Proposed Public Residential Housing/ Starter Homes Development at UDWYT Lot 14RP and Adjoining Government Land (Site A) & Proposed Private Residential Development at UDWYT Lot 11RP and Adjoining Government Land (Site B), Wong Yue Tan, Tai Po

Ecological Impact Assessment Report

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1. INTRODUCTION

1.1.1 This Ecological Impact Assessment Report is prepared in support of a Land Sharing Pilot Scheme application of the proposed residential development in the "Green Belt" and 'Road' zones of Approved Tai Po Outline Zoning Plan No. S/TP/30 in the Lo Fai Road and Ting Kok Road, Tai Po, New Territories (The Remaining Portions of Unsurveyed District at Wong Yue Tan Lot Nos. 11 and 14 and adjoining Government land).

1.1.2 The Application Sites are located at the lots mentioned above, with a total site area of about 2.03 ha for Site A with government land of about 0.58 ha; and a total site area of about 0.57 ha for Site B with government land of about 0.14 ha. Site A is bounded by Lo Fai Road to its west and Ting Kok Road to the south; Site B is located to the north of the Ting Kok Road.

1.1.3 This report provided the results of review of relevant literature of the ecological information in the proximity of the Study Area, ecological baseline gathered from 6-month survey, the assessment of the potential ecological impacts of the proposed development on the latest proposed Master Layout Plan and is submitted as part of the technical assessment for the Application.

2. Approach of Evaluation of Ecological Baseline

2.1 Relevant legislation, Standards and Guidelines

2.1.1 The HKSAR ordinances and regulations relevant to the evaluation of ecological baseline for the Application include the following:

- Forests and Countryside Ordinance (Cap. 96) and its subsidiary legislation, the Forestry Regulations (Cap. 96A);
- Town Planning Ordinance (Cap. 131);
- Wild Animals Protection Ordinance (WAPO, Cap. 170);
- Country Parks Ordinance (Cap. 208) and its subsidiary legislation;
- Environmental Impact Assessment Ordinance ("the EIAO", Cap. 499) and the associated Technical Memorandum (EIAO-TM); and
- Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586) which is the local legislation that gives effect to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

2.1.2 The ecological baseline evaluation also makes reference to the following guidelines and standards:

- Hong Kong Planning Standards and Guidelines (HKPSG) Chapter 10, "Conservation";
- PELB Technical Circular 1/97 / Works Branch Technical Circular 4/97, "Guidelines for Implementing the Policy on Off-site Ecological Mitigation Measures";
- EIAO Guidance Note No. 3/2010 - Flexibility and Enforceability of Mitigation Measures Proposed in an EIA Report;
- EIAO Guidance Note No. 6/2010 - Some Observations on Ecological Assessment from the Environmental Impact Assessment Ordinance Perspective;
- EIAO Guidance Note No. 7/2023 - Ecological Baseline Survey for Ecological Assessment; and
- EIAO Guidance Note No. 10/2023 - Methodologies for Terrestrial and Freshwater Ecological Baseline Surveys.

2.1.3 The ecological baseline evaluation makes reference to the following Mainland legislations:

- List of Wild Animals under State Priority Conservation 國家重點保護野生動物名錄; and
- List of Wild Plants, promulgated by the State Council 國家重點保護野生植物名錄.

2.1.4 Other international conventions and guidelines that are relevant to the ecological baseline evaluation include the following:

- **Convention on International Trade in Endangered Species of Wild Fauna and Flora ("CITES")**. This Convention regulates international trade in animal and plant species

considered to be at risk from such trade. Depending on the degree of threat posed by international trade, CITES classifies endangered species of animals and plants into three Appendices. Appendix I includes highly endangered species threatened with extinction. Commercial trade in these species is prohibited. Appendix II includes species which are not presently threatened with extinction but may become so unless trade is controlled. Trade of these species is allowed but is subject to licensing controls. Appendix III species are species identified by any Party to CITES as requiring cooperation in controlling their trade. Their trade is subject to permits or certificates of origin. Hong Kong's obligations under this Convention are enforced via the Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586). The CITES authority for Hong Kong SAR is the Department of Agriculture, Fisheries and Conservation (AFCD).

- **The International Union for Conservation of Nature (IUCN) Red List of Threatened Species**. IUCN established the IUCN Red List of Threatened Species™, which has since evolved into the world's most comprehensive data source on the global extinction risk of species. The IUCN Red List is considered the authoritative publication to classify species into nine groups:
  - Extinct (EX) - No individuals remaining;
  - Extinct in the Wild (EW) - Known only to survive in captivity, or as a naturalized population outside its historic range;
  - Critically Endangered (CR) - Extremely high risk of extinction in the wild;
  - Endangered (EN) - Very high risk of extinction in the wild;
  - Vulnerable (VU) - High risk of extinction in the wild;
  - Near Threatened (NT) - Likely to become endangered in the near future;
  - Least Concern (LC) - Lowest risk. Does not qualify for a higher risk category.
  - Data Deficient (DD) - Knowledge of the species is inadequate to enable assessment its risk of extinction; and
  - Not Evaluated (NE) - Species not yet evaluated against the criteria.

- **The United Nations Convention on Biological Diversity.** This convention requires parties to regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use. It also requires parties to promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings. The People's Republic of China (PRC) ratified the Convention on Biological Diversity on 5th January 1993. The HKSAR Government has stated that it

is "committed to meeting the environmental objectives" of the Convention (PELB 1996).

- **Convention on the Conservation of Migratory Species of Wild Animals (the Bonn Convention)**, which requires parties to protect listed threatened or endangered migratory species occurring within their boundaries.

2.2 Criteria of Evaluating Species of Conservation Importance

2.2.1 Species listed under local legislation and international conventions for conservation of flora and fauna will be given special attention. In accordance with Table 3, Annex 8 of the EIAO-TM, the ecological value of species should be assessed in terms of protection status, species distribution, and rarity. For fauna species, criteria relating to these three aspects were considered, such as being protected under Cap. 170 (except birds), Cap. 586, and/or regional/global legislations/conventions (i.e. the protection status), whether they are endemic species (i.e. species distribution and being considered rare or restricted, and highlighted in publications such as Fellowes *et al*. (2002)) (i.e. rarity). References were also made to those protected by law in China. Flora species are considered of conservation importance when it is protected/listed under the regional/global legislations/conventions (e.g. listed under Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586); Forestry Regulations (Cap. 96A); Category I or II protected species in mainland China; listed by IUCN (2023) or CITES), and concerned due to species distribution and rarity (e.g. considered rare by Agriculture, Fisheries and Conservation Department (AFCD) (2003, 2007); Xing *et al*. (2000); Wu and Lee (2000); or Siu (2000)). However, this excludes exotic weeds, escaped cultivars or captive species, vagrants and introduced species which have lower ecological value. Species which are classified by IUCN as Near Threatened (NT), Least Concern (LC), Data Deficient (DD), or Not Evaluated (NE), and not covered by any other laws/regulations/conventions are not considered of conservation importance.

2.2.2 The species identified as having conservation importance will be further categorised in accordance with their relevance to potential impacts, which will be assessed in accordance with the EIAO-TM criteria.

2.3 Impact Assessment Methodology

2.3.1 According to the data from the reviewed literature and the ecological surveys being conducted, existing wildlife uses of various habitats with special attention to those wildlife groups and habitats with conservation importance as well as the key issues shall be investigated and described. The ecological data will form a basis to determine an optimal option in ecological perspective and evaluate

how the development affects the ecology within the Study Area. The assessment will identify and quantify as far as possible the potential terrestrial and aquatic ecological impacts associated with the proposed development, both direct and indirectly, on-site, off-site, primary, secondary and cumulative ecological impacts on the wildlife groups and habitats identified such as direct loss of habitats, destruction of habitat, disturbance to wildlife, reduction of species abundance/diversity, loss of roosting, feeding and breeding grounds, reduction of ecological carrying capacity, loss in ecological linkage and function, and habitat fragmentation.

2.3.2 Other possible disturbance caused by the proposed development will also be identified, in particular the following:

a) Loss of habitats, feeding, breeding and roosting grounds of wildlife and recognised sites of conservation importance due to construction and operation phases of the proposed development;
b) Indirect ecological impacts due to changes in the water quality and hydrology, as a result of surface run-off any associated disinfection activities, temporary sewage overflow, accidental discharge of untreated sewage, etc. in the water bodies, drainage channels and other wildlife habitats in the Study Area during construction and operation phases;
c) Impacts arising from and/or associated with the proposed works e.g. direct mortality of fauna (e.g. road-kill), removal of plant species of conservation importance, barrier effect on mobile species, disturbance impacts;
d) Impacts due to increase in human activities and disturbance during the construction and operation stages of the proposed development such as increase in light intensity, noise, glare, dust and traffic;
e) Fragmentation of habitats and deterioration of environmental quality to the recognised sites
f) Recognised sites of conservation importance and other ecologically important areas; and
g) Cumulative impacts due to other planned and committed concurrent development projects at or near the area.

2.3.3 Predicted impacts will be quantified as far as possible and evaluated with reference to the criteria in Annexes 8 and 16 of the EIAO-TM. Ecological impacts will be assessed in the absence of mitigation. Impacts are generally ranked as "insignificant", "minor", "moderate" or "severe".

2.3.4 Where significant negative impacts are predicted, the strategy will follow the priority of "avoid, minimize, and compensate". The construction and operational phase impacts on ecology will be assessed individually, then cumulatively, in combination with other existing, committed and proposed developments. The study team, in consultation with the client, will follow the approaches as:

modifications to project design, consideration of alternative options (if any), special controls on construction methods and schedule.

2.3.5 After conducting the impact assessment from the proposed development, possible and practicable mitigation measures (such as alternative design and configuration of the Project, modification/change of construction methods, restriction of building height, provision of buffer areas, etc.) to avoid, minimize and/or compensate for the adverse ecological impacts identified during the construction and operation phases of the proposed development. The feasibility and effectiveness of the recommended mitigation measures shall be evaluated. The scope, type, location, implementation arrangement, resource requirement, subsequent management and maintenance of such measures shall be defined.

2.3.6 The acceptability of residual impacts following mitigation will be assessed. Finally, the assessment will evaluate the need for ecological monitoring and audit.

3. METHODOLOGY

3.1 Application Site and Study Area

3.1.1 The Application Site A is bounded by Lo Fai Road to its west and Ting Kok Road to the south; the Application Site B is located to the north of the section of Ting Kok Road adjoining the Fortune Garden (**Figure 3.1**).

3.1.2 The Application Sites are currently zoned as "Green Belt" and 'Road' in the Approved Tai Po Outline Zoning Plan No. S/TP/30. The "Study Area" for this Ecological Impact Assessment covers the area within the 500m from the Application Site boundary and also the areas likely to be affected by the proposed development (**Figure 3.1**).

3.2 Literature Review

3.2.1 The following available literature covering the Study Area and its vicinity was reviewed:

- Binnies (2022). AEIAR-244/2022 - Upgrading of Tai Po Sewage Treatment Works
- Arup (2019). AEIAR-221/2019 - Shuen Wan Golf Course
- Outline Zoning Plan
- Historical and latest government aerial photos
- Hong Kong Biodiversity Information Hub (2024)
- Rare and Precious Plant of Hong Kong (AFCD 2003a)
- Hong Kong Biodiversity - Newsletter of AFCD
- Memoirs of Hong Kong Natural History Society
- Porcupine! - Newsletter of Department of Ecology and Biodiversity, University of Hong Kong

3.3 Ecological Survey Methodology

3.3.1 In accordance with EIAO Guidance Note No. 7/2010, the ecological baseline survey aims at collecting ecological data through sampling. Survey methods used shall be scientifically robust and appropriate for the habitats and target taxa groups under this study.

3.3.2 The ecological surveys shall cover but not be limited to flora, fauna and any other habitats/species of conservation importance. The team of specialists/ecologists shall have adequate knowledge and field experience of the target taxa groups surveyed. The ecological survey team leader should have at least 5 years of relevant experience in ecological survey/assessment. The proposed ecological surveys stated in this methodology paper will cover different habitats according to the results after ground-truthing. Detailed methodology is stated as below.

Habitat and Vegetation

3.3.3 Habitats within the Study Area were mapped based on the latest government aerial photos and database combined with field ground-truthing. Representative areas of each habitat type were surveyed on foot. Plant species of each habitat type encountered and their relative abundance were recorded with special attention to species of conservation importance. A plant list was produced, and the dominant plant species were reported as such information is a useful indication of the habitat quality. Nomenclature of plant species follows the latest Hong Kong Plant Database available from the website of the Hong Kong Herbarium.

Terrestrial Mammal

3.3.4 Mammal surveys (including day and night-time surveys) were carried out in representative habitats within the Study Area along the transect (**Figure 3.1**). All sightings, tracks, and signs of mammals (including droppings) were actively searched within the representative habitats of the Study Area. Night surveys were conducted to survey nocturnal mammal species (e.g., bats). As it is a common practice to conserve bat roost as direct impact on bat roost would affect the species population, attention was paid on bat roost location. Active search was carried out in the potential roosting locations (e.g. cave, mine, tunnel, abandoned buildings, palm trees etc.). Ultrasonic bat detector was used for locating and identifying bats after sunset. Camera traps were installed to survey the cryptic mammals at representative locations within the Study Area. Nomenclature for mammals follows that available from the Hong Kong Biodiversity Information Hub.

Avifauna

3.3.5 The avifauna of representative habitats within the Study Area were surveyed in the active period of bird activities (i.e. early morning and dusk) using transect count method (**Figure 3.1**). The presence and abundance of avifauna species at various habitats observed from survey transects were recorded. Behaviours relating to roosting (including night roosting sites, if any), breeding (e.g., nest building) and feeding observed during the surveys were recorded. Night surveys were also conducted to record nocturnal avifauna (e.g., owls). The location(s) of any encountered avifauna species of conservation importance were recorded, along with any notable behaviours. Ornithological nomenclature in this study follows the latest Hong Kong Bird Watching Society List of Hong Kong Birds.

Herpetofauna

3.3.6 Herpetofauna surveys (including day and night survey) were carried out and covered representative habitats within the Study Area along the transect (**Figure 3.1**). Particular attention was given to streams/watercourses or other water bodies. Herpetofauna surveys were conducted through direct observation and active searching in all potential hiding places such as among leaf litter, inside holes, under

stones and logs within the Study Area. During the surveys, all reptiles and amphibians sighted and heard were recorded. Nocturnal auditory detection of species-specific calls was used to survey frogs and toads during night surveys. The nomenclature follows that available from the Hong Kong Biodiversity Information Hub.

Butterfly and Odonate

3.3.7 Butterfly and Odonate surveys were conducted by transect survey (**Figure 3.1**) during daytime and under fine weather when most butterflies and dragonflies are active. All encountered dragonflies and butterflies were recorded by species by direct observation with binoculars and their abundance will be recorded. The nomenclature follows that available from the Hong Kong Biodiversity Information Hub.

Fireflies

3.3.8 Firefly survey was conducted monthly from Apr 2024 to June 2024. The survey was conducted following transect and near the aquatic sampling points within the Study Area (**Figure 3.1**). The firefly survey was conducted in the daytime and, at night (started shortly after sunset and continued until 120 minutes after sunset when the fireflies are most active). During the survey, any firefly observed was identified to the species level, where possible. The abundance and distribution of fireflies were recorded. Nomenclature and conservation status of fireflies (e.g. endemic to Hong Kong) follow Yiu (2023).

Freshwater fish and invertebrates

3.3.9 Surveys of freshwater communities were undertaken at streams/watercourses and other water bodies (either natural or man-made) within the Study Area by means of one or a combination of the following techniques: bank side observation; active searching with fish hand nets; and fish capturing using baited fish cages. The aquatic sampling locations are shown in **Figure 3.1**. All freshwater fauna found were identified to the lowest practicable taxonomic level and their abundance was recorded. The nomenclature for fish follows that available from the Hong Kong Biodiversity Information Hub.

3.3.10 Survey schedule of the 6-month survey programme is shown in **Table 3.1**. The ecological survey programme covered dry and wet seasons from 2023 to 2024.

Table 3.1 Ecological Survey Programme

Year	2023		2024			
Month#	1	2	3	4	5	6
Month	Aug	Sep	Jan	Apr	May	Jun
Season	Wet		Dry	Wet		
Habitat &Vegetation	D	D	D	D		D
Mammals	D+N	D+N	D+N	D+N	D+N	D+N
*Birds	D+N	D+N	D+N	D+N	D+N	D+N
Reptiles	D+N	D+N		D+N	D+N	D+N
Amphibians	D+N	D+N		D+N	D+N	D+N
Butterflies	D	D		D	D	D
Odonates	D	D		D	D	D
*Fireflies				D+N	D+N	D+N
Fish	D+N	D+N		D+N		D+N
Freshwater Invertebrates	D	D		D		D

*Note: D: day time survey; N: night-time survey; surveys included early morning and dusk, night-time for bird; dusk and night-time surveys were conducted for fireflies.

4. ECOLOGICAL BASELINE

4.1 Literature Review of the Recognised Sites of Conservation Importance

4.1.1 There are six Sites of Special Scientific Interest (SSSIs) in Tai Po and Ting Kok areas including Fung Yuen SSSI, Shuen Wan Egretry SSSI, Ting Kok SSSI, Sha Lo Tung SSSI, Yim Tin Tsai and Ma Shi Chau SSSI, and Centre Island SSSI. The first two are located about 1km from the Application Sites while others are at least 1.5 km from the Application Sites.

4.1.2 **Fung Yuen SSSI** - Fung Yuen SSSI was designated in 1980 because the forested ravine of about 42.8 ha behind Fung Yuen Village supports rare and/or protected plants such as *Illigera Illigera celebica* and also provides an important breeding site for some uncommon butterflies such as White *Dragontail Lamproptera curius*, Common Birdwing *Troides helena* and Common Rose *Pachliopta aristolochiae*. A Fung Yuen Butterfly Reserve (2 ha) has been managed by the Tai Po Environmental Association under the Management Agreement Scheme since November 2005.

4.1.3 **Shuen Wan Egretry SSSI** - Shuen Wan Egretry SSSI was designated in 1994. The site is a small fung shui wood behind the villages of Shuen Wan Tsim Uk and Shun Wan Lei Uk, covering an area about 2.1 ha. The site was once used for nesting by Little Egrets *Egretta garzetta*, Great Egrets *Ardea alba*, Eastern Cattle Egrets *Bubulcus*

coromandus, Black-crowned Night Herons *Nycticorax nycticorax* and Chinese Pond Heron *Ardeola bacchus* (Young and Cha 1995). More than 300 nests were recorded in 1993 (ibid.). Nesting ceased after 1995, and resumed in 2005, but the nesting population (3 nests in 2007, 2 nests in 2008, 3 nests in 2009) (Anon. 2007, 2008) was much smaller than those recorded in the 1990's and the egretry was abandoned again since 2010.

4.1.4 **Ting Kok SSSI** - covers an area of about 37.5 ha along the coastal area near Ting Kok Village, Tai Po and was designated in 1985. It is a mangrove habitat consisting of *Kandelia obovata*, *Aegiceras corniculatum, Lumnitzera racemosa*, *Avicennia marina* and *Bruguiera gymnorrhiza* and is typical example of mangrove habitat suitable for field studies.

4.1.5 **The Yim Tin Tsai and Ma Shi Chau SSSI** - was designated since September 1982 mainly for geological interest with about 50 hectares in area size, and covering the eastern tip of Yim Tin Tsai, the whole island of Ma Shi Chau, and the tombolo connecting them. Yim Tin Tsai and its surrounding area contain the best exposed, densest swarm of dyke varied from 3 to 20m wide. Yim Tin Tsai also contains unconformable contact of Tolo Harbour Formation with volcanic tuff of the Yim Tin Tsai Formation.

4.1.6 **Centre Island** - The whole Centre Island was designated as SSSI in 1982. The island is also of geological interest. It contains lant fossils of Permian Age, and geologically linked to Ma Shi Chau and contains the oldest rock formation known in Hong Kong.

4.1.7 Due to the characteristics of the proposed development and significant separation distance of these recognised sites of conservation importance from the Application Sites, adverse impacts are unlikely to be posed to the abovementioned recognised sites of conservation importance. Literature review and desktop assessment were deemed sufficient to assess whether these sites will be affected by the proposed development.

4.2 Literature Review of the Habitats and Wildlife Groups of Conservation Interest

4.2.1 **Habitats of conservation interest** - No habitat of conservation importance is identified as reported in the report for AEIAR-221/2019 and AEIAR-244/2022, such as continuous mature woodland, Fung Shui Wood and mangrove that are generally considered of higher ecological value with higher abundance and diversity of wildlife, either within the Application Sites or in the Study Area under the current Application.

4.2.2 The habitat of Site A was composed of secondary woodland and plantation, while Site B was only composed of plantation habitat as reported in the report for AEIAR-221/2019. Secondary woodland within the location of Site A, which originated from shrubland/grassland that managed to survive hillfires around burial site. This continuous patch of secondary woodland was majorly situated on hillsides outside of Site A with an extension to the northeast of Site B under the current Application. Most of these secondary woodland areas consisted of young stands of trees, ranging in canopy height from 6 to 10 meters. Some trees within these areas were heavily covered with climbers. In secondary woodlands located near villages and on foothills, more mature trees were documented. The secondary woodland comprised a mixture of both exotic and native plant species. Commonly observed species included *Alangium chinense*, *Ficus hispida*, *Mallotus paniculatus*, *Schefflera heptaphylla*, *Aporosa dioica*, *Rhus succedanea*, *Bauhinia championii*, *Mikania micrantha*, and *Alocasia macrorrhizos*.

4.2.3 **Species of Conservation Importance reported -** The Collared Crow (*Corvus torquatus*) is a relatively rare and localized resident species in Hong Kong. It holds a vulnerable status according to the IUCN Red List (IUCN 2023). This bird species is primarily observed in specific habitats such as rocky and sandy shores, mudflats, gei wais, and fish ponds within Hong Kong. It is infrequently documented in non-coastal areas (Carey *et al.* 2001). The Collared Crow may occasionally gather in areas where scavenging opportunities are available from human activities (*ibid.*).

4.2.4 Based on a previous population assessment conducted by BirdLife International in 2007, it was observed that the population of this species in China has experienced a significant decline over the past few decades (Leader *et al.* 2016). The decline was attributed to notable changes in agricultural practices, including the loss of food sources due to intensified farming methods and the excessive use of pesticides starting in the 1950s. Hong Kong, on the other hand, supported the second largest proportion (20%) of this species' population in China (*ibid.*). In Hong Kong, the Collared Crow is primarily concentrated in two major areas: Deep Bay and Tolo Harbour (Stanton 2017). Sightings of Collared Crow beyond Deep Bay and Tolo Harbour are infrequent, with rarely more than five individuals observed (*ibid.*).

4.2.5 The communal roosting behavior exhibited by corvids is widely recognised. Typically, these birds gather during the early evening hours at specific locations known as pre-roosting sites, which are situated in proximity to their final roosting sites. In Hong Kong, communal roost sites have been identified in two locations: Mai Po Nature Reserve and Shuen Wan (Stanton *et al.* 2014). A study conducted between 2004 and 2013 focused on the roosting behavior

at Mai Po Nature Reserve. The final roosting site was found within dense stands of mangrove trees, likely *Kandelia obovata*, situated outside the immigration fence. The number of birds observed roosting ranged from 31 individuals (in February 2005) to 167 individuals (in July 2013), with higher numbers recorded during the summer months compared to winter.

4.2.6 Shuen Wan is recognised as both a pre-roosting and roosting site for the Collared Crow species. In contrast to the study conducted at Mai Po Nature Reserve, the documentation of roosting bird counts in Shuen Wan primarily relied on anecdotal observations (**Table 4.1**). It appears that the population of Collared Crows are not utilizing the Shuen Wan Landfill located to the south of the Application Site for roosting purposes has been consistent for approximately a decade, as reports regarding the "Shuen Wan Landfill" site predominantly emerged after 2010. Roosting activities were also observed in nearby locations such as Sha Lan (with 77 birds sighted in August 2006) and Yim Tin Tsai (with 18 birds observed in October 2006 and 42 birds in October 2008).

Table 4.1 Counts of Collared Crow at "Shuen Wan" (data source: Hong Kong Bird Report)

Year	Peak Count
1997	36 (Jul), 25(Oct)
1998	28 (Jul), 20 (Sep)
1999	62 (Jul)*
2000	Regularly recorded
2001	17 (May), 19 (Sep)
2002	16 (Oct), 13 (Dec)
2003	Small numbers
2004	Small numbers (< 6 birds)
2005	18 (Nov)
2006	nil
2007	Present
2008	Present
2009	nil
2010	nil
2011	71 (April)*
2012	nil
2013	nil
2014	117 (June)*
2015	94 (June)*

*specified as "Shuen Wan Landfill"

4.2.7 The majority of the local Collared Crow population appears to consist of non-breeding birds that are transient in nature (Carey *et al.* 2001, Leader *et al.* 2016). The breeding population of Collared Crows is primarily concentrated in the Deep Bay area (Carey *et al.* 2001). Anecdotal records suggest that courtship behaviors and nest-building activities of Collared Crows predominantly occur from mid-November to December, with young birds observed in nests during February and

fledglings sighted in late March. Nests are typically concealed within dense woody vegetation, such as fung shui woodland, intertidal mangroves, or plantation woodlands (Stanton 2017).

4.2.8 Scattered coral colonies were reported within Tolo Harbour and Tolo Channel, while one species of hard coral *Oulastrea crispata* was previously recorded on the coastline to the south of the current Application Site B and the adjacent Tai Po Industrial Estate (AECOM 2009). This species is commonly found in Hong Kong waters especially in turbid water.

4.2.9 A total of five seahorses (*Hippocampus kuda*) were documented along the coastlines of Tai Po Industrial Estate (AECOM 2009). *H. kuda* continues to exist in significant numbers within the eastern waters of Hong Kong. This species is classified as "Vulnerable" on the IUCN Red List, reflecting a worldwide decline in its population (IUCN 2023). All Hippocampus species, including *H. kuda*, are listed under Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Consequently, they receive protection under Cap. 586, ensuring conservation measures are in place.

4.2.10 **Pre-roosting and roosting sites of Collared Crow and Black Kite** - As reported in the AEIAR-221/2019, the Shuen Wan Restored Landfill (SWRL), which is one of the main communal roosting sites for Collared Crows in Hong Kong, that has been identified as globally threatened and listed as Vulnerable due to a significant decline in the species' population in China over the past few decades. The study conducted by Stanton et al. (2014) and Stanton (2017) highlighted this fact. The study also found that the rooftops of buildings in Tai Po Sewage Treatment Works (TPSTW) were the primary pre-roosting sites for Collared Crows, as indicated in the Shuen Wan Golf Course (SWGC) EIA report. Additionally, pre-roosting was occasionally observed in northern and southwestern plantations, as well as turfgrass platforms in Temporary Golf Driving Range (TGDR). Within the SWRL plantation, a communal roost ranging from 12 to 100 birds was documented under the SWGC EIA. The survey results from the SWGC EIA revealed that the Collared Crows would change their pre-roost and final roost locations over time.

4.2.11 The Black Kite (*Milvus migrans*) is the most observed raptor species in Hong Kong, frequently found in various habitats, including urban areas (Carey et al. 2001). During winter, its population significantly increases, typically peaking in December and January (ibid.). It is likely that the birds seen in Hong Kong during autumn, winter, and spring include migratory individuals (ibid.). Additionally, as reported in the AEIAR-221/2019, a maximum count of 147 Black Kites roosting was observed within the SWRL plantation, with night roosts scattered throughout the woodland, primarily along the eastern to southern

boundary. However, the number of Black Kites roosting in the SWRL during the peak over-wintering season was relatively low.

4.2.12 For several decades, it has been recognised that the Black Kite exhibits colonial roosting behavior (Hutson 1930). However, in the reviewed literature (Hutson 1930, Humphreys 1960, Bovey 1972, Webb 1972, Melville 1976, Carey 1996), there was no mention of the utilization of pre-roosting sites by Black Kites. Based on survey observations reported in Carey (1996), it was found that Black Kites primarily roosted in Magazine Gap and on Stonecutters Island, which was the case in 1996. Night roosts were also identified in other areas such as Tai O, Ma Wan, and Ma Lam Wat (*ibid.*). In recent years, large numbers of Black Kites have been regularly observed roosting in Magazine Gap, Stonecutters Island, and Yeung Chau in Sai Kung. The tree species used as roosts at Yeung Chau included Hibiscus tiliaceus and Acacia auriculiformis. Only daytime roosting in Shuen Wan was mentioned in the literature (Carey *et al.* 2001). Occasional roosting populations were recorded at Yim Tin Tsai Island near Shuen Wan, with sightings of 23 birds on October 1, 2005, 70 birds on September 18, 2007, and 74-78 birds on February 16, 2008.

4.2.13 Specific surveys to identify the pre-roost and roost locations(s) with the abundance of Collared Crow and Black Kite were conducted twice a month (between August 2020 and January 2021) in the AEIAR-244/2022. Contrary to the findings of SWGC EIA, no proper pre-roost gathering was recorded within the Project Site, though up to 89 Collared Crows have been recorded in the TPSTW were of birds following their usual daytime activities. Pre-roosting sites were located in the adjacent SWRL. Pre-roosting of Collared Crow was recorded at the SWRL; either on the taller trees or on the grassy areas of the TGDR. The highest pre-roost count was of 114 Collared Crows recorded from the higher platform of the TGDR in early October 2020, with all staying at the grassland after sunset. Roosting of Collared Crow was mainly recorded at the eastern plantation of the SWRL. The highest count of roosting birds was 107, recorded in August 2020.

4.2.14 No pre-roosting or roosting behavior was identified within the habitats of the Application Sites of the current Application in the study of AEIAR-221/2019 and AEIAR-244/2022. The nearest pre-roosting site of Collared Crow was identified about 200m to the south of the Application Site B, and the roosting sites of Collared Crow and Black Kite were identified about 400m to the south of the Application Site B, which the Application Site A is located 400m further away from the Application B to the west.

4.3 Ecological Survey Results and Evaluation of the Application Sites and the Study Area

Habitat and vegetation Recorded within Study Area and Application Sites

4.3.1 There were 11 habitats found within Study Area, namely artificial hard shoreline, agricultural land, green urban area, natural rocky shoreline, other urban area, rural plantation, sea, soft shore, watercourse, woody shrubland and woodland (**Figure 4.1**). The sizes of the recorded habitats are summarized in **Table 4.2**.

4.3.2 **Agricultural Land** - Agricultural Land was found within Study Area. This habitat was comprised mainly of landscaping and agricultural species namely, *Archontophoenix alexandrae*, *Carica papaya*, *Hylocereus undatus* and ruderal species such as *Bidens alba* and *Ipomoea cairica*.

4.3.3 **Green Urban Area** - Green Urban Area was found extensive south of Ting Kok Road within Study Area. The habitat consisted of roadside plantation and turfgrass in golf course and had a simple floristic composition. The canopies of the roadside plantation stands were dominated by exotic species generally for landscaping and visual screening purposes such as *Acacia confusa*, *Lagerstroemia speciosa* and *Juniperus chinensis*. The turfgrass was comprised of mainly herb such as *Axonopus compressus* and weedy species such as *Ipomoea cairica* and *Wedelia trilobata*.

4.3.4 **Other Urban Area** - Other Urban Area was found in Study Area and comprised of roads, highways, engineered slopes, villages and housing estates. It was mainly concrete-paved and subject to frequent human and vehicular disturbance. In general, this habitat was characterized by landscape species for visual screening purposes such as *Archontophoenix alexandraem*, *Calliandra haematocephala*, *Schefflera arboricola* and *Terminalia mantaly*, and the domination of disturbance-tolerant and opportunistic herb species prospering in limited microhabitats, namely *Bidens alba* and *Wedelia trilobata*.

4.3.5 **Rural Plantation** - Rural plantation was found along Lo Fai Road and Ting Kok Road within Study Area. Mixed planting composed of both native and exotic tree species was found. *Acacia confusa*, *Casuarina equisetifolia* and *Eucalyptus citriodora* were abundantly planted and constituted the canopy of the plantation stands (12–15m). Other native tree species, including *Mallotus paniculatus*, *Celtis sinensis*, *Schefflera heptaphylla* were also found in the plantation, with their heights generally reaching the midstorey. Regeneration of native species such as *Psychotria asiatica* and *Sapium discolor* was observed in the understorey, possibly through seed dispersal of native species from woodland in the vicinity.

4.3.6 **Woody Shrubland** - Woody shrubland was found on the hillslopes from Lo Fai Road to Casa Marina. The habitat was dominated by shrub and herb species namely *Dicranopteris pedata* and *Polyspora axillaris*. On the hillsides, tree species such as *Macaranga tanarius var. tomentosa* and *Schefflera heptaphylla* formed a semi-shaded

understorey supporting herb species, for example, *Euphorbia hirta* and *Liriope spicata*. The floral species recorded in woody shrubland are mostly native to Hong Kong.

4.3.7 **Woodland** - A patch of woodland was found within Study Area. The canopy was dominated by native light-demanding and bird-dispersed tree species such as *Macaranga tanarius var. tomentosa*, *Schefflera heptaphylla* and *Sterculia lanceolata*. The tree canopies reached 10 to 13 meters. The midstorey and understorey were both recruited with saplings of common native tree and shrub species namely *Bridelia tomentosa*, *Ficus hispida* and *Zanthoxylum avicennae*. The understorey layer was intertwined with common native climbers such as *Gnetum luofuense* and *Tetracera asiatica*, and herb species including *Alocasia macrorrhizos* and *Lygodium japonicum*. The floral species recorded in woody shrubland are mostly native to Hong Kong.

4.3.8 **Watercourse** – Watercourse was found within Study Area. The watercourse was semi-modified with concrete bed and banks at downstream section. Human disturbance such as sewage discharge from nearby villages was observed. This habitat was dominated by opportunisitic species such as *Microstegium ciliatum* and *Wedelia trilobata* at the embankment.

4.3.9 **Vegetation** - A total of 247 plant species were recorded within the Study Area, among which 157 and 89 are known to be native and exotic to Hong Kong respectively and the remaining 1 species is of uncertain origin (**Appendix A**). 3 flora species of conservation importance namely *Ailanthus fordii*, *Aquilaria sinensis* and *Fortunella hindsii* were recorded within the Study Area.

Table 4.2 Recorded sizes of each habitat within the Study Area

Habitat	Study Area (ha)	Length (m)	Site A (ha)	Site B (ha)
Artificial Hard Shoreline	0.12			
Agricultural Land	6.57			
Green Urban Area	33.33			
Natural Rocky Shoreline	0.12			
Other Urban Area	50.24			
Rural Plantation	42.38		0.66	0.57
Sea	18.61			
Soft Shore	0.38			
Watercourse	0.29	704		
Woodland	15.29		0.90	
Woody Shrubland	1.01		0.46	
Total	**168.34**	**704**	**2.03**	**0.57**

4.3.10 1 individual of *Ailanthus fordii* was recorded in woodland within Site A. It is a native tree species considered rare by Corlett *et al*. (2000). It is protected under Cap.96 Forests and Countryside Ordinance and listed as Near threatened in China in "Rare and Precious Plants of Hong Kong" (Hu *et al*. 2003).

4.3.11 2 individuals of *Aquilaria sinensis* were recorded in woodland and woody shrubland within Site A while 3 individuals of *Aquilaria sinensis* were recorded in rural plantation within Site B. It is a native tree species considered common in the lowland forests and fung shui woods of Hong Kong (Corlett *et al*. 2000) and was included in the book "Rare and Precious Plants of Hong Kong" (Hu *et al*. 2003). In South China, it is threatened by illegal felling and over-exploitation and is listed in Appendix II of CITES and protected under Cap. 586 Protection of Endangered Species of Animals and Plants Ordinance in Hong Kong. Moreover, it is included in China Plant Red Data Book (Fu and Chin 1992) and Illustration of Rare & Endangered plant in Guangdong Province (Wu and Hu 1988), and wild individuals are listed in Category II of the List of Wild Plants under State Protection (State Forestry Administration & Ministry of Agriculture 1999). It is also categorized as "Vulnerable" in China Red Data Book (Fu and Chin 1992), the Threatened Species List of China's Higher Plants (Qin *et al*. 2017) and the IUCN Red List (IUCN 2023).

4.3.12 1 individual of *Fortunella hindsii* was recorded in woody shrubland within Site A. It is a native shrub species considered common in shrubland and forest in Hong Kong (Corlett *et al*. 2000). It is listed in Category II of the List of Wild Plants under State Protection (State Forestry Administration & Ministry of Agriculture 1999).

4.3.13 *Casuarina equisetifolia*, *Dimocarpus longan*, *Lagerstroemia speciosa*, *Litchi chinensis*, *Michelia x alba* and *Pterocarpus indicus* are exotic to Hong Kong and not considered of conservation importance, despite

being considered rare/ very rare by Corlett *et al*. (2000), listed as Vulnerable by IUCN (2023), listed as endangered or vulnerable in Threatened Species List of China's Higher Plants, listed as vulnerable in China Plant Red Data Book, listed under Category II in the List of Wild Plants under State Protection (Part 1), listed under Cap. 96 Forests and Countryside Ordinance, and/ or Cap. 586 Protection of Endangered Species of Animals and Plants Ordinance.

4.3.14 *Dalbergia spp.* are listed under Appendix II of CITES and protected under Cap. 586 Protection of Endangered Species of Animals and Plants Ordinance in Hong Kong as species in this genus is facing threat due to the overexploitation for its valuable wood (known as rosewood). In the current study, *Dalbergia benthamii* was recorded. As the recorded Dalbergia are climber which is not relevant to the timber exploitation. In addition, the species are considered 'common' in Hong Kong by Corlett *et al*. (2000). Thus, it is not considered as species of conservation importance in the current Study.

4.3.15 **Application Site A** - Site A is mainly comprised of rural plantation on engineered slope with woody shrubland and woodland on hillsides. A continuous patch of rural plantation was found within Site A along Ting Kok Road and Lo Fai Road. The canopy of rural plantation was dominated by exotic species such as *Acacia spp.*, *Eucalyptus spp.* and *Lophostemon confertus*. The tree canopies reached 10 to 12 meters. Other native tree species, including *Celtis sinensis* and *Ficus microcarpa* were also found in the plantation, with their heights generally reaching the midstorey. Woodland was found further uphill within Site A. The woodland canopy was dominated by native tree species such as *Macaranga tanarius var. tomentosa*, *Sterculia lanceolata* and *Schefflera heptaphylla*. The tree canopies reached 8 to 10 meters. The midstorey and understorey were both recruited with saplings of tree and shrub species namely *Ficus hispida*, *Sarcandra glabra* and *Psychotria asiatica*.

4.3.16 **Application Site B** - Site B is mainly comprised of rural plantation on roadside. The canopy of rural plantation was dominated by exotic species such as *Acacia spp.*, *Dimocarpus longan* as well as native species *Ficus microcarpa*. The tree canopies reached 8 to 12 meters. The understorey was comprised of mainly herb or weedy species such as *Microstegium biaristatum* and *Dicranopteris pedata*.

Fauna Recorded within the Study Area and Application Sites

4.3.17 **Mammal** – 4 species of mammal were recorded within the Study Area. 2 individuals of Eurasian Wild Pig *Sus scrofa* were recorded within the rural plantation of the Application Site A. Eurasian Wild Pig is considered very widely distributed in countryside areas throughout Hong Kong (**Appendix B1**). 3 species of bat were recorded flying within Study Area but outside the Application Sites, including Chinese Noctule *Nyctalus plancyi*, Japanese Pipistrelle *Pipistrellus abramus*

and Least Pipistrelle *Pipistrellus tenuis* (**Appendix B2**). As the bats were recorded flying across multiple habitats, the exact location of the recorded bat species was not summarized in the figure.

4.3.18 **Bird** – 38 species of bird were recorded within the Study Area. The recorded birds within the Study Area are generally considered common and abundant throughout Hong Kong (**Appendix C**). Only 5 species of bird of conservation importance were recorded within the Study Area, i.e. Black-crowned Night Heron *Nycticorax nycticorax*, Little Egret *Egretta garzetta*, Black Kite *Milvus migrans*, Greater Coucal *Centropus sinensis* and Black-throated Laughingthrush *Garrulax chinensis*. None of the recorded bird species of conservation importance was recorded in Site A and Site B.

4.3.19 **Reptile and amphibian** – 5 species of reptile were recorded within the Study Area, including Changeable Lizard *Calotes versicolor*, Chinese Gecko *Gekko chinensis*, Garnot's Gecko *Hemidactylus garnotii*, Brown Forest Skink *Sphenomorphus incognitus* and Indian Forest Skink *Sphenomorphus indicus*. Brown Forest Skink and Indian Forest Skink are considered Local Concerned by Fellowes et al. (2002) (**Appendix D**).

4.3.20 9 species of amphibian were recorded within the Study Area, including but not limited to Asian Common Toad *Duttaphrynus melanostictus*, Spotted Narrow-mouthed Frog *Kalophrynus interlineatus*, Asiatic Painted Frog *Kaloula pulchra*, Ornate Pigmy Frog *Microhyla fissipes*, Paddy Frog *Fejervarya limnocharis*, Chinese Bullfrog *Hoplobatrachus chinensis*, Gunther's Frog *Hylarana guentheri*, Brown Tree Frog *Polypedates megacephalus* and Greenhouse frog *Eleutherodactylus planirostris*. All of them are generally considered widely distributed in Hong Kong. Only Chinese Bullfrog is considered as species of conservation importance. It was considered Potential Regional Concerned; List of Wild Animals under State Priority Conservation: Class II and Red List of China's Vertebrates: Endangered (**Appendix E**).

4.3.21 **Odonate** – 13 species of odonate were recorded within the Study Area, including but not limited to Orange-tailed Midget *Agriocnemis femina*, Orange-tailed Sprite *Ceriagrion auranticum*, Common Blue Skimmer *Orthetrum glaucum*, Marsh Skimmer *Orthetrum luzonicum*, Common Red Skimmer *Orthetrum pruinosum neglectum*, Green Skimmer *Orthetrum sabina sabina*, Wandering Glider *Pantala flavescens*, Variegated Flutterer *Rhyothemis variegata aria*, Indigo Dropwing *Trithemis festiva,* Yellow Featherlegs *Copera marginipes,* Emerald Cascader *Zygonyx iris,* Yellow Featherlegs *Copera marginipes,* Black Threadtail *Prodasineura autumnalis* (**Appendix F**). 1 odonate species of conservation importance was recorded within the Study Area, i.e. Emerald Cascader *Zygonyx iris* recorded in the watercourse within Study Area.

4.3.22 **Firefly** – 1 species of firefly was recorded in the agricultural land within the Study Area but outside the Application Site, i.e. Lunate Window Firefly *Pyrocoelia lunata*. Larva of Lunate Window Firefly was recorded near an irrigation ditch of a farmland about 200m to the northwest of Application Site A during the firefly survey.

4.3.23 **Butterfly** – 27 speices of butterfly were recorded within the Study Area. The species includes but not limited to Formosan Swift *Borbo cinnara*, Banana Skipper *Erionota torus*, Chestnut Bob *Iambrix salsala*, Chinese Dart *Potanthus Confucius*, Lesser Band Dart *Potanthus trachala*, Water Snow Flat *Tagiades litigiosus*, Grass Demon *Udaspes folus*, Pale Grass Blue *Pseudozizeeria maha*, Plum Judy *Abisara echerius*, Common Indian Crow *Euploea core*, Blue-spotted Crow *Euploea midamus*, Angled Castor *Ariadne ariadne*, Common Mapwing *Cyrestis thyodamas*, Great Egg-fly *Hypolimnas bolina*, Common Sailer *Neptis hylas*, Five-dot Sergeant *Parathyma sulpitia*, Large Faun *Faunis eumeus*, Dark Evening Brown *Melanitis phedima*, Dark Brand Bush Brown *Mycalesis mineus*, South China Bush Brown *Mycalesis zonata*, Common Bluebottle *Graphium Sarpedon*, Paris Peacock *Papilio paris*, Common Mormon *Papilio polytes*, Spangle *Papilio protenor*, Common Birdwing *Troides Helena*, Lemon Emigrant *Catopsilia pomona* and Common Grass Yellow *Eurema hecabe*. All recorded butterfly species are considered widely distributed throughout Hong Kong (**Appendix G**). 3 species of butterfly recorded are considered rare/species of conservation importance, i.e. Lesser Band Dart *Potanthus trachala*, Grass Demon *Udaspes folus* and Common Birdwing *Troides Helena*. They were all recorded outside the Application Sites.

4.3.24 **Aquatic Fauna** – 10 species of aquatic community were recorded in the watercourse within the Study Area, including Snakehead murrel *Channa striata*, Mozambique tilapia *Oreochromis mossambicus*, Sharphead sleeper *Eleotris oxycephala*, Chinese Barb *Puntius semifasciolatus*, Fork tongue goby *Glossogobius giuris*, Mosquito fish *Gambusia affinis*, Guppy *Poecilia reticulata*, Backswimmer *Notonectidae* species, Water Striders *Gerridae species* and Sundaic paddler crab *Varuna yui* (**Appendix H**). No aquatic species of conservation importance was recorded within the Study Area.

4.4 Evaluation of Habitats and Species of Conservation Importance

4.4.1 The ecological importance of habitats within the Study Area are evaluated in accordance with the criteria stipulated in Annex 8 of TM-EIAO (**Tables 4.3**).

4.4.2 In accordance with Table 3, Annex 8 of the TM-EIAO, the ecological value of species recorded within the Study Area was assessed in terms of protection status (e.g. fauna protected under WAPO (except

birds), and flora and fauna protected under regional/global legislation/conventions), species distribution (e.g. endemic), and rarity (e.g. rare or restricted).

4.4.3 Flora or fauna species protected by the following laws/regulations, listed under the following conventions and/or endemic to Hong Kong were considered to be species of conservation importance and are shown in **Table 4.4**. However, this excludes exotic weeds, escaped cultivars or captive species, vagrants and introduced species which have lower ecological value. Species which are classified by IUCN as Near Threatened (NT), Least Concern (LC), Data Deficient (DD), or Not Evaluated (NE), and not covered by any other laws/regulations/conventions are not considered of conservation importance in the present EcoIA.

- The International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species;
- China Plant Red Data Book;
- China Species Red List;
- China Red Data Book of Endangered Animals;
- Category I or II protected species in mainland China;
- Threatened Species List of China's Higher Plants (Qin et al. 2017);
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);
- Forestry Regulations (Cap. 96A) which are subsidiary legislation of the Forests and Countryside Ordinance (Cap. 96);
- Wild Animals Protection Ordinance (Cap. 170) (except birds as all wild birds are protected under the ordinance but their conservation importance is not equal);
- Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586);
- PRC Wild Animal Protection Law;
- Plant species considered 'Rare' or 'Very Rare' listed by Corlett et al. (2000) or Yip et al. (2010) where applicable; and
- Fauna species considered of concern in Fellowes et al. (2002).

Table 4.3 Evaluation of the Habitats of the Study Area and Application Sites

Habitats/Application Sites	Artificial Hard Shoreline	Agricultural Land	Green Urban Area	Natural Rocky Shoreline	Other Urban Area	Rural Plantation	Sea	Soft Shore	Watercourse	Woodland	Woody Shrubland	Application Site A	Application Site B
Naturalness	Man-made	Man-made	Man-made	Natural	Man-made	Man-made with natural succession	Natural	Natural	Semi-natural	Semi-natural	Semi-natural	Man-made with semi-natural habitat	Man-made
Size (ha)	0.12	6.57	34.8	0.12	50.24	42.38	18.61	0.38	0.29	15.29	1.00	2.03 0.66 ha of rural plantation, 0.90 ha of woodland, 0.46 ha of woody shrubland	0.57
Diversity	Low	Low	Low	Low for terrestrial fauna	Low	Low to moderate	Low for terrestrial fauna	Low for terrestrial fauna	Low	Low	Low	Low to medium for flora; Low for fauna	Low
Rarity	Nil	Chinese Bullfrog, Black-throated Laughingthrush, Greater Coucal, Grass Demon, Lesser Band Dart, Common Birdwing	Black Kite	Nil	Black Kite	Indian Forest Skink	Nil	Nil	Black-crowned Night Heron, Brown Forest Skink, Little Egret, Emerald Cascader	*Ailanthus fordii*, *Aquilaria sinensis*; Black Kite	*Fortunella hindsii*	*Ailanthus fordii*, *Aquilaria sinensis* and *Fortunella hindsii*; Indian Forest Skink	*Aquilaria sinensis*
Re-creatability	Readily re-created	Readily re-created	Readily re-created	Hard to recreate	Readily re-created	Readily re-created, take time for succession	Difficult to recreate	Hard to recreate	Natural sections are difficult to recreate	Readily re-created, take time for succession	Readily re-created, take time for succession	Readily re-created, take time for succession for the woodland	Readily re-created
Fragmentation	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Patches of woodland are fragmented	Nil	Nil	Nil

Habitats/Application Sites	Artificial Hard Shoreline	Agricultural Land	Green Urban Area	Natural Rocky Shoreline	Other Urban Area	Rural Plantation	Sea	Soft Shore	Watercourse	Woodland	Woody Shrubland	Application Site A	Application Site B
Ecological Linkage	No	No	No	Marine water	No	Ecological linked to adjacent woodland	Other marine water	Marine water	Connected to Tolo Harbour	Connected to woody shrubland and plantation	Connected to woodland	Connected to woodland	Connected to woodland
Potential Value	Low	Low	Limited	Moderate	Limited	Low	Medium	Medium	Low to medium	Low to medium	Low	Low	Low
Nursery/breeding ground	Nil	Nil	Nil	Nursery grounds for intertidal communities	Nil	Nil	Nursery grounds for fishes and invertebrates	Nursery grounds for intertidal communities	Nil	Nil	Nil	Nil	Nil
Age	N/A	N/A	TGDR since 1999; Sheun Wan Landfill restored since 1997	N/A	Since 1979	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Abundance/ Richeness of wildlife	Low	Low	Low	Low for fauna and flora	Very Low	Low	Low for flora and terrestrial fauna	Low for flora and terrestrial fauna	Low	Low	Low	Low to medium for flora; Very Low for fauna	Very Low
Overall Ecological Value	Low to medium	Low	Low; Medium for pre-roosting and roosting sites	Low to medium	Very Low; Medium for pre-roosting and roosting sites	Low to medium	Low	Low	Low	Low to medium	Low	Low	Low

Table 4.4 Evaluation of the Species of Conservation Importance Recorded within the Study Area

Common Name[1]	Scientific Name[1]	Rarity[1]	Distribution in Hong Kong[1]	Conservation Status[1 - 16]	Location
Flora					
Ailanthus	*Ailanthus fordii*	Rare	-	Rare and Precious Plants of Hong Kong (Near threatened in China) Cap.96	Site A: Woodland
Incense Tree	*Aquilaria sinensis*	Common	-	IUCN Red List (Vulnerable) CITES Appendix II Threatened Species List of China's Higher Plants (Vulnerable, endemic species) China Plant Red Data Book (Vulnerable) Illustrations of Rare & endangered plant in Guangdong Province Rare and Precious Plants of Hong Kong (Near threatened in China) Cap. 586 Wild plant under State protection (category II)	Site A: Woodland, Site B: Rural Plantation
Mountain Kumquat	*Fortunella hindsii*	Common	-	Wild plant under State protection (category II)	Site A: Woody Shrubland
Mammal					
Chinese Noctule	*Nyctalus plancyi*	-	Fairly widely distributed in countryside areas throughout Hong Kong.	Fellowes et al. (2002): PRC; Cap. 170	Within Study Area but outside Application Sites
Japanese Pipistrelle	*Pipistrellus abramus*	-	Widely distributed throughout Hong Kong.	Cap. 170	Within Study Area but outside Application Sites
Least Pipistrelle	*Pipistrellus tenuis*	-	Ten-something records found in Nam Chung, Sheung Wo Hang, Lin Ma Hang, Plover Cove Country Park, Yuen Long, Shek Pik, Deep Water Bay, Ho Pui and Ho Chung	Cap. 170	Within Study Area but outside Application Sites
Bird					
Black-crowned Night Heron	*Nycticorax nycticorax*	Common resident and migrant	Widely distributed in Hong Kong	Fellowes et al. (2002): Local Concern	Study Area: Watercourse
Little Egret	*Egretta garzetta*	Common resident, migrant and winter visitor.	Widely distributed in coastal area throughout Hong Kong.	Fellowes et al. (2002): PRC	Study Area: Watercourse
Black Kite	*Milvus migrans*	Common resident and winter visitor	Widely distributed in Hong Kong	Fellowes et al. (2002): (RC); Cap. 586; List of Wild Animals under State Priority Conservation: Class II; CITES: Appendix II	Study Area: Green Urban Area
Greater Coucal	*Centropus sinensis*	Common resident.	Widely distributed in Hong Kong.	List of Wild Animals under State Priority Conservation: Class II	Study Area: Agricultural Land
Black-throated Laughingthrush	*Garrulax chinensis*	Common resident.	Widely distributed in woodland and shrubland throughout Hong Kong.	List of Wild Animals under State Priority Conservation: Class II	Study Area: Agricultural Land
Reptile					
Brown Forest Skink	*Sphenomorphus incognitus*	-	Distributed in streams in the New Territories	Fellowes et al. (2002): Local Concern	Study Area: Watercourse

Common Name[1]	Scientific Name[1]	Rarity[1]	Distribution in Hong Kong[1]	Conservation Status[1 - 16]	Location
Indian Forest Skink	*Sphenomorphus indicus*	-	Distributed in woodlands in eastern and central New Territories	Fellowes et al. (2002): Local Concern	Application Site A: rural plantation; Study Area: rural plantation
Amphibian					
Chinese Bullfrog	*Hoplobatrachus chinensis*	-	Widely distributed in Lantau Island and New Territories	Fellowes et al. (2002): Potential Reginal Concern: ; List of Wild Animals under State Priority Conservation: Class II; Red List of China's Vertebrates: Endangered	Study Area: agricultural land
Butterfly					
Lesser Band Dart	*Potanthus trachala*	Rare.	Widely distributed in grassland throughout Hong Kong	-	Study Area: agricultural land
Grass Demon	*Udaspes folus*	Rare.	Widely distributed throughout Hong Kong.	-	Study Area: agricultural land
Common Birdwing	*Troides Helena*	Uncommon.	Widely distributed throughout Hong Kong	Cap. 170; Cap. 586; CITES: Appendix II	Study Area: Rural Plantation, Agricultural Land
Odonate					
Emerald Cascader	*Zygonyx iris*	Abundant.	Widely distributed in moderately clean, rapidly flowing forested streams throughout Hong Kong.	Fellowes et al. (2002): PGC	Study Area: Watercourse

Notes:

1. AFCD (2024). Hong Kong Biodiversity Information Hub
2. Corlett et al. (2000). Hong Kong vascular plants: distribution and status.
3. International Union of Conservation for Nature. (2023). The IUCN Red List of Threatened Species. Version 2022-2.
4. Convention on International Trade in Endangered Species of Wild Flora and Fauna (2022). Appendices I, II and III.
5. Qin et al. (2017). Threatened Species List of China's Higher Plants.
6. Fu & Chin (1992). China Plant Red Data Book – Rare and Endangered Plants.
7. Wu et al. (1988). Illustration of Rare & endangered plant in Guangdong Province.
8. Hu et al. (2003). Rare and Precious Plants of Hong Kong.
9. Cap. 586 Protection of Endangered Species of Animals and Plants Ordinance.
10. State Forestry Administration & Ministry of Agriculture. (1999). List of Wild Plants under State Protection (Part 1).
11. Cap. 96A Forests and Countryside Ordinance.
12. Fellowes et al. (2002). Wild animals to watch: Terrestrial and freshwater fauna of conservation concern in Hong Kong
13. Cap. 170 Wild Animals Protection Ordinance
14. Convention on International Trade in Endangered Species of Wild Flora and Fauna (2022). Appendices I, II and III
15. National Forestry and Grassland Administration and the Ministry of Agricultural and Rural Affairs. (2023). List of Wild Animals under State Priority Conservation
16. Jiang et al. (2016). Red list of China’s vertebrates.

5. IMPACT IDENTIFICATION AND PREDICTION

5.1 General

5.1.1 The proposed development has the following key project elements.

Application Site A:

- Residential towers;
- Covered walkway;
- Retaining wall;
- Space for parking and loading/unloading; and
- Roads.

Application Site B:

- Residential towers
- Retaining wall;

5.1.2 The potential impacts associated with the proposed development include:

- Direct habitat loss, either permanent or temporary, which may occur on-site and/or off-site, due to site formation and construction works within the Application Site or in off-site works areas;
- Direct impacts to flora and fauna species, in particular those of conservation importance, arising from mortality;
- Disturbance impacts to surrounding habitats and fauna during construction;
- Water quality impact due to construction site runoff;
- Disturbance impacts to surrounding fauna, habitats and recognised sites of conservation importance during operation;
- Potential bird collision or road-kill; and
- Night-time light impacts.

5.2 Impact Evaluation Criteria

5.2.1 The significance of ecological impacts has been evaluated based primarily on the criteria set out in Table 1 of Annex 8 of the TM-EIAO:

- habitat quality;
- species affected;
- size/abundance of habitats/species affected;
- duration of impacts;
- reversibility of impacts; and
- magnitude of environmental changes.

5.3 Construction phase

Direct Impact – Construction Phase Habitat Loss

5.3.1 Within the Application Site A, direct impact to habitats of the woodland, woody shrubland of and rural plantation is anticipated. The size of the habitats that will be directly impacted by the development are

summarized in **Table 5.1**. Within the Application Site B, direct impact to habitat of rural plantation is anticipated. The woodland loss within Site A is about 0.90 ha. The potential ecological impact of the woodland loss is considered **Minor to Moderate** if unmitigated. Nevertheless, there shall be planting of whip tree and plant species with ecological enhancement to mitigate the habitat loss. The measures to mitigate the impacts are discussed in section **6.4.1**. The detail of the planting of whip tree and plants shall be discussed in the Landscape Impact Assessment. The overall ecological value of both Application Sites are low. As the rural plantation within the Application Site is mainly the landscape plantation with low diversity of plantation, supporting low diversity of wildlife. Limited abundance and diversity of wildlife could be observed within the habitat within the Application Site. Due to the low overall ecological value, the overall potential ecological impact by permanent habitat loss of the Application Sites are ranked as **Minor**.

Table 5.1 Habitat Loss by the Proposed Development within Site A and Site B

Habitat	Site A (ha)	Site B (ha)
Rural plantation	0.66	0.57
Woodland	0.90	-
Woody Shrubland	0.46	-
Total	**2.03**	**0.57**

Fragmentation (habitats)

5.3.2 Fragmentation is the discontinuities in habitat that render it lowered attractiveness to flora or fauna or isolate populations of a species, potentially leading to reduced viability of a population. This is most easily seen in infrastructural links, where roads and rail lines break up habitat into smaller units, but also arises from disturbance impacts, where organisms avoid certain areas due to secondary impacts from nearby development. Where these prevent mobility of organisms, fragmentation has occurred.

5.3.3 Fragmentation of habitats may occur during construction phase, resulting in the loss of ecological linkages between patches of habitats or habitats assemblages, especially in the cases where construction of the development cuts through one habitat or between two areas of similar habitat with significant migration of fauna. With regard to the current Application, however, there is little potential for habitat fragmentation. Currently the Application Site A is composed of rural plantation, woody shrubland and woodland with overall low ecological value and Application Site B is composed of rural plantation of low ecological value with no significant ecological linkage identified. The habitats outside the Application Site are also mainly extensive green urban area and rural plantation, and is also bounded by man-made other urban area. There is unlikely wildlife would need to go through the Application Site for accessing their preferred habitats.

5.3.4 Hence, the potential impact due to habitat fragmentation is not anticipated.

Indirect Impacts – Construction Noise

5.3.5 High level of disturbance could cause deterioration of habitat quality and decrease of wildlife usage. Sensitive wildlife e.g., birds might move away to areas which are less disturbed and within their noise tolerances or remain in the affected area if they are habituated to the disturbance, and subsequently reduce wildlife density in the wetland habitats with higher value in the vicinity. While the sensitivity of waterbirds to the same level of noise disturbance varies among different species, residents are typically more tolerant of disturbance than migrant birds (Klein *et al*. 1995). As such, the noise disturbance from construction activities of the proposed development on waterbirds that are present all year round (e.g. resident ardeids) are expected to be less significant than the disturbance impacts on migratory/overwintering waterbirds given the generally higher tolerance of residents to disturbance.

5.3.6 For many construction projects, waterbirds were found to be especially prone to 1) the intrusion of human activities into the wetland habitats and 2) high level of irregular construction noise. In general, construction noise which suddenly increases to high level is relatively more disturbing to waterbirds than constant background noise level. While intrusion of workers into the nearby wetland outside the Application Site is not expected, the piling works for the proposed development are expected to pose more disturbance comparing with other quieter construction procedures, and potentially cause the waterbirds to avoid using the habitats near the works area.

5.3.7 The habitats that are potentially the roosting and foraging habitats for waterbird are identified in the watercourse and to the east of the Application Site A. However, due to the separation distance of the watercourse and the Application Sites and the existing disturbance in the proximity of the watercourse. Potential disturbance impacts due to construction works with higher noise disturbance (such as piling) to these habitats are considered to be **Minor** if unmitigated.

5.3.8 Habitats potentially impacted by the proposed development involve open habitats which include only the other urban area, green urban area, agricultural land and immediately to the boundary of the Application Site. However, these habitats are considered of **Very Low to Low** overall ecological values and with limited potential value.

5.3.9 Isolated from the Application Site by other habitats and physical barriers, such as the rural plantation in the green urban area, the impacts from construction works with higher noise disturbance (such as piling) is considered **Insignificant** for the intertidal and aquatic

communities recorded as they are generally not considered as noise sensitive.

Indirect Impacts – Dust

5.3.10 Dust emission is generally expected during construction phase and might temporarily reduce the abundance and distribution of fauna in habitats adjacent to the works area.

5.3.11 Unmitigated construction works create significant levels of dust under certain weather conditions due to the construction vehicles and the phenomenon of wind-blown dust from works areas. Dust would be deposited on nearby habitats, which can cause vegetation damage and, as a secondary effect, have an impact on fauna such as insects and birds. Impacts from dust deposition of these types will, however, be temporary and reversible, and standard construction best practices as mitigation measures can be implemented to negate harmful impacts. Dust deposition impacts arising from the Proposed Development, therefore, considered **Insignificant**.

Indirect Impacts – Light Glare

5.3.12 If the construction site has strong lightings or flood light, there may be light glare impacts to nocturnal wildlife in the vicinity during any night time construction. However, no night time construction works are expected for the Application Site. In addition, the surrounding habitats (other urban area) was installed with urban lighting including street light posts and security lighting of the village. Species habituated the area in the vicinity of the Application Site could be considered well adapted to the urban lighting. The construction site would also be expected to only have limited lighting for security purpose. For the firefly species recorded within the Study Area, it was recorded near an irrigation ditch of a farmland about 200m to the northwest of Application Site A, separated from the Lo Fai Road and village houses with existing lighting. The impacts due to increased night-time light during construction phase will therefore be **Insignificant**. However, as a precautionary measure, implementation of good site practices would still be recommended to minimise the impacts of the artificial lighting/glare as much as possible such as limiting the angle of the security lighting.

Indirect Impacts – Water Quality and Site Run-off

5.3.13 During construction phase, surface site run-off containing sediments, lubricants, chemicals or other pollutants might be generated, and may lead to indirect impact on water quality in the surrounding aquatic habitats. Construction runoff may carry sediments and lead to temporary increases in local suspended solids for a short period of time and is potentially destructive to aquatic and intertidal communities, which include prey species of waterbirds.

5.3.14 The risk would be higher during periods of heavy rain, and accelerated by any inappropriate stock piling of construction materials, and incorrect handling of construction chemicals. The factors however could be controlled or prevented by standard site management and practices.

5.3.15 Because of the separation of the watercourses and the Application Sites, it is very unlikely that the run-off would affect the aquatic and intertidal habitats. As a precautionary approach, the potential impact is ranked precautionary as **Minor** if unmitigated. However, as a precautionary measure, potential impact due to site run-off will be minimized and controlled by implementation of good site practice.

Impacts on species of conservation importance

Species of conservation importance

5.3.16 3 floral species of conservation importance were recorded within the Study Area, i.e. *Ailanthus fordii*, *Aquilaria sinensis* and *Fortunella hindsii*, of which 1 no. of *Ailanthus fordii* and 2 nos. of *Aquilaria sinensis* were recorded within the woodland and 1 no. of *Fortunella hindsii* was recorded in woody shrubland of Site A. 3 nos. of *Aquilaria sinensis* were recorded in the rural plantation of Site B. There were only scarce records of floral species of conservation importance within Site A and Site B. 2 nos. of *Aquilaria sinensis* within Site A and 1 no. of *Aquilaria sinensis* within Site B are considered of "low suitability for transplanting" and are recommended to be fell due to their conditions according to the Tree Preservation and Removal Proposal. The direct ecological impact to these species are considered **Minor to Moderate** if unmitigated. The measures to mitigate the impacts are discussed in section **6.4.2**.

5.3.17 15 faunal species of conservation importance were recorded within the Study Area, i.e., Chinese Noctule, Japanese Pipistrelle, Least Pipistrelle, Black-crowned Night Heron, Little Egret, Black Kite, Greater Coucal, Brown Forest Skink, Brown Forest Skink, Indian Forest Skink, Chinese Bullfrog, Lesser Band Dart, Grass Demon, Common Birdwing and Emerald Cascader. These species of conservation importance however were of very low abundance. Among the 15 faunal species of conservation importance, only 1 individual of Indian Forest Skink was recorded within the Application Site A. In addition, Indian Forest Skink is a highly mobile reptile species, with abundant readily available habitats (e.g. woodland and woody shrubland) outside Application Site. Thus, the direct impact to these species recorded within the Application Site is considered **Minor** overall.

5.4 Operational Phase

Operational Phase Permanent Habitat loss

5.4.1 Operational phase direct impacts would be the areas permanently occupied by the project elements during operation, and in this case would be the area occupied by the residential portion (i.e. the same as the permanent habitat loss during the construction phase). No additional habitat loss will occur during operational phase. Among the habitats being lost in construction phase, the habitats were of relatively lower ecological values. The potential impacts to the loss of these habitats are considered **Insignificant**.

Indirect Impacts – Human Disturbance

5.4.2 During the operational phase, there may be indirect disturbance impacts to wildlife in the surrounding habitats due to an increase in human activity from residents inside the Application Sites. The proposed development is however located in an area currently with high disturbance, and as such the surroundings have already been inhabited by species tolerant of human disturbance. Moreover, human activities will mainly be indoors and noise from residential uses will be screened by the landscape area within the Application Sites, and also the surrounding plantation and buildings. The latest design of the development would not have any dedicated paths/roads to allow the residents accessing to the nearby sensitive habitats directly. Also, residential development by nature has much lower disturbance impacts than other undesired uses including the factories and the roads. The indirect ecological impacts due to human disturbance is considered **Insignificant** during operational phase.

Indirect Impacts – Water Quality

5.4.3 There could be potential indirect impacts to the water quality of the surrounding waterbodies from surface run-off and pollution events from the development and their associated infrastructure. This nonpoint pollution, such as stormwater washed off from areas of hardstanding, roads and landscape area may have various impacts to the local aquatic environment. Magnitude of impacts would be dependent upon the pollution type and quantity of pollutant. Increased stormwater runoff may also lead to increased siltation if there are areas with bare soils.

5.4.4 The proposed development however is a residential development and pollutants on road surface would be very limited, and significant bare grounds will be unlikely. The built-in structures of the drain system within the Application Sites could also help isolate and collect sediment and pollutants. Point pollution would not be an issue for the proposed development as the sewerage will collect all domestic effluent and organic load. It is anticipated that any impacts of water quality will be **Insignificant**.

Indirect Impacts – Light Glare

5.4.5 The future buildings will have limited external lightings for security purposes. Strong external lightings such as flood light is not expected

from the residential buildings. There are existing lightings from Ting Kok Road to the south of the Application Sites, the villages nearby and other urban area outside the Application Site. Hence, the fauna habituated in the proximity are already exposed to the lighting. As there is no light sensitive fauna recorded in the proximity (e.g. firefly or nocturnal fauna), the plantation nearby has buffered the residential portion from the habitats outside the Application Sites. For the firefly species recorded within the Study Area, it was recorded near an irrigation ditch of a farmland about 200m to the northwest of Application Site A, separated from the Lo Fai Road and village houses with existing lighting. The potential of the fauna being influenced by lighting is considered **minor** during the operational phase.

Indirect Impacts – Bird Collision

5.4.6 Bird collision risk would be more prominent when the building consists of extensive reflective glass façade such that the birds flying nearby are confused by the reflected image inside the glass which is normally the image of the sky and/or nearby environment. Considering that the current residential development would not have extensive glass façade, the building design and lack of identified flight lines across the residential portion, and the potential bird collision impact is considered **minor**.

Impacts on species of conservation importance

Species of conservation importance

5.4.7 No additional ecological impact is expected further to the evaluation as in construction phase. Thus the potential ecological impacts are considered **Insignificant**.

6. MITIGATION OF ECOLOGICAL IMPACTS

6.1 General

6.1.1 According to the principles in the TM-EIAO Annex 16 and EIAO Guidance Note 3/2010, ecological impacts on important habitats and the associated wildlife caused by the proposed development should be avoided, minimized and mitigated where practicable.

6.1.2 The potential impacts arising from the construction and operation of the proposed development have been assessed. Since most of the potential ecological impacts are of minor or insignificant levels, specific ecological mitigation measures is not required for most impacts.

6.2 Avoidance

6.2.1 The Application Sites are located beyond all the areas of conservation importance, including the SSSIs in Tai Po District. The Application also has avoided habitats of higher ecological values, or natural habitats. Only man-made / semi-natural habitats of **Low** ecological

value, including rural plantation, woody shrubland and woodland will be affected.

6.3 Minimization

Habitat Loss

6.3.1 Impacts from the direct impact of the loss of woodland (0.90 ha) within Site A is considered **Minor to Moderate** if unmitigated. Nevertheless, the layout of the development has minimized the impacts on the woodland within site, of which the majority of the habitats directly impacted are the rural plantation and the woody shrubland (1.12 ha in total) within site.

Construction Noise

6.3.2 Impacts from piling on other habitats are ranked as **Minor**. No specific mitigation measure is required. Only standard measures for site runoff and general human disturbances would be required. The measures are discussed in the following sections.

Site Hoarding and Good Site Practices

6.3.3 Site hoarding would be erected along the construction site boundary. Together with general good site practices which would be undertaken during the construction phase, potential disturbance to the wildlife inhabiting nearby areas could be minimized.

6.3.4 To minimise the contamination of wastewater discharge, accidental chemical spillage and construction site run-off, the below general good practices should be adopted:

- The good site practices outlined in ProPECC PN 1/94 “Construction Site Drainage” should be followed to minimize surface runoff;
- Surface run-off from construction sites should be discharged into storm drains via adequately designed sand / silt removal facilities such as sand traps, silt traps and sedimentation basins;
- Open stockpiles of construction materials (e.g. aggregates, sand and fill material) on sites should be covered with tarpaulin or similar fabric during rainstorms;
- Good construction and site management practices should be observed to ensure that litter, fuels and solvents do no enter the storm water drains;
- Chemical toilets should be provided within the construction site and properly maintained. All effluent discharged from the construction site should comply with the standards stipulated in the “Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters” (TM-DSS)

6.4 Mitigation

Floral species of conservation importance

6.4.1 The ecological impacts on the recorded floral species of conservation importance (i.e. sapling of *Ailanthus fordii*, sapling of *Aquilaria sinensis* and *Fortunella hindsii*) within Sites should be mitigated by transplantation to suitable habitats prior to any construction work as far as feasible. The potential ecological impacts of such species could be fully mitigated to acceptable level.

Planting of whip tree and plant within Sites

6.4.2 The loss of the woodland shall be mitigated by planting of whip trees and plant species within Site A and Site B. The space available for the planting is maximized under the latest layout plan to include the whip tree planting area, landscape planting area and the open space in the proximity of Site A and Site B. The planting of native species, as the provision of ecological enhancement and function, is recommended in the planting area where feasible. The details are provided in Landscape and Visual Impact Assessment. With the implementation of the planting of whip trees and plants in the Sites, the potential ecological impacts of woodland loss and the direct impact to the floral species of conservation importance could be fully mitigated.

Good Practice of Night-time Light

6.4.3 Although mitigation measures would not be required for the potential night-time light impact, it is recommended to avoid orientating any external flood light outside the Application Site during both construction and operational phases to minimize any potential disturbance.

6.4.4 A summary of the impacts in construction and operational phases, with sources, receivers, nature, significance and mitigation required, are provided in **Table 6.1**.

Table 6.1 Summary of Potential Ecological Impacts in Construction Phase and Operation Phase

Impact	Sources	Receivers	Nature of impacts						Significance of ecological impact	Mitigation required
			Habitat quality	Species affected	Size / abundance	Duration	Reversibility	Magnitude		
Construction Phase										
Habitat loss	Construction works of the proposed development	Application Site A: Woodland, woody shrubland and rural plantation; Application Site B: Rural plantation	Low in general	Low abundance and diversity of wildlife in general	0.90 ha of woodland; Low abundance of wildlife	Construction Phase	Not reversible	Low	Minor to moderate for the loss of woodland; Minor for woody shrubland and rural plantation	Planting of whip trees and plant with majority of native species No mitigation is required for other habitats
Fragmentation (habitats)	The proposed development	Adjacent habitats	Low ecological value	Vary	Vary	Construction Phase	Not reversible	Very Low	Negligible for the habitat fragmentation	No mitigation required
Construction noise	Piling Construction works	Sensitive habitats near the works area	Vary with habitat types	Mainly waterbirds and the fauna habituated	Vary	Temporary	Reversible	Minor	Minor	No mitigation required, standard construction best practices as precautionary measures
Dust	Construction works	Sensitive habitats near the works area	Vary with habitat types	Fauna in habitats adjacent to the works area	Vary	Temporary	Reversible	Low	Insignificant	No mitigation required, standard construction best practices
Light Glare	Security lighting of the works area	Light sensitive species or habitats	Vary	No light sensitive species reported	Vary	Temporary	Reversible	Insignificant	Insignificant	No mitigation required, precaution on lighting angle
Water quality and site run-off	Construction works	Aquatic or wetland habitats	Vary	Aquatic fauna and wetland dependent species	Vary	Temporary	Reversible	Minor	Minor	No mitigation required, follow precautionary water quality mitigation measures
Species of conservation importance	Construction works	Recorded floral and faunal species of conservation importance	N/A	Recorded species of conservation importance	Vary	Temporary	Reversible	Minor	Minor to moderate for flora; Minor for fauna	Transplantation for floral species of conservation importance within Sites as far as feasible (i.e. sapling of *Ailanthus fordii*, sapling

Impact	Sources	Receivers	Nature of impacts						Significance of ecological impact	Mitigation required
			Habitat quality	Species affected	Size / abundance	Duration	Reversibility	Magnitude		
										of *Aquilaria sinensis* and *Fortunella hindsii*) Planting of whip trees and plant with majority of native species to provide ecological function No mitigation required for fauna, follow precautionary standard construction best practices
Operational Phase										
Permanent habitat loss	Proposed senior residential development area	Application Site A: Woodland, woody shrubland and rural plantation; Application Site B: Rural plantation	Low in general	Low abundance and diversity of wildlife in general	Low abundance of wildlife	Permanent	Not reversible	Low	Insignificant	No mitigation is required
Human disturbance	The proposed development	Sensitive habitats near the residential area	Vary with habitat types	Terrestrial fauna including those species of conservation importance	Vary	Transient	Reversible	Low	Minor	No mitigation is required
Water quality	Runoff from the proposed development	Wetland habitats	Vary	Aquatic fauna and intertidal species	Vary	Transient	Reversible	Insignificant	Insignificant	No mitigation is required
Light Glare	Buildings of the proposed development	Light sensitive species or habitats	Vary	No light sensitive species reported	Vary	Permanent	Reversible	Insignificant	Minor	No mitigation is required

Impact	Sources	Receivers	Nature of impacts						Significance of ecological impact	Mitigation required
			Habitat quality	Species affected	Size / abundance	Duration	Reversibility	Magnitude		
Bird collision	The proposed development	N/A	N/A	Birds	Vary	Permanent	Not reversible	Low	Minor	No mitigation is required
Impacts on Species of conservation importance	Operational disturbance of the proposed development	Recorded floral and faunal species of conservation importance	N/A	Recorded faunal species of conservation importance	Vary	Temporary	Reversible	Minor	Insignificant	No mitigation is required

7. CONCLUSIONS

7.1.1 Information on the ecological baseline conditions of the Application Sites was collected through literature review and the 6-month ecological surveys, and they were integrated into the present Ecological Impact Assessment. All Application Sites were not identified with any recognised site of conservation importance or habitat of conservation interest and are considered of **Low** overall ecological value.

7.1.2 No observation of pre-roosting or roosting behavior of Collared Crow and Black Kite was recorded in Site A and Site B during the ecological surveys. Site A and Site B were also not identified as pre-roosting or roosting sites for Collared Crow and Black Kite by EIA studies in the proximity.

7.1.3 With the implementation of planting of whip tree and plants of a majority of native species, and transplantation of floral species of conservation importance within Sites, the potential ecological impacts due to the proposed development could be fully mitigated to acceptable level. The ecological surveys also shows that the Sites are of records of **Low** abundance of wildlife and **Low** overall ecological values. The overall potential ecological impacts to the Application Sites by the proposed development are considered **Insignificant**.

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Figures

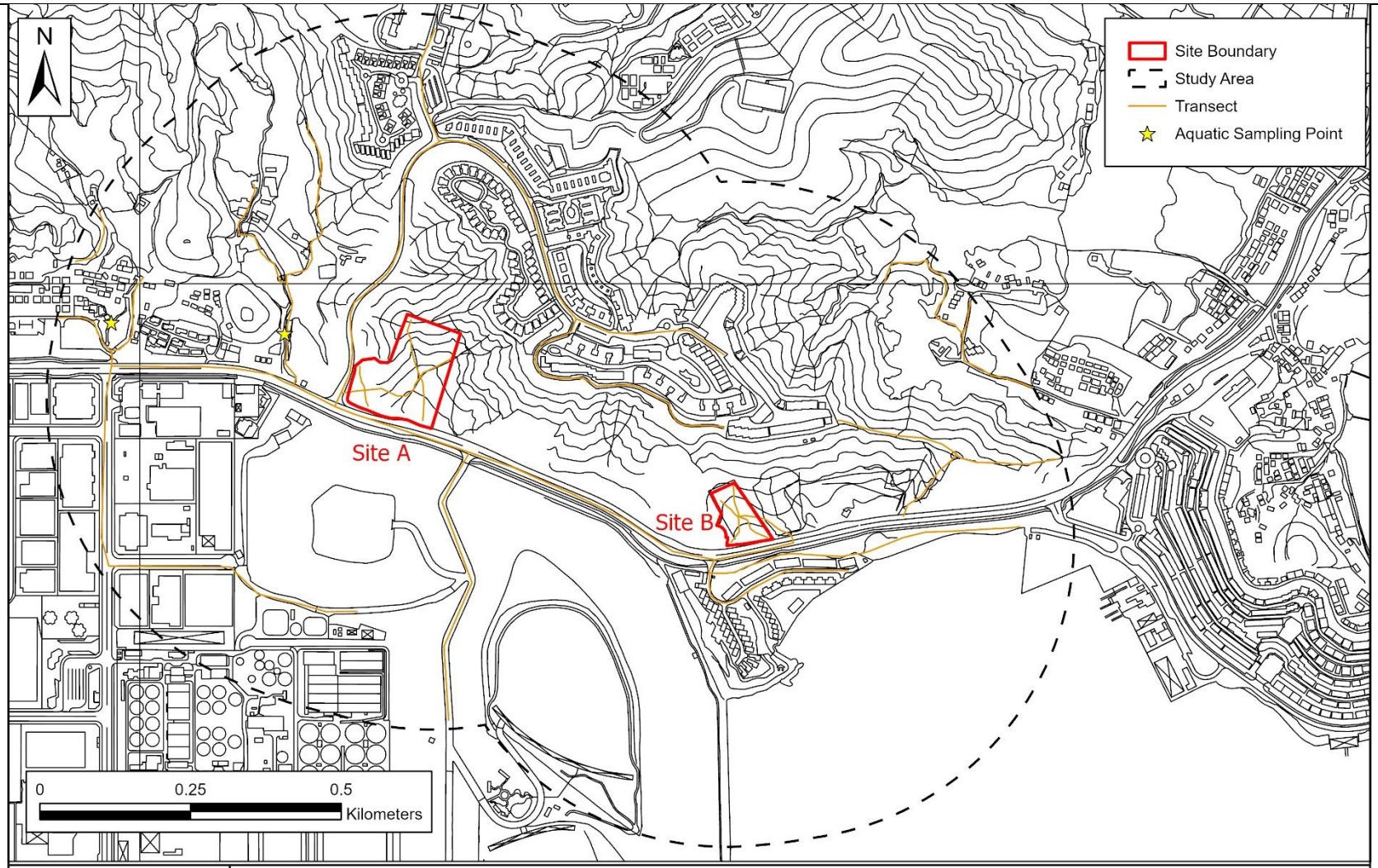

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Figure 3.1 The Application, 500m Study Area, Transect and Aquatic Sampling Point

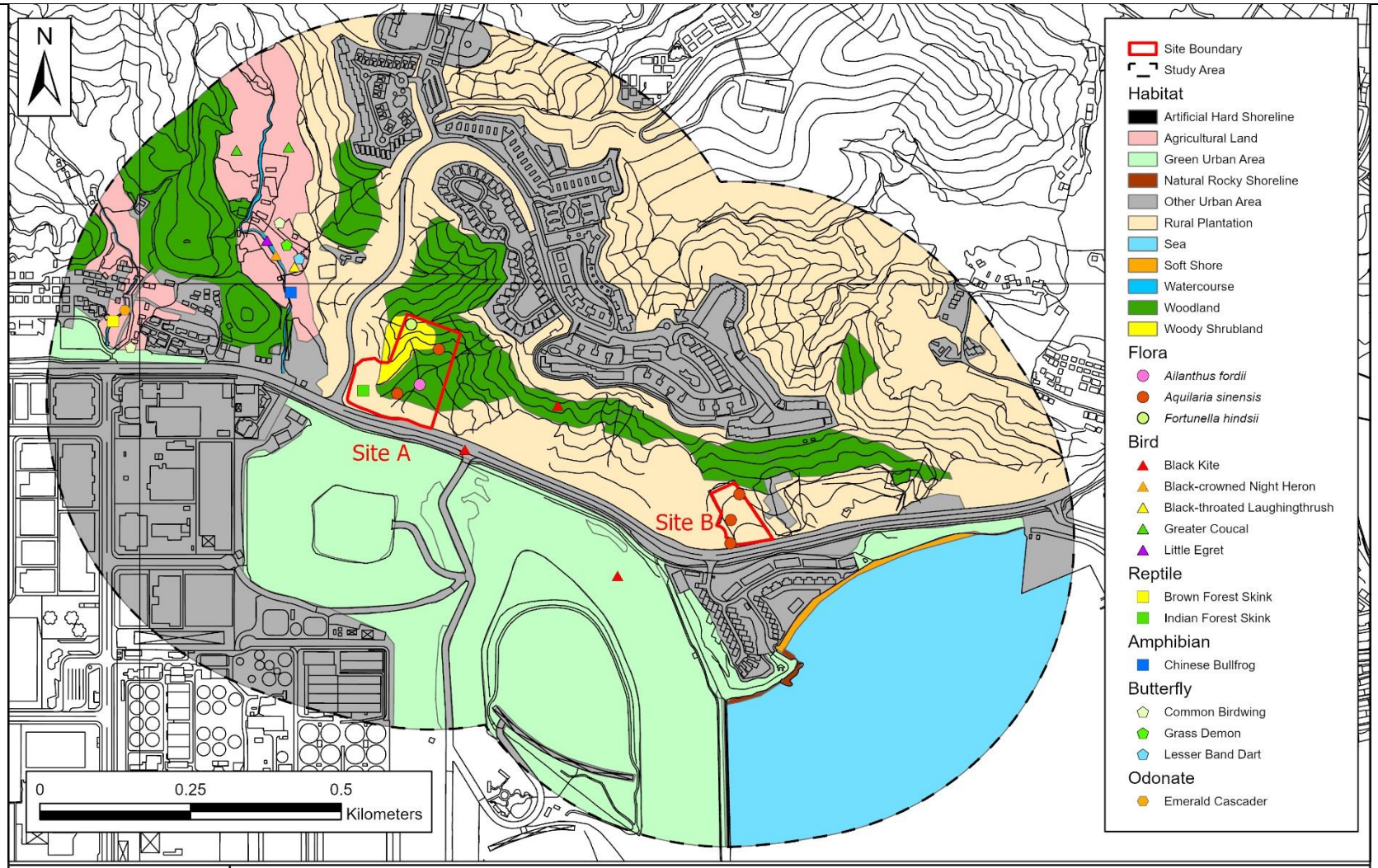

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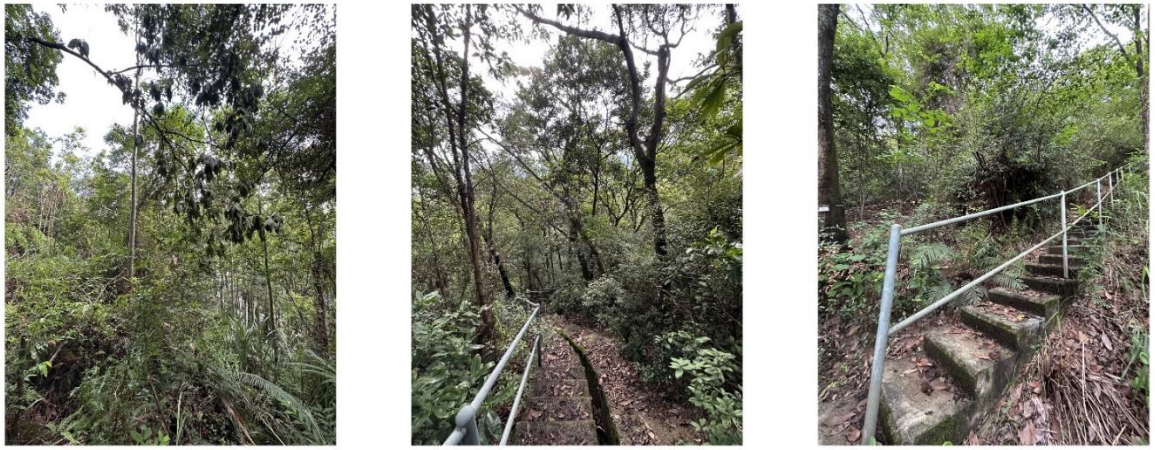
Figure 4.1 Habitat Map of the Application Sites and the 500m Study Area and the Location of the recorded species of conservation importance



Application Site A

Application Site B

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Figure 4.2Representative Photos of Habitat of Application Sites

Appendices

Appendix A Relative Abundance of the Floral Species Recorded within Site A, Site B and 500m Study Area

Scientific name	Growth form	Origin	Rarity in Hong Kong [1]	Protection/Conservation status [2 3 4 5 5 6 7 8 9 10]	Relative Abundance										
					Site A			Site B	Study Area including Site A and Site B						
					RP	WS	WO	RP	AG	GUA	OUA	RP	WS	WO	WAT
Abrus mollis	Climber	Native	Restricted	-				S				S		S	
Acacia auriculiformis	Tree	Exotic	-		S		O	O				O	S		
Acacia confusa	Tree	Exotic	-		C		S	C		O	O	C		S	
Acacia mangium	Tree	Exotic	-		S		S	S			S	S		S	
Acronychia pedunculata	Tree	Native	Very common		S		O								
Ageratum conyzoides	Herb	Exotic	Common		S			S		S	S	S			
Aglaia odorata	Shrub	Exotic	-								S				
Ailanthus fordii	**Tree**	**Native**	**Rare**	**Rare and Precious Plants of Hong Kong (Near threatened in China) [7] Cap.96 [10]**			**S**								
Alangium chinense	Tree	Native	Common				S	O				O		O	
Alchornea trewioides	Shrub	Native	Common											S	
Aleurites moluccana	Tree	Exotic	-								S	S			
Allamanda cathartica	Climber	Exotic	-								S	S			
Alocasia macrorrhizos	Herb	Native	Very common		S		S	O			S	O		O	S
Alternanthera sessilis	Herb	native	Common						S			S			S
Amaranthus viridis	Herb	native	Very common								S				S
Aporusa dioica	Tree	Native	Very common		O		C	O				O		O	
Aquilaria sinensis	**Tree**	**Native**	**Common**	**IUCN Red List (Vulnerable) [2] CITES Appendix II [3] Threatened Species List of China's Higher Plants (Vulnerable, endemic species) [4] China Plant Red Data Book (Vulnerable) [5] Illustrations of Rare & endangered plant in Guangdong Province [6]**			**S**	**S**							

Scientific name	Growth form	Origin	Rarity in Hong Kong [1]	Protection/Conservation status [2 3 4 5 5 6 7 8 9 10]	Relative Abundance										
					Site A			Site B	Study Area including Site A and Site B						
					RP	WS	WO	RP	AG	GUA	OUA	RP	WS	WO	WAT
				Rare and Precious Plants of Hong Kong (Near threatened in China) [7] **Cap. 586 [8]** **Wild plant under State protection (category II)**											
Araucaria heterophylla	Tree	Exotic	-	IUCN Red List (Vulnerable)							S	S			
Archidendron lucidum	Tree	native	Common				S	O						O	
Archontophoenix alexandrae	Tree	Exotic	-						O		C				
Ardisia lindleyana	Shrub	native	Common			S								S	
Ardisia quinquegona	Shrub	native	Very common					O							
Artocarpus heterophyllus	Tree	Exotic	-					S			S	S			
Axonopus compressus	Herb	Exotic	Common							C					
Baeckea frutescens	Tree	Native	Very common		S	O								O	
Bambusa sp.	Herb	-	-		S		S				O	O		S	
Bauhinia championii	Climber	Native	Common								S	S			
Bauhinia variegata	Tree	Exotic	-								S				
Bauhinia x blakeana	Tree	Native	-							S		O			
Bidens alba	Herb	Exotic	Very common		S	S		O	O	O	O	S		S	O
Bischofia javanica	Tree	Native	Common		S			S			O	S			
Blechnum orientale	Herb	Native	Very common		S			O				O		O	
Boehmeria nivea	Shrub	Exotic	Restricted					O			S			O	
Bombax ceiba	Tree	Exotic	-					S			S	S			
Bougainvillea spectabilis	Climber	Exotic	-								S				
Breynia fruticosa	Shrub	Native	Very common											S	
Bridelia tomentosa	Shrub	Native	Very common			S	O	C			O	O	S	C	
Broussonetia papyrifera	Tree	Native	Very common				S				S	S			

Scientific name	Growth form	Origin	Rarity in Hong Kong [1]	Protection/Conservation status [2 3 4 5 5 6 7 8 9 10]	Relative Abundance										
					Site A			Site B	Study Area including Site A and Site B						
					RP	WS	WO	RP	AG	GUA	OUA	RP	WS	WO	WAT
Caesalpinia crista	Climber	Native	Very common									S			
Calliandra haematocephala	Shrub	Exotic	-								O				
Canarium album	Tree	Exotic	Restricted								S				
Canarium pimela	Tree	Exotic	Rare					S							
Cansjera rheedii	Climber	Native	Restricted		S		O	S							
Carallia brachiata	Tree	Native	Common				S	S							
Carica papaya	Tree	Exotic	-						O			S			
Caryota mitis	Tree	Exotic	-								S	S			
Castanopsis fissa	Tree	Native	Common		S		S							S	
Castanopsis lamontii	Tree	Native	0									S			
Casuarina equisetifolia	Tree	Exotic	Rare		S			S		S	O	C			
Celastrus aculeatus	Climber	Native	0										S		
Celastrus hindsii	Climber	Native	Very common											S	
Celosia argentea	Herb	Native	Very common												S
Celtis sinensis	Tree	Native	Common		S	O	C	O			O	C	S	S	
Celtis timorensis	Tree	Native	Restricted		S							S		S	
Chukrasia tabularia	Tree	Exotic	-				S	O				S		S	
Cinnamomum aromaticum	Tree	Exotic	-		S							S			
Cinnamomum burmannii	Tree	Native	-								S				
Cinnamomum camphora	Tree	Native	Common		S		S	O				S		O	
Cinnamomum parthenoxylon	Tree	Native	Common				S							S	
Citrus limonia	Tree	Exotic	-						S		S				
Citrus maxima	Tree	Exotic	-						S		S				
Clerodendrum cyrtophyllum	Shrub	Native	Common					O							
Cocculus orbiculatus	Climber	Native	Common									S			

Scientific name	Growth form	Origin	Rarity in Hong Kong [1]	Protection/Conservation status [2 3 4 5 5 6 7 8 9 10]	Relative Abundance										
					Site A			Site B	Study Area including Site A and Site B						
					RP	WS	WO	RP	AG	GUA	OUA	RP	WS	WO	WAT
Colocasia esculenta	Herb	Exotic	-						S						O
Commelina diffusa	Herb	Native	Common						S						
Conyza canadensis	Herb	Exotic	Very common												S
Cratoxylum cochinchinense	Tree	native	Very common		O	S	S	O				S			
Cyclobalanopsis edithiae	Tree	Native	Restricted				S							S	
Cyclosorus parasiticus	Herb	Native	Very common				S				S	O		O	S
Cynodon dactylon	Herb	native	Very common							O					
Cyperus involucratus	Herb	Exotic	Restricted												S
Cyrtococcum patens	Herb	Native	Very common									O			
Dactyloctenium aegyptium	Herb	Native	Common								S				
Dalbergia benthamii	Climber	Native	Common	Cap. 586 CITES Appendix II			S	S						S	
Daphniphyllum calycinum	Tree	Native	Common		S	S		S				O		O	
Daphniphyllum pentandrum	Tree	Native	Common		S	C	S					S		S	
Delonix regia	Tree	Exotic	-					S			O				
Dendrotrophe varians	Climber	Native	Very common										S		
Desmodium heterocarpon	Shrub	Native	Very common					O							
Desmodium triflorum	Herb	Native	Very common							S		O			
Desmos chinensis	Shrub	Native	Common		S		C	S			S	O		C	
Dicranopteris pedata	Herb	native	Very common			C		O				O	C	O	
Dimocarpus longan	Tree	Exotic	Restricted	China Plant Red Data Book (Vulnerable) Wild plant under State protection (category II) Threatened Species List of China's Higher Plants (Vulnerable)				C			O	O		O	
Diospyros kaki	Tree	Native	-											S	
Diospyros morrisiana	Tree	Native	Very common				O								
Dracaena fragrans	Shrub	Exotic	-								S				
Duranta erecta	Climber	Exotic	-		S						S	S			

Scientific name	Growth form	Origin	Rarity in Hong Kong [1]	Protection/Conservation status [2 3 4 5 5 6 7 8 9 10]	Relative Abundance										
					Site A			Site B	Study Area including Site A and Site B						
					RP	WS	WO	RP	AG	GUA	OUA	RP	WS	WO	WAT
Dypsis lutescens	Shrub	Exotic	-								O				
Eclipta prostrata	Herb	Native	Common								S				
Eleusine indica	Herb	Native	Very common							O					
Embelia laeta	Climber	Native	Very common				**S**					**S**		**S**	
Emilia sonchifolia	Herb	Native	Very common								S				
Endospermum chinense	Tree	Native	Restricted				S	S							
Engelhardia roxburghiana	Tree	Native	Common				S	S						S	
Epipremnum aureum	Climber	Exotic	-				S					S		S	
Eriobotrya fragrans	Shrub	Native	Common											S	
Eriobotrya japonica	Tree	Exotic	-											S	
Eucalyptus camaldulensis	Tree	Exotic	-									S			
Eucalyptus citriodora	Tree	Exotic	-		O			S			S	C		S	
Eucalyptus exserta	Tree	Exotic	-		S			S							
Eucalyptus robusta	Tree	Exotic	-		O							S			
Eucalyptus tereticornis	Tree	Exotic	-									C			
Eucalyptus torelliana	Tree	Exotic	-		C							S			
Eucalyptus urophylla	Tree	Exotic	-					S							
Euphorbia hirta	Herb	Exotic	Very common			S			O	S	S		S		
Eurya chinensis	Shrub	Native	Very common				S					O	S		
Ficus elastica	Tree	Exotic	-								O				
Ficus hirta	Shrub	Native	Common		S		O	S						S	
Ficus hispida	Shrub	Native	Very common		C		S	O			O	O		C	S
Ficus microcarpa	Tree	Native	Common		O		O	S			O	O		S	
Ficus pumila	Climber	Native	Very common				S	S				S		S	
Ficus variegata var. *chlorocarpa*	Tree	Native	Common				S	O						O	
Fimbristylis subbispicata	Herb	Native	Common								S				
Fortunella hindsii	**Shrub**	**Native**	**Common**	**Wild plant under State protection (category II)**		**S**									
Garcinia oblongifolia	Tree	Native	Very common		S		S	S						S	

Scientific name	Growth form	Origin	Rarity in Hong Kong [1]	Protection/Conservation status [2 3 4 5 5 6 7 8 9 10]	Relative Abundance										
					Site A			Site B	Study Area including Site A and Site B						
					RP	WS	WO	RP	AG	GUA	OUA	RP	WS	WO	WAT
Gardenia jasminoides	Shrub	Native	Common		S		O								
Gardenia jasminoides var. *fortuniana*	Shrub	Exotic	Common								S				
Glochidion eriocarpum	Shrub	Native	Very common		S		S					S		S	
Glochidion lanceolarium	Tree	Native	Common					S							
Gnetum luofuense	Climber	Native	Very common				O					S		O	
Grevillea robusta	Tree	Exotic	-								S	S			
Hedyotis auricularia	Herb	Native	Common			S					S			S	
Heterosmilax japonica	Climber	Native	Common											S	
Hibiscus rosa-sinensis	Shrub	Exotic	-		S			S			S	S			
Hylocereus undatus	Herb	Exotic	-						S		S				
Hyophorbe lagenicaulis	Tree	Exotic	-								O				
Ilex asprella	Shrub	Native	Very common		S		S					S		S	
Ilex rotunda	Tree	Exotic	Common					S							
Ilex viridis	Tree	Native	Common		S		O					S		S	
Imperata cylindrica	Herb	Native	Very common								O				
Ipomoea cairica	Climber	Exotic	Very common				S	O	C	O	S			O	S
Itea chinensis	Shrub	Native	Very common				S							S	
Ixora chinensis	Shrub	Native	Restricted							S	O				
Juniperus chinensis	Tree	Exotic	-							O	C				
Kyllinga polyphylla	Herb	Exotic	Common								O	S			S
Lagerstroemia speciosa	Tree	Exotic	-	Cap.96				O		S		O			
Lantana camara	Shrub	Exotic	Very common		S			O		O	S	O	S	O	S
Lepidagathis incurva	Herb	Native	Common										S		
Leucaena leucocephala	Tree	Exotic	Common		S		O	O			O	O	S	S	O
Ligustrum sinense	Tree	Native	Common		S			O				O		O	
Lindernia crustacea	Herb	Native	Restricted										S		
Liquidambar formosana	Tree	Native	Common				S	S				S			

Scientific name	Growth form	Origin	Rarity in Hong Kong [1]	Protection/Conservation status [2 3 4 5 5 6 7 8 9 10]	Relative Abundance										
					Site A			Site B	Study Area including Site A and Site B						
					RP	WS	WO	RP	AG	GUA	OUA	RP	WS	WO	WAT
Liriope spicata	Herb	Native	Very common			S							S		
Litchi chinensis	Tree	Exotic	Restricted	China Plant Red Data Book (Vulnerable) Threatened Species List of China's Higher Plants (Endangered)				S				S			
Litsea cubeba	Shrub	Native	Common		O		S	O				S			
Litsea glutinosa	Tree	Native	Very common				S	S				O		O	
Litsea monopetala	Tree	Native	Restricted				S	S						S	
Litsea rotundifolia var. *oblongifolia*	Shrub	Native	Very common		S	O	S					O	S	S	
Livistona chinensis	Tree	Exotic	-					S			O				
Lophatherum gracile	Herb	Native	Very common				S							O	
Lophostemon confertus	Tree	Exotic	-		C			O			O	C			
Lygodium japonicum	Herb	Native	Very common		O		S				S	S		S	
Lygodium scandens	Herb	Native	Common				O	O				S			
Macaranga tanarius var. *tomentosa*	Tree	Native	Common		O	O	C	O				O	O	O	
Machilus breviflora	Tree	Native	Very common				S	S							
Machilus chekiangensis	Tree	Native	Very common				S	S				S		S	
Machilus pauhoi	Tree	Native	-				S							S	
Machilus velutina	Tree	Native	Common				S								
Maesa perlarius	Shrub	Native	Common					O				S		O	
Mallotus paniculatus	Tree	Native	Very common		S		S	O				O		O	
Mangifera indica	Tree	Exotic	-								S				
Melaleuca cajuputi subsp. *cumingiana*	Tree	Exotic	-		S						S	S			
Melastoma malabathricum	Shrub	Native	Common			O									
Melastoma sanguineum	Shrub	Native	Common			O		S					O		
Melia azedarach	Tree	Exotic	Common				C	O			O	S			
Melicope pteleifolia	Shrub	Native	Common				S							S	
Melinis repens	Herb	Exotic	Very common							S	O				
Michelia x *alba*	Tree	Exotic	-	Cap.96							O	S			
Microcos nervosa	Shrub	Native	Common		O		O	S				O		S	

Scientific name	Growth form	Origin	Rarity in Hong Kong [1]	Protection/Conservation status [2 3 4 5 5 6 7 8 9 10]	Relative Abundance										
					Site A			Site B	Study Area including Site A and Site B						
					RP	WS	WO	RP	AG	GUA	OUA	RP	WS	WO	WAT
Microstegium ciliatum	Herb	Native	Very common					C	O			S		S	C
Mikania micrantha	Herb	Exotic	Very common				S	C	O	O	O	S		S	C
Millettia speciosa	Climber	Native	Common										S		
Mimosa pudica	Herb	Exotic	Very common								S				
Miscanthus floridulus	Herb	Native	Common								S	S	S		
Murraya paniculata	Tree	Exotic	-		S		S	S			S	S		S	
Musa x *paradisiaca*	Herb	Exotic	-						S		S			S	
Oxalis corniculata	Herb	Native	Very common								S				
Paederia scandens	Climber	Native	Very common								O	S			
Pandanus tectorius	Shrub	Native	Very common			S	S	S						S	
Panicum maximum	Herb	Exotic	Common				O	O		S	O	S	O		S
Paspalum distichum	Herb	Native	Common							O	S				
Passiflora foetida	Climber	Exotic	Very common								S				
Passiflora suberosa	Climber	Exotic	Common									S			
Phoenix loureiroi	Tree	Native	Common								O	S			
Phyllanthus cochinchinensis	Shrub	Native	Very common					S							
Phyllanthus emblica	Tree	Native	Very common					S							
Phyllanthus reticulatus	Shrub	Native	Common				S					S		O	
Pilea microphylla	Herb	Exotic	Very common								S				
Pinus elliottii	Tree	Exotic	-									S			
Piper hancei	Climber	Native	Very common					S						S	
Platycladus orientalis	Tree	Exotic	-								S				
Polyspora axillaris	Shrub	Native	Very common			O	S					S	O		
Pothos chinensis	Herb	Native	Very common											S	
Pottsia laxiflora	Climber	Native	Common					S				S		S	
Praxelis clematidea	Herb	Exotic	Very common								O	O			S
Psychotria asiatica	Tree	Native	Very common		S	S	O	O				O		O	
Pteris semipinnata	Herb	Native	Very common				S	S				O		S	
Pteris vittata	Herb	Native	Very common								S			S	
Pterocarpus indicus	Tree	Exotic	-	Threatened Species List of China's							S	S			

Scientific name	Growth form	Origin	Rarity in Hong Kong [1]	Protection/Conservation status [2 3 4 5 5 6 7 8 9 10]	Relative Abundance										
					Site A			Site B	Study Area including Site A and Site B						
					RP	WS	WO	RP	AG	GUA	OUA	RP	WS	WO	WAT
				Higher Plants (Critically endangered) IUCN Red List (Critically endangered)											
Pueraria lobata var. *montana*	Climber	Native	Common		S		S	S				S		O	
Pueraria lobata var. *thomsonii*	Climber	Exotic	-				S				O			O	S
Pueraria phaseoloides	Climber	Native	Very common									S			
Rhaphiolepis indica	Shrub	Native	Very common		S	O	S	O				O			
Rhodomyrtus tomentosa	Shrub	Native	Very common			S						O		O	
Rhus chinensis	Tree	Native	Common				S					O			
Rhus hypoleuca	Shrub	Native	Common				S	S				O		O	
Rhus succedanea	Shrub	Native	Common		S	S	S	S						O	S
Rhynchospora rubra	Herb	Native	Very common			S				S					
Ricinus communis	Shrub	Exotic	Restricted									S			S
Rourea microphylla	Climber	Native	Common		S	O								S	
Sageretia thea	Shrub	Native	Very common				S							S	
Sapium discolor	Tree	Native	Very common			O	S	S				O		O	
Sapium sebiferum	Tree	Native	Common		S	S		S				S		O	
Sarcandra glabra	Shrub	Native	Very common		S		C	O						O	
Schefflera arboricola	Climber	Exotic	-								O				
Schefflera heptaphylla	Tree	Native	Very common		O		C	O				O	O	C	
Schima superba	Tree	Native	Common				S	S						O	
Scolopia chinensis	Tree	Native	Common				S								
Scolopia saeva	Tree	Native	Common					S							
Scoparia dulcis	Herb	Exotic	Common								S				
Senna surattensis	Shrub	Exotic	-								O				
Smilax glabra	Climber	Native	Very common		O		S							S	
Solanum nigrum	Herb	Native	-												
Solanum torvum	Shrub	Exotic	Common		S						S				S
Spathodea campanulata	Tree	Exotic	-								S				
Spilanthes paniculata	Herb	Native	Common							O	S				

Scientific name	Growth form	Origin	Rarity in Hong Kong [1]	Protection/Conservation status [2 3 4 5 5 6 7 8 9 10]	Relative Abundance										
					Site A			Site B	Study Area including Site A and Site B						
					RP	WS	WO	RP	AG	GUA	OUA	RP	WS	WO	WAT
Stephania longa	Climber	Native	Common					S						S	
Sterculia lanceolata	Tree	Native	Very common		S	O	C	O				O	S	C	
Strychnos angustiflora	Climber	Native	Common		S		O	S						S	
Symplocos glauca	Tree	Native	Common					S						S	
Syngonium podophyllum	Herb	Exotic	-					S				S			
Syzygium hancei	Tree	Native	Common				S	S						O	
Syzygium jambos	Tree	Exotic	Common		S		S	S			S	S		O	
Syzygium levinei	Tree	Native	Common				S							O	
Terminalia mantaly	Tree	Exotic	-								C	S			
Tetracera asiatica	Climber	Native	Very common		S		O					S		S	
Tetradium glabrifolium	Tree	Native	Common				S	S				S		S	
Tibouchina sp.	Herb	Exotic	-		S		S							S	
Trema tomentosa	Shrub	Native	Common		O		S							S	
Urena lobata	Herb	Native	Common											S	
Uvaria macrophylla	Climber	Native	Common				S							O	
Vernonia cinerea	Herb	Native	Very common							S			S	O	
Viburnum odoratissimum	Shrub	Native	Very common				S	S						O	
Vitex quinata	Tree	Native	Common				S								
Wedelia trilobata	Herb	Exotic	Common				S	S		O	C	O	O		C
Zanthoxylum avicennae	Tree	Native	Common		S		O	S				O		C	
Zanthoxylum nitidum	Climber	Native	Very common								S				
Number of species recorded within the habitat					**66**	**28**	**98**	**101**	**14**	**23**	**93**	**115**	**24**	**108**	**23**

Notes:

1. Corlett *et al*. (2000). Hong Kong vascular plants: distribution and status.
2. International Union of Conservation for Nature. (2023). The IUCN Red List of Threatened Species. Version 2022-2
3. Convention on International Trade in Endangered Species of Wild Flora and Fauna (2020). Appendices I, II and III.
4. Qin *et al*. (2017). Threatened Species List of China's Higher Plants.
5. Fu & Chin (1992). China Plant Red Data Book – Rare and Endangered Plants.
6. Wu *et al*. (1988). Illustration of Rare & endangered plant in Guangdong Province.
7. Hu *et al*. (2003). Rare and Precious Plants of Hong Kong.
8. Cap. 586 Protection of Endangered Species of Animals and Plants Ordinance.
9. State Forestry Administration & Ministry of Agriculture. (1999). List of Wild Plants under State Protection (Part 1).
10. Cap. 96 Forests and Countryside Ordinance.

- **Species in bold are considered of conservation importance.**
- **Casuarina equisetifolia, Dimocarpus longan, Lagerstroemia speciosa, Litchi chinensis, Michelia* x *alba* and *Pterocarpus indicus* are exotic to Hong Kong and not considered of conservation importance, despite being considered rare/ very rare by Corlett *et al*. (2000), listed as Vulnerable by IUCN (2023), listed as endangered or vulnerable in Threatened Species List of China's Higher Plants, listed as vulnerable in China Plant Red Data Book, listed under Category II in the List of Wild Plants under State Protection (Part 1), listed under Cap. 96 Forests and Countryside Ordinance, and/ or Cap. 586 Protection of Endangered Species of Animals and Plants Ordinance.
- #*Dalbergia spp.* are listed under Appendix II of CITES and protected under Cap. 586 Protection of Endangered Species of Animals and Plants Ordinance in Hong Kong as species in this genus is facing threat due to the overexploitation for its valuable wood (known as rosewood). In the current study, *Dalbergia benthamii* was recorded. As the recorded Dalbergia are climber which is not relevant to the timber exploitation. In addition, the species are considered 'common' in Hong Kong by Corlett *et al*. (2000). Thus, it is not considered as species of conservation importance in the current Study.

Abbreviations:

- Habitats: AG: Agricultural Land; GUA: Green Urban Area; OUA: Other Urban Area; RP: Rural Plantation; WS: Woody Shrubland; WO: Woodland, WAT: Watercourse
- Relative abundance: C = Common; O = Occasional; S = Scarce

Appendix B1 Abundance of Mammals Recorded within Site A, Site B and 500m Study Area (except bats)

Common Names[1]	Scientific Names[1]	Rarity and Distribution in Hong Kong[1]	Conservation status	Site A	Study Area including the Application Sites
				RP	RP
Eurasian Wild Pig	*Sus scrofa*	Very widely distributed in countryside areas throughout Hong Kong.	-	2	2

Note:
1. AFCD (2024). Hong Kong Biodiversity Information Hub

Appendix B2 Records of Bats within 500m Study Area

Common Names[1]	Scientific Names[1]	Rarity and Distribution in Hong Kong[1]	Conservation status[1,2,3]
Chinese Noctule	***Nyctalus plancyi***	**Fairly widely distributed in countryside areas throughout Hong Kong.**	**Fellowes et al. (2002): PRC; Cap. 170**
Japanese Pipistrelle	***Pipistrellus abramus***	**Widely distributed throughout Hong Kong.**	**Cap. 170**
Least Pipistrelle	***Pipistrellus tenuis***	**Ten-something records found in Nam Chung, Sheung Wo Hang, Lin Ma Hang, Plover Cove Country Park, Yuen Long, Shek Pik, Deep Water Bay, Ho Pui and Ho Chung.**	**Cap. 170**

Notes:
1. AFCD (2024). Hong Kong Biodiversity Information Hub
2. Fellowes et al. (2002). Wild animals to watch: Terrestrial and freshwater fauna of conservation concern in Hong Kong: PRC: Potential Regional Concern
3. Cap. 170 Wild Animals Protection Ordinance

- **Species in bold are considered of conservation importance.**

Appendix C Abundance of Birds Recorded within Site A, Site B and 500m Study Area

Common Names[1]	Scientific Names[1]	Rarity and Distribution in Hong Kong[1]	Conservation status[1,2,3,4,5,6]	Site A			Site B	Study Area Including the Application Sites						
				RP	WO	WS	RP	AG	GUA	OUA	RP	WAT	WO	WS
Black-crowned Night Heron	***Nycticorax nycticorax***	**Common resident and migrant. Widely distributed in Hong Kong.**	**Fellowes et al. (2002): LC**									**2**		
Little Egret	***Egretta garzetta***	**Common resident, migrant and winter visitor. Widely distributed in coastal area throughout Hong Kong.**	**Fellowes et al. (2002): PRC**									**2**		
Black Kite	***Milvus migrans***	**Common resident and winter visitor. Widely distributed in Hong Kong.**	**Fellowes et al. (2002): (RC); Cap. 586; List of Wild Animals under State Priority Conservation: Class II; CITES: Appendix II**						**1**	**1**			**1**	
White-breasted Waterhen	*Amaurornis phoenicurus*	Common resident. Widely distributed in wetland throughout Hong Kong.	-									2		
Domestic Pigeon	*Columba livia*	Locally common resident. Widely distributed in urban area throughout Hong Kong.	-											6
Spotted Dove	*Spilopelia chinensis*	Abundant resident. Widely distributed in Hong Kong.	-	2		4	5	4		23	7	3	5	4
Greater Coucal	***Centropus sinensis***	**Common resident. Widely distributed in Hong Kong.**	**List of Wild Animals under State Priority Conservation: Class II**					**1**						
Chestnut-winged Cuckoo	*Clamator coromandus*	Uncommon spring and summer visitor. Widely distributed in woodland throughout Hong Kong.	-										1	
Asian Koel	*Eudynamys scolopaceus*	Common resident. Widely distributed in Hong Kong.	-							1				
Plaintive Cuckoo	*Cacomantis merulinus*	Passage migrant and common visitor. Widely distributed in open area throughout Hong Kong.	-					1		1				
Large Hawk-Cuckoo	*Hierococcyx sparverioides*	Locally common spring and summer visitor. Widely distributed in woodland throughout in Hong Kong.	-							1				
Savanna Nightjar	*Caprimulgus affinis*	Uncommon resident. Widely distributed in Hong Kong.	-							1				
House Swift	*Apus nipalensis*	Abundant spring migrant and common resident. Widely distributed in Hong Kong.	-							11	12			

Common Names[1]	Scientific Names[1]	Rarity and Distribution in Hong Kong[1]	Conservation status[1,2,3,4,5,6]	Site A			Site B	Study Area Including the Application Sites						
				RP	WO	WS	RP	AG	GUA	OUA	RP	WAT	WO	WS
Common Kingfisher	*Alcedo atthis*	Common passage migrant and winter visitor. Widely distributed in wetland habitat throughout Hong Kong.	-									1		
Scarlet Minivet	*Pericrocotus speciosus*	Common resident. Found in Tai Po Kau, the Peak, Lam Tsuen, Cape D'Aguilar Road, Peel Rise, Shing Mun.	-							2				
Hair-crested Drongo	*Dicrurus hottentottus*	Common migrant and winter visitor, and locally common resident. Widely distributed in wooded area throughout Hong Kong.	-							3				
Red-billed Blue Magpie	*Urocissa erythroryncha*	Common resident. Widely distributed in woodland edges throught Hong Kong	-	2				1		5	4			
Large-billed Crow	*Corvus macrorhynchos*	Common resident. Widely distributed in Hong Kong	-							1				
Cinereous Tit	*Parus cinereus*	Common resident. Widely distributed in Hong Kong.	-		2	2	2		1	10	3	2	3	2
Red-whiskered Bulbul	*Pycnonotus jocosus*	Abundant resident. Widely distributed in Hong Kong.	-	10	4	7	11	4		19	21		13	7
Chinese Bulbul	*Pycnonotus sinensis*	Abundant resident. Widely distributed in Hong Kong.	-		1		2			7	5	1	2	
Barn Swallow	*Hirundo rustica*	Abundant passage migrant and summer visitor. Widely distributed in Hong Kong.	-							6	2			
Dusky Warbler	*Phylloscopus fuscatus*	Abundant winter visitor and migrant. Widely distributed in shrubland and waterside vegetation throughout Hong Kong.	-								1	1		
Yellow-bellied Prinia	*Prinia flaviventris*	Common resident. Widely distributed in Hong Kong.	-							5				
Common Tailorbird	*Orthotomus sutorius*	Common resident. Widely distributed in Hong Kong.	-		2	1			1		1	2	3	1

Common Names[1]	Scientific Names[1]	Rarity and Distribution in Hong Kong[1]	Conservation status[1,2,3,4,5,6]	Site A			Site B	Study Area Including the Application Sites						
				RP	WO	WS	RP	AG	GUA	OUA	RP	WAT	WO	WS
Masked Laughingthrush	*Pterorhinus perspicillatus*	Abundant resident. Widely distributed in shrubland throughout Hong Kong.	-	1	3	3		9		12	5	4	3	10
Black-throated Laughingthrush	***Garrulax chinensis***	**Common resident. Widely distributed in woodland and shrubland throughout Hong Kong.**	**List of Wild Animals under State Priority Conservation: Class II**					**1**						
Japanese White-eye	*Zosterops simplex*	Abundant resident. Widely distributed in Hong Kong.	-	12	5		15		2	26	35		7	
Crested Myna	*Acridotheres cristatellus*	Abundant resident. Widely distributed in Hong Kong.	-							2	10		3	
Black-collared Starling	*Gracupica nigricollis*	Common resident. Widely distributed in Hong Kong.	-		2		2	4		2	4		4	
Oriental Magpie-Robin	*Copsychus saularis*	Abundant resident. Widely distributed in Hong Kong.	-							2	2	3	1	
Daurian Redstart	*Phoenicurus auroreus*	Common winter visitor. Widely distributed in Hong Kong.	-								1			
Fork-tailed Sunbird	*Aethopyga christinae*	Common resident and winter visitor. Widely distributed in Hong Kong.	-							1				
Eurasian Tree Sparrow	*Passer montanus*	Abundant resident. Widely distributed in Hong Kong.	-	2	2		6	16		14	15	1	2	2
Scaly-breasted Munia	*Lonchura punctulata*	Abundant resident. Widely distributed in Hong Kong.	-					6					3	
Grey Wagtail	*Motacilla cinerea*	Common passage migrant and winter visitor. Widely distributed in hill streams throughout Hong Kong.	-							1			2	
White Wagtail	*Motacilla alba*	Resident, common passage migrant and winter visitor. Widely distributed in Hong Kong.	-							2		4		
Olive-backed Pipit	*Anthus godlewskii*	Common passage migrant and winter visitor. Widely distributed in Hong Kong.	-						1					

Notes:
1. AFCD (2024). Hong Kong Biodiversity Information Hub
2. Fellowes et al. (2002). Wild animals to watch: Terrestrial and freshwater fauna of conservation concern in Hong Kong: PRC: Potential Regional Concern, LC: Local Concern
3. Cap. 170 Wild Animals Protection Ordinance
4. Cap. 586 Protection of Endangered Species of Animals and Plants Ordinance.
5. Convention on International Trade in Endangered Species of Wild Flora and Fauna. Appendices I, II and III.
6. List of Wild Animals under State Priority Conservation (2021).

- Species in bold are considered of conservation importance.

Appendix D Abundance of Reptiles Recorded within Site A, Site B and 500m Study Area

Common Names	Scientific Names	Rarity and Distribution in Hong Kong	Conservation status	Site A	Study Area Including the Application Sites			
				RP	RP	WAT	OUA	AG
Changeable Lizard	*Calotes versicolor*	Widely distributed throughout Hong Kong.	-	1	1			
Chinese Gecko	*Gekko chinensis*	Widely distributed throughout Hong Kong.	-	1	1		2	1
Garnot's Gecko	*Hemidactylus garnotii*	Distributed in Lantau Island, Hong Kong Island and eastern New Territories.	-		2			1
Brown Forest Skink	***Sphenomorphus incognitus***	**Distributed in streams in the New Territories.**	**Fellowes et al. (2002): LC**			**1**		
Indian Forest Skink	***Sphenomorphus indicus***	**Distributed in woodlands in eastern and central New Territories.**	**Fellowes et al. (2002): LC**	**1**	**1**			

Notes:

1. AFCD (2024). Hong Kong Biodiversity Information Hub
2. Fellowes et al. (2002). Wild animals to watch: Terrestrial and freshwater fauna of conservation concern in Hong Kong: LC: Local Concern

- **Species in bold are considered of conservation importance.**

Appendix E Abundance of Amphibians Recorded within Site A, Site B and 500m Study Area

Common Names[1]	Scientific Names[1]	Rarity and Distribution in Hong Kong[1]	Conservation status[1,2,3,4,5,6]	Site A	Site B	Study Area Including the Application Sites			
				RP	RP	RP	WAT	AG	OUA
Asian Common Toad	*Duttaphrynus melanostictus*	Widely distributed in Hong Kong.	-	2		2	1		
Spotted Narrow-mouthed Frog	*Kalophrynus interlineatus*	Widely distributed from low to moderate altitudes in northern and central New Territories.	-	1		1	2		
Asiatic Painted Frog	*Kaloula pulchra*	Widely distributed in Hong Kong.	-				1		1
Ornate Pigmy Frog	*Microhyla fissipes*	Widely distributed in Hong Kong.	-		14	14	2		
Paddy Frog	*Fejervarya limnocharis*	Widely distributed in Hong Kong.	-	3		3			
Chinese Bullfrog	***Hoplobatrachus chinensis***	**Widely distributed in Lantau Island and New Territories.**	**Fellowes et al. (2002): PRC: ; List of Wild Animals under State Priority Conservation: Class II; Red List of China's Vertebrates: EN**					**2**	
Gunther's Frog	*Hylarana guentheri*	Widely distributed throughout Hong Kong.	-				25		
Brown Tree Frog	*Polypedates megacephalus*	Widely distributed throughout Hong Kong.	-		1	1	5	3	
Greenhouse frog	*Eleutherodactylus planirostris*	Widely distributed throughout Hong Kong.	-	16	7	23	30	25	

Notes:

1. AFCD (2024). Hong Kong Biodiversity Information Hub
2. Fellowes et al. (2002). Wild animals to watch: Terrestrial and freshwater fauna of conservation concern in Hong Kong: PRC: Potential Regional Concern
3. Cap. 170 Wild Animals Protection Ordinance
4. Cap. 586 Protection of Endangered Species of Animals and Plants Ordinance.
5. Convention on International Trade in Endangered Species of Wild Flora and Fauna. Appendices I, II and III.
6. List of Wild Animals under State Priority Conservation (2021).

- Species in bold are considered of conservation importance.

Appendix F Abundance of Odonates Recorded within Site A, Site B and 500m Study Area

Common Names[1]	Scientific Names[1]	Rarity and Distribution in Hong Kong[1]	Conservation status[1,2]	Site A	Site B	Study Area			
				RP	RP	OUA	RP	WAT	AG
Orange-tailed Midget	*Agriocnemis femina*	Abundant. Widely distributed in disused paddy fields, marshes, ditches and weedy ponds margins.	-					20	
Orange-tailed Sprite	*Ceriagrion auranticum*	Abundant. Widely distributed in weedy ponds, marshes, abandoned fields or grasslands adjacent to waters.	-					5	
Common Blue Skimmer	*Orthetrum glaucum*	Abundant. Widely distributed in streams, conduits, drainage channels, seepages and road gutters throughout Hong Kong.	-			6		6	
Marsh Skimmer	*Orthetrum luzonicum*	Abundant. Widely distributed in abandoned paddies, marshy swampy and boggy locations.	-					2	
Common Red Skimmer	*Orthetrum pruinosum neglectum*	Abundant. Widely distributed in slow streams, ponds, rain puddles and irrigation conduits.	-					11	1
Green Skimmer	*Orthetrum sabina sabina*	Abundant. Widely distributed in all wetland habitats throughout Hong Kong.	-					5	
Wandering Glider	*Pantala flavescens*	Abundant. Widely distributed all over Hong Kong.	-	7	8		33	18	
Variegated Flutterer	*Rhyothemis variegata arria*	Common. Widely distributed in marshes, ponds and tanks throughout Hong Kong.	-					6	
Crimson Dropwing	*Trithemis aurora*	Abundant. Found in marshes, ponds, streams, andor even ornamental ponds in urban areas. Widely distributed throughout Hong Kong.	-					2	1
Indigo Dropwing	*Trithemis festiva*	Abundant. Favours sluggish sections of streams with a strong current or the small rock pools inof mountain streams. Widespread in Hong Kong.	-					6	
Emerald Cascader	***Zygonyx iris***	**Abundant. Widely distributed in moderately clean, rapidly flowing forested streams throughout Hong Kong.**	**Fellowes et al. (2002): PGC**					**1**	
Yellow Featherlegs	*Copera marginipes*	Abundant. Widely distributded in lowland streams, ditches, and weedy margins of pond throughout Hong Kong.	-					5	
Black Threadtail	*Prodasineura autumnalis*	Abundant. Often perches on the plants near streams. Widely distributed in streams throughout Hong Kong.	-					2	

Notes:

1. AFCD (2024). Hong Kong Biodiversity Information Hub
2. Fellowes et al. (2002). Wild animals to watch: Terrestrial and freshwater fauna of conservation concern in Hong Kong: PGC: Potential Global Concern

- **Species in bold are considered of conservation importance.**

Appendix G Abundance of Butterflies Recorded within Site A, Site B and 500m Study Area

Common Names[1]	Scientific Names[1]	Rarity and Distribution in Hong Kong[1]	Conservation status[1,2,3,4,5]	Site A			Site B	Study Area Including the Application Sites					
				RP	WO	WS	RP	OUA	RP	WAT	WO	WS	AG
Formosan Swift	*Borbo cinnara*	Common. Widely distributed throughout Hong Kong.	-	1					1				
Banana Skipper	*Erionota torus*	Uncommon. Widely distributed in agricultural field throughout Hong Kong	-										2
Chestnut Bob	*Iambrix salsala*	Uncommon. Widely distributed throughout Hong Kong.	-	12					12				
Chinese Dart	*Potanthus confucius*	Uncommon. Widely distributed throughout Hong Kong.	-							1			
Lesser Band Dart	***Potanthus trachala***	**Rare. Widely distributed in grassland throughout Hong Kong**	**-**										**1**
Water Snow Flat	*Tagiades litigiosus*	Common. Widely distributed throughout Hong Kong.	-	1					1				1
Grass Demon	***Udaspes folus***	**Rare. Widely distributed throughout Hong Kong.**	**-**										**4**
Pale Grass Blue	*Pseudozizeeria maha*	Very common. Widely distributed throughout Hong Kong	-				12	8	16				6
Plum Judy	*Abisara echerius*	Very common. Widely distributed throughout Hong Kong	-	1			4		6				
Common Indian Crow	*Euploea core*	Common. Widely distributed throughout Hong Kong	-										2
Blue-spotted Crow	*Euploea midamus*	Very common. Widely distributed throughout Hong Kong	-										2
Angled Castor	*Ariadne ariadne*	Common. Widely distributed throughout Hong Kong	-								2		
Common Mapwing	*Cyrestis thyodamas*	Common. Widely distributed throughout Hong Kong.	-	1				1	1				
Great Eggfly	*Hypolimnas bolina*	Common. Widely distributed throughout Hong Kong	-		1			4			1		1
Common Sailer	*Neptis hylas*	Very common. Widely distributed throughout Hong Kong	-					1					
Five-dot Sergeant	*Parathyma sulpitia*	Common. Widely distributed throughout Hong Kong	-							1			
Large Faun	*Faunis eumeus*	Common. Widely distributed throughout Hong Kong.	-	1			3		4				
Dark Evening Brown	*Melanitis phedima*	Uncommon. Widely distributed throughout Hong Kong.	-	2					2				
Dark-brand Bush Brown	*Mycalesis mineus*	Very common. Widely distributed throughout Hong Kong	-	2		2	5	4	9			2	
South China Bush Brown	*Mycalesis zonata*	Common.Widely distributed throughout Hong Kong.	-	4					4				
Common Bluebottle	*Graphium sarpedon*	Very common. Widely distributed throughout Hong Kong	-	1					1				
Paris Peacock	*Papilio paris*	Very common. Widely distributed throughout Hong Kong	-	1					1				

Common Names[1]	Scientific Names[1]	Rarity and Distribution in Hong Kong[1]	Conservation status[1,2,3,4,5]	Site A			Site B	Study Area Including the Application Sites					
				RP	WO	WS	RP	OUA	RP	WAT	WO	WS	AG
Common Mormon	*Papilio polytes*	Very common. Widely distributed throughout Hong Kong	-	3	1			2	3	2	1	2	
Spangle	*Papilio protenor*	Very common. Widely distributed throughout Hong Kong	-	1	1			1	2	4	1		1
Common Birdwing	***Troides helena***	**Uncommon. Widely distributed throughout Hong Kong**	**Cap. 170; Cap. 586; CITES: Appendix II**						**1**				**2**
Lemon Emigrant	*Catopsilia pomona*	Common. Widely distributed throughout Hong Kong	-				5		5		1		8
Common Grass Yellow	*Eurema hecabe*	Very common. Widely distributed throughout Hong Kong	-	1			6		7			1	4

Notes:
1. AFCD (2024). Hong Kong Biodiversity Information Hub
2. Fellowes et al. (2002). Wild animals to watch: Terrestrial and freshwater fauna of conservation concern in Hong Kong: PRC: Potential Regional Concern
3. Cap. 170 Wild Animals Protection Ordinance
4. Cap. 586 Protection of Endangered Species of Animals and Plants Ordinance.
5. Convention on International Trade in Endangered Species of Wild Flora and Fauna. Appendices I, II and III.

- Species in bold are considered of conservation importance.

Appendix H Relative Abundance of Freshwater Communities Recorded within 500m Study Area

Scientific Names	Common Names	Rarity and Distribution in Hong Kong	Relative Abundance
Channa striata	Snakehead murrel	Uncommon in the wild and is an introduced species. Records from a few streams in North District and on Lantau Island.	+
Eleotris oxycephala	Sharphead sleeper	Records from streams and estuaries in North District, Sai Kung on Hong Kong Island and Lantau Island.	+
Gambusia affinis	Mosquito fish	Introduced as a mosquito-control agent, widespread in local freshwater bodies	+++
Gerridae species	Water Striders	-	+++
Glossogobius giuris	Fork tongue goby	Widespread in local estuaries, lowland streams and coastal waters.	+
Notonectidae species	Backswimmer	-	+++
Oreochromis mossambicus	Mozambique tilapia	Widespread in brackish waters, freshwater ponds, ditches, rivers and reservoirs. The fish is also cultivated in some local fish farms.	++
Poecilia reticulata	Guppy	Occurs in large number in many local streams and ponds.	+++
Puntius semifasciolatus	Chinese Barb	Widely distributed in most of local freshwater streams, rivers and reservoirs.	+
Varuna yui	Sundaic paddler crab	-	++