chinese Bullfrog <i>Hoplobatrachus rugulosus</i>	PRC; RLCV(EN); CSMPS(II)	Widely distributed in Lantau Island and New Territories.	Mar, N/SW, R/S, VA, V/A/M, N/A
Lesser Spiny Frog <i>Quasipaa exilispinosa</i>	PGC; RLCV(VU); IUCN(VU)	Occurs throughout the territory.	G/S, N/SW
Three-striped Grass Frog <i>Hylarana macrodactyla</i>	RLCV(NT)	Distributed in marshy areas on Lantau Island and New Territories.	N/A
Romer's Tree Frog <i>Liuixalus romeri</i>	PGC; RLCV(VU); IUCN(EN); Cap.170	Distributed in woodlands on Lantau Island, Po Toi Island, Lamma Island, Hong Kong Island and New Territories.	G/S, N/SW, PL, SW, VA

Notes:

- Conservation and Protection Status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016), CSIS (2022), CITES (2022), Cap. 170 and Cap. 586.
 - Conservation status by Fellowes *et al.* (2002): LC: Local Concern, PRC = Potential Regional Concern, RC = Regional Concern, PGC = Potential Global Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
 - Conservation status by International Union for Conservation of Nature (IUCN): VU = Vulnerable, EN = Endangered.
 - Conservation status by Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016): NT = Near Threatened, VU = Vulnerable; EN = Endangered; CR = Critically Endangered.

- d. Protection status by China State Major Protection Status (CSMPS) (CSIS 2019): (I) = Class I Protected Species in China; (II) = Class II Protected Species in China.
 - e. Protection status by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 2019): (II) = Listed in Appendix II of CITES.
 - f. Cap. 170 = Chapter 170. Wild Animals Protection Ordinance.
 - g. Cap. 586 = Chapter 586. Protection of Endangered Species of Animals and Plants Ordinance.
2. Status in Hong Kong follows Hong Kong Biodiversity Database (AFCD 2022).
 3. Habitat: DA = Developed Area, G/S = Grassland / Shrubland, Mar = Marsh, N/SW = Natural / Semi-natural Watercourse, PL = Plantation, R/S = River / Stream, SW= Secondary Woodland, V/A/M = Village / Agriculture / Marsh Mosaic, VA = Village Area, WC = Watercourse, N/A = habitat not provided in literature
 4. Note that habitat classification may be inconsistent between studies

Field Survey Results

- 2.4.3 The maximum count of all herpetofauna species recorded within the Proposed Works Limit and the Assessment Area has been reported in **Appendix 2**, with their habitat(s) and conservation and protection status presented.
- 2.4.4 A total of three amphibian and one reptile species were recorded from the Proposed Works Limit, while 12 amphibian and 16 reptile species were recorded within the 500m Assessment Area. Among the Herpetofauna recorded, nine species are considered to be of conservation importance. Species of conservation importance recorded in the survey are presented below in **Table 10** with habitat(s) where they were recorded.
- 2.4.5 The Hong Kong Newt in particular, was recorded within a section of the Proposed Works Limit in Tai Tei Tong River where a proposed flood wall would be installed. Although Hong Kong Newts are known to breed within watercourses and lay their eggs on *Acorus gramineus*, no breeding behaviour of the species was observed within the survey period.

Table 10. List of herpetofauna species of conservation importance recorded during the survey

Species	Conservation and Protection Status ¹	Status in HK ²	Recorded in:	
			Proposed Works Limit ³	500m Assessment Area ³
Amphibians				
Hong Kong Newt <i>Paramesotriton hongkongensis</i>	PGC; RLCV(NT); IUCN(NT); Cap.170	Widely distributed in mountain streams throughout New Territories, Lantau Island and Hong Kong Island.	SWC	SWC
Short-legged Toad <i>Megophrys brachykolos</i>	PGC; RLCV(VU); IUCN(EN)	Widely distributed in upland forest streams throughout Hong Kong.	/	SWC
Chinese Bullfrog <i>Hoplobatrachus rugulosus</i>	PRC; RLCV(EN); CSMPS(II)	Widely distributed in Lantau Island and New Territories.	/	AL, SWC, M
Romer's Tree Frog <i>Liuixalus romeri</i>	PGC; RLCV(VU); IUCN(EN); Cap.170	Distributed in woodlands on Lantau Island, Po Toi Island, Lamma Island, Hong Kong Island and New Territories.	/	AL, SWC, M, SW, V/D
Reptiles				
Chinese Soft-shelled Turtle <i>Pelodiscus sinensis</i>	GC; RLCV(EN); IUCN(VU); Cap.170	Locally found in reservoirs and fishponds in Deep Bay area.	/	SWC
Four-clawed Gecko <i>Gehyra mutilata</i>	RLCV(VU)	Widely but thinly distributed throughout Hong Kong.	/	V/D
Tokay Gecko <i>Gekko gekko</i>	RC; RLCV(CR); CSMPS(II)	Distributed in rocky areas in Tung Chung and Sham Wat on Lantau Island, Lion Rock Country Park. Population on Hong Kong Island are considered as escaped from snake shops.	/	SW, V/D
Chinese Cobra <i>Naja atra</i>	PRC; RLCV(VU); IUCN(VU); CITES(II); Cap.586	Found throughout the territory.	/	AL
Buff-striped Keelback <i>Amphiesma stolatum</i>	LC	Distributed in lowland in central and northern New Territories and Lantau Island.	/	M, V/D

Notes:

1. Conservation and protection status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (Jiang *et al.* 2016), IUCN (2022), China State Major Protection Status, CITES (2022), Cap. 170 and Cap. 586.
 - a. Conservation status by Fellowes *et al.* (2002): LC = Local Concern, RC = Regional Concern, PRC = Potential Regional Concern, GC = Global Concern, PGC = Potential Global Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
 - b. Conservation status by Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016): NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered.
 - c. Protection status by IUCN (2022): NT = Near Threatened, VU = Vulnerable, EN = Endangered.
 - d. Protection status by CITES (2022): I = Listed in CITES Appendix I, II = Listed in CITES Appendix II.
 - e. Protection status by China State Major Protection Status (CSMPS): II = Class II Protection Species.
 - f. Cap.586. Protection of Endangered Species of Animals and Plants Ordinance.
 - g. Cap. 170. Wild Animal Protection Ordinance. All wild birds in Hong Kong are protected under Cap. 170
2. Status in HK follows AFCD (2022).
3. Habitats: AL = Agricultural Land, IF = In Flight, M = Marsh, SW = Secondary Woodland, SWC = Semi-natural Watercourse, V/D = Village/Developed Area.

2.5 Butterflies

Findings from Literature Review

- 2.5.1 A total of 91 species were recorded within the Assessment Area, amongst them ten are considered to have a rarity of "Rare" or "Very Rare" by AFCD (2022) or considered of conservation interest by Fellowes *et al.* (2002), such as the Orange Awlet and Falcate Oak Blue.

Table 11. Butterfly Species of Conservation Importance Recorded in Literature

Species	Conservation and Protection Status ¹	Status in Hong Kong ²	Habitat of Occurrence ³
Orange Awlet <i>Bibasis oedipodea</i>	-	Very Rare	SW
Common Awl <i>Hasora badra</i>	LC	Very Rare	SW
Grey Scrub Hopper <i>Aeromachus jhora</i>	-	Rare	Mar, N/A
Banded Demon <i>Notocrypta paralysos</i>	-	Rare	Mar, V/A/M
Grass Demon <i>Udaspes folus</i>	-	Rare	Mar, VA, V/A/M, N/A
Metallic Cerulean <i>Jamides alecto</i>	-	Very Rare	AL, Mar, SW, VA, V/A/M, N/A
Falcate Oak Blue <i>Mahathala ameria</i>	LC	Uncommon	G/S, SW, S/G
Yellow Rajah <i>Charaxes marmax</i>	LC	Uncommon	N/A
White Dragontail <i>Lamproptera curius</i>	LC	Rare	N/A
Small Cabbage White <i>Pieris rapae</i>	-	Rare	N/SW

Notes:

1. Conservation and Protection Status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016), CSIS (2022), CITES (2022), Cap. 170 and Cap. 586.
 - a. Conservation status by Fellowes *et al.* (2002): LC: Local Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
2. Status in Hong Kong follows Hong Kong Biodiversity Database (AFCD 2022).
3. Habitat: AL = Agricultural Land, G/S = Grassland / Shrubland, Mar = Marsh, N/SW = Natural / Semi-natural Watercourse, S/G = Shrubland / Grassland, SW = Secondary Woodland, V/A/M = Village / Agriculture / Marsh Mosaic, VA = Village Area, N/A = habitat not provided in literature
4. Note that habitat classification may be inconsistent between studies

Field Survey Results

- 2.5.2 The maximum count of all butterfly and odonate species recorded within the Proposed Works Limit and the Assessment Area has been reported in **Appendix 2**, with their habitat(s) and conservation and protection status presented.

2.5.3 A total of 106 species of butterflies were recorded within the 500m Assessment Area. Among the butterflies recorded, 15 species are considered to be of conservation importance. Species of conservation importance recorded in the survey are presented below in **Table 12** with habitat(s) where they were recorded.

Table 12. List of butterfly species of conservation importance recorded during the survey

Species	Conservation and Protection Status ¹	Status in HK ²	Recorded in:	
			Proposed Works Limit ³	500m Assessment Area ³
Grey Scrub Hopper <i>Aeromachus jhora</i>		Rare	/	M
Pale Palm Dart <i>Telicota colon</i>	LC	Rare	/	M
Forget-me-not <i>Catochrysops strabo</i>		Very Rare; Species of Conservation Concern	/	AL, M, SW, V/D
Metallic Cerulean <i>Jamides alecto</i>		Very Rare	/	AL, M, SW, V/D
Common Cerulean <i>Jamides celeno</i>		Rare	/	AL, SW
Malayan <i>Megisba malaya</i>	LC	Very Rare; Species of Conservation Concern	/	M
Tiny Grass Blue <i>Zizula hylax</i>		Very Rare; Species of Conservation Concern	/	AL, SW, V/D
Peacock Royal <i>Tajuria cippus</i>	LC	Rare	/	S/G
Courtesan <i>Euripus nyctelius</i>		Very Rare	/	S/G
Danaid Egg-fly <i>Hypolimnas misippus</i>	LC	Uncommon	/	S/G
White Dragontail <i>Lamproptera curius</i>	LC	Rare	/	M, SW
Common Rose <i>Pachliopta aristolochiae</i>		Rare	/	AL, M
Swallowtail <i>Papilio xuthus</i>		Rare	/	SW, S/G
Small Cabbage White <i>Pieris rapae</i>		Rare	/	AL, M, V/D
Spotted Sawtooth <i>Prioneris thestylis</i>	LC	Rare	/	AL

Notes:

- Conservation and protection status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (Jiang *et al.* 2016), IUCN (2022), China State Major Protection Status, CITES (2022), Cap. 170 and Cap. 586.
 - Conservation status by Fellowes *et al.* (2002): LC = Local Concern.
- Status in HK follows AFCD (2022).
- Habitats: AL = Agricultural Land, M = Marsh, S/G = Shrubland/Grassland, SW = Secondary Woodland, V/D = Village/Developed Area.

2.6 Odonates

Findings from Literature Review

2.6.1 44 species of odonates were recorded from previous studies, within it ten are species of conservation importance. Aside from Angle-winged Cruiser, all species of conservation importance are abundant or common (AFCD 2021).

Table 13. Odonate Species of Conservation Importance Recorded in Literature

Species	Conservation and Protection Status ¹	Status in Hong Kong ²	Habitat of Occurrence ³
Chinese Yellowface <i>Agriomorpha fusca</i>	LC	Abundant	SW
Blue Sprite <i>Pseudagrion microcephalum</i>	LC	Common	IWA, N/SW, N/A
Blue-spotted Dusk-hawker <i>Gynacantha japonica</i>	LC	Common	N/A

Species	Conservation and Protection Status ¹	Status in Hong Kong ²	Habitat of Occurrence ³
Dingy Dusk-hawker <i>Gynacantha subinterrupta</i>	LC	Common	N/SW, SW, V/A/M
Tiger Hawker <i>Polycanthagyna erythromelas</i>	LC	Common	N/A
Dog-legged Clubtail <i>Burmagomphus vermicularis</i>	LC	Common	N/SW
Angle-winged Cruiser <i>Macromia berlandi</i>	LC	Uncommon	N/SW
Ruby Darter <i>Rhodothermis rufa</i>	LC	Common	Mar
Sapphire Flutterer <i>Rhyothemis triangularis</i>	LC	Common	N/A
Emerald Cascader <i>Zygonyx iris</i>	PGC	Abundant	N/SW, SW, S/G

Notes:

- Conservation and Protection Status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016), CSIS (2022), CITES (2022), Cap. 170 and Cap. 586.
 - Conservation status by Fellowes *et al.* (2002): LC: Local Concern, PGC = Potential Global Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
- Status in Hong Kong follows Hong Kong Biodiversity Database (AFCD 2022).
- Habitat: IWA = Inactive Wet Agriculture, Mar = Marsh, N/SW = Natural / Semi-natural Watercourse, S/G = Shrubland / Grassland, SW= Secondary Woodland, V/A/M = Village / Agriculture / Marsh Mosaic, N/A = habitat not provided in literature
- Note that habitat classification may be inconsistent between studies

Field Survey Results

2.6.2 The maximum count of all odonate species recorded within the Proposed Works Limit and the Assessment Area has been reported in **Appendix 2**, with their habitat(s) and conservation and protection status presented.

2.6.3 A total of 25 species of odonates were recorded in the Proposed Works Limit and 37 were recorded within the 500m Assessment Area. Among the odonates recorded, seven species are considered to be of conservation importance. Species of conservation importance recorded in the survey are presented below in **Table 14** with habitat(s) where they were recorded.

Table 14. List of odonate species of conservation importance recorded during the survey

Species	Conservation and Protection Status ¹	Status in HK ²	Recorded in:	
			Proposed Works Limit ³	500m Assessment Area ³
Chinese Yellowface <i>Agriomorpha fusca</i>	LC	Abundant	/	SW
Dingy Dusk-hawker <i>Gynacantha subinterrupta</i>	LC	Common	/	SWC
Least Clubtail sp. <i>Stylogomphus</i> sp.	Restricted Species; previously treated as <i>Stylogomphus chunliuae</i> which is classified as LC	-	SWC	/
Mangrove Skimmer <i>Orthetrum poecilops</i>	GC; IUCN(VU)	Uncommon	CWC	M
Blue Chaser <i>Potamarcha congener</i>	LC	Common	/	AL
Ruby Darter <i>Rhodothermis rufa</i>	LC	Common	CWC	/
Emerald Cascader <i>Zygonyx iris</i>	PGC	Abundant	/	IF

Notes:

- Conservation and protection status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (Jiang *et al.* 2016), IUCN (2022), China State Major Protection Status, CITES (2022), Cap. 170 and Cap. 586.
 - Conservation status by Fellowes *et al.* (2002): LC = Local Concern, GC = Global Concern, PGC = Potential Global Concern.
 - Protection status by IUCN (2022): VU = Vulnerable.
- Status in HK follows AFCD (2022).
- Habitats: AL = Agricultural Land, M = Marsh, S/G = Shrubland/Grassland, SW = Secondary Woodland, V/D = Village/Developed Area.

2.7 Freshwater Community

Findings from Literature Review

2.7.1 63 species of freshwater fishes were recorded within the Assessment Area by previous studies. A total of seven species recorded are of conservation importance, most of which are uncommon in the wild and restricted to a few streams; among them the Giant Mottled Eel, Largesnout Goby and Scaly Neon Goby are listed as species of conservation concern by AFCD (2022).

Table 15. Freshwater Fish Species of Conservation Importance Recorded in Literature

Species	Conservation and Protection Status ¹	Status in Hong Kong ²	Habitat of Occurrence ³
Japanese Eel <i>Anguilla japonica</i>	RLCV(EN); IUCN(EN)	-	CW, N/SW
Giant Mottled Eel <i>Anguilla marmorata</i>	GC; RLCV(EN); CSMPS(II)	Species of Conservation Concern	N/SW, N/A
Largesnout Goby <i>Awaous melanocephalus</i>	RC	Species of Conservation Concern	N/A
Blue Neon Goby <i>Stiphodon atropurpureus</i>	GC; RLCV(NT)	Species of Conservation Concern	N/SW, N/A
Scaly Neon Goby <i>Stiphodon multisquamus</i>	GC; RLCV(EN)	-	N/SW, N/A
Small Snakehead <i>Channa asiatica</i>	LC	Uncommon	N/SW, V/A/M, N/A
Dark-margined Flagtail <i>Kuhlia marginata</i>	RC	-	N/SW, R/S, N/A

Notes:

- Conservation and Protection Status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016), CSIS (2022), CITES (2022), Cap. 170 and Cap. 586.
 - Conservation status by Fellowes *et al.* (2002): LC: Local Concern, RC = Regional Concern, GC = Global Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
 - Conservation status by International Union for Conservation of Nature (IUCN): EN = Endangered.
 - Conservation status by Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016): NT = Near Threatened; EN = Endangered.
 - Protection status by China State Major Protection Status (CSMPS) (CSIS 2019): (I) = Class I Protected Species in China; (II) = Class II Protected Species in China.
- Status in Hong Kong follows Hong Kong Biodiversity Database (AFCD 2022).
- Habitat: CW = Channelised Watercourse, N/SW = Natural / Semi-natural Watercourse, R/S = River / Stream, V/A/M = Village / Agriculture / Marsh Mosaic, N/A = habitat not provided in literature
- Note that habitat classification may be inconsistent between studies

2.7.2 38 species of aquatic invertebrates were recorded within the streams of the Assessment Area. In particular one odonate larvae (*Zygonyx iris*) and two crabs (*Cryptopotamon anacoluthon* and *Somanniathelphusa zanklon*) of conservation importance were found. The location of these records were TTTR, PNHR and near TTTR respectively.

Table 16. Aquatic invertebrate Species of Conservation Importance Recorded in Literature

Species	Conservation and Protection Status ¹	Status in Hong Kong ²	Habitat of Occurrence ³
Emerald Cascader (Larva) <i>Zygonyx iris</i>	PGC	Abundant	N/SW
Freshwater Crab <i>Cryptopotamon anacoluthon</i>	PGC; IUCN(VU)	-	N/SW
Freshwater Crab <i>Somanniathelphusa zanklon</i>	GC; IUCN(EN)	-	N/SW

Notes:

- Conservation and Protection Status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016), CSIS (2022), CITES (2022), Cap. 170 and Cap. 586.
 - Conservation status by Fellowes *et al.* (2002): PGC = Potential Global Concern, GC = Global Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
 - Conservation status by International Union for Conservation of Nature (IUCN): VU = Vulnerable, EN = Endangered.
- Status in Hong Kong follows Hong Kong Biodiversity Database (AFCD 2022).
- Habitat: N/SW = Natural / Semi-natural Watercourse

4. Note that habitat classification may be inconsistent between studies

Field Survey Results

- 2.7.3 The maximum count of all freshwater fish and aquatic invertebrate species recorded within the Proposed Works Limit and the Assessment Area has been reported in **Appendix 2**, with their habitat(s) and conservation and protection status presented.
- 2.7.4 A total of 38 species of freshwater fishes were recorded in the Proposed Works Limit and 63 were recorded within the 500m Assessment Area. Among the freshwater fishes recorded, eight species are considered to be of conservation importance. Species of conservation importance recorded in the survey are presented below in **Table 17** with habitat(s) where they were recorded.

Table 17. List of fish species of conservation importance recorded during the survey

Species	Conservation and Protection Status ¹	Status in HK ²	Recorded in:	
			Proposed Works Limit ³	500m Assessment Area ³
Whitespotted Walking Catfish <i>Clarias fuscus</i>	KFBG(NT)	Common	/	AL, SWC
Blue Neon Goby <i>Stiphodon atropurpureus</i>	GC; RLCV(NT)	Species of Conservation Concern	SWC	/
Akihito's Neon Goby <i>Stiphodon imperiorientis</i>	IUCN(VU); KFBG(CR)	-	SWC	/
Scaly Neon Goby <i>Stiphodon multisquamus</i>	GC; RLCV(EN); KFBG(EN)	-	SWC	/
Sharptail Goby <i>Oligolepis acutipennis</i>	BSAP(NT)	-	/	SWC
Small Snakehead <i>Channa asiatica</i>	LC	Uncommon	SWC	AL, M
Dark-margined Flagtail <i>Kuhlia marginata</i>	RC	-	SWC	/
Eclipse Puffer <i>Takifugu ocellatus</i>	LC; IUCN(NT)	-	/	CWC, SWC

Notes:

- Conservation and protection status refers to Fellowes et al. (2002), Red List of China's Vertebrates (Jiang et al. 2016), IUCN (2022), China State Major Protection Status, CITES (2022), KFBG (2019), BSAP (2014), Cap. 170 and Cap. 586.
 - Conservation status by Fellowes et al. (2002): LC = Local Concern, RC = Regional Concern, GC = Global Concern.
 - Conservation status by Red List of China's Vertebrates (RLCV) (Jiang et al. 2016): NT = Near Threatened, EN = Endangered.
 - Conservation status by IUCN (2022): NT = Near Threatened, VU = Vulnerable.
 - Conservation status by KFBG (2019): NT = Near Threatened, CR = Critically Endangered.
 - Conservation status by potential Hong Kong Red List (2014): NT = Near Threatened.
 - Conservation status by BSAP Marine Fishes Sub-group (2014): NT = Near Threatened.
 - Status in HK follows AFCD (2022).
- Habitats: AL = Agricultural Land, CWC = Channelised Watercourse, M = Marsh, SWC = Semi-natural Watercourse.
- Species regarded as invasive species and thus is not considered as species with conservation importance in Hong Kong.

- 2.7.5 A total of 21 species of aquatic invertebrates were recorded in the Proposed Works Limit and 25 were recorded within the 500m Assessment Area. Among the aquatic invertebrates recorded, three species are considered to be of conservation importance. Species of conservation importance recorded in the survey are presented below in **Table 18** with habitat(s) where they were recorded.

Table 18. List of aquatic invertebrate species of conservation importance recorded during the survey

Species	Conservation and Protection Status ¹	Status in HK ²	Recorded in:	
			Proposed Works Limit ³	500m Assessment Area ³
Emerald Cascader (Larva) <i>Zygonyx iris</i>	PGC	Abundant	SWC	/
Greasyback Shrimp <i>Metapenaeus ensis</i>	CSRL(VU)	Common	SWC	CWC
Freshwater Crab <i>Somanniathelphusa zanklon</i>	GC; IUCN(EN)	-	/	AL, M

Notes:

- Conservation and protection status refers to Fellowes et al. (2002), Red List of China's Vertebrates (Jiang et al. 2016), China Species Red List (Wang & Xie, 2004), IUCN (2022), China State Major Protection Status, CITES (2022), Cap. 170 and Cap. 586.

- a. Conservation status by Fellowes et al. (2002): GC = Global Concern, PGC = Potential Global Concern.
 - b. Conservation status by Red List of China's Vertebrates (RLCV) (Jiang et al. 2016): NT = Near Threatened, EN = Endangered.
 - c. Conservation by China Species Red List (CSRL) (Wang & Xie, 2004): VU = Vulnerable.
 - d. Conservation status by IUCN (2022): EN = Endangered.
2. Status in HK follows AFCD (2022).
 3. Habitats: AL = Agricultural Land, CWC = Watercourse, M = Marsh, SWC = Semi-natural Watercourse.

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Appendix 1.

Floral species recorded within the Proposed Works Limit and the 500m Assessment Area

Table 1. Floral species recorded within the Proposed Works Limit and the 500m Assessment Area

Scientific Name	Chinese Name	Origin ¹	Growth Form ²	Status in HK ¹	Proposed Works Limit ³				500m Assessment Area ³											
					AL	CWC	SWC	V/D	AL	CWC	MG	M	PL	PO	SS	SW	SWC	S/G	V/D	
<i>Acacia confusa</i>	台灣相思	Exotic	Tree	Widely cultivated	*	*								***			**			***
<i>Acanthus ilicifolius</i>	老鼠簕	Native	Shrub	Common			*				***							*		
<i>Acorus gramineus</i>	石菖蒲	Native	Herb	Very common			**											**		
<i>Acronychia pedunculata</i>	山油柑	Native	Tree	Very common									*							
<i>Acrostichum aureum</i>	鹵蕨	Native	Herb	Restricted		**	*			**				**				*		
<i>Adenosma glutinosum</i>	毛麝香	Native	Herb	Very common															*	
<i>Adiantum flabellulatum</i>	扇葉鐵線蕨	Native	Herb	Very common													***		*	
<i>Adina pilulifera</i>	水團花	Native	Shrub/Tree	Very common													***			
<i>Aegiceras corniculatum</i>	桐花樹	Native	Shrub/Tree	Common						**										
<i>Ageratum conyzoides</i>	藿香薊	Exotic	Herb	Common	**															
<i>Aglaiia odorata</i>	米仔蘭	Exotic	Shrub/Tree	Cultivated (IUCN: Lower Risk/ Near Threatened)																**
<i>Alangium chinense</i>	八角楓	Native	Shrub/Tree	Common									***				****		***	***
<i>Allamanda schottii</i>	硬枝黃蟬	Exotic	Shrub	Commonly cultivated													*			
<i>Alocasia macrorrhizos</i>	海芋	Native	Herb	Very common	***		***		***			***					****	**		****
<i>Alpinia hainanensis</i>	草豆蔻	Native	Herb	Very common			**										**	***		
<i>Alternanthera philoxeroides</i>	空心莧	Exotic	Herb	Common		****				****										
<i>Amaranthus viridis</i>	野莧	Native	Herb	Very common	**				**											
<i>Ampelopsis cantoniensis</i>	廣東蛇葡萄	Native	Climber	Very common															*	
<i>Antidesma bunius</i>	五月茶	Native	Tree	Common													*			
<i>Aporosa dioica</i>	銀柴	Native	Tree	Very common													***		***	
<i>Aquilaria sinensis</i>	土沉香	Native	Tree	Common, Protected under Cap. 586, assessed as "Vulnerable" in China Plant Red Data Book, listed as Near Threatened and under State protection (Category II) in China (AFCD 2003), classified as "Vulnerable" on the IUCN Red List													*		*	*

Scientific Name	Chinese Name	Origin ¹	Growth Form ²	Status in HK ¹	Proposed Works Limit ³				500m Assessment Area ³										
					AL	CWC	SWC	V/D	AL	CWC	MG	M	PL	PO	SS	SW	SWC	S/G	V/D
<i>Araucaria heterophylla</i>	異葉南洋杉	Exotic	Tree	Cultivated (IUCN: Vulnerable)															*
<i>Archidendron clypearia</i>	猴耳環	Native	Tree	Common													**		
<i>Archidendron lucidum</i>	亮葉猴耳環	Native	Tree	Common													**		
<i>Archontophoenix alexandrae</i>	假檳榔	Exotic	Tree	Commonly cultivated															*
<i>Ardisia crenata</i>	朱砂根	Native	Shrub	Common															*
<i>Artocarpus hypargyreus</i>	白桂木	Native	Tree	Regarded as Common in Xing et al. (2000). Status in China as "Near Threatened" (AFCD 2003), classified as "Vulnerable" on the IUCN Red List													*		
<i>Asparagus cochinchinensis</i>	天門冬	Native	Climber/Shrub	Common														*	*
<i>Atalantia buxifolia</i>	酒餅籐	Native	Shrub	Common													*		
<i>Axonopus compressus</i>	地毯草	Exotic	Herb	Common and naturalised	***				***										
<i>Azolla imbricata</i>	滿江紅	Native	Herb	Regarded as Rare in Xing et al. (2000), found in restricted localities as in Hong Kong and widely distributed in Southeast Asia (KFBG 2003)								*							
<i>Bambusa</i> sp.	竹屬	-	Bamboo	-														*	
<i>Bauhinia championii</i>	缺葉藤	Native	Climber	Common													*		
<i>Bauhinia variegata</i>	宮粉羊蹄甲	Exotic	Tree	Cultivated													*		
<i>Bauhinia x blakeana</i>	洋紫荊	Native	Tree	Cultivated															*
<i>Beta vulgaris</i> var. <i>rapacea</i>	紅菜頭	Exotic	Herb	Cultivated	*				*										
<i>Bidens alba</i>	白花鬼針草	Exotic	Herb	Very common		***	***			***		***		***			***		***
<i>Blechnum orientale</i>	烏毛蕨	Native	Herb	Very common								***		****			**		
<i>Boehmeria nivea</i>	苧麻	Exotic	Shrub	Common			***							***	**				
<i>Bombax ceiba</i>	木棉	Exotic	Tree	Cultivated				*								*			***
<i>Bougainvillea spectabilis</i>	籐杜鵑	Exotic	Climber/Shrub	Cultivated	**				**										
<i>Brachiaria mutica</i>	巴拉草	Exotic	Herb	Very common								***		***					

Scientific Name	Chinese Name	Origin ¹	Growth Form ²	Status in HK ¹	Proposed Works Limit ³				500m Assessment Area ³										
					AL	CWC	SWC	V/D	AL	CWC	MG	M	PL	PO	SS	SW	SWC	S/G	V/D
<i>Brassica rapa chinensis</i>	西蘭花	Exotic	Herb	Cultivated	*				*										
<i>Breynia fruticosa</i>	黑面神	Native	Shrub	Very common												***		**	
<i>Bridelia tomentosa</i>	土蜜樹	Native	Shrub/Tree	Very common									***			****			***
<i>Brucea javanica</i>	鴉膽子	Native	Shrub/Tree	Common														*	
<i>Byttneria grandifolia</i>	刺果藤	Native	Climber	Very common												***			
<i>Calliandra haematocephala</i>	紅絨球	Exotic	Shrub	Cultivated															*
<i>Callistemon viminalis</i>	串錢柳	Exotic	Tree	Cultivated	*				*										
<i>Camellia japonica</i>	山茶	Exotic	Shrub/Tree	Cultivated												*			
<i>Canarium album</i>	橄欖	Exotic	Tree	Restricted														*	
<i>Carica papaya</i>	番木瓜	Exotic	Tree	Cultivated	**				**			**		*					
<i>Caryopteris incana</i>	蘭香草	Native	Herb	Common		*				**									
<i>Castanopsis fissa</i>	蠟菊錐	Native	Tree	Common												**			
<i>Casuarina equisetifolia</i>	木麻黃	Exotic	Tree	Cultivated										****					***
<i>Cayratia corniculata</i>	角花烏薺莓	Native	Climber	Very common												*			
<i>Celosia argentea</i>	青葙	Native	Herb	Very common		*			*										
<i>Celtis sinensis</i>	朴	Native	Tree	Common and widely planted	*		**	*				***			****	*			
<i>Chloris barbata</i>	孟仁草	Native	Herb	Very common															**
<i>Chrysanthemum segetum</i>	茼蒿	Exotic	Herb	Cultivated	*				*										
<i>Cinnamomum camphora</i>	樟	Native	Tree	Common, also cultivated												**			
<i>Cinnamomum parthenoxylon</i>	黃樟	Native	Tree	Common												**		*	
<i>Citrus maxima</i>	柚	Exotic	Tree	Cultivated															*
<i>Citrus reticulata</i>	桔	Exotic	Tree	Cultivated															*
<i>Clausena lansium</i>	黃皮	Exotic	Tree	Cultivated	***				***										***
<i>Cleistocalyx nervosum</i>	水翁	Native	Tree	Common			**										**		
<i>Cocculus orbiculatus</i>	木防己	Native	Climber	Common												***			

Scientific Name	Chinese Name	Origin ¹	Growth Form ²	Status in HK ¹	Proposed Works Limit ³				500m Assessment Area ³										
					AL	CWC	SWC	V/D	AL	CWC	MG	M	PL	PO	SS	SW	SWC	S/G	V/D
<i>Coix lacryma-jobi</i>	薏苡	Native	Herb	Common								*							
<i>Colocasia esculenta</i>	芋	Native	Herb	Cultivated		***	***			**		***					**		
<i>Commelina diffusa</i>	節節草	Native	Herb	Common		**	**		**							***			
<i>Cosmos bipinnatus</i>	臭薺	Native	Herb	Common	*				*										
<i>Cratogeomys cochinchinense</i>	黃牛木	Native	Shrub/Tree	Very common								***			****				***
<i>Cuphea petiolata</i>	黏毛萼距花	Exotic	Herb	-	*														
<i>Cyclosorus interruptus</i>	間斷毛蕨	Native	Herb	Common								****							
<i>Cyclosorus parasiticus</i>	華南毛蕨	Native	Herb	Very common		*	**		*		***			****	***				***
<i>Cynodon dactylon</i>	狗牙根	Native	Herb	Very common	****				***					**					***
<i>Cyperus involucratus</i>	風車草	Exotic	Herb	Cultivated or naturalised		**	**		*							**			
<i>Cyperus malaccensis</i> var. <i>brevifolius</i>	短葉茛芎	Native	Herb	Common						**									
<i>Dalbergia benthamii</i>	兩廣黃檀	Native	Climber	Common											**		*		
<i>Dalbergia hancei</i>	藤黃檀	Native	Climber	Common											**				
<i>Delonix regia</i>	鳳凰木	Exotic	Tree	Cultivated				*						**					
<i>Desmodium heterocarpon</i>	假地豆	Native	Shrub	Very common														*	
<i>Desmos chinensis</i>	假鷹爪	Native	Climber/Shrub	Common											***		**		
<i>Dicranopteris pedata</i>	芒萁	Native	Herb	Very common								**		**		****			
<i>Dimocarpus longan</i>	龍眼	Exotic	Tree	Cultivated (IUCN: Lower Risk/ Near Threatened)	***				***										***
<i>Dioscorea cirrhosa</i>	薯蕷	Native	Climber	Common														*	
<i>Duranta erecta</i>	假連翹	Exotic	Climber/Shrub	Cultivated				**							*				
<i>Dyopsis lutescens</i>	散尾葵	Exotic	Shrub	Cultivated (IUCN: Near Threatened)															**
<i>Ehretia monopyrena</i>	長花厚殼樹	Native	Tree	Restricted				**											
<i>Eichhornia crassipes</i>	鳳眼藍	Exotic	Herb	Common		**			*			**							
<i>Elephantopus scaber</i>	地膽草	Native	Herb	Common										**					

Scientific Name	Chinese Name	Origin ¹	Growth Form ²	Status in HK ¹	Proposed Works Limit ³				500m Assessment Area ³										
					AL	CWC	SWC	V/D	AL	CWC	MG	M	PL	PO	SS	SW	SWC	S/G	V/D
<i>Elephantopus tomentosus</i>	白花地膽草	Native	Herb	Common												**			
<i>Eleusine indica</i>	牛筋草	Native	Herb	Very common	**														
<i>Embelia ribes</i>	白花酸藤子	Native	Climber/Shrub	Common								*				***		*	
<i>Emilia sonchifolia</i>	一點紅	Native	Herb	Very common			*							*			*		
<i>Epipremnum aureum</i>	綠蘿	Exotic	Climber	Cultivated								*				**			
<i>Erigeron karvinskianus</i>	加勒比飛蓬	Exotic	Herb/Shrub	Restricted		*				*									
<i>Erythrina speciosa</i>	象牙花	Exotic	Tree	Cultivated															*
<i>Eucalyptus camaldulensis</i>	赤桉	Exotic	Tree	Cultivated			*												
<i>Eurya nitida</i>	細齒葉柃	Native	Shrub/Tree	Very common															*
<i>Excoecaria agallocha</i>	海漆	Native	Tree	Common			*												
<i>Ficus hirta</i>	粗葉榕	Native	Shrub/Tree	Common												***			
<i>Ficus hispida</i>	對葉榕	Native	Shrub/Tree	Very common	***		***	*	***			***	***	**		****	**		***
<i>Ficus microcarpa</i>	細葉榕	Native	Tree	Common and widely cultivated	**		**							*			*		***
<i>Ficus pumila</i>	薜荔	Native	Climber	Very common												***			***
<i>Ficus subpisocarpa</i>	筆管榕	Native	Tree	Common			**										*		**
<i>Ficus variegata</i>	青果榕	Native	Tree	Common												***			*
<i>Ficus variolosa</i>	變葉榕	Native	Shrub/Tree	Very common															*
<i>Foeniculum vulgare</i>	白飯樹	Native	Shrub	Common	*				*										
<i>Garcinia subelliptica</i>	菲島福木	Exotic	Tree	-															*
<i>Glochidion eriocarpum</i>	毛果算盤子	Native	Shrub/Tree	Very common												**		***	
<i>Glycosmis parviflora</i>	小花山小橘, 山小橘	Native	Shrub/Tree	Restricted	**														
<i>Gymnanthera oblonga</i>	海島藤	Native	Climber	Restricted						*									
<i>Hedychium coronarium</i>	薑花	Exotic	Herb	Common		*				*		**							
<i>Hedyotis acutangula</i>	方骨草	Native	Herb	Very common															*

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					AL	CWC	SWC	V/D	AL	CWC	MG	M	PL	PO	SS	SW	SWC	S/G
<i>Hedyotis hedyotidea</i>	牛白藤	Native	Climber/Shrub	Very common											*			
<i>Helicteres angustifolia</i>	山芝麻	Native	Shrub	Very common													**	
<i>Heterosmilax gaudichaudiana</i>	合絲肖菝葜	Native	Climber	Common													**	
<i>Hibiscus tiliaceus</i>	黃槿	Native	Tree	Very common		*				*	****	**			**			
<i>Homalium cochinchinense</i>	天料木	Native	Shrub/Tree	Common														*
<i>Hydrocotyle sibthorpioides</i>	天胡荽	Native	Herb	Common								**						
<i>Hydrocotyle verticillata</i>	銅錢草	Exotic	Herb	-	**				**		**							
<i>Hymenocallis littoralis</i>	水鬼蕉	Exotic	Herb	Cultivated	*													
<i>Ilex asprella</i>	梅葉冬青	Native	Shrub	Very common											**		***	
<i>Ilex cinerea</i>	灰冬青	Native	Shrub/Tree	Common											*			
<i>Ipomoea nil</i>	牽牛	Exotic	Herb	Common								*						
<i>Itea chinensis</i>	鼠刺	Native	Shrub/Tree	Very common													**	
<i>Ixora chinensis</i>	龍船花	Native	Shrub	Restricted, also widely cultivated.														*
<i>Juniperus chinensis</i> 'Kaizuca'	龍柏	Exotic	Tree	Cultivated														*
<i>Kalanchoe blossfeldiana</i>	多花伽藍菜	Exotic	Shrub	-	*				*									
<i>Kandelia obovata</i>	水筆仔	Native	Tree	Very common		**				**								
<i>Kyllinga brevifolia</i>	短葉水蜈蚣	Native	Herb	Common	*				*									
<i>Kyllinga nemoralis</i>	單穗水蜈蚣	Native	Herb	Very common	*				*									
<i>Lactuca sativa</i>	生菜	Exotic	Herb	Cultivated	*				*									
<i>Lactuca sativa</i> var. <i>longifolia</i>	油麥菜	Exotic	Herb	Cultivated	*				*									
<i>Lagerstroemia speciosa</i>	大花紫薇	Exotic	Tree	Cultivated														*
<i>Lantana camara</i>	馬纓丹	Exotic	Shrub	Very common	**		**					***		*	***	**	*	***
<i>Lantana montevidensis</i>	鋪地臭金鳳	Exotic	Shrub	Often planted									*					
<i>Lemna minor</i>	浮萍	Native	Herb	Restricted		**			**			**						
<i>Leucaena leucocephala</i>	銀合歡	Exotic	Shrub/Tree	Cultivated or naturalised							**	**		***				***

Scientific Name	Chinese Name	Origin ¹	Growth Form ²	Status in HK ¹	Proposed Works Limit ³				500m Assessment Area ³										
					AL	CWC	SWC	V/D	AL	CWC	MG	M	PL	PO	SS	SW	SWC	S/G	V/D
<i>Ligustrum sinense</i>	山指甲	Exotic	Shrub/Tree	Common, also widely cultivated									**			***			***
<i>Lindera communis</i>	香葉樹	Native	Shrub/Tree	Very common												*			
<i>Litchi chinensis</i>	荔枝	Exotic	Tree	Cultivated			**										*		
<i>Litsea cubeba</i>	木薑子	Native	Shrub/Tree	Common														*	***
<i>Litsea glutinosa</i>	潺槁	Native	Tree	Very common	*		**									****			
<i>Litsea rotundifolia</i> var. <i>oblongifolia</i>	豺皮樟	Native	Shrub/Tree	Very common								**				***		***	
<i>Livistona chinensis</i>	蒲葵	Exotic	Tree	Cultivated				*											
<i>Lophatherum gracile</i>	淡竹葉	Native	Herb	Very common			**										*	**	
<i>Ludwigia hyssopifolia</i>	草龍	Native	Herb	Restricted			***			*									
<i>Lygodium flexuosum</i>	曲軸海金沙	Native	Climber/Herb	Very common												***			***
<i>Lygodium japonicum</i>	海金沙	Native	Climber/Herb	Very common												***		**	***
<i>Lygodium scandens</i>	小葉海金沙	Native	Climber/Herb	Common								***				***			***
<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	Native	Tree	Common	***		***	*	***		**	****	**			****	**		****
<i>Machilus chekiangensis</i>	浙江潤楠	Native	Tree	Very common								**				***		**	
<i>Maesa perlaris</i>	鯽魚膽	Native	Shrub	Common												**			
<i>Malaisia scandens</i>	牛筋藤	Native	Climbing Shrub	Regarded as Rare in Xing et al. (2000)					*										
<i>Mallotus paniculatus</i>	白楸	Native	Shrub/Tree	Very common	***				***			***				***		**	***
<i>Malvastrum coromandelianum</i>	囊葵	Native	Herb/Shrub	Common	*														
<i>Mangifera indica</i>	芒果	Exotic	Tree	Cultivated	**				**										
<i>Manihot esculenta</i>	木薯	Exotic	Shrub	Cultivated															*
<i>Melaleuca cajuputi</i> subsp. <i>cumingiana</i>	白千層	Exotic	Tree	Cultivated															**
<i>Melastoma malabathricum</i>	野牡丹	Native	Shrub	Common												**			
<i>Melastoma sanguineum</i>	毛茛	Native	Shrub	Common												**		**	
<i>Melicope pteleifolia</i>	三椏苦	Native	Shrub/Tree	Common														**	

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					AL	CWC	SWC	V/D	AL	CWC	MG	M	PL	PO	SS	SW	SWC	S/G	V/D
<i>Mentha canadensis</i>	薄荷	Exotic	Herb	Cultivated	*				*										
<i>Michelia x alba</i>	白蘭	Exotic	Tree	Widely cultivated															**
<i>Microcos nervosa</i>	布渣葉	Native	Shrub/Tree	Common	**	**									****				***
<i>Microstegium ciliatum</i>	剛莠竹	Native	Herb	Very common		**	****			***		**		**			****		
<i>Mikania micrantha</i>	薇甘菊	Exotic	Climber/Herb	Very common		**	***			**		***		***			****	*	***
<i>Millettia nitida</i>	亮葉雞血藤	Native	Climber	Very common															*
<i>Mimosa pudica</i>	含羞草	Exotic	Herb	Very common	***				***										
<i>Morus alba</i>	桑	Native	Shrub/Tree	Common and cultivated	**				**										
<i>Murraya paniculata</i>	九里香	Exotic	Tree	Cultivated or naturalised	*														
<i>Musa x paradisiaca</i>	大蕉	Exotic	Herb	Cultivated	***				***			**		**					
<i>Myriophyllum aquaticum</i>	粉綠狐尾藻	Exotic	Herb	-		***				**									
<i>Neyraudia reynaudiana</i>	類蘆	Native	Herb	Very common		***	***			**			*		****	***			****
<i>Opuntia stricta</i> var. <i>dillenii</i>	仙人掌	Exotic	Shrub/Tree	Common															*
<i>Osmanthus fragrans</i>	桂花, 木犀	Exotic	Shrub/Tree	Cultivated	*				*										*
<i>Oxalis corniculata</i>	酢醬草	Native	Herb	Very common	***				***										***
<i>Oxalis debilis</i> subsp. <i>corymbosa</i>	紅花酢醬草	Exotic	Herb	Common	***		**		***			***					**		
<i>Paederia scandens</i>	雞矢藤	Native	Herb	Very common	*														
<i>Pandanus tectorius</i>	露兜樹	Native	Shrub/Tree	Very common		*					***								
<i>Panicum brevifolium</i>	短葉黍	Native	Herb	Very common															*
<i>Panicum maximum</i>	大黍	Exotic	Herb	Very common	****	***			****	**			****		****				****
<i>Panicum repens</i>	鋪地黍	Native	Herb	Very common		***				**		***							
<i>Parthenocissus dalzielii</i>	爬牆虎	Exotic	Climber	Cultivated								**							
<i>Paspalum conjugatum</i>	兩耳草	Native	Herb	Common		**				*									
<i>Peltophorum pterocarpum</i>	盾柱木	Exotic	Tree	Cultivated	**				**										
<i>Pericampylus glaucus</i>	細圓藤	Native	Climber	Restricted											**				

Scientific Name	Chinese Name	Origin ¹	Growth Form ²	Status in HK ¹	Proposed Works Limit ³				500m Assessment Area ³										
					AL	CWC	SWC	V/D	AL	CWC	MG	M	PL	PO	SS	SW	SWC	S/G	V/D
<i>Persicaria barbata</i>	毛蓼	Native	Herb	Common		*													
<i>Persicaria chinensis</i>	火炭母	Native	Herb	Very common			**										**		
<i>Phragmites australis</i>	蘆葦	Native	Herb	Very common		**			**		***		***						
<i>Phyllanthus cochinchinensis</i>	越南葉下珠	Native	Shrub	Very common											***		**		
<i>Phyllodium pulchellum</i>	排錢草	Native	Shrub	Very common													*		
<i>Pistia stratiotes</i>	大藻	Native	Herb	Common		**			**										
<i>Plantago major</i>	車前草	Native	Herb	Very common	**				**										
<i>Pogonatherum crinitum</i>	金絲草	Native	Herb	Common															**
<i>Psychotria asiatica</i>	山大刀	Native	Shrub/Tree	Very common								**			***		**		
<i>Psychotria serpens</i>	蔓九節	Native	Climber/Shrub	Very common													*		
<i>Pteris semipinnata</i>	半邊旗	Native	Herb	Very common											**				
<i>Pueraria lobata var. montana</i>	葛麻姆	Native	Climber	Common		*	**						*		***		**		
<i>Pyrostegia venusta</i>	炮仗花	Exotic	Climber	Cultivated	*				*										
<i>Ranunculus sceleratus</i>	石龍芮	Native	Herb	Restricted	*				*										
<i>Rhaphiolepis indica</i>	車輪梅	Native	Shrub/Tree	Very common														**	
<i>Rhododendron pulchrum</i>	錦繡杜鵑	Exotic	Shrub	All Rhododendron species are protected under Cap. 96, but the recorded specimen was in cultivated form															*
<i>Rhodomyrtus tomentosa</i>	桃金娘	Native	Shrub	Very common														***	
<i>Rhus chinensis</i>	鹽膚木	Native	Shrub/Tree	Common								**							
<i>Rhus succedanea</i>	野漆樹	Native	Shrub/Tree	Common											***		**		
<i>Roystonea regia</i>	王棕	Exotic	Tree	Often planted															*
<i>Rubus leucanthus</i>	白花懸鈎子	Native	Climber/Shrub	Common											**				
<i>Rubus parvifolius</i>	茅莓	Native	Climber/Shrub	Common											**				
<i>Rubus reflexus</i>	蛇泡筋	Native	Climber/Shrub	Very common											***		*		

Scientific Name	Chinese Name	Origin ¹	Growth Form ²	Status in HK ¹	Proposed Works Limit ³				500m Assessment Area ³										
					AL	CWC	SWC	V/D	AL	CWC	MG	M	PL	PO	SS	SW	SWC	S/G	V/D
<i>Sageretia thea</i>	雀梅藤	Native	Climber/Shrub	Very common												**			
<i>Sapium discolor</i>	山烏柏	Native	Tree	Very common														***	
<i>Schefflera heptaphylla</i>	鴨腳木	Native	Shrub/Tree	Very common								**				***		**	
<i>Scindapsus aureus</i>	黃金葛	Exotic	Climber	Cultivated												*			
<i>Scleria ciliaris</i>	華珍珠茅	Native	Herb	Very common												*		*	
<i>Scolopia chinensis</i>	刺柊	Native	Shrub/Tree	Common		*													
<i>Senecio scandens</i>	千里光	Native	Herb	Common												*			
<i>Senna siamea</i>	鐵刀木	Exotic	Tree	Cultivated												*			*
<i>Senna surattensis</i>	黃槐	Exotic	Shrub/Tree	Often planted								*				*			
<i>Sida acuta</i>	黃花稔	Native	Herb	Common															**
<i>Sida rhombifolia</i>	白背黃花稔	Native	Shrub	Common	**											**			
<i>Smilax china</i>	金剛藤	Native	Climber	Very common												**		**	
<i>Smilax glabra</i>	土茯苓	Native	Climber	Very common														**	
<i>Solanum torvum</i>	水茄	Exotic	Shrub	Common	**	**	**					**	*		***	**			
<i>Sonchus oleraceus</i>	苦苣菜	Exotic	Herb	Very common			*												
<i>Sonneratia caseolaris</i>	海桑	Exotic	Tree	Naturalised			*												
<i>Spermacoce remota</i>	光葉豐花草	Exotic	Herb	-															*
<i>Spermacoce stricta</i>	豐花草	Native	Herb	Restricted															*
<i>Sphenomeris chinensis</i>	烏蕨	Native	Herb	Very common			*									**	**		
<i>Stachytarpheta jamaicensis</i>	假馬鞭	Exotic	Herb/Shrub	Common												*			
<i>Sterculia lanceolata</i>	假蘋婆	Native	Tree	Very common			***					***			****	***			
<i>Strophanthus divaricatus</i>	羊角拗	Native	Climber/Shrub	Common												**			
<i>Symplocos lancifolia</i>	光葉山礬	Native	Shrub/Tree	Common														**	
<i>Synedrella nodiflora</i>	金腰箭	Exotic	Herb	Very common	**														
<i>Syngonium auritum</i>	長耳合果芋	Exotic	Herb	Commonly cultivated	**				**										

Scientific Name	Chinese Name	Origin ¹	Growth Form ²	Status in HK ¹	Proposed Works Limit ³				500m Assessment Area ³										
					AL	CWC	SWC	V/D	AL	CWC	MG	M	PL	PO	SS	SW	SWC	S/G	V/D
<i>Syzygium jambos</i>	蒲桃	Exotic	Tree	Cultivated and naturalised			**									*			
<i>Tabebuia chrysantha</i>	黃鐘木	Exotic	Tree	Cultivated														*	
<i>Terminalia catappa</i>	欖仁樹	Exotic	Tree	Regarded as Very Rare in Xing et al. (2000) but also widely cultivated										***					
<i>Tetracera asiatica</i>	錫葉藤	Native	Climber	Very common										***		**			
<i>Thevetia peruviana</i>	黃花夾竹桃	Exotic	Tree	Commonly cultivated														*	
<i>Trema tomentosa</i>	山黃麻	Native	Shrub/Tree	Common							*								
<i>Tridax procumbens</i>	羽芒菊	Exotic	Herb	Very common														**	
<i>Triumfetta rhomboidea</i>	刺蒴麻	Native	Shrub	Common											**				
<i>Tylophora ovata</i>	娃兒藤	Native	Climber	Common											*				
<i>Urena lobata</i>	尚梵天花	Native	Shrub	Common		**							*				*	**	
<i>Uvaria macrophylla</i>	紫玉盤	Native	Climber/Shrub	Common											**		*		
<i>Wedelia trilobata</i>	三裂葉蟛蜞菊	Exotic	Herb	Common, also widely cultivated	***	**	**		**	**			*		***	**		***	
<i>Wikstroemia indica</i>	了哥王	Native	Shrub	Common													**		
<i>Zanthoxylum avicennae</i>	筍櫨	Native	Tree	Common			*					**			***		**		
<i>Zanthoxylum nitidum</i>	兩面針	Native	Climber/Shrub	Very common											**				
<i>Zea mays</i>	玉蜀黍	Exotic	Herb	Cultivated	*				*										
Total no. of species recorded				253	56	34	38	8	40	26	6	25	26	20	6	96	32	58	67

Notes:

1. Origin and Status in HK refer to:
 - a. Cap. 96 = Chapter 96 Forests and Countryside Ordinance, including the associated Chapter 96A Forestry Regulation
 - b. Cap. 586 = Chapter 586 Protection of Endangered Species of Animal and Plants Ordinance
 - c. Corlett *et al.* (2000);
 - d. AFCD (2003);
 - e. AFCD (2007);
 - f. AFCD (2008);
 - g. AFCD (2009);
 - h. AFCD (2011);

- i. AFCD (2012);
- j. IUCN (2022);
- k. Qin *et al.* (2017);
- l. Status in China Red Data Book is retrieved from AFCD (2003).

In this study, plant species is regarded as floral species of conservation importance if it is protected under Cap. 96A, Cap. 586, documented as rare/protected species in AFCD (2003), or its wild population (i.e. not cultivated specimens) has conservation status under international or regional conservation inventory (e.g. IUCN Red List of Threatened Species, China Red Data Book).

2. Growth form follows AFCD (2012).
3. Habitats: AL = Agricultural Land, CWC= Channelised Watercourse, G/S = Grassland/Shrubland, MG = Mangrove, M = Marsh, PL = Plantation, PO = Pond, SS = Sandy Shore, SW = Secondary Woodland, V/D = Village/Developed Area.

Species presented in habitats within the new Proposed Works Limit were determined by the latest site photos provided by the Engineer.

Code for abundance: **** = Abundant, *** = Frequent, ** = Occasional, * = Scarce

Appendix 2.

Faunal species recorded within the Proposed Works Limit and the 500m Assessment Area

Table 1. List of mammal species recorded within the Proposed Works Limit and the 500m Assessment Area

Species	Conservation and Protection Status ¹	Status in HK ²	Proposed Works Limit	500m Assessment Area										
			SWC	AL	IF	MG	M	PL	PO	SW	SWC	S/G	V/D	
Musk Shrew <i>Suncus murinus</i>	-	Common		1										1
Short-nosed Fruit Bat <i>Cynopterus sphinx</i>	RLCV(NT); Cap.170	Very Common		1	1									13
Himalayan Leaf-nosed Bat <i>Hipposideros armiger</i>	(LC); Cap.170	Very Common			1									
Chinese Noctule <i>Nyctalus plancyi</i>	PRC (RC); Cap.170	Common			1									
Japanese Pipistrelle <i>Pipistrellus abramus</i>	Cap.170	Very Common			2									
Least Pipistrelle <i>Pipistrellus tenuis</i>	RLCV(NT); Cap.170	Uncommon			1									
Chinese Pipistrelle <i>Hypsugo pulveratus</i>	(LC); RLCV(NT); Cap.170	Rare; Species of Conservation Concern			1									
Lesser Bamboo Bat <i>Tylonycteris pachypus</i>	(LC); Cap.170	Very Common			1									
Lesser Yellow Bat <i>Scotophilus kuhlii</i>	(LC); Cap.170	Uncommon			1									
Greater Bent-winged Bat <i>Miniopterus magnater</i>	PRC (RC); RLCV(NT); Cap.170	Data Deficient			1									
Lesser Bent-winged Bat <i>Miniopterus pusillus</i>	(LC); RLCV(NT); Cap.170	Uncommon			1									
Indochinese Forest Rat <i>Rattus andamanensis</i>	-	Very Common							1		1			
Red Muntjac <i>Muntiacus muntjak</i>	PRC	Very Common									1			
Domestic Ox <i>Bos taurus</i>	-	Common		25				20					10	22
Domestic Water Buffalo <i>Bubalus bubalis</i>	-	Uncommon	8	11		4	8		5	1	7	5	2	
Total no. of species recorded			1	2	10	1	2	1	1	3	1	2	4	

Notes:

1. Conservation and protection status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (Jiang *et al.* 2016), China Species Red List (Wang & Xie, 2004), IUCN (2022), China State Major Protection Status, CITES (2021), Native fish of conservation concern in HK (KFBG, 2019), Cap. 170 and Cap. 586.
 - a. Conservation status by Fellowes *et al.* (2002): LC = Local Concern; PRC = Potential Regional Concern; RC = Regional Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
 - b. Conservation status by Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016): NT = Near Threatened.

- c. Cap. 170 = Wild Animals Protection Ordinance. All wild bats and birds in Hong Kong are protected under Cap. 170.
2. Distribution and Rarity follows AFCD (2022) in general and the latest Hong Kong Bird Report for avifauna and AFCD Hong Kong Biodiversity Database (2014) for other fauna.
3. PWL = Proposed Works Limit
4. Habitat: AL = Agricultural Land, IF = In Flight, M = Marsh, MG = Mangrove, PL = Plantation, PO = Pond, SW = Secondary Woodland, SWC = Semi-natural Watercourse, S/G = Shrubland/Grassland, V/D = Village / Developed Area

Table 2. List of bird species recorded within the Proposed Works Limit and the 500m Assessment Area

Species	Conservation and Protection Status ¹	Principal Status ²	Wetland-dependant ?	Status in Hong Kong ³	Proposed Works Limit ⁴		500m Assessment Area ⁴													
					CWC	SWC	AL	CWC	IF	MG	M	PL	PO	SS	S	SW	SWC	S/G	V/D	
Black-crowned Night Heron <i>Nycticorax nycticorax</i>	(LC)	Common resident and migrant mainly in Deep Bay wetlands and at scattered breeding colonies, mostly around Starling Inlet and Tolo Harbour	Y	P			2	3			15			5		3				
Chinese Pond Heron <i>Ardeola bacchus</i>	PRC (RC)	Common in wetlands and damp areas, with winter, migrant and breeding populations	Y	P	1	1		4						9						
Eastern Cattle Egret <i>Bubulcus coromandus</i>	(LC)	Common in widespread freshwater wetlands and short grassland areas, with winter, migrant and breeding populations	Y	P	8		12	1			80	7		6	2					
Grey Heron <i>Ardea cinerea</i>	PRC	Common in wetlands and some coastal areas, mainly in the Deep Bay area, present all year with highest numbers in winter and very low numbers in summer	Y	W				2			2	3		3		4				
Great Egret <i>Ardea alba</i>	PRC (RC)	Abundant, present all year in wetlands, mainly in the Deep Bay area although breeding populations are found mainly around Starling Inlet and Tolo Harbour, migrants and winter visitors occur	Y	P		1		3			21	2		9		10				
Intermediate Egret <i>Ardea intermedia</i>	RC	Uncommon, present all year, though rather few in summer, mainly in freshwater wetlands in the Deep Bay area	Y	M,P	1			1			1	1								
Little Egret <i>Egretta garzetta</i>	PRC (RC)	Abundant, present all year in wetland areas throughout HK, mostly in the Deep Bay area	Y	P		1		4	1		179	2		22	2	21				1
Pacific Reef Heron <i>Egretta sacra</i>	(LC); CSMPS(II)	Locally common resident in rocky coastal areas	Y*	R						1						1				
Crested Serpent Eagle <i>Spilornis cheela</i>	(LC); RLCV(NT); CITES(II); CSMPS(II); Cap.586	Locally common, present all year and probably the largest resident, in woodland	N	R,M						2										

Species	Conservation and Protection Status ¹	Principal Status ²	Wetland-dependant ?	Status in Hong Kong ³	Proposed Works Limit ⁴		500m Assessment Area ⁴												
					CWC	SWC	AL	CWC	IF	MG	M	PL	PO	SS	S	SW	SWC	S/G	V/D
Crested Goshawk <i>Accipiter trivirgatus</i>	RLCV(NT); CITES(II);CSMPS(II); Cap.586	Common resident in woodland throughout HK	N	R					1										
Besra <i>Accipiter virgatus</i>	CSMPS(II); CITES(II); Cap.586	Common resident and migrant in shrubland and wooded areas	N	R					1										
Black Kite <i>Milvus migrans</i>	(RC); CITES(II); CSMPS(II); Cap.586	Abundant, present all year and widespread, with increased numbers in winter between October and March	N	W,R					5										
White-breasted Waterhen <i>Amaurornis phoenicurus</i>	-	Common resident in low-lying, damp areas throughout Hong Kong, probably also with some migrants.	Y	R			1			1	4								1
Watercock <i>Gallinula cinerea</i>	RC	Scarce passage migrant, mostly in autumn, with a few summer records to freshwater wetlands. A return to normal numbers after a good year in 2015, 3 recorded this year	Y	M							1								
Common Sandpiper <i>Actitis hypoleucos</i>	-	Common and widespread in wetlands, present all year though few in summer	Y	M,W				1											1
Spotted Dove <i>Spilopelia chinensis</i>	-	Abundant resident in diverse habitats in urban and rural areas	N	R			3	1			4						3	1	4
Common Emerald Dove <i>Chalcophaps indica</i>	-	Uncommon but widespread resident, locally common in some areas, in closed-canopy shrubland and forest habitats	N	R								1					1		1
Greater Coucal <i>Centropus sinensis</i>	CSMPS(II)	Widespread and common resident in lowland shrubland areas	N	R													2		
Chestnut-winged Cuckoo <i>Clamator coromandus</i>	-	Uncommon spring and summer visitor, scarce in autumn, to closed-canopy shrubland and woodland	N	Su														1	1
Asian Koel <i>Eudynamis scolopaceus</i>	-	Common and widespread, recorded in all months though less frequently in winter, from urban and rural areas with trees	N	Su,R													1		1
Large Hawk-cuckoo <i>Hierococcyx sparveroides</i>	-	Locally common spring and summer visitor to closed-canopy shrubland and woodland	N	Su													1		
Indian Cuckoo <i>Cuculus micropterus</i>	-	Locally common spring and summer visitor to open woodland habitats	N	Su															1

Species	Conservation and Protection Status ¹	Principal Status ²	Wetland-dependant ?	Status in Hong Kong ³	Proposed Works Limit ⁴		500m Assessment Area ⁴												
					CWC	SWC	AL	CWC	IF	MG	M	PL	PO	SS	S	SW	SWC	S/G	V/D
Collared Scops owl <i>Otus lettia</i>	CITES(II); CSMPS(II); Cap.586	Common and widespread resident in lowland areas of closed-canopy shrubland and woodland	N	R													1		
House Swift <i>Apus nipalensis</i>	-	Abundant spring passage migrant, mostly to the Deep Bay area, and widespread common resident	N	R,SpM				3	5	2									10
Common Kingfisher <i>Alcedo atthis</i>	-	Common and present all year in wetland areas	Y	AM,P				1		1								1	1
Peregrine Falcon <i>Falco peregrinus</i>	(LC); RLCV(NT); CITES(I); CSMPS(II); Cap.586	Locally common resident subspecies peregrinator with migrant northerly taxa in winter	N	R,W					1										
Scarlet Minivet <i>Pericrocotus speciosus</i>	-	Common resident in mature closed-canopy woodland and woodland edge, even adjoining urban areas	N	R													5		
Black-winged Cuckooshrike <i>Lalage melaschistos</i>	-	Common passage migrant and scarce winter visitor to closed and open woodland	N	AM,W													1		
Brown Shrike <i>Lanius cristatus</i>	-	Common passage migrant and scarce winter visitor in open country habitats	N	SpM													1		1
Long-tailed Shrike <i>Lanius schach</i>	-	Common resident in open country habitats	N	R			1				1								1
Black Drongo <i>Dicrurus macrocercus</i>	-	Common passage migrant, mainly in autumn, and locally common breeder and winter visitor to open-country areas	N	M,Su			1				3						5	1	2
Hair-crested Drongo <i>Dicrurus hottentottus</i>	-	Common winter visitor, migrant and locally common resident in wooded areas	N	M,Su,W			2				4						2		
Red-billed Blue Magpie <i>Urocissa erythroryncha</i>	-	Common resident of closed-canopy shrubland	N	R					2			2					3		6
Large-billed Crow <i>Corvus macrorhynchos</i>	-	Common resident of open rural and wooded urban-edge habitats	N	R					8			2							1
Cinereous Tit <i>Parus cinereus</i>	-	Common resident in open and closed-canopy woodland, shrubland and parkland areas	N	R			1				1	2					3		2
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	-	Abundant resident in most habitats except woodland interior	N	R			2				2	3					5	5	13

Species	Conservation and Protection Status ¹	Principal Status ²	Wetland-dependant ?	Status in Hong Kong ³	Proposed Works Limit ⁴		500m Assessment Area ⁴														
					CWC	SWC	AL	CWC	IF	MG	M	PL	PO	SS	S	SW	SWC	S/G	V/D		
Chinese Bulbul <i>Pycnonotus sinensis</i>	-	Abundant all year, with migrants and winter visitors occurring, present in nearly all habitats, the most abundant and widespread species in HK	N	R			3										5		1	3	
Sooty-headed Bulbul <i>Pycnonotus aurigaster</i>	-	Common resident in open country habitats away from urban and marshy areas	N	R													1				
Barn Swallow <i>Hirundo rustica</i>	-	Abundant passage migrant, common breeding species and uncommon winter visitor	N	SpM,Su					5											5	
Yellow-browed Warbler <i>Phylloscopus inornatus</i>	-	Abundant and widespread winter visitor and migrant to wooded and open-country areas	N	W								1							3		
Dusky Warbler <i>Phylloscopus fuscatus</i>	-	Abundant winter visitor and migrant to shrubland and open country areas	N	W							2								1	1	
Yellow-bellied Prinia <i>Prinia flaviventris</i>	-	Abundant resident in a variety of non-woodland habitats	N	R			1				1									1	
Plain Prinia <i>Prinia inornata</i>	-	Locally common resident in grassy and reed habitats	N	R							1										
Common Tailorbird <i>Orthotomus sutorius</i>	-	Widespread and common resident in diverse shrubland and wooded habitats	N	R			4				1	1							3	2	
Masked Laughingthrush <i>Pterorhinus perspicillatus</i>	-	Abundant resident in diverse urban and rural lightly-wooded habitats	N	R			1													4	
Swinhoe's White-eye <i>Zosterops simplex</i>	-	Abundant and widespread resident of urban and rural wooded habitats with increased numbers in winter	N	R,?W													4			3	
Crested Myna <i>Acridotheres cristatellus</i>	-	Abundant resident of lowland habitats including urban areas	N	R			4	10	3	2	11			11						50	
Black-collared Starling <i>Gracupica nigricollis</i>	-	Common resident of open-country, village edge and urban habitats	N	R			11	2			6			3					1	5	
Oriental Magpie Robin <i>Copsychus saularis</i>	-	Abundant resident in urban and rural areas, including mangrove	N	R		1	1				1	1							3	1	2
Verditer Flycatcher <i>Eumyias thalassinus</i>	-	Uncommon winter visitor to woodland areas	N	W							1										

Species	Conservation and Protection Status ¹	Principal Status ²	Wetland-dependant ?	Status in Hong Kong ³	Proposed Works Limit ⁴		500m Assessment Area ⁴												
					CWC	SWC	AL	CWC	IF	MG	M	PL	PO	SS	S	SW	SWC	S/G	V/D
Rufous-tailed Robin <i>Larvivora sibilans</i>	-	Common winter visitor and passage migrant to woodland and closed-canopy shrubland	N	W,SpM													1		
Blue Whistling Thrush <i>Myophonus caeruleus</i>	-	Common and widespread resident in closed-canopy shrubland and woodland, often near streams and in urban areas	N	R		1					4							1	1
Daurian Redstart <i>Phoenicurus aureus</i>	-	Common winter visitor to shrubland and open woodland	N	W															1
Stejneger's Stonechat <i>Saxicola stejnegeri</i>	-	Common passage migrant and winter visitor	N	W,M				1				1							
Scarlet-backed Flowerpecker <i>Dicaeum cruentatum</i>	-	Common resident of open woodland and village edge	N	R			1										1		1
Fork-tailed Sunbird <i>Aethopyga christinae</i>	-	Common and widespread resident and winter visitor in woodland and shrubland	N	R			1										2		1
Eurasian Tree Sparrow <i>Passer montanus</i>	-	Abundant resident of lowland habitats, commensal with man; higher numbers sometimes recorded in fish pond areas and on offshore islands in spring	N	R			2	10			2			7			2		100
Scaly-breasted Munia <i>Lonchura punctulata</i>	-	Abundant resident in open-country grassy habitats	N	R			10												
Eastern Yellow Wagtail <i>Motacilla tschutschensis</i>	-	Common passage migrant and winter visitor	N	M,W		3		2				1							
Grey Wagtail <i>Motacilla cinerea</i>	-	Common winter visitor and passage migrant, mostly to watercourses but also other lowland wetland areas	N	W		1													
White Wagtail <i>Motacilla alba</i>	-	A widespread species although most records and high counts from northwest NT	N	W,R		1	1	1			1							1	2
Olive-backed Pipit <i>Anthus hodgsoni</i>	-	Common winter visitor and passage migrant to lightly wooded and open country areas, including village edge and parks	N	W			4												1
Chinese Grosbeak <i>Eophona migratoria</i>	LC	Common winter visitor and scarce breeding species in recent years, in wooded, open-country habitats	N	M													1		1
Little Bunting	-	Common winter visitor and passage	N	W								1							

Species	Conservation and Protection Status ¹	Principal Status ²	Wetland-dependant ?	Status in Hong Kong ³	Proposed Works Limit ⁴		500m Assessment Area ⁴													
					CWC	SWC	AL	CWC	IF	MG	M	PL	PO	SS	S	SW	SWC	S/G	V/D	
<i>Emberiza pusilla</i>		migrant in open country areas, especially inactive dry agriculture																		
Black-faced Bunting <i>Emberiza spodocephala</i>	-	Common passage migrant and winter visitor to open-country areas	N	M,W															4	1
Total no. of species recorded					3	8	22	17	12	13	24	8	6	5	5	27	4	6	36	

Notes:

- Conservation and protection status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (Jiang *et al.* 2016), IUCN (2022), China State Major Protection Status, CITES (2022), Cap. 170 and Cap. 586.
 - Conservation status by Fellowes *et al.* (2002): LC = Local Concern, RC = Regional Concern, PRC = Potential Regional Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
 - Conservation status by Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016): NT = Near Threatened.
 - Protection status by CITES (2022): I = Listed in CITES Appendix I, II = Listed in CITES Appendix II.
 - Protection status by China State Major Protection Status (CSMPS): II = Class II Protection Species.
 - Cap.586. Protection of Endangered Species of Animals and Plants Ordinance.
 - Cap. 170. Wild Animal Protection Ordinance. All wild birds in Hong Kong are protected under Cap. 170
- Principal Status follows Carey *et al.* (2001). R = Resident; W = Winter Visitor; Su = Summer Visitor; M = Migrant; A = Autumn; Sp = Spring; P = Present all year, exact composition unknown.
- Status in Hong Kong follows the most updated Hong Kong Bird Report.
- Habitats: AL = Agricultural Land, CWC = Channelised Watercourse, IF = In Flight, M = Marsh, MG = Mangrove, PL = Plantation, PO = Pond, SS = Sandy Shore, S = Sea, SW = Secondary Woodland, SWC = Semi-natural Watercourse, S/G = Shrubland/Grassland, V/D = Village/Developed Area.

Table 3. List of herpetofauna species recorded within the Proposed Works Limit and the 500m Assessment Area

Species	Conservation and Protection Status ¹	Status in HK ²	Proposed Works Limit ³	500m Assessment Area ³						
			SWC	AL	CWC	M	SW	SWC	S/G	V/D
Amphibians										
Hong Kong Newt <i>Paramesotriton hongkongensis</i>	PGC; RLCV(NT); IUCN(NT); Cap.170	Widely distributed in mountain streams throughout New Territories, Lantau Island and Hong Kong Island.	10					1		
Asian Common Toad <i>Duttaphrynus melanostictus</i>	-	Widely distributed in Hong Kong.		2		25	2			4
Short-legged Toad <i>Megophrys brachykolos</i>	PGC; RLCV(VU); IUCN(EN)	Widely distributed in upland forest streams throughout Hong Kong.						1		
Asiatic Painted Frog <i>Kaloula pulchra</i>	-	Widely distributed in Hong Kong.		3		3	1	2		5
Ornate Pigmy Frog <i>Microhyla fissipes</i>	-	Widely distributed in Hong Kong.		3		50	3			
Marbled Pigmy Frog <i>Microhyla pulchra</i>	-	Widely distributed in Hong Kong.		2		9				
Paddy Frog <i>Fejervarya multistriata</i>	-	Widely distributed in Hong Kong.	1	7		40	5	2	2	2
Chinese Bullfrog <i>Hoplobatrachus rugulosus</i>	PRC; RLCV(EN); CSMPS(II)	Widely distributed in Lantau Island and New Territories.		4		2		5		
Günther's Frog <i>Sylvirana guentheri</i>	-	Widely distributed throughout Hong Kong.	4	36		40	2	3		5
Romer's Tree Frog <i>Liuixalus romeri</i>	PGC; RLCV(VU); IUCN(EN); Cap.170	Distributed in woodlands on Lantau Island, Po Toi Island, Lamma Island, Hong Kong Island and New Territories.		3		40	5	1		1
Brown Tree Frog <i>Polypedates megacephalus</i>	-	Widely distributed throughout Hong Kong.		31		25	3	2		5
Greenhouse Frog <i>Eleutherodactylus planirostris</i>	-	(Introduced species)		1		9	1	1		6
Reptiles										
Red-eared Slider <i>Trachemys scripta</i>	-	Widely distributed and commonly found in reservoirs or ponds in urban parks.	1		1			1		
Chinese Soft-shelled Turtle <i>Pelodiscus sinensis</i>	GC; RLCV(EN); IUCN(VU); Cap.170	Locally found in reservoirs and fishponds in Deep Bay area.						1		
Changeable Lizard <i>Calotes versicolor</i>	-	Widely distributed throughout Hong Kong.		2			1	1		1
Chinese Forest Skink <i>Ateuchosaurus chinensis</i>	-	Distributed in woodlands in Tai Po Kau Nature Reserve, Sai Kung West Country Park, Tai Mo								1

Species	Conservation and Protection Status ¹	Status in HK ²	Proposed Works Limit ³	500m Assessment Area ³						
			SWC	AL	CWC	M	SW	SWC	S/G	V/D
		Shan Country Park, Tai Lam Country Park, Aberdeen Country Park, Pok Fu Lam Country Park and some small islands such as Peng Chau and Tung Ping Chau.								
Long-tailed Skink <i>Eutropis longicaudata</i>	-	Widely distributed throughout Hong Kong.		1			1	1	1	1
Chinese Skink <i>Plestiodon chinensis</i>	-	Widely distributed throughout Hong Kong.								1
Slender Forest Skink <i>Scincella modesta</i>	-	Distributed in woodlands in a few scattered sites in the New Territories, on Lantau Island and Hong Kong Island.					1			
Four-clawed Gecko <i>Gehyra mutilata</i>	RLCV(VU)	Widely but thinly distributed throughout Hong Kong.								3
Chinese Gecko <i>Gekko chinensis</i>	-	Widely distributed throughout Hong Kong.					7			7
Tokay Gecko <i>Gekko gekko</i>	RC; RLCV(CR); CSMPS(II)	Distributed in rocky areas in Tung Chung and Sham Wat on Lantau Island, Lion Rock Country Park. Population on Hong Kong Island are considered as escaped from snake shops.					1			1
Bowring's Gecko <i>Hemidactylus bowringii</i>	-	Distributed throughout Hong Kong.					1	1		5
Chinese Cobra <i>Naja atra</i>	PRC: RLCV(VU); IUCN(VU); CITES(II); Cap.586	Found throughout the territory.		1						
Mock Viper <i>Psammodynastes pulverulentus</i>	-	Distributed in woodlands, shrublands and grasslands on Lantau Island and in the eastern New Territories.					1			
Buff-striped Keelback <i>Amphiesma stolatum</i>	LC	Distributed in lowland in central and northern New Territories and Lantau Island.					1			1
Checkered Keelback <i>Fowlea flavipunctatus</i>	-	Widely distributed in streams in the New Territories and Lantau Island.								1
Bamboo Snake <i>Cryptelytrops albolabris</i>	-	Distributed in shrubland, grassland throughout Hong Kong.					1			1
Total no. of species recorded			4	13	1	13	15	14	1	18

Notes:

1. Conservation and protection status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (Jiang *et al.* 2016), IUCN (2022), China State Major Protection Status, CITES (2022), Cap. 170 and Cap. 586.
 - a. Conservation status by Fellowes *et al.* (2002): LC = Local Concern, RC = Regional Concern, PRC = Potential Regional Concern, GC = Global Concern, PGC = Potential Global Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.

- b. Conservation status by Red List of China's Vertebrates (RLCV) (Jiang *et al.* 2016): NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered.
 - c. Protection status by IUCN (2022): NT = Near Threatened, VU = Vulnerable, EN = Endangered.
 - d. Protection status by CITES (2022): I = Listed in CITES Appendix I, II = Listed in CITES Appendix II.
 - e. Protection status by China State Major Protection Status (CSMPS): II = Class II Protection Species.
 - f. Cap.586. Protection of Endangered Species of Animals and Plants Ordinance.
 - g. Cap. 170. Wild Animal Protection Ordinance. All wild birds in Hong Kong are protected under Cap. 170
2. Status in HK follows AFCD (2022).
 3. Habitats: AL = Agricultural Land, CWC = Channelised Watercourse, IF = In Flight, M = Marsh, SW = Secondary Woodland, SWC = Semi-natural Watercourse, S/G = Shrubland/Grassland, V/D = Village/Developed Area.

Table 4. List of butterfly species recorded within the Proposed Works Limit and the 500m Assessment Area

Species	Conservation and Protection Status ¹	Status in HK ²	500m Assessment Area ³					
			AL	M	PL	SW	S/G	V/D
Grey Scrub Hopper <i>Aeromachus jhora</i>		Rare		1				
Forest Hopper <i>Astictopterus jama</i>		Common				1		
Formosan Swift <i>Borbo cinnara</i>		Common		1				
Common Redeye <i>Matapa aria</i>		Uncommon				1		
Restricted Demon <i>Notocrypta curvifascia</i>		Uncommon				1		
Common Straight Swift <i>Parnara guttata</i>		Common	1					
Contiguous Swift <i>Polytremis lubricans</i>		Common		1				
Unidentified Dart <i>Potanthus sp.</i>		-					1	
Indian Palm Bob <i>Suastus gremius</i>		Uncommon					2	
Greenish Palm Dart <i>Telicota ancilla</i>		Uncommon		1			1	
Pale Palm Dart <i>Telicota colon</i>	LC	Rare		1				
Chestnut Angle <i>Odontoptilum angulatum</i>		Common	2			1		
Water Snow Flat <i>Tagiades litigiousus</i>		Common				1		
Purple Sapphire <i>Heliophorus epicles</i>		Common	2					1
Common Hedge Blue <i>Acytolepis puspa</i>		Common						1
Forget-me-not <i>Catochrysops strabo</i>		Very Rare; Species of Conservation Concern	1	1		1		4
Plains Cupid <i>Chilades pandava</i>		Uncommon		1			2	
Metallic Cerulean <i>Jamides alecto</i>		Very Rare	1	2		1		1
Dark Cerulean <i>Jamides bochus</i>		Common	4		1	1	1	2

Species	Conservation and Protection Status ¹	Status in HK ²	500m Assessment Area ³					
			AL	M	PL	SW	S/G	V/D
Common Cerulean <i>Jamides celeno</i>		Rare	1			1		
Long-tailed Blue <i>Lampides boeticus</i>		Common	1			1	2	1
Malayan <i>Megisba malaya</i>	LC	Very Rare; Species of Conservation Concern		1				
Transparent 6-line Blue <i>Nacaduba kurava</i>		Common				1	2	
Quaker <i>Neopithecops zalmora</i>		Uncommon	1					1
Tailless Line Blue <i>Prosotas dubiosa</i>		Vagrant	2			1		1
Pale Grass Blue <i>Pseudozizeeria maha</i>		Very Common	10	3	2	1	1	5
Dark Grass Blue <i>Zizeeria karsandra</i>		Uncommon	1					1
Lesser Grass Blue <i>Zizina otis</i>		Common	1					1
Tiny Grass Blue <i>Zizula hylax</i>		Very Rare; Species of Conservation Concern	1			1		1
Fluffy Tit <i>Zeltus amasa</i>		-				3		
Silver Streak Blue <i>Iraota timoleon</i>		Uncommon					1	
Slate Flash <i>Rapala manea</i>		Common					1	1
Silver Royal <i>Ancema blanka</i>		-				1	1	
Chocolate Royal <i>Remelana jangala</i>		Common	1					
Long-banded Silverline <i>Spindasis lohita</i>		Common					1	
Club Silverline <i>Spindasis syama</i>		Uncommon	1					
Peacock Royal <i>Tajuria cippus</i>	LC	Rare					1	
Plum Judy <i>Abisara echerius</i>		Very Common	1		1	2	3	1
Punchinello		Common			1	1	2	1

Species	Conservation and Protection Status ¹	Status in HK ²	500m Assessment Area ³					
			AL	M	PL	SW	S/G	V/D
<i>Zemeros flegyas</i>								
Common Duffer <i>Discophora sondaica</i>		Uncommon	1			1		
Large Faun <i>Faunis eumeus</i>		Common	1			10		1
Tawny Rajah <i>Charaxes bernardus</i>		Common		1		1	2	2
Common Nawab <i>Polyura athamas</i>		Uncommon					1	
Shan Nawab <i>Polyura nepenthes</i>		Uncommon				1	2	
Plain Tiger <i>Danaus chrysippus</i>		Uncommon	1					
Common Tiger <i>Danaus genutia</i>		Common	1	1		2	1	2
Common Indian Crow <i>Euploea core</i>		Common	2	3	1	1	2	1
Blue-spotted Crow <i>Euploea midamus</i>		Very Common	2	3	1	2	1	3
Ceylon Blue Glassy Tiger <i>Ideopsis similis</i>		Very Common	1	2	1	2	1	2
Glassy Tiger <i>Parantica aglea</i>		Common			1	1		
Blue Tiger <i>Tirumala limniace</i>		Common		1			1	1
Angled Castor <i>Ariadne ariadne</i>		Common	2	2				4
Colour Sergeant <i>Athyma nefte</i>		Common		1		1	1	
Staff Sergeant <i>Athyma selenophora</i>		Common	1			1	1	
Rustic <i>Cupha erymanthis</i>		Very Common	2	7	1	5	3	2
Common Mapwing <i>Cyrestis thyodamas</i>		Common	1				1	1
Courtesan <i>Euripus nyctelius</i>		Very Rare					1	
White-edged Blue Baron <i>Euthalia phemius</i>		Common	1	1		1		1

Species	Conservation and Protection Status ¹	Status in HK ²	500m Assessment Area ³					
			AL	M	PL	SW	S/G	V/D
Red-ring Skirt <i>Hestina assimilis</i>		Common	1		1		2	1
Great Egg-fly <i>Hypolimnas bolina</i>		Common	2	1			1	1
Danaid Egg-fly <i>Hypolimnas misippus</i>	LC	Uncommon					1	
Peacock Pansy <i>Junonia almana</i>		Common						1
Grey Pansy <i>Junonia atlites</i>		Common	1	1			1	3
Chocolate Pansy <i>Junonia iphita</i>		Common			1			1
Lemon Pansy <i>Junonia lemonias</i>		Common	2	1				1
Blue Admiral <i>Kaniska canace</i>		Common						1
Common Archduke <i>Lexias pardalis</i>		Suspected species				2	2	1
Southern Sullied Sailer <i>Neptis clinia</i>		Common	1			3		
Common Sailer <i>Neptis hylas</i>		Very Common	2	3	1	1	1	1
Five-dot Sergeant <i>Parathyma sulphitia</i>		Common	1	1	1	2		
Short-banded Sailer <i>Phaedyma columella</i>		Common	1	1		3	1	1
Black Prince <i>Rohana parisatis</i>		Common				1	1	1
Common Jester <i>Symbrenthia lilaea</i>		Common	1		1	1		2
Common Palmfly <i>Elymnias hypermnestra</i>		Common	1	1		1		1
Banded Tree Brown <i>Lethe confusa</i>		Common	1					
Common Evening Brown <i>Melanitis leda</i>		Common				1		
Dark Evening Brown <i>Melanitis phedima</i>		Uncommon	1			1		
Dark-brand Bush Brown		Very Common	2	1		10	2	2

Species	Conservation and Protection Status ¹	Status in HK ²	500m Assessment Area ³					
			AL	M	PL	SW	S/G	V/D
<i>Mycalesis mineus</i>								
South China Bush Brown <i>Mycalesis zonata</i>		Common				3	1	
Common Five-ring <i>Ypthima baldus</i>		Very Common		1				
Common Mime <i>Chilasa clytia</i>		Common	3	1		1	2	2
Tailed Jay <i>Graphium agamemnon</i>		Common	1	1		3	1	2
Common Jay <i>Graphium doson</i>		Common	1	2				1
Common Bluebottle <i>Graphium sarpedon</i>		Very Common	1	3	1	1	2	1
White Dragontail <i>Lamproptera curius</i>	LC	Rare		1		1		1
Common Rose <i>Pachliopta aristolochiae</i>		Rare	1	1			1	
Chinese Peacock <i>Papilio bianor</i>		Common	1	1		2	1	2
Lime Butterfly <i>Papilio demoleus</i>		Common	2	1			1	1
Red Helen <i>Papilio helenus</i>		Very Common	5	1	1	3	1	4
Great Mormon <i>Papilio memnon</i>		Very Common	5	2		3	1	4
Paris Peacock <i>Papilio paris</i>		Very Common	2	3	1	3	5	3
Common Mormon <i>Papilio polytes</i>		Very Common	6	2		3	5	5
Spangle <i>Papilio protenor</i>		Very Common	9	2		3	1	5
Swallowtail <i>Papilio xuthus</i>		Rare				1	1	
Five-bar Swordtail <i>Pathysa antiphates</i>		Common					2	1
Lemon Emigrant <i>Catopsilia pomona</i>		Common	5	3	1	15	1	3
Mottled Emigrant <i>Catopsilia pyranthe</i>		Very Common	4	2	1	8	1	3

Species	Conservation and Protection Status ¹	Status in HK ²	500m Assessment Area ³					
			AL	M	PL	SW	S/G	V/D
Three-spot Grass Yellow <i>Eurema blanda</i>		Common	1	4		2	2	1
Common Grass Yellow <i>Eurema hecabe</i>		Very Common	4	8	1	11	3	3
Common Gull <i>Cepora nerissa</i>		Common		1		1	2	1
Red-base Jezebel <i>Delias pasithoe</i>		Very Common	1	3	3	29	3	14
Great Orange Tip <i>Hebomoia glaucippe</i>		Common	2			1		1
Yellow Orange Tip <i>Ixias pyrene</i>		Uncommon	1			1		1
Indian Cabbage White <i>Pieris canidia</i>		Very Common	20	1		5	9	9
Small Cabbage White <i>Pieris rapae</i>		Rare	7	1				4
Spotted Sawtooth <i>Prioneris thestylis</i>	LC	Rare	1					
Total no. of species recorded			64	50	21	63	58	63

Notes:

1. Conservation and protection status refers to Fellowes et al. (2002), Red List of China's Vertebrates (Jiang et al. 2016), IUCN (2022), China State Major Protection Status, CITES (2022), Cap. 170 and Cap. 586.
 - a. Conservation status by Fellowes *et al.* (2002): LC = Local Concern.
2. Status in HK follows AFCD (2022).
3. Habitats: AL = Agricultural Land, M = Marsh, PL = Plantation, SW = Secondary Woodland, S/G = Shrubland/Grassland, V/D = Village/Developed Area.

Table 5. List of odonate species recorded within the Proposed Works Limit and the 500m Assessment Area

Species	Conservation and Protection Status ¹	Status in HK ²	Proposed Works Limit ³			500m Assessment Area ³								
			CWC	IF	SWC	AL	CWC	IF	MG	M	SW	SWC	S/G	V/D
Common Blue Jewel <i>Rhinocypha perforata</i>	-	Abundant												
Common Blue Jewel <i>Rhinocypha perforata</i>	-	Abundant			4					1		2		
Black-banded Gossamerwing <i>Euphaea decorata</i>	-	Abundant			5					1	2	4		1
Chinese Yellowface <i>Agriomorpha fusca</i>	LC	Abundant									1			
Orange-tailed Midget <i>Agriocnemis femina</i>	-	Abundant				1				1				
Orange-tailed Sprite <i>Ceriagrion auranticum</i>	-	Abundant	1		1					1		2		
Marsh Dancer <i>Onychargia atrocyana</i>	-	Common								1				
Yellow Featherlegs <i>Copera marginipes</i>	-	Abundant			1					1		2		
Black-kneed Featherlegs <i>Pseudocopera ciliata</i>	-	Common			2							1		
Black Threadtail <i>Prodasineura autumnalis</i>	-	Abundant	1		6	1				3	1	7		1
Common Evening Hawker <i>Anaciaeschna jaspidea</i>	-	Common				1								
Pale-spotted Emperor <i>Anax guttatus</i>	-	Common	1			1	1							
Lesser Emperor <i>Anax parthenope</i>	-	Common				1								
Dingy Dusk-hawker <i>Gynacantha subinterrupta</i>	LC	Common			1									
Common Flangetail <i>Ictinogomphus pertinax</i>	-	Common	1											
Least Clubtail sp. <i>Stylogomphus sp.</i>	Restricted Species; previously treated as <i>Stylogomphus chunliuae</i> which is classified as LC	-			1									
Regal Pond Cruiser <i>Epopthemia elegans</i>	-	Common					1					2		
Asian Pintail <i>Acisoma panorpoides</i>	-	Common								4				
Blue Dasher	-	Common	1			1				1				

Species	Conservation and Protection Status ¹	Status in HK ²	Proposed Works Limit ³			500m Assessment Area ³								
			CWC	IF	SWC	AL	CWC	IF	MG	M	SW	SWC	S/G	V/D
<i>Brachydiplax chalybea</i>														
Crimson Darter <i>Crocothemis servilia</i>	-	Abundant	1							3				
Blue Percher <i>Diplacodes trivialis</i>	-	Abundant			1	2				1			2	1
Amber-winged Glider <i>Hydrobasileus croceus</i>	-	Common	1		1									
Forest Chaser <i>Lyriothemis elegantissima</i>	-	Common								1		1	1	
Russet Percher <i>Neurothemis fulvia</i>	-	Common	5		1	10				12	1	1	1	
Red-faced Skimmer <i>Orthetrum chrysis</i>	-	Abundant	4		2					4		1		1
Common Blue Skimmer <i>Orthetrum glaucum</i>	-	Abundant	2		3	1	1			5		1	1	2
Marsh Skimmer <i>Orthetrum luzonicum</i>	-	Abundant	10		5	1				8				
Mangrove Skimmer <i>Orthetrum poecilops</i>	GC; IUCN(VU)	Uncommon	1							1				
Common Red Skimmer <i>Orthetrum prunosum</i>	-	Abundant	3		4	3				3	1	1	1	3
Green Skimmer <i>Orthetrum sabina</i>	-	Abundant	4		3	1	1			4		2	1	1
Lesser Blue Skimmer <i>Orthetrum triangulare</i>	-	Common										1		
Asian Widow <i>Palpopleura sexmaculata</i>	-	Common				1							1	
Wandering Glider <i>Pantala flavescens</i>	-	Abundant		5					42					
Blue Chaser <i>Potamarcha congener</i>	LC	Common				1								
Pied Skimmer <i>Pseudothemis zonata</i>	-	Common												1
Ruby Darter <i>Rhodothemis rufa</i>	LC	Common	1											
Variegated Flutterer <i>Rhyothemis variegata</i>	-	Common	2						1					1
Saddlebag Glider <i>Tamea virginia</i>	-	Abundant	2		1					1	2		1	1

Species	Conservation and Protection Status ¹	Status in HK ²	Proposed Works Limit ³			500m Assessment Area ³								
			CWC	IF	SWC	AL	CWC	IF	MG	M	SW	SWC	S/G	V/D
Crimson Dropwing <i>Trithemis aurora</i>	-	Abundant	2		3				1	3		2		1
Indigo Dropwing <i>Trithemis festiva</i>	-	Abundant	1		2					1	1	1		
Emerald Cascader <i>Zygonyx iris</i>	PGC	Abundant						1				1		
Total no. of species recorded			19	1	19	14	4	3	1	22	7	17	8	11

Notes:

1. Conservation and protection status refers to Fellowes *et al.* (2002), Red List of China's Vertebrates (Jiang *et al.* 2016), IUCN (2022), China State Major Protection Status, CITES (2022), Cap. 170 and Cap. 586.
 - a. Conservation status by Fellowes *et al.* (2002): LC = Local Concern; PGC = Potential Global Concern.
 - b. Conservation status by IUCN (2022): VU = Vulnerable.
2. Status in HK follows AFCD (2022).
3. Habitats: AL = Agricultural Land, CWC = Channelised Watercourse, IF = In Flight, MG = Mangrove, M = Marsh, SW = Secondary Woodland, SWC = Semi-natural Watercourse, S/G = Shrubland/Grassland, V/D = Village/Developed Area.

Table 6. List of freshwater fish recorded within the Proposed Works Limit and the 500m Assessment Area

Species	Conservation and Protection Status ¹	Status in HK ²	Proposed Works Limit ³		500m Assessment Area ³		
			CWC	SWC	AL	CWC	M
Indo-Pacific Tarpon <i>Megalops cyprinoides</i>	-	-	3				5
Kelee Shad <i>Hilsa kelee</i>	-	-				20	
Bloch's Gizzard Shad <i>Nematalosa nasus</i>	-	-				20	
Spotted Sardinella <i>Amblygaster sirm</i>	-	-				10	
Milkfish <i>Chanos chanos</i>	-	-				2	
Chinese Barb <i>Barbodes semifasciolatus</i>	-	Common		30	5	20	10
Goldfish <i>Carassius auratus</i>	-	Not common in streams					2
Mud Carp <i>Cirrhinus molitorella</i>	IUCN(NT) ⁴	Not common in streams					2
Mrigal Carp <i>Cirrhinus mrigala</i>	-	-					1
Ornamental Carp / Koi <i>Cyprinus sp.</i>	-	-					50
Rohu Labeo <i>Labeo rohita</i>	-	-					1
Predaceous Chub <i>Parazacco spilurus</i>	-	Common	10	200		20	300
Striped Loach <i>Schistura fasciolata</i>	-	Common					20
Whitespotted Walking Catfish <i>Clarias fuscus</i>	KFBG(NT)	Common			7		1
Sharphead Sleeper <i>Eleotris oxycephala</i>	-	Common		10			2
Black-spotted Gudgeon <i>Butis melanostigma</i>	-	Uncommon	1				5
Sharptail Goby <i>Oligolepis acutipennis</i>	BSAP(NT)	-					1
Shuttles Hoppfish <i>Periophthalmus modestus</i>	-	Common	20			10	2
Javanese Fat-nose Goby <i>Pseudogobius javanicus</i>	-	Common	10				20

Species	Conservation and Protection Status ¹	Status in HK ²	Proposed Works Limit ³		500m Assessment Area ³			
			CWC	SWC	AL	CWC	M	SWC
Speckled Goby <i>Redigobius cf. bikolanus</i>	-	-						1
White-cheeked Goby <i>Rhinogobius duospilus</i>	-	Common		20				20
Barcheek Goby <i>Rhinogobius similis</i>	-	Common		51				
Blue Neon Goby <i>Stiphodon atropurpureus</i>	GC; RLCV(NT)	Species of Conservation Concern		5				
Akihito's Neon Goby <i>Stiphodon imperiorientis</i>	IUCN(VU); KFBG(CR)	-		1				
Scaly Neon Goby <i>Stiphodon multsquamus</i>	GC; RLCV(EN); KFBG(EN)	-		20				
Shimofuri Goby <i>Tridentiger bifasciatus</i>	-	-	1					
Chameleon Goby <i>Tridentiger trigonocephalus</i>	-	Common	10	5		2		
Indo-pacific Tropical Sand Goby <i>Favonigobius reichei</i>	-	Common	10					2
Fork Tongue Goby <i>Glossogobius giuris</i>	-	Common	3			100		2
Spotty Band Goby <i>Glossogobius olivaceus</i>	-	Uncommon						10
Unidentified Tank Goby <i>Glossogobius</i> sp.	-	-	20				50	1
Sleepy Goby <i>Psammagobius biocellatus</i>	-	Uncommon						1
Unidentified Glassy Perchlet <i>Ambassis</i> sp.	-	-	10	2000		200		600
Grey Mullet <i>Mugil cephalus</i>	-	Common	40	20		100		50
Eastern Keelback Mullet <i>Planiliza affinis</i>	-	-	10	20		50		30
Largescale Mullet <i>Planiliza macrolepis</i>	-	-	20	20		50		30
Greenback Mullet <i>Planiliza subviridis</i>	-	-	20	20		50		30
Redbelly Tilapia <i>Coptodon zillii</i>	-	Common	10	20	1	20	5	200
Jewel Cichlid	-	-		1				

Species	Conservation and Protection Status ¹	Status in HK ²	Proposed Works Limit ³		500m Assessment Area ³			
			CWC	SWC	AL	CWC	M	SWC
<i>Hemichromis guttatus</i>								
Mozambique Tilapia <i>Oreochromis mossambicus</i>	IUCN(NT) ⁴	Common	1	50		30		50
Nile Tilapia <i>Oreochromis niloticus</i>	-	Common						100
Fenestratus Cichlid <i>Vieja fenestrata</i>	-	-		20		50		40
Flesh-crested Blenny <i>Omobranchus fasciolatoceph</i>	-	-				1		
Gossamer Blenny <i>Omobranchus ferox</i>	-	-				1		
Spot-tail Needlefish <i>Strongylura strongylura</i>	-	Common				12		
Mosquito Fish <i>Gambusia affinis</i>	-	Common		50	25		20	20
Guppy <i>Poecilia reticulata</i>	-	Common		20				
Swordtail <i>Xiphophorus hellerii</i>	-	Common	10	100	30			10
Variable Platyfish <i>Xiphophorus variatus</i>	-	Common		50				
Bigeye Trevally <i>Caranx sexfasciatus</i>	-	-				5		
Needle-scaled Queenfish <i>Scomberoides tol</i>	-	-				1		
Great Barracuda <i>Sphyraena barracuda</i>	-	-				3		
Climbing Perch <i>Anabas testudineus</i>	-	-					30	
Small Snakehead <i>Channa asiatica</i>	LC; KFBG(NT)	Uncommon		20	1		3	
Snakehead Murrel <i>Channa striata</i>	-	Uncommon	2				20	
Whipfin Silver-biddy <i>Gerres filamentosus</i>	-	-				10		5
Longspine Silver-biddy <i>Gerres macracanthus</i>	-	-	5			50		1
Common Silver-biddy <i>Gerres oyena</i>	-	-	10	3		30		5

Species	Conservation and Protection Status ¹	Status in HK ²	Proposed Works Limit ³		500m Assessment Area ³			
			CWC	SWC	AL	CWC	M	SWC
Spotted Sea Bass <i>Lateolabrax maculatus</i>	-	-				1		
Dark-margined Flagtail <i>Kuhlia marginata</i>	RC	-		5				
Sharpbeak Terapon <i>Rhynchopelates oxyrhynchus</i>	-	-				2		10
Jarbua Terapon <i>Terapon jarbua</i>	-	Common	100			100		100
Mangrove Snapper <i>Lutjanus argentimaculatus</i>	-	Common	5	2		20		20
Russell's Snapper <i>Lutjanus russellii</i>	-	Common				1		1
Spotted Scat <i>Scatophagus argus</i>	-	Common	20	4		200		20
Mottled Spinefoot <i>Siganus fuscescens</i>	-	-				30		10
Orange-spotted Spinefoot <i>Siganus guttatus</i>	-	-						5
Unidentified Sillago <i>Sillago sp.</i>	-	-						5
Yellowfin Seabream <i>Acanthopagrus latus</i>	-	Common				1		5
Blackhead Seabream <i>Acanthopagrus schlegelii</i>	-	-				3		5
Eclipse Puffer <i>Takifugu ocellatus</i>	LC; IUCN(NT)	-				3		1
Total no. of species recorded			24	27	6	36	6	47

Notes:

- Conservation and protection status refers to Fellowes et al. (2002), Red List of China's Vertebrates (Jiang et al. 2016), IUCN (2022), China State Major Protection Status, CITES (2022), KFBG (2019), BSAP (2014), Cap. 170 and Cap. 586.
 - Conservation status by Fellowes et al. (2002): LC = Local Concern, RC = Regional Concern, GC = Global Concern.
 - Conservation status by Red List of China's Vertebrates (RLCV) (Jiang et al. 2016): NT = Near Threatened, EN = Endangered.
 - Conservation status by IUCN (2022): NT = Near Threatened, VU = Vulnerable.
 - Conservation status by KFBG (2019): NT = Near Threatened, CR = Critically Endangered.
 - Conservation status by BSAP Marine Fishes Sub-group (2014): NT = Near Threatened.
- Status in HK follows AFCD (2022).
- Habitats: AL = Agricultural Land, CWC = Channelised Watercourse, M = Marsh, SWC = Semi-natural Watercourse.
- Species regarded as invasive species and thus is not considered as species with conservation importance in Hong Kong.

Table 7. List of aquatic invertebrate species recorded within the Proposed Works Limit and the 500m Assessment Area

Species	Conservation and Protection Status ¹	Status in HK ²	Proposed Works Limit ³		500m Assessment Area ³			
			CWC	SWC	AL	CWC	M	SWC
Common Blue Jewel (Larva) <i>Rhinocypha perforata</i>	-	Abundant		5				
Black-banded Gossamerwing (Larva) <i>Euphaea decorata</i>	-	Abundant		5				20
Chinese Hooktail (Larva) <i>Ophiogomphus sinicus</i>	-	Common		2				
Unidentified Skimmer (Larva) <i>Orthetrum</i> sp.	-	-					1	6
Unidentified Dropwing (Larva) <i>Trithemis</i> sp.	-	-		5				
Emerald Cascader (Larva) <i>Zygonyx iris</i>	PGC	Abundant		6				3
Mayfly (Ephemeroptera) Larva <i>Baetidae</i> sp.	-	-						1
Mayfly (Ephemeroptera) Larva <i>Heptageniidae</i> sp.	-	-						2
Water Strider <i>Gerroidea</i> sp.	-	-						3
Caddisfly (Trichoptera) Larva <i>Hydropsychidae</i> sp.	-	-		20				10
Caddisfly (Trichoptera) Larva <i>Philopotamidae</i> sp.	-	-		20				
Caddisfly (Trichoptera) Larva <i>Anisocentropus</i> sp.	-	-						1
Fishfly (Megaloptera) Larva <i>Neochauliodes</i> sp.	-	-		4				
Beetle Larva <i>Eulichas</i> sp.	-	-		1				
Beetle Larva <i>Hydrophilidae</i> sp.	-	-		1				1
Whirligig Beetle <i>Gyrinidae</i> sp.	-	-						1
Cranefly Larva <i>Tipulidae</i> sp.	-	-		2				
Freshwater Shrimp <i>Caridina cantonensis</i>	-	-		50				20
Freshwater Shrimp <i>Caridina leucosticta</i>	-	-	20	20				

Species	Conservation and Protection Status ¹	Status in HK ²	Proposed Works Limit ³		500m Assessment Area ³			
			CWC	SWC	AL	CWC	M	SWC
Freshwater Prawn <i>Macrobrachium equidens</i>	-	-						2
Freshwater Prawn <i>Macrobrachium formosense</i>	-	-		3	1			2
Giant Tiger Prawn <i>Penaeus monodon</i>	-	-						5
Freshwater Prawn <i>Macrobrachium nipponense</i>	-	-		10				5
Greasyback Shrimp <i>Metapenaeus ensis</i>	CSRL(VU)	-		25		25		5
Freshwater Crab <i>Somanniathelphusa zanklon</i>	GC; IUCN(EN)	-			1		1	
Mitten Crab <i>Eriocheir</i> sp.	-	-		20		5		5
Crab <i>Varuna litterata</i>	-	-		2				
Mud Crab <i>Scylla serrata</i>	-	-				2		5
Freshwater Snail <i>Clithon faba</i>	-	-				500		500
Freshwater Snail <i>Clithon oualaniensis</i>	-	-				2000		500
Freshwater Snail <i>Clithon retropictus</i>	-	-		20		500		500
Freshwater Snail <i>Sulcospira hainanensis</i>	-	-	50					
Freshwater Snail <i>Melanoides tuberculata</i>	-	-				500		500
Freshwater Snail <i>Tarebia granifera</i>	-	-				500		500
Rock Oyster <i>Saccostrea cucullata</i>	-	-				1000		
Annelid Worm <i>Tubificinae</i> sp.	-	-		1				
Total no. of species recorded			2	20	2	9	2	23

Notes:

1. Conservation and protection status refers to Fellowes et al. (2002), Red List of China's Vertebrates (Jiang et al. 2016), China Species Red List (Wang & Xie, 2004), IUCN (2022), China State Major Protection Status, CITES (2022), Cap. 170 and Cap. 586.
 - a. Conservation status by Fellowes et al. (2002): GC = Global Concern, PGC = Potential Global Concern.
 - b. Conservation status by Red List of China's Vertebrates (RLCV) (Jiang et al. 2016): NT = Near Threatened, EN = Endangered.

- c. Conservation by China Species Red List (CSRL) (Wang & Xie, 2004): VU = Vulnerable.
- d. Conservation status by IUCN (2022): EN = Endangered.
2. Status in HK follows AFCD (2022).
3. Habitats: AL = Agricultural Land, CWC = Watercourse, M = Marsh, SWC = Semi-natural Watercourse.

Appendix 3.

Representative Photographs of Habitats and Species of Conservation Importance Recorded

Agricultural Land



Channelised Watercourse



Mangrove



Marsh



Plantation



Pond



Sandy Shore



Sea



Secondary Woodland



Semi-natural Watercourse



Shrubland/Grassland



Village/Developed Area



Aquila sinensis



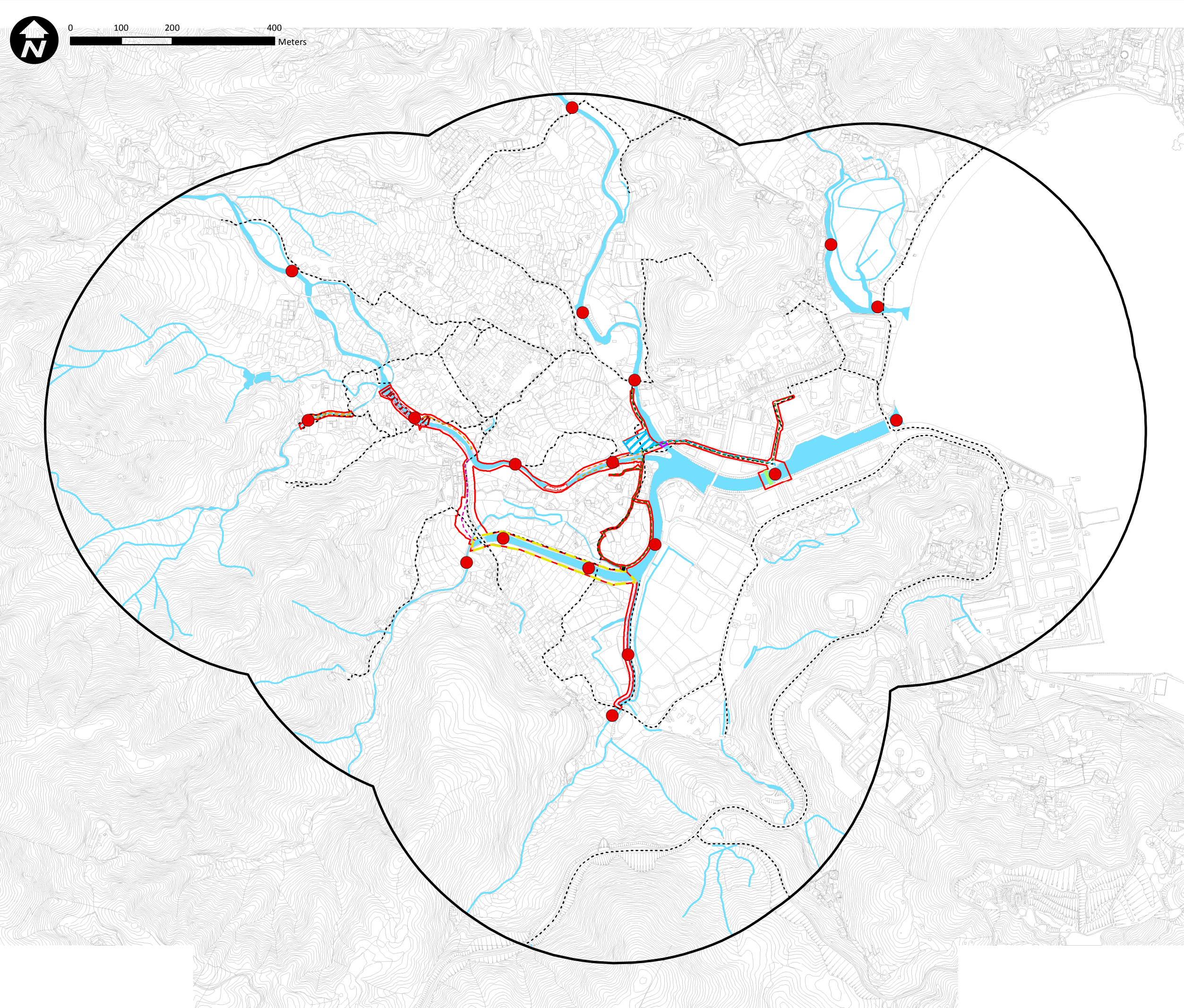
Artocarpus hypargyreus



Malaisia scandens



Figures



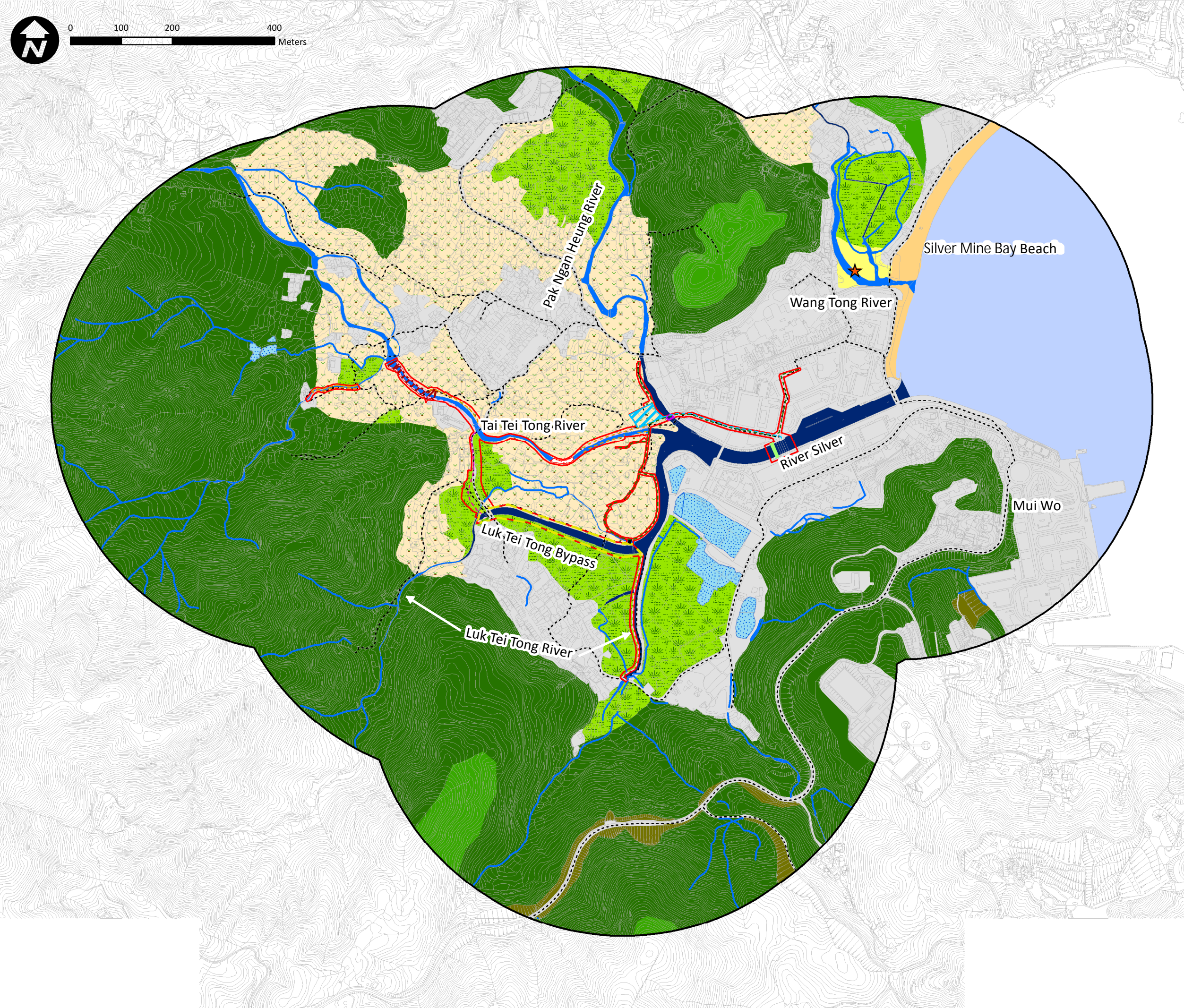
- 500m Assessment Area
- Proposed Works Limit
- Survey Transects
- Aquatic Sampling Points
- Proposed Stormwater Drain
- Proposed Box Culvert
- Proposed Flood Wall
- Reconstruction of Gabion Wall
- Outlet Pipe of Stormwater Pumping Station
- Proposed Cross Bridge
- Proposed Fish Ladder with Gradient 1:30
- Proposed Mechanical Penstock
- Extent of River Revitalisation
- Proposed River Reprofilling
- Proposed Stormwater Pumping Station
- Proposed Tidal Gate
- Watercourses



Project Title:
 Agreement No. CE 54/2020 (DS)
 Drainage Improvement Works in Mui Wo – Investigation
 Contract No. PM 03/2021 Ecological Survey in Mui Wo

Figure Title:
 500m Assessment Area,
 Survey Transects and Aquatic Sampling Points

Drawn by:	NT	Scale:	1:7,000 on A3
Checked By:	NT	Date:	18 Mar 2023
Approved by:	TH	Internal Use	
Figure Number:	Figure 1		Revision: 4



- 500m Assessment Area
- Proposed Works Limit
- Proposed Stormwater Drain
- Proposed Box Culvert
- Proposed Flood Wall
- Reconstruction of Gabion Wall
- Outlet Pipe of Stormwater Pumping Station
- Proposed Cross Bridge
- Proposed Fish Ladder with Gradient 1:30
- Proposed Mechanical Penstock
- Extent of River Revitalisation
- Proposed River Reprofiling
- Proposed Stormwater Pumping Station
- Proposed Tidal Gate
- ★ Tai Wai Yuen Night Roost
- Secondary Woodland
- Plantation
- Shrubland/Grassland
- Channelised Watercourse
- Semi-natural Watercourse
- Pond
- Sea
- Marsh
- Mangrove
- Agricultural Land
- Village / Developed Area
- Sandy Shore



Project Title:
 Agreement No. CE 54/2020 (DS)
 Drainage Improvement Works in Mui Wo – Investigation
 Contract No. PM 03/2021 Ecological Survey in Mui Wo

Figure Title:
 Habitat Map

Drawn by:	NT	Scale:	1:7,000 on A3
Checked By:	NT	Date:	18 Mar 2023
Approved by:	TH	Internal Use	
Figure Number:	Figure 2		Revision: 5