

CONTENTS

1	TERRESTRIAL ECOLOGY	1-1
1.1	INTRODUCTION	1-1
1.2	RELEVANT LEGISLATION AND ASSESSMENT CRITERIA	1-1
1.3	DESCRIPTION OF THE STUDY AREA	1-4
1.4	SITE OF CONSERVATION IMPORTANCE	1-4
1.5	LITERATURE REVIEW OF ECOLOGICAL CONDITION AND PREVIOUS ECOLOGICAL SURVEYS	1-5
1.6	ECOLOGICAL BASELINE SURVEYS METHODOLOGY	1-8
1.7	RESULTS OF ECOLOGICAL BASELINE SURVEYS	1-12

ANNEX

ANNEX A TERRESTRIAL ECOLOGICAL RESOURCES

1 TERRESTRIAL ECOLOGY

1.1 INTRODUCTION

This section presents the baseline conditions of ecological resources within the Study Area of Cheung Chau (i.e. 500m from the boundary of the proposed Project Site in Cheung Chau). Baseline conditions for ecological components of the terrestrial and associated aquatic environment are evaluated based on information from available literature and recent ecological field surveys that were conducted during the wet season of 2011.

1.2 RELEVANT LEGISLATION AND ASSESSMENT CRITERIA

The local relevant regulations, legislation and guidelines for the protection of species and habitats of ecological importance include the following:

- *Technical Memorandum for the Environmental Impact Assessment Ordinance (Cap 499) (EIAO TM);*
- *EIAO Guidance Note No. 6/2010;*
- *EIAO Guidance Note No. 7/2010;*
- *Hong Kong Planning Standards and Guidelines Chapter 10 (HKPSG);*
- *Forests and Countryside Ordinance (Cap 96) and its subsidiary legislation the Forestry Regulations;*
- *Wild Animals Protection Ordinance (Cap 170);*
- *Protection of Endangered Species of Animals and Plants Ordinance (Cap 586);*
- *Country Parks Ordinance (Cap 208);*
- *Town Planning Ordinance (Cap 131);*
- *PRC Regulations and Guidelines;*
- *IUCN Red List Categories and Criteria;*
- *China Red Data Book of Endangered Species; and*
- *The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).*

Annex 16 of the EIAO-TM sets out the general approach and methodology for assessments of ecological impacts arising from a project or proposal, to allow a complete and objective identification, prediction and evaluation of the potential

ecological impacts. *Annex 8* recommends the criteria that can be used for evaluating ecological impacts.

EIAO Guidance Note No. 6/2010 clarifies the requirements of ecological assessments under the EIAO. *EIAO Guidance Note No. 7/2010* provides general guidelines for conducting ecological baseline surveys in order to fulfil requirements stipulated in the *EIAO-TM*.

Chapter 10 of the *HKPSG* covers planning considerations relevant to conservation. This chapter details the principles of conservation, the conservation of natural landscape and habitats, historic buildings, archaeological sites and other antiquities. It also addresses the issue of enforcement. The appendices list the legislation and administrative controls for conservation, other conservation related measures in Hong Kong and Government departments involved in conservation.

The *Forests and Countryside Ordinance (Cap 96)* prohibits felling, cutting, burning or destroying of trees and live plants in forests and plantations on Government land. Related subsidiary Regulations prohibit the picking, felling or possession of listed rare and protected plant species. The list of protected species in Hong Kong, which comes under the *Forestry Regulations*, was last amended on 11 June 1993 under the *Forestry (Amendment) Regulation 1993* made under *Section 3* of the *Forests and Countryside Ordinance*.

Under the *Wild Animals Protection Ordinance (Cap 170)*, designated wild animals are protected from being hunted, whilst their nests and eggs are protected from destruction and removal. All birds and most mammals are protected under this Ordinance. The Second Schedule of the Ordinance that lists all the animals protected was last revised in June 1992.

The *Protection of Endangered Species of Animals and Plants Ordinance (Cap 586)* was enacted to align Hong Kong to control regime with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). With effect from 1 December 2006, it replaces the *Animals and Plants (Protection of Endangered Species) Ordinance (Cap 187)*. The purpose of the *Protection of Endangered Species of Animals and Plants Ordinance* is to restrict the import and export of species listed in CITES Appendices so as to protect wildlife from overexploitation or extinction. The Ordinance is primarily related to controlling trade in threatened and endangered species and restricting the local possession of them.

The *Country Parks Ordinance (Cap 208)* provides for the designation and management of Country Parks and Special Areas. Country Parks are designated for the purpose of nature conservation, countryside recreation and outdoor education. Special Areas are reserved generally for the purpose of nature conservation.

The amended *Town Planning Ordinance (Cap 131)* provides for the designation of coastal Protection Areas, Sites of Special Scientific Interest (SSSI), Green Belt or other specified uses that promote conservation or protection of the environment,

e.g., Conservation Areas. The authority responsible for administering the *Town Planning Ordinance* is the Town Planning Board.

The Peoples' Republic of China (PRC) is a Contracting Party to the *United Nations Convention on Biological Diversity of 1992*. The Convention requires signatories to make active efforts to protect and manage their biodiversity resources. The Government of the Hong Kong SAR has stated that it will be "committed to meeting the environmental objectives" of the Convention (PELB 1996). In 1988 the PRC ratified the *Wild Animal Protection Law*, which lays down basic principles for protecting wild animals. The Law prohibits killing of protected animals, controls hunting, and protects the habitats of wild animals, both protected and non-protected. The Law also provides for the creation of lists of animals protected at the state level, under Class I and Class II. There are 96 animal species in Class I and 156 in Class II. Class I provides a higher level of protection for animals considered to be more threatened.

The International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species provides taxonomic, conservation status and distribution information on taxa that have been evaluated using the IUCN Red List Categories and Criteria. This system is designed to determine the relative risk of extinction, and the main purpose of the IUCN Red List is to catalogue and highlight those taxa that are facing a higher risk of global extinction. The IUCN Red List also includes information on taxa that are either close to meeting the threatened thresholds or that would be threatened were it not for an ongoing taxon-specific conservation programme.

China Red Data Book of Endangered Species is a joint publication of China National Environmental Protection Agency (NEPA) and the Endangered Species Scientific Commission, PRC (ESSC). The first four volumes of this series cover China's vertebrates (i.e. aves, pisces, amphibia, reptilian and mammalia). The criteria of categories of species included in these volumes are 'extinct', 'extirpated', 'endangered', 'vulnerable', 'indeterminate' and 'rare'. These categories are basically based on the criteria set out by the IUCN Species Survival Commission (IUCN-SSC) for its global Red List. However, there are some important differences. The category "Extirpated" includes those species which experts believe have been lost from China, although they may be secure in the other countries. The use of the category "Rare" has been discontinued by the IUCN-SSC, however, it is used here for those species that have always been rare in China but are not necessary to be vulnerable or endangered.

CITES is an international agreement between governments. It aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. Roughly 5,000 species of animals and 28,000 species of plants are protected by CITES against over-exploitation through international trade. They are listed in the three CITES Appendices, in which the species are grouped according to how threatened they are by international trade. Appendix I lists species that are the most endangered and are threatened with extinction. Appendix II lists species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled. And Appendix III is a list of species included at the request of a Party that already regulates trade in the

species and that needs the cooperation of other countries to prevent unsustainable or illegal exploitation.

1.3 DESCRIPTION OF THE STUDY AREA

The Study Area of the terrestrial ecological assessment in Cheung Chau is 500 m from the boundary of the project components including the upgrade of the existing Cheung Chau Sewage Treatment Works (STW), Pak She Sewage Pumping Station (SPS) and some village sewers works (*Figure 1.1*). The Study Area covers a large portion of Cheung Chau Island and has a mixed topography, being flat in the middle and hilly in the northern and southern sections.

The existing Cheung Chau STW and Pak She SPS are located in the middle north of the Study Area, along Pak Kok Tsui Road and Pak She Praya Road respectively. Both are situated in developed areas where limited vegetation is present. The proposed upgrading works will be undertaken within the existing STW/SPS.

All of the proposed sewers to be constructed/upgraded (with a total length of around 8.0 km) are along existing roads or footpaths. Most of them will be located in residential and commercial areas, except a section of proposed sewer in Fa Peng where it will run across a stream (*Figures 1.1 and 1.2*).

1.4 SITE OF CONSERVATION IMPORTANCE

There are no Country Parks (CPs), Sites of Special Scientific Interest (SSSIs), Special Areas (SA) or Conservation Areas (CAs) within the Study Area. But it covers areas of Coastal Protection Area (CPA) and Green Belt (GB).

Several narrow and winding strips of CPA lie along the coastal areas of Tai Kwai Wan, Tung Wan, Kwun Yam Wan and the southern coastlines of the Study Area (*Figure 1.1*). According to the planning intention of Outline Zoning Plan No. S/I-CC/5, the CPA zone was gazetted to conserve, protect and retain the natural coastlines and the sensitive coastal natural environment, including attractive geological features, physical landform or area of high landscape, scenic or ecological value, with a minimum of built development. There is a general presumption against development in this zone, but some public works coordinated or implemented by Government including sewage works are always permitted. No construction or upgrading works under the Project will be carried out in the CPA area.

GB areas are mainly located along the hill slopes and uplands covered with vegetation in the northern and southern parts of the Study Area (*Figure 1.1*). The planning intention of this zone is primarily for defining the limits of development areas by natural features, to protect the natural landscape, as well as to provide passive recreational outlets for local population and visitors. Development within this zone will be strictly controlled and development proposals will be considered on individual merits taking into account the

relevant Town Planning Board Guidelines. Under this Project, some sections of the proposed sewers fall into the GB zone (Figure 1.1).

1.5 LITERATURE REVIEW OF ECOLOGICAL CONDITION AND PREVIOUS ECOLOGICAL SURVEYS

1.5.1 Introduction

A literature review was conducted to characterise the existing conditions within the Study Area and to identify habitats and species of potential importance in the area. The literature review included Government and private sector reports, independent and Government published literature, academic studies, vegetation maps and land use maps. Reviewed information included, but was not limited to, the following:

- *Hong Kong Biodiversity – Newsletter of Agriculture, Fisheries and Conservation Department (AFCD);*
- *Annual report and other publications of The Hong Kong Bird Watching Society;*
- *Memoirs of Hong Kong Natural History Society;*
- *132 KV Supply Circuit from Pui O via Chi Ma Wan Peninsula via Sea Crossing towards Cheung Chau EIA (2001). Mott MacDonald; and*
- *Improvement of Fresh Water Supply to Cheung Chau EIA (2010). Black & Veatch Hong Kong Ltd.*

1.5.2 Habitat and Vegetation

The assessment area of *Improvement of Fresh Water Supply to Cheung Chau* ⁽¹⁾ overlaps with the current Study Area in the north. According to this EIA report, the habitats in northern Cheung Chau included rocky shore, sandy shore, developed area, plantation and extensive shrubland-grassland. Based on recent aerial photographs of the whole Study Area, it can be seen that, in addition to the northern part, the southern part of the Study Area is also largely vegetated and covered areas of woodland, shrubland and grassland. Small patches of agricultural land could also be found at the south of Fa Peng. Although residential houses and other built structures scattered in vegetated areas, they are more concentrated in the middle flat area of the island. Rocky shore and sandy shore are present along the coastline of the Study Area except near Sai Wan, Cheung Chau Wan and Cheung Chau Typhoon Shelter which are dominated by artificial seawall.

Three restricted plant species (*Thespesia populnea*, *Celtis biondii* and *Ficus Tinctoria* Subsp. *gibbosa*) were recorded and were considered species of conservation interest due to their restricted distribution in Hong Kong in the EIA for

(1) Black & Veatch Hong Kong Ltd (2010) *Improvement of Fresh Water Supply to Cheung Chau EIA*.

Improvement of Fresh Water Supply to Cheung Chau ⁽¹⁾. Among them, *Thespesia populnea* and *Ficus Tinctoria* Subsp. *Gibbosa* are located within the current Study Area. None of these species are protected under local or regional regulations.

1.5.3 Mammals

There is no large wild terrestrial mammal recorded within the Study Area. The roost censuses of cave dwelling bats of Hong Kong conducted by AFCD in 2004 and 2005 found roosts of Short-nosed Fruit Bat (*Cynopterus sphinx*) and Leschenault's Rousette (*Rousettus leschenaulti*) within/near the Study Area ⁽²⁾. Both of the species are protected under *Wild Animals Protection Ordinance* (Cap. 170).

1.5.4 Birds

Publications by HKBWS and previous baseline surveys as part of EIA studies recorded eight species of conservation interest in Cheung Chau Island covering the Study Area as listed in *Table 1.1*.

Table 1.1 Bird Species of Conservation Interest Previously Recorded within Cheung Chau

Species	Commonness in Hong Kong	Hong Kong Protection Status*	PRC Protection Status	China Red Data Book	CITES Appendix
Pacific Reef Egret (<i>Egretta sacra</i>) †	Uncommon		II	Rare	--
Black Kite (<i>Milvus migrans</i>) †	Common	Cap. 586	II	--	II
White-bellied Sea Eagle (<i>Haliaeetus leucogaster</i>) [△]	Uncommon	Cap. 586	II	--	II
Crested Goshawk (<i>Accipiter trivirgatus</i>) [△]	Uncommon	Cap. 586	II	Rare	II
Emerald Dove (<i>Chalcophaps indica</i>) [△]	Scarce		--	Vulnerable	--
Greater Coucal (<i>Centropus sinensis</i>) †	Common		II	Vulnerable	--
Lesser Coucal (<i>Centropus bengalensis</i>) [△]	Common		II	Vulnerable	--
Chinese Hwamei (<i>Garrulax canorus</i>) †	Common		--	--	II

* All avifauna species in Hong Kong are listed under the Wild Animals Protection Ordinance (Cap. 170).

† Indicates the bird species found within the Study Area ⁽³⁾.

△ Indicates the bird species found within Cheung Chau but not necessarily in the Study Area.

The Avifauna of Hong Kong ⁽⁴⁾ published by HKBWS summarised the results of Hong Kong Breeding Bird Survey 1993-1996. According to this survey, confirmed or probable breeding of a number of bird species were found in Cheung

(1) Black & Veatch Hong Kong Ltd (2010) *Improvement of Fresh Water Supply to Cheung Chau* EIA.

(2) Shek, C.T. and Chan, C.S.M. (2005) *Roost Censuses of Cave Dwelling Bats of Hong Kong*. Hong Kong Biodiversity, 10: 1-8.

(3) Black & Veatch Hong Kong Ltd (2010) *Improvement of Fresh Water Supply to Cheung Chau* EIA.

(4) HKBWS (2001) *The Avifauna of Hong Kong*.

Chau, including Crested Goshawk (*Accipiter trivirgatus*), Chinese Bulbul (*Pycnonotus sinensis*), Hwamei (*Garrulax canorus*), Black-collared Starling (*Gracupica nigricollis*), White-shouldered Starling (*Sturnia sinensis*), Crested Myna (*Acridotheres cristatellus*), Black Drongo (*Dicrurus macrocercus*) and Common Magpie (*Pica pica*). It should be noted that, locations of the breeding sites of these bird species were presented in a map divided into squares of 1 km × 1 km and 5 km × 5 km, and hence their exact locations in Cheung Chau are unclear.

1.5.5 *Herpetofauna (Amphibians & Reptiles)*

One toad species (Asian Common Toad *Bufo melanostictus*), four frog species (Asiatic Painted Frog *Kaloula pulchral*, Marbled Pygmy Frog *Microhyla pulchra*, Gunther's Frog *Rana guentheri* and Brown Tree Frog *Polypedates megacephalus*) and three gecko/skink/lizard species (Chinese Gecko *Gekko chinensis*, Reeves's Smooth Skink *Scincella reevesii* and Changeable Lizard *Calotes versicolor*) were recorded during the survey for Improvement of Fresh Water Supply to Cheung Chau EIA ⁽¹⁾. All of these herpetofauna species are common and widespread in Hong Kong ⁽²⁾. Nevertheless, it should be noticed that they were recorded in an area covering both the southeastern coast of Chi Ma Wan Peninsula and the northwestern coast of Cheung Chau, which may not exactly fall within the current Study Area.

There are some records of Chinese Bullfrog (*Rana rugulosa*) ⁽³⁾ and Chinese Cobra (*Naja atra*) ⁽⁴⁾ along the southern fringe of Cheung Chau Island. Chinese Bullfrog is Class II Protected Animal in PRC, while Chinese Cobra is listed in CITES Appendix II, classified as 'Vulnerable' in the *China Red Data Book* and locally protected under Cap. 586 in Hong Kong.

1.5.6 *Butterflies*

Two individuals of Red Lacewing (*Cethosia biblis phanaroia*) were recorded in north Cheung Chau in the EIA report of Improvement of Fresh Water Supply to Cheung Chau ⁽⁵⁾. Although considered as a rare species ⁽⁶⁾, it is recorded in many locations in Hong Kong and mainly occurs in coastal shrublands and woodside areas ⁽⁷⁾.

1.5.7 *Odonates (Dragonfly & Damselfly)*

No odonate species of conservation interest was recorded by previous baseline surveys/researches within the Study Area.

(1) Black & Veatch Hong Kong Ltd (2010) *Improvement of Fresh Water Supply to Cheung Chau EIA*.

(2) Hong Kong Biodiversity Database.
[<http://www.afcd.gov.hk/english/conservation/hkbiodiversity/database/search.asp>]

(3) Chan S.K.F. et al. (2005) *A Field Guide to the Amphibians of Hong Kong*. Agriculture, Fisheries and Conservation Department.

(4) Chan, S. K. F. et al. (2006) *A Field Guide to the Venomous Land Snakes of Hong Kong*. Agricultural, Fisheries and Conservation Department.

(5) Black & Veatch Hong Kong Ltd (2010) *Improvement of Fresh Water Supply to Cheung Chau EIA*.

(6) Hong Kong Biodiversity Database.
[<http://www.afcd.gov.hk/english/conservation/hkbiodiversity/database/search.asp>]

(7) Lo, P. Y. F. (2005) *Hong Kong Butterflies*. Friends of the Country Parks.

1.5.8 *Stream Fauna*

The literature review revealed that limited information on freshwater stream fauna was available within the Study Area. Relevant data was found regarding to an outfall section which is located outside Scenic Garden behind Tai Kwai Wan. This outfall section receives tidal influence and only low abundance of some brackish species such as Crab *Varuna littarata* was recorded ⁽¹⁾.

1.6 *ECOLOGICAL BASELINE SURVEYS METHODOLOGY*

1.6.1 *Introduction*

Following the literature review of available ecological data characterising the Study Area, a number of more focused baseline field surveys were conducted to supplement the review findings.

The ecological baseline surveys in Cheung Chau were conducted in the wet season (May - August 2011) and followed survey transects and sampling points, which were set out to cover all representative habitats within the Study Area including the Project Site and were shown in *Figure 1.2*. Habitat types covered by each sampling point as requested in the Service Order No. CE1015-EBS01 Ecological Baseline Survey (April 2011) are listed in *Table 1.2*.

Table 1.2 *Types of Habitats Covered by Sampling Points in Cheung Chau*

Sampling Point No.	Type of Habitat
1	Developed area/Village
2	Developed area/Village
3	Developed area/Village
4	Developed area/Village and Shrubland
5	Developed area/Village
6	Developed area/Village and Plantation
7	Developed area/Village

Both day-time and night-time surveys were carried out in Cheung Chau and the methodology of the ecological surveys was made reference to the technical guidelines of ecological assessment in *Annexes 8 and 16* of EIAO-TM and the related Guidance Notes (GN 7/2010 and GN 10/2010). *Table 1.3* summarises the flora and fauna surveys carried out in terrestrial and freshwater habitats in the Study Area of Cheung Chau. Detailed methodologies are provided in the following paragraphs.

(1) Black & Veatch Hong Kong Ltd (2010) *Improvement of Fresh Water Supply to Cheung Chau EIA*.

Table 1.3 Summary of the Ecological Baseline Surveys – Cheung Chau

Survey Type	Brief Methodology	Survey Period
Habitat and Vegetation	Habitat mapping and vegetation identification through ground truthing in major habitats.	Monthly from May to August 2011
Bird	Quantitative (point count and transect count method) and qualitative (recorded within the Study Area) survey including day and night surveys covering the wet season.	Monthly from May to August 2011
Mammal	Quantitative (active searching along the survey transect) and qualitative (recorded within Study Area); including day and night surveys covering the wet season.	Monthly from May to August 2011
Herpetofauna	Quantitative (active searching along the survey transect) and qualitative (recorded within Study Area); including day and night surveys covering the wet season.	Monthly from May to August 2011
Butterfly	Quantitative (point count and transect count method) and qualitative (recorded within Study Area) survey; including only day-time surveys covering the wet season.	Monthly from May to August 2011
Odonates (i.e. Dragonfly and Damselfly)	Quantitative (point count and transect count method) and qualitative (recorded within Study Area) survey; including only day-time surveys covering the wet season.	Monthly from May to August 2011
Freshwater Aquatic Assemblage	Active searching in freshwater streams; using hand net and kick sampling; including only day-time surveys in the wet season.	Two times in July and August 2011

1.6.2 *Habitat and Vegetation Survey*

A preliminary habitat map of suitable scale (ie 1:5,000) prepared during the literature review were used during the baseline survey to map habitats within the Study Area. The preliminary habitat map was produced based on latest aerial photos and verified by field ground-truthing to generate the final habitat map (*Figures 1.3a – 1.3d*). Plant species within each habitat type were identified, and their relative abundance were recorded with special attention to rare or protected species. Nomenclature and protection of the plant species followed those documented in the AFCD’s biodiversity database ⁽¹⁾ as well as Xing *et al.* (2000) ⁽²⁾, Wu and Lee (2000) ⁽³⁾ and Siu (2000) ⁽⁴⁾. Habitats were characterised and defined with reference to size, vegetation type, flora species present, dominant species, species diversity and abundance, community structure, seasonality and inter-dependence as well as the presence of any feature of ecological importance. Photographic records of habitats were taken and presented in *Figures 1.4a* and *1.4b* for better illustration of the site conditions.

- (1) AFCD (2010) HK Biodiversity Database. <http://www.afcd.gov.hk/english/conservation/hkbiodiversity/database/search.asp>
- (2) Xing FW, Ng S.C., and Chau L.K.C. 2000. Gymnosperms and angiosperms of Hong Kong. *Memoirs of the Hong Kong Natural History Society* 23: 21-136
- (3) Wu S.H and Lee T.C. 2000. Pteridophytes of Hong Kong. *Memoirs of the Hong Kong Natural History Society*: 23:5-20
- (4) Siu, L.P.G. 2000. Orchidaceae of Hong Kong. *Memoirs of the Hong Kong Natural History Society*: 23:137-148

1.6.3 *Terrestrial Mammal (including Bat) Survey*

As most mammals occur at low densities, all sightings, tracks, and signs of mammals (including scats, footprints) were actively searched along the sampling transects (as shown in *Figure 1.2*). Nomenclature for mammals followed AFCD (2006) ⁽¹⁾. Whilst quantification of abundance of mammals in the Study Area is not required, due to the difficulties in translating sights and tracks (e.g. burrows) to actual abundance, a list of mammals recorded during the surveys were provided.

1.6.4 *Avifauna Survey*

Birds in each habitat type recorded within the Study Area were surveyed quantitatively and qualitatively by using point count method and transect count method. Locations of sampling points and transects are shown in *Figure 1.2*. For point count method, ten minutes were spent counting birds at each sampling point, and all birds seen or heard within 30 m of each point were counted and identified to species where possible. For transect count method, all birds seen or heard within 30m from either sides of the sampling transect were counted and identified to species where possible. Signs of breeding (e.g. nests, recently fledged juveniles) within the Study Area were also recorded, if any. Observations were made using binoculars (at least 8x) and photographic records were taken, if possible. Bird species encountered outside transects/counting points but within the Study Area were also recorded to produce a complete species list. Nomenclature and protection of the bird species followed those documented in the AFCD's biodiversity database and Viney et al (2006) ⁽²⁾.

1.6.5 *Herpetofauna Survey*

Herpetofauna surveys were conducted through direct observation and active searching in all habitat types along the sampling transects (as shown in *Figure 1.2*) and in potential hiding places such as among leaf litter, inside holes, under stones and logs within the Study Area. Particular attention was given to streams and watercourses. Auditory detection of species-specific calls was also used to survey frogs and toads. Nomenclature and status used for reptiles will follow Karsen et al (1998) ⁽³⁾ and AFCD (2006) ⁽⁴⁾ while those of amphibians will follow AFCD (2005) ⁽⁵⁾.

1.6.6 *Butterflies and Odonates (ie Dragonflies & Damselflies) Survey*

Butterflies and odonates in different habitats of the Study Area were surveyed using point count method and transect count method (*Figure 1.2*). Particular attention was paid to streams and watercourses. Butterflies and odonates

(1) Shek, C. T 2006. A Field Guide to the Terrestrial Mammals of Hong Kong. Friends of Country Park and Cosmos book Limited.

(2) Viney, C., Phillipps, K., Ying, L.C. 2006. *Birds of Hong Kong and South China*. Government Publications Centre, Hong Kong;

(3) Karsen, S.J., Lau M.W.N., Bogadek A. 1998. *Hong Kong Amphibians and Reptiles*. Urban Council, Hong Kong

(4) AFCD. 2006. A Field Guide to the Venomous Land Snakes of Hong Kong. Friends of Country Park

(5) AFCD. 2005. A Field Guide to the Amphibians of Hong Kong. Friends of Country Park

within 10 m from either side of the sampling transect, or within 30 m of each sampling point, were identified and counted. Odonates and butterflies encountered outside counting points/transects but within the Study Area were also recorded in order to produce a complete species list. Nomenclature for butterflies followed Yiu (2004) ⁽¹⁾, and odonates nomenclature followed Wilson (2004) ⁽²⁾.

1.6.7 *Freshwater Aquatic Assemblage Survey*

After field ground-truthing, two streams within the Study Area of Cheung Chau were confirmed for further freshwater survey. Their locations together with the locations of the sampling points (3 points for each stream) are shown in *Figure 1.2*. Aquatic fauna, including freshwater macro-invertebrates (e.g. freshwater crabs, shrimps, freshwater molluscs and aquatic insect larvae) and fishes, in the streams were studied by direct observation and active searching by hand nets and standard field sampling techniques (e.g. kick sampling) for most parts of the stream course. Organisms were recorded and identified to the lowest possible taxon, and their relative abundances were reported. Nomenclature for fish followed Lee *et al* (2004) ⁽³⁾, while those for the macro-invertebrates followed Dudgeon (1999) ⁽⁴⁾.

1.6.8 *Criteria of Evaluating Species of Conservation Interest*

Species listed under local legislation and international conventions for conservation of wildlife were given special attention. References were also made to those protected by law in China. Specifically speaking, flora or fauna species protected by the following laws/regulations or listed under the following conventions were considered to be species of conservation interest. However this excludes exotic weeds, escaped cultivars or captive species, vagrants and introduced species which have lower ecological value.

- *Forests and Countryside Ordinance (Cap 96) and its subsidiary legislation the Forestry Regulations;*
- *Wild Animals Protection Ordinance (Cap 170);*
- *Protection of Endangered Species of Animals and Plants Ordinance (Cap 586);*
- *PRC Wild Animal Protection Law; and*
- *China Red Data Book of Endangered Species;*
- *The International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species;*

(1) Yiu, V. 2004. Field Guide to the butterflies of Hong Kong. Hong Kong Discovery Ltd.

(2) Wilson K.D.P. 2004. Field Guide to the Dragonflies of Hong Kong. Agriculture, Fisheries and Conservation Department, Friends of Country Park and Cosmos Book Ltd. Hong Kong

(3) Virginia L.F. Lee, Samuel K. S. Lam, Franco K. Y. Ng, Tony K. T. Chan and Maria L. C. Young (2004). Field Guide to the Freshwater Fish of Hong Kong. Agriculture, Fisheries and Conservation Department, Friends of Country Park and Cosmos Book Ltd. Hong Kong

(4) Dudgeon, D. (1999). *Tropical Asian Streams*. Hong Kong University Press.

- *The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).*

1.7 RESULTS OF ECOLOGICAL BASELINE SURVEYS

The information presented in the following sections has been based on the findings of baseline surveys performed and the requirement of the EIA Study Brief (ESB- 212/2009). The importance of potentially impacted ecological resources identified within the Study Area was assessed using the EIAO-TM methodology.

1.7.1 Habitat and Vegetation

Eight habitat types were recorded within the Study Area. These included young woodland, plantation, shrubland, grassland, stream, agricultural land/orchard, village/developed area and coastal area. Habitats found are shown in the habitat maps (Figures 1.3a – 1.3d). Photographic records of each habitat are presented in Figures 1.4a and 1.4b. A total of 257 plant species were recorded during the ecological baseline surveys (Annex A1). No rare or protected plant species was found during the surveys. Table 1.4 lists the number of plant species recorded in, and total area occupied by, each habitat in the Study Area.

Table 1.4 Plant Species and Area of Each Habitat of Study Area

Habitat	Number of Plant Species Recorded	Area within the Study Area in ha (% of Total Area)
Young Woodland	100	78.4 (37.6%)
Plantation	18	9.5 (4.6%)
Shrubland	67	16.0 (7.7%)
Grassland	37	6.9 (3.3%)
Stream	32	0.05 (0.02 %)
Agricultural Land/Orchard	33	1.8 (0.9%)
Village/Developed Area	136	85.9 (41.2%)
Coastal Area	20	9.8 (4.7%)

Young Woodland

Large patches of young woodland were found in the hilly northern (behind Tai Kwai Wan San Tsuen), south-western (in the vicinity of Cheung Chau Public Cemetery) and south-eastern (i.e. Fa Peng) parts of the Study Area. In the northern part, the young woodland borders those shrubland and grassland located on the more elevated topography, while in the southern parts, its closed canopy is often opened or chopped by built-ups such as village houses and camp sites etc.

Young woodland is the next stage of shrubland in terms of ecological succession or established through the spontaneous colonisation of native plant species in a previous plantation. Within the Study Area, it is estimated that the young woodlands have an age of 15 – 20 years, with an average canopy height of 4 – 10 m.

All the three main patches of young woodland share similar habitat characteristics. Their under-storey is densely vegetated with plant species common to hillside woodland in Hong Kong, such as the climbers *Cocculus orbiculatus*, *Heterosmilax japonica* var. *gaudichaudiana* and *Paederia scandens*, as well as the shrubs *Psychotria asiatica* and *Phyllanthus cochinchinensis*. Seedlings of some tree species including *Microcos paniculata*, *Litsea glutinosa*, and *Schefflera heptahylla* also proliferate in the under-storey. On the canopy level, pioneer tree species including *Leucaena leucocephala*, *Macaranga tanarius*, *Celtis sinensis* and *Bridelia tomentosa* were usually found.

The whole woodland, where a total of 100 plant species were recorded, is dominated by native trees including *Mallotus paniculatus*, *Microcos paniculata* and *Sterculia lanceolata*. One tree species, *Celtis biondii*, with a restricted distribution in the woodland near coastal area, was commonly recorded in the northern patch of young woodland, but it is not considered as a species of conservation interest.

Plantation

The plantation habitat within the Study Area was found both in the plantation woodland on the hill slopes at the north and the area with planted trees and shrubs in close proximity of the residential buildings such as Nga Ning Court as well as along major roads (e.g. Cheung Chau Sai Tai Road and Cheung Kwai Road).

The plantation woodland along hillside has a semi-closed canopy at a relatively uniform height of about 10 m and is extensively planted with the exotic tree species *Acacia confusa*, *Acacia auriculiformis* and *Acacia mangium* which have been widely used in Hong Kong during the past few decades because of their adaptability to poor soil conditions.

In comparison, the plantation found in those developed environments comprised more diverse landscaping trees (e.g. *Delonix regia*, *Ficus microcarpa*, *Livistona chinensis* and *Ravenala madagascariensis*) and shrubs (*Allamanda* spp., *Duranta erecta*, *Hibiscus rosa-sinensis* and *Schefflera arboricola*). Also, *Hibiscus tiliacousis* is predominantly planted along the roadside next to coastal areas. More than 70% of the species observed in this habitat are exotic to Hong Kong and most of the plants are of little ecological interest.

During the ecological baseline surveys, a total of 18 plant species were recorded within this habitat, and no species of conservation interest were found during the surveys.

Shrubland

In the northern part of the Study Area, patches of shrubland were found bordering the young woodland as a temporary stage in the natural succession towards the latter. These shrublands have a moderate level of structural complexity and were mainly covered by native species with an average height ranging from 1.5 to 3 m. The understorey species were highly variable, from ferns (e.g. *Cyclosorus parasiticus* and *Lygodium japonicum*), herbs (e.g. *Wedelia trilobata*, *Rhynchelytrum repens*, *Peperomia pellucida* and *Dactyloctenium aegyptium*)

to climbers (e.g. *Cassytha filiformis*, *Cocculus orbiculatus* and *Morinda umbellata*), whilst woody climbers (e.g. *Desmos chinensis*), shrubs (e.g. *Ilex asprella*, *Psychotria asiatica*, *Phyllanthus cochinchinensis* and *Sageretia thea*) and small scattered trees (e.g. *Rhus succedanea* and *Sterculia lanceolata*) formed the canopy. One native herb species, *Piper sarmentosum*, with a restricted distribution usually in ravines and dense forests was found under shades on an area of damp soil behind Tai Kwai Sun Tsuen within the shrubland. However, this species is not considered to be a species of conservation interest.

There were also two isolated patches of shrubland found near the existing Pak She SPS. They are small in area, and since they are surrounded by developed areas, disturbance caused by human activities may impede the succession of these two patches of shrubland. Nevertheless, they share a similarity with the above-mentioned shrubland in terms of plant species composition and structural complexity.

Grassland

Grassland was identified along the exposed hillsides north and northeast of Cheung Pak Road. Because of the bouldered steep terrain and grassy nature, this habitat is generally open and simple in structure and had an average plant height of 1 m to 2 m. There is an extensive coverage of herbs (e.g. *Bidens alba* and *Perotis indica*) and tall grasses (e.g. *Miscanthus sinensis*, *Miscanthus floridulus* and *Panicum maximum* and) growing in this area. Most of the species are wind resistant and are well adapted to the relatively dry environment. A total of 37 plant species was recorded within grassland during the ecological baseline surveys, and no species of conservation interest was found within this habitat.

Stream

Two permanent freshwater streams were found during the baseline survey. Both of them are located in the south of the Study Area, one at Shui Hang and one at Fa Peng (Figures 1.3a – 1.3d). There was only limited water flow observed in both streams during the wet season surveys. Considering the local topography and the gradient of hill slope where the streams run down, it is believed that water flows of these two streams would probably cease or be maintained at just a minimum level in the dry season.

The stream at Shui Hang is narrow and shallow with sandy bottom throughout the stream. Generally medium to large sized boulders are present along its banks. Except some stream-associated plants such as *Commelina* sp., the plant species recorded in its riparian zone are similar to those in the adjacent young woodland, including *Alocasia odora*, *Pandanus tectoriu*, *Ficus hispida*, *Macaranga tanarius* and *Litsea glutinosa*.

The condition of the stream at Fa Peng varies in sections. Water in the upstream section runs slowly through an active agricultural land. Since the excessive fertilizer used during the farming activities could enter the water freely, the stream water in this section is considered to be nutrient-enriched. It is therefore able to support large amount of floating macrophytes such as *Pistia stratiotes* and

Nymphaea sp. and submersed aquatic plants (e.g. *Myriophyllum* sp.). In its mid-stream section along Fa Peng Road, the stream is channelised by using soil-cement blocks to build up its banks. Vegetation seldom grows within this section. The downstream section of the stream is natural with water running through large boulders. Plants recorded along its banks mainly include herbs (e.g. *Centotheca lappacea*), climbers (e.g. *Caesalpinia crista* and *Zanthoxylum nitidum*) and trees (e.g. *Ficus microcarpa*, *Celtis sinensis* and *Bambusa* sp.).

Agricultural Land/Orchard

Agricultural lands usually associated with small sized orchards were found located within the valley east of the Self Help Care Village as well as in the lowland area below Ming Fai Road in Fa Peng.

The agricultural land near Self Help Care Village is located on the western hill slope of the valley. This land is planted mainly with fruit trees such as *Litchi chinensis*, *Dimocarpus longan* and *Musa* sp. It is also cultivated with some vegetables such as *Brassica alboglabra* and *Saccharum officinarum*. During the field surveys, some patches of agricultural land were inactive and colonised by weeds species (e.g. *Ageratum conyzoides* and *Bidens alba*).

Crops farmed in Fa Peng agricultural land is comparatively more diverse. These include the common vegetables such as *Capsicum annuum* L. var. *conoides*, *Ipomoea batatas*, *Benincasa hispida* and *Ocimum basilicum*, as well as a range of fruit trees such as *Citrus* sp., *Eriobotrya japonica*, *Litchi chinensis* and *Dimocarpus longan*. In the nearby orchard area, some landscaping plants including *Aglaia odorata* and *Tradescantia spathacea* were also recorded. Nevertheless, naturally colonised vegetation is found along the edges of the fields and was mostly composed of weedy herbaceous species, in particular the herbs *Amaranthus viridis*, *Bidens alba*, *Hedyotis corymbosa* and *Panicum maxima*.

Developed Area/Village

Developed area/village found within the Study Area comprises residential and commercial areas, institution, camp site, park and sport centre, existing STW and SPS, radar station, public cemetery, roads and paths, etc. It accounts for 41.1% of the whole Study Area.

The baseline surveys recorded 135 plant species in this habitat and most of the plant species are common in Hong Kong. Vegetation is dominated by ornamental trees (e.g. *Bauhinia blakeana*, *Delonix regia*, *Ficus microcarpa*, *Hibiscus tiliaceous*, *Lagerstroemia indica*, *Phoenix hanceana* and *Plumeria rubra*) and fruit trees (e.g. *Litchi chinensis*, *Dimocarpus longan*, *Clausena lansium* and *Morus alba*). Other plant species frequently recorded were trees such as *Casuarina equisetifolia* and *Macaranga tanarius*, shrubs such as *Codiaeum variegatum*, *Hibiscus rosa-sinensis*, *Polyscias fruticosa* and *Rhapis excelsa* and climbers such as *Antigonon leptopus*. Most of them are planted in private and public gardens.

One individual of Old and Valuable Tree, Chinese Banyan *Ficus microcarpa* (Registration No.: LCSD Is/4) was found outside the Pak Tai Temple. It was about 10 m in height and with a DBH of 1,340 mm. Except for the OVT, this

habitat receives intensive human disturbances and natural ecological resources are largely absent.

Coastal Area

Coastal Area is mainly found along the sandy shores at Tai Kwai Wan and Kwun Yam Wan as well as along the rocky shores at Nam Tam Wan and the south-eastern fringe of the Study Area.

Large rocks predominate the steep rocky shores. Due to the harsh growing conditions, limited plants grow sparsely along its backshore area. They include herbs *Bidens alba*, *Wedelia trilobata* and *Cyperus rotundus*, shrubs such as *Pandanus tectorius* and trees *Casuarina equisetifolia* and *Macaranga tanarius*. Compared to the rocky shores, sandy shores at Tai Kwai Wan and Kwun Yam Wan are more accessible and hence receive more human disturbances. Rubbishes such as plastic bags and empty bottles were frequently spotted on the beach. In terms of vegetation, apart from the common coastal plant species such as *Clerodendrum inerme*, *Pandanus tectorius* and *Portulaca* sp., some landscaping trees, including *Erythrina speciosa* and *Terminalia catappa*, were also found planted along its periphery where the coastal area meets the inland developed area.

No plant species of conservation interest was found in this habitat during the surveys. The floristic diversity and the structural complexity of this habitat were low.

1.7.2

Mammals

One individual shrew was recorded in the young woodland east of the Self Help Care Village during the night-time survey. However, it was not identified to a species level (*Annex A2*).

Currently there are two shrew species recorded in Hong Kong, i.e. Musk Shrew (*Suncus murinus*) and Grey Shrew (*Crocidura attenuata*). Musk Shrew is locally common. It is found in wide variety of habitats, such as woodlands, grasslands and wetlands, agricultural areas, disturbed areas and urban areas. It is generally a solitary and nocturnal species ⁽¹⁾ ⁽²⁾. Grey Shrew is uncommon, with a fairly wide distribution in forests, grasslands, cultivated areas and occasionally human settlements. Recently, it has been found in Tai Po Kau, Wong Lung Hang, Pak Sha O and Pok Fu Lam. It is generally solitary, aggressive and voracious, and must eat very frequently ⁽³⁾ ⁽⁴⁾. Neither of the two shrew species is of conservation interest.

No bat was recorded during the baseline surveys.

(1) Hong Kong Biodiversity Database. [<http://www.afcd.gov.hk/english/conservation/hkbiodiversity/database/search.asp>]

(2) Shek, C.T. (2006) *A Field Guide to the Terrestrial Mammals of Hong Kong*. Agricultural, Fisheries and Conservation Department

(3) Hong Kong Biodiversity Database. [<http://www.afcd.gov.hk/english/conservation/hkbiodiversity/database/search.asp>]

(4) Shek, C.T. (2006) *A Field Guide to the Terrestrial Mammals of Hong Kong*. Agricultural, Fisheries and Conservation Department

1.7.3

Birds

A total of 39 bird species were recorded within the Study Area during the ecological baseline surveys (*Annex A3*). Abundance and species number of the birds in each type of habitat, based on the results of the transect count, are shown in *Table 1.5*. Higher numbers of bird individuals were recorded in the developed area/village, young woodland and shrubland. It is believed that, for the developed area/village, large groups of the common urban bird species such as Eurasian Tree Sparrow (*Passer montanus*), Barn Swallow (*Hirundo rustica*), Chinese Bulbul (*Pycnonotus sinensis*) and Crested Myna (*Acridotheres cristatellus*) contributed its highest bird abundance. In terms of species richness, young woodland supported the most diverse avifauna species, with 24 species recorded within this habitat, followed by 22 species in developed area/village and 15 species in shrubland.

Table 1.5 *Bird Abundance and Number of Species Recorded in Each Habitat along the Survey Transects within Study Area*

Habitat	Total Number of Birds Recorded Along the Transects	Number of Bird Species Recorded Along the Transects
Young Woodland	94	24
Plantation	37	6
Shrubland	73	15
Grassland	16	6
Stream	6	5
Agricultural Land/Orchard	9	6
Developed Area/Village	196	22
Coastal Area	21	8

Based on the results of the point count method, a total of 107 birds of 18 different species at all of the seven sampling points were averagely recorded during each survey. The bird abundance and species diversity recorded at each point are summarised in *Table 1.6*. Both of the highest bird abundance and number of species were recorded at Point 4 covering the habitats of developed area/village and shrubland.

Table 1.6 *Bird Abundance and Number of Species Recorded at Each Sampling Point*

Sampling Point No.	Type of Habitat	Bird Abundance	Number of Bird Species
1	Developed area/Village	11	6
2	Developed area/Village	15	8
3	Developed area/Village	14	6
4	Developed area/Village and Shrubland	22	11
5	Developed area/Village	12	10
6	Developed area/Village and Plantation	19	7
7	Developed area/Village	14	8

Most of the bird species recorded are generally common and widespread in Hong Kong (e.g. Spotted Dove *Streptopelia chinensis*, Chinese Bulbul *Pycnonotus sinensis*, Japanese White-eye *Zosterops japonica* and Oriental Magpie Robin *Copsychus saularis*). There are six bird species of conservation interest, including Black Kite *Milvus migrans*, Crested Goshawk *Accipiter trivirgatus*, Chinese

Goshawk *Accipiter soloensis*, Emerald Dove *Chalcophaps indica*, Greater Coucal *Centropus sinensis* and Chinese Hwamei *Garrulax canorus* (Annex A3, recorded during the surveys (NB all bird species in Hong Kong are also protected under *Wild Animals Protection Ordinance* (WAPO)(Cap. 170)). Their locations are shown on Figures 1.3a – 1.3d.

Black Kite (*Milvus migrans*) is a very widespread and common species in Hong Kong. It is conspicuous in the urban area and over Victoria Harbour all year around. It is more numerous in winter than in summer and the number peaks in December and January ⁽¹⁾. It is found in a wide variety of coastal and inland habitats, including small islands, sea-coasts, intertidal mudflat, fish ponds, reservoirs, landfills and grassy hillsides at all altitudes. It is listed as a Class II Protected Animal of the PRC and being a member of the Falconiformes it is listed in CITES *Appendix II* as well as being protected under Cap 586 in Hong Kong. During the surveys it was recorded perching at or flying over all habitats except grassland and stream.

Crested Goshawk (*Accipiter trivirgatus*) is a Class II Protected Animal of PRC and being a member of the Falconiformes is listed in CITES *Appendix II*. It is considered as “Rare” in *China Red Data Book*. It is protected under Cap 586 in Hong Kong. It is a locally uncommon resident widespread in the forest and mature woodlands of the New Territories in Hong Kong. It was recorded flying over the young woodland during the ecological baseline surveys.

Chinese Goshawk (*Accipiter soloensis*) is an uncommon passage migrant in Hong Kong. It was previously recorded in Tsim Bei Tsui, Kadoorie Farm and Botanic Garden, as well as Tai Po Kau ⁽²⁾. It is listed as a Class II Protected Animal of the PRC and being a member of the Falconiformes it is listed in CITES *Appendix II* as well as being protected under Cap 586 in Hong Kong. During the surveys it was observed flying over the young woodland in the north of the Study Area.

Emerald Dove (*Chalcophaps indica*) is categorised as ‘Vulnerable’ in the *China Red Data Book*. It is a scarce resident in Hong Kong. It was found flying through the developed area and finally perching at the nearby young woodland during the survey.

Greater Coucal (*Centropus sinensis*) is of ecological interest as it is listed as Class II Protected Animal of the PRC and is categorised as Vulnerable in *China Red Data Book*, despite its commonness and widespread distribution in Hong Kong. It is frequently found in various habitats in Hong Kong, including grasslands, mangroves, marshes, agricultural lands with scattered trees and bushes, open canopy shrubland, fung shui woods and gardens, and has been noted foraging in

(1) Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M., and Young, L. (2001). *The Avifauna of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong.

(2) Hong Kong Biodiversity Database.
[<http://www.afcd.gov.hk/english/conservation/hkbiodiversity/database/search.asp>]

refuse. During the ecological survey, its calling was heard at several spots in the young woodland and shrubland.

Chinese Hwamei is listed in CITES *Appendix II*. It is almost endemic to the PRC. In Hong Kong, it is common breeding resident and commonly found on hillsides and shrubland. During the survey, its calling was heard in young woodland and shrubland within the Study Area.

1.7.4 *Herpetofauna*

Five reptiles, including Chinese Cobra *Naja atra*, Common Blind Snake *Ramphotyphlops braminus*, Long-tailed Skink *Mabuya longicaudata*, Four-clawed Gecko *Gehyra mutilata*, and Chinese Gecko *Gekko chinensis*, and five amphibian species, including Brown Tree Frog *Polypedates megacephalus*, Gunther's Frog *Rana guentheri*, Paddy Frog *Fejervarya limnocharis*, Asiatic Painted Frog *Kaloula pulchra pulchra* and Asian Common Toad *Bufo melanostictus*, were recorded during the ecological baseline surveys (*Annex A4*). All of these herpetofauna were found during transect surveys, and most of them are abundant or widely distributed in Hong Kong except the Chinese Cobra ⁽¹⁾, which is considered as a species of conservation interest.

Chinese Cobra (*Naja atra*) is listed in CITES *Appendix II*, classified as 'Vulnerable' in the *China Red Data Book* and locally protected under Cap 586 in Hong Kong. This species is active in both day and night time and occurs in different kinds of habitat such as woodlands, shrublands, grasslands and moangroves. During the ecological survey, it was found in front of a village house along Fa Peng Road. Its location is shown on *Figure 1.3a* and a photograph recorded in presented in *Figure 1.5*.

1.7.5 *Butterflies*

There were a total of 30 species of butterflies recorded within the Study Area during the ecological surveys (*Annex A5*). Except Plains Cupid (*Chilades pandava pandava*) and Large Eight-ring (*Neope muirheadii muirheadii*), which are considered to be uncommon by AFCD (NB only rare butterfly species are considered as butterfly species of conservation interest), all of the other recorded butterfly species are common in Hong Kong.

The abundance and species richness of butterflies in each habitat, based on the results of transect count surveys are shown in *Table 1.7*. The highest butterfly abundance was found in young woodland, which also supported the most diverse butterfly species. Developed area/village had the second highest butterfly abundance. This might be due to the planting of food plants for butterfly larvae in some private gardens in the residential areas. For example, the White Jade Orchid Tree (*Michelia x alba*) was recorded only around village houses, and this species is the food plant of Great Orange Tip (*Hebomoia glaucippe glaucippe*) and Tailed Jay (*Graphium agamemnon agamemnon*) larvae. Both of the two butterfly species occurred only in developed area/village during the

(1) Hong Kong Biodiversity Database. [<http://www.afcd.gov.hk/english/conservation/hkbiodiversity/database/search.asp>]

baseline surveys. Also, it should be noticed that, of the total butterflies recorded in developed area/village, Pale Grass Blue (*Zizeeria maha serica*), one of the most common lycaenid in Hong Kong, accounts for 50% in terms of abundance. The least number of butterfly individuals and species were recorded in plantation and coastal area.

Table 1.7 *Butterfly Abundance and Number of Species Recorded in Each Habitat along the Survey Transects within Study Area*

Habitat	Total Number of Butterflies Recorded Along the Transects	Number of Butterfly Species Recorded Along the Transects
Young Woodland	73	20
Plantation	1	1
Shrubland	52	10
Grassland	6	5
Stream	2	2
Agricultural Land/Orchard	2	2
Developed Area/Village	54	12
Coastal Area	1	1

The butterfly abundance and species diversity recorded at each sampling point are summarised in *Table 1.8*. Similar to the result of bird counting, Point 4 showed the highest butterfly abundance and richness.

Table 1.8 *Butterfly Abundance and Species Richness at Each Sampling Point*

Sampling Point No.	Type of Habitat	Butterfly Abundance	Number of Butterfly Species
1	Developed area/Village	3	4
2	Developed area/Village	3	4
3	Developed area/Village	3	5
4	Developed area/Village and Shrubland	14	7
5	Developed area/Village	9	6
6	Developed area/Village and Plantation	2	2
7	Developed area/Village	1	1

1.7.6 *Odonates (Dragonflies and damselflies)*

A total of four dragonflies species were recorded within the Study Area during the surveys (*Annex A6*). They are Wandering Glider (*Pantala flavescens*) recorded from both shrubland and developed area/village, Common Blue Skimmer (*Orthetrum glaucum*) from young woodland, Common Red Skimmer (*Orthetrum pruinosum neglectum*) from shrubland and Crimson Darter (*Crocothemis servilia servilia*) from stream. For the point count results, only Wandering Glider (*Pantala flavescens*) and Common Red Skimmer (*Orthetrum pruinosum neglectum*) were recorded at Point 2 and Point 4, respectively.

All of the four species are abundant as considered by the AFCD's Hong Kong Biodiversity Database ⁽¹⁾.

No damselfly species were recorded during the ecological survey.

(1) Hong Kong Biodiversity Database. [<http://www.afcd.gov.hk/english/conservation/hkbiodiversity/database/search.asp>]

1.7.7 *Freshwater Aquatic assemblage*

A total of 18 freshwater fauna taxa were recorded in the two freshwater streams within the Study Area. They included tadpoles, fishes, insect larvae and some lower invertebrates such as leeches (*Annex A6*).

The two streams, at Shui Hang and Fa Peng, share most of the aquatic macroinvertebrates in terms of species composition. The minor difference may reflect the distinction of the micro-habitats in these two streams. For instance, the Shui Hang stream contains more sands in its bed, and Odonoceridae, a family of caddisfly whose larvae are associated with sandy substrates where they sometimes burrow ⁽¹⁾, was only recorded in this stream. Also, there were comparatively more pollutant-tolerant oligochaetes in Fa Peng Stream than in Shui Hang Stream. This is in line with the fact that Fa Peng Stream may receive excessive fertilizers from its nearby farmlands as described in *Section 1.7.1*.

The two fish species recorded from the streams are Mosquito Fish (*Gambusia affinis*) and Guppy (*Poecilia reticulata*), and Guppy was only recorded in the Fa Peng Stream. Both of the fishes are common and occur in many local freshwater bodies. Tadpoles of Asian Common Toad (*Bufo melanostictus*) were present abundantly in the downstream section of Shui Hang Stream. No species of conservation interest was found for the freshwater community during the ecological baseline surveys.

1.7.8 *Summary of Terrestrial Ecological Resources*

The ecological importance of the habitats and wildlife identified within the Study Area during the surveys are evaluated in accordance with the *EIAO TM Annex 8* criteria, and presented in *Tables 1.9 - 1.16*. Habitats recorded within the Study Area included young woodland, plantation, shrubland, grassland, stream, agricultural land/orchard, developed area/village and coastal area. The ecological value of young woodland was considered to be moderate to high. The ecological value of shrubland, stream and developed area/village was considered to be low to moderate. And that of plantation, grassland, agricultural land/orchard and coastal area was considered to be low.

(1) Dudgeon, D. (1999). *Tropical Asian Streams*. Hong Kong University Press

Table 1.9 Ecological Evaluation of Young Woodland within Study Area of Cheung Chau

Criteria	Young Woodland
Naturalness	Semi-natural dominated by native plants.
Size	Large patches of young woodland were found in the hilly northern (behind Tai Kwai Wan San Tsuen), south-western (in the vicinity of Cheung Chau Public Cemetery) and south-eastern (i.e. Fa Peng) parts of the Study Area, with an overall area of approximately 78.4 ha (37.6% of the total Study Area).
Diversity	Moderate to high floral diversity (100 plant species recorded) with moderate structural complexity. Moderate faunal diversity.
Rarity	Bird species of conservation interest included Black Kite <i>Milvus migrans</i> , Crested Goshawk <i>Accipiter trivirgatus</i> , Chinese Goshawk <i>Accipiter soloensis</i> , Emerald Dove <i>Chalcophaps indica</i> , Greater Coucal <i>Centropus sinensis</i> and Chinese Hwamei <i>Garrulax canorus</i> .
Re-creatability	Habitat characteristics and species composition are relatively natural although not mature enough. In the absence of disturbance, it would take 15 - 20 years for the young woodland to be re-created.
Fragmentation	The north patch is largely continuous, while the close canopy of the southern patches is often opened or chopped by built-ups.
Ecological Linkage	Not functionally links to any highly valued habitat in close proximity; but may provide roosting sites for different fauna. Largely fell within the Green Belt zone.
Potential Value	With a moderate to high potential value to become mature woodland if given sufficient time and protection from disturbances.
Nursery/ Breeding Ground	Nil.
Age	15 - 20 years.
Abundance/ Richness of Wildlife	Moderate to high for birds and butterflies; low for the other fauna groups.
Overall Ecological Value	Moderate to high.

Table 1.10 Ecological Evaluation of Plantation within Study Area of Cheung Chau

Criteria	Plantation
Naturalness	Manmade habitat, dominated by exotic trees and shrubs.
Size	The total area of this habitat is approximately 9.5 ha (4.6% of the total Study Area).
Diversity	Low floral diversity (18 plant species recorded) with low structural complexity. Low faunal diversity.
Rarity	One bird species of conservation interest, Black Kite <i>Milvus migrans</i> .
Re-creatability	For the plantation woodland along northern hillsides, it would take about 10 years for the trees to be re-created. For the plantation in close proximity of urban environments, habitat characteristics and species composition are relatively easy to be re-created.
Fragmentation	Largely fragmented and isolated except for the northern plantation woodland along hill slopes.
Ecological Linkage	Not functionally linked to any highly valued habitat in close proximity.
Potential Value	Generally low, but low to moderate for the plantation woodland in north to become young woodland with native species as dominant plants if given sufficient time and protection from disturbances.
Nursery/ Breeding Ground	Nil.
Age	10 years.
Abundance/ Richness of Wildlife	Low for all fauna groups.
Overall Ecological Value	Low.

Table 1.11 Ecological Evaluation of Shrubland within Study Area of Cheung Chau

Criteria	Shrubland
Naturalness	Semi-natural habitats mainly covered by native species.
Size	Patches were recorded within the Study Area with an overall area of approximately 16.0 ha (7.7% of the total Study Area).
Diversity	Moderate diversity of plants (67 species) with moderate structural complexity. Moderate faunal diversity.
Rarity	Bird species of conservation interest included Black Kite <i>Milvus migrans</i> , Greater Coucal <i>Centropus sinensis</i> and Chinese Hwamei <i>Garrulax canorus</i> .
Re-creatability	In the absence of disturbance, it would take 5 - 10 years for the shrubland to be re-created.
Fragmentation	Relatively fragmented, in particular to those patches surrounded by the developed areas.
Ecological Linkage	Not functionally linked to any highly valued habitat, bordering young woodland in close proximity. Largely fell within the Green Belt zone.
Potential Value	Low to moderate to become mature shrubland and then young woodland if given sufficient time and protection from disturbance.
Nursery/ Breeding Ground	Nil.
Age	5 - 10 years.
Abundance/ Richness of Wildlife	Moderate for butterflies and birds, low for the other fauna groups.
Overall Ecological Value	Low to moderate

Table 1.12 *Ecological Evaluation of Grassland within Study Area of Cheung Chau*

Criteria	Grassland
Naturalness	Natural succession would be frequently impeded by disturbances such as hill fires.
Size	The total area of this habitat is approximately 6.9 ha (3.3% of the total Study Area).
Diversity	Relatively low diversity of plants (37 species) with low structural complexity. Low faunal diversity.
Rarity	No flora or fauna species of conservation interest were found in this habitat.
Re-creatability	Readily re-creatable.
Fragmentation	Concentrated in the northern hilly areas, generally not fragmented.
Ecological Linkage	Not functionally linked to any highly valued habitat, bordering young woodland and shrubland located at lower levels. Largely fell within the Green Belt zone.
Potential Value	Subject to practice of management and level of disturbance (e.g. hill fires).
Nursery/ Breeding Ground	Nil.
Age	Very young.
Abundance/ Richness of Wildlife	Low for all fauna groups.
Overall Ecological Value	Low.

Table 1.13 *Ecological Evaluation of Stream within Study Area of Cheung Chau*

Criteria	Stream
Naturalness	Stream at Shui Hang: generally natural. Stream at Fa Peng: may receive excessive fertilizer from nearby farmlands in upstream section.
Size	Total area of this habitat is 0.05 ha, accounting for 0.02% of the total Study Area (in terms of length, 159.9 m for the stream at Shui Hang and 476.3 m for the stream at Fa Peng).
Diversity	Moderate diversity of plants (32 species) given its small area. Low to moderate diversity of amphibian species, low diversity of other fauna.
Rarity	No flora or fauna species of conservation interest were found in this habitat.
Re-creatability	Low re-creatability, the characteristic of natural stream banks and stream bed could be recreated through the incorporation of ecologically friendly stream design, but the ecological value/ function will be less compare with natural stream.
Fragmentation	Not applicable.
Ecological Linkage	Not functionally linked to any highly valued habitat. Nevertheless, banks of the Shui Hang river integrated into the young woodland in close proximity.
Potential Value	Moderate in general if provided with sufficient time, deduction in fertilizer input and protection from disturbance, etc.
Nursery/ Breeding Ground	Nil.
Age	Not applicable.
Abundance/ Richness of Wildlife	Low to moderate for freshwater assemblage, low for the other fauna groups.
Overall Ecological Value	Low to moderate.

Table 1.14 *Ecological Evaluation of Agricultural Land/Orchard within Study Area of Cheung Chau*

Criteria	Agricultural Land/Orchard
Naturalness	Man-made habitat actively cultivated in most area except some small plots in the agricultural land near Self Help Care Village.
Size	Two patches of agricultural lands often associated with small sized orchards were found located within the valley east of the Self Help Care Village as well as in the lowland area below Ming Fai Road in Fa Peng, with an overall area of approximately 1.8 ha (0.9% of the total Study Area).
Diversity	Moderate diversity of crop plant species, in particular in the Fa Peng Agricultural land. Low fauna diversity.
Rarity	One bird species of conservation interest, Black Kite <i>Milvus migrans</i> .
Re-creatability	Readily re-creatable.
Fragmentation	Relatively fragmented given the small size of the two patches.
Ecological Linkage	Surrounded by young woodland, but not functionally linked to any highly valued habitat.
Potential Value	Highly depending on the management practice of land owners, i.e. wet agricultural land often has higher ecological value due to the comparatively high diversity of fauna it supports.
Nursery/ Breeding Ground	Nil.
Age	Not applicable.
Abundance/ Richness of Wildlife	Low to all fauna groups.
Overall Ecological Value	Low

Table 1.15 *Ecological Evaluation of Developed Area/Village within Study Area of Cheung Chau*

Criteria	Developed Area/Village
Naturalness	Man-made habitat dominated by ornamental trees and fruit trees.
Size	The largest habitat within the Study Area with an overall area of approximately 85.9 ha (41.2% of the total Study Area).
Diversity	Moderate to high floral diversity (136 plant species recorded). Moderate faunal diversity.
Rarity	No flora species of conservation interest, but one OVT (Chinese Banyan <i>Ficus microcarpa</i> , Registration No.: LCSD Is/4) found outside the Pak Tai Temple. Bird species of conservation interest included Black Kite <i>Milvus migrans</i> and Emerald Dove <i>Chalcophaps indica</i> . One reptile species of conservation interest, Chinese Cobra <i>Naja atra</i> , found in front of a village house along Fa Peng Road.
Re-creatability	Readily re-creatable.
Fragmentation	Largely continuous and concentrated in the central part of the Study Area, some village houses or other rural settlements scattered in the northern and southern hilly areas.
Ecological Linkage	Not functionally linked to any highly valued habitat, but bordering nearly all of the other habitats within the Study Area. .
Potential Value	Low.
Nursery/ Breeding Ground	Nil.
Age	Not applicable.

Criteria	Developed Area/Village
Abundance/ Richness of Wildlife	Moderate to high for birds, moderate for butterflies and herpetofauna, low for the other fauna groups.
Overall Ecological Value	Low to moderate.

Table 1.16 *Ecological Evaluation of Coastal Area within Study Area of Cheung Chau*

Criteria	Coastal Area
Naturalness	Rocky shore: largely natural. Sandy shore: disturbed by beach activities and littering.
Size	Total area of this habitat is 9.8 ha (4.7% of the total Study Area).
Diversity	Low in plant species diversity (20 plant species recorded) and structural complexity. Low in fauna diversity.
Rarity	One bird species of conservation interest, Black Kite <i>Milvus migrans</i> .
Re-creatability	Difficult to be re-created.
Fragmentation	Located continuous along the periphery of the Study Area.
Ecological Linkage	Not functionally linked to any highly valued habitat in close proximity. Rocky shore mainly bordering young woodland and shrubland, while sandy shore mainly bordering developed area/village.
Potential Value	Low.
Nursery/Breeding Ground	Nil.
Age	Young.
Abundance/ Richness of Wildlife	Low for all fauna groups.
Overall Ecological Importance	Low

A list and evaluation of the species of ecological conservation interest recorded during ecological baseline surveys within the Study Area, according to the *EIAO-TM*, are given in *Table 1.17*. The locations of these species of conservation interest, whenever available, are presented in *Figures 1.3a - 1.3d*.

Table 1.17 *Evaluation of Species of Conservation Interest recorded within Study Area of Cheung Chau during Ecological Baseline Surveys*

Species	Location and Activities (if any)	Protection Status	Distribution	Commonness in HK
Bird*				
Black Kite <i>Milvus migrans</i>	Flew over or perched at young woodland, plantation, shrubland, agricultural land/orchard, developed area/village and coastal area of the Study Area.	<i>Appendix II</i> of CITES; Class II Protected Animal of PRC; Protected under <i>Protection of Endangered Species of Animals and Plants Ordinance</i> (Cap. 586).	Found in a wide variety of coastal and inland habitats, including small islands, sea-coasts, intertidal mudflat, fish ponds, reservoirs, landfills and grassy hillsides at all altitudes; East Eurasia	Common and widespread. Resident and Winter Visitor

Species	Location and Activities (if any)	Protection Status	Distribution	Commonness in HK
Crested Goshawk <i>Accipiter trivirgatus</i>	Flew over the young woodland in the north of the Study Area.	Appendix II of CITES; Class II Protected Animal of PRC; Listed as 'Rare' in <i>China Red Data Book</i> ; Protected under <i>Protection of Endangered Species of Animals and Plants Ordinance</i> (Cap. 586);	Widespread in the forest and mature woodlands of the New Territories in Hong Kong, widespread in PRC	Locally uncommon resident
Chinese Goshawk <i>Accipiter soloensis</i>	Flew over the young woodland in the north of the Study Area.	Appendix II of CITES; Class II Protected Animal of PRC; Protected under <i>Protection of Endangered Species of Animals and Plants Ordinance</i> (Cap. 586).	Breeds in Ussuriland, Korea, and much of China, and winters from southeast China through Indochina, the Philippines and Indonesia to New Guinea. In Hong Kong, previously recorded in Tsim Bei Tsui, Kadoorie Farm and Botanic Garden, and Tai Po Kau	Uncommon passage migrant in Hong Kong.
Emerald Dove <i>Chalcophaps indica</i>	Flew through the developed area and finally perching at the young woodland near Ping Chong Road during the survey.	Listed at 'Vulnerable' in <i>China Red Data Book</i>	South Asia and Australia. Favours thick woodland and good secondary growth.	Scarce resident in Hong Kong
Greater Coucal <i>Centropus sinensis</i>	Calling heard at several spots in young woodland and shrubland	Class II Protected Animal of PRC; Listed as 'Vulnerable' in <i>China Red Data Book</i> .	Resident throughout the Oriental region, apart from Taiwan, the Philippines and Sulawesi; Found in many types of habitats in Hong Kong.	Common and widespread resident in Hong Kong.
Hwamei <i>Garrulax canorus</i>	Calling heard in young woodland and shrubland.	Appendix II of CITES.	North Indo-China to China and South China; Found in woodland and hillsides with thick scrub cover.	Common breeding resident in Hong Kong

Species	Location and Activities (if any)	Protection Status	Distribution	Commonness in HK
Reptile				
Chinese Cobra <i>Naja atra</i>	Found in front of a village house along Fa Peng Road.	Appendix II of CITES; Listed as 'Vulnerable' in <i>China Red Data Book</i> ; Protected under <i>Protection of Endangered Species of Animals and Plants Ordinance</i> (Cap. 586).	Usually occurs in different kinds of habitat such as woodlands, shrublands, grasslands and moangroves.	Unclear

* Note: All birds in Hong Kong are Protected under the *Wild Animals Protection Ordinance* (Cap 170).

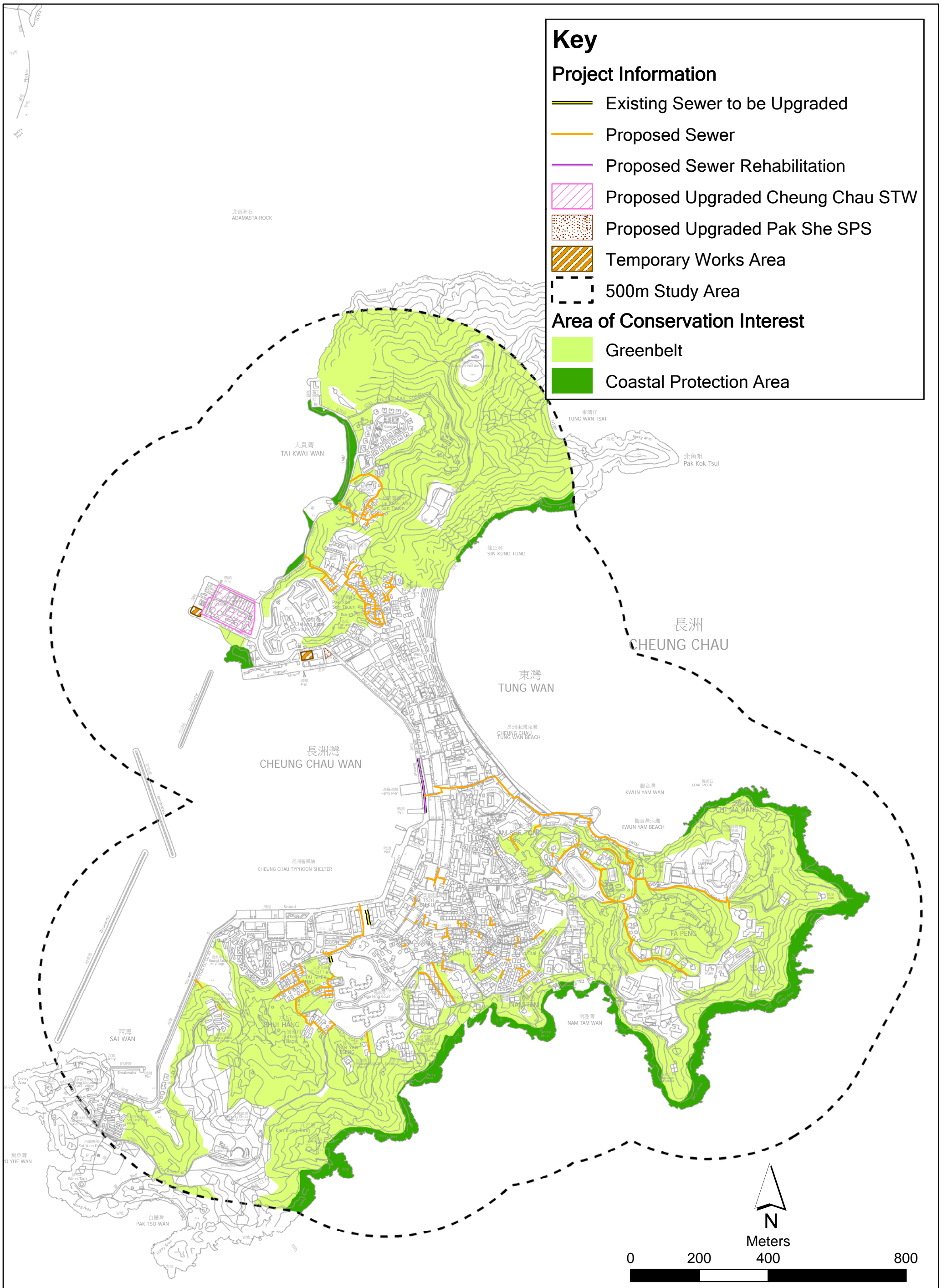


Figure 1.1

Study Area of Ecological Baseline Survey - Cheung Chau

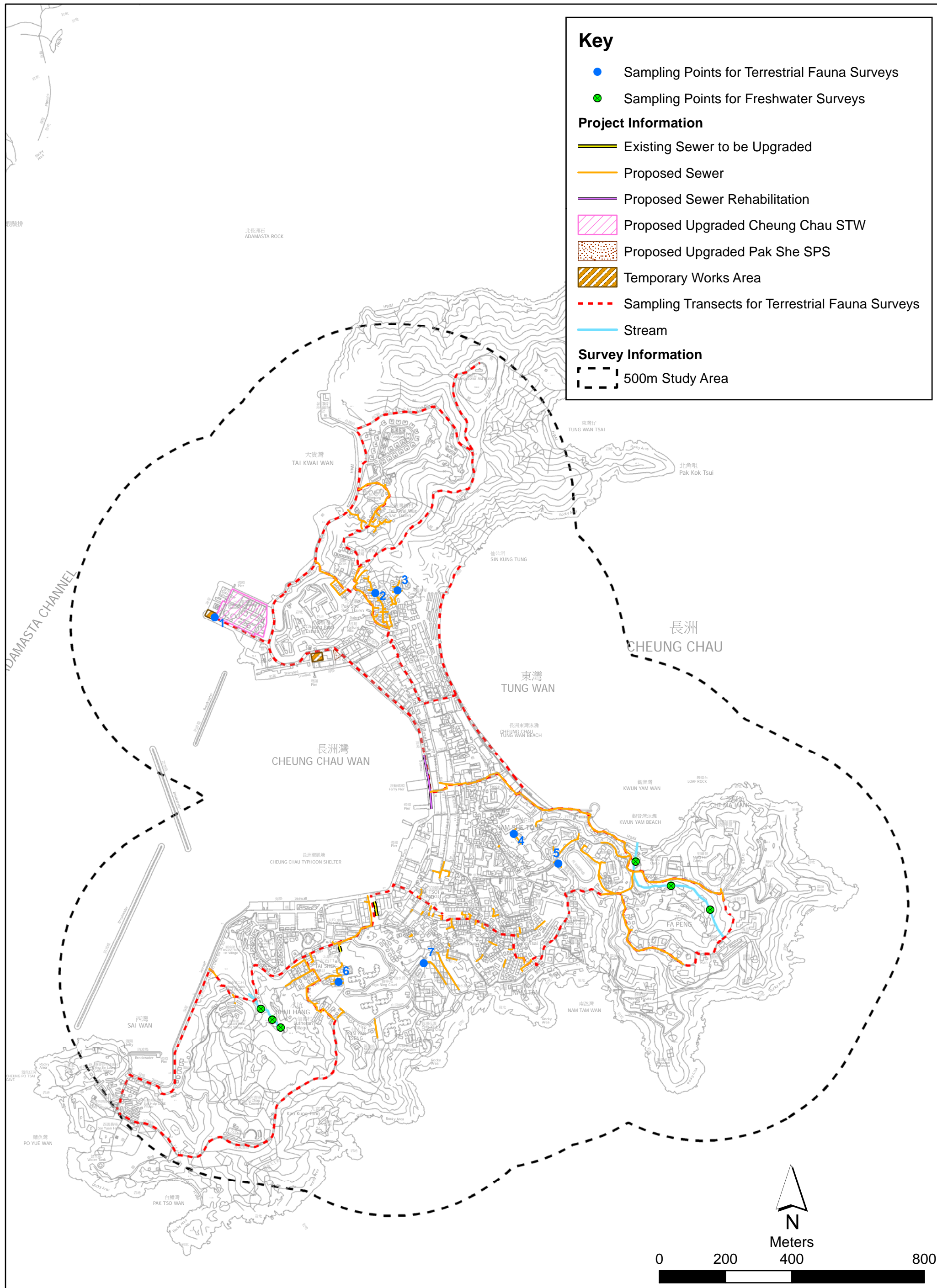


Figure 1.2
Locations of Study Area, Survey Transects and Sampling Points for Terrestrial and Freshwater Fauna Surveys - Cheung Chau

File: T:\GIS\CONTRACT\0133209\mxd\0133209_CheungChau_Survey_Transect_Sampling_Pt.mxd
 Date: 19/9/2013

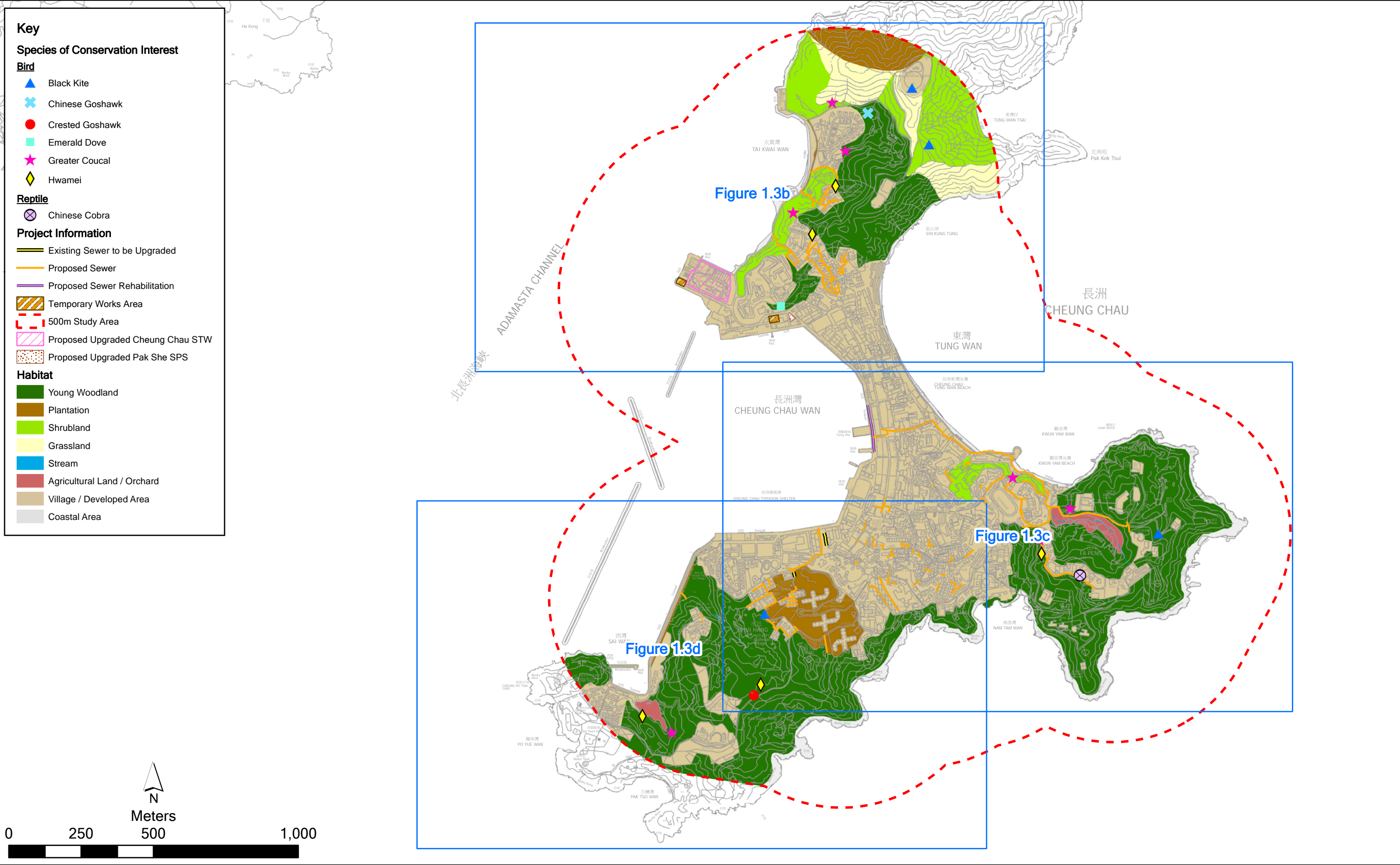


Figure 1.3a

Habitat Map and Species of Conservation Interest - Cheung Chau (a)



Figure 1.3b

Habitat Map and Species of Conservation Interest - Cheung Chau (b)

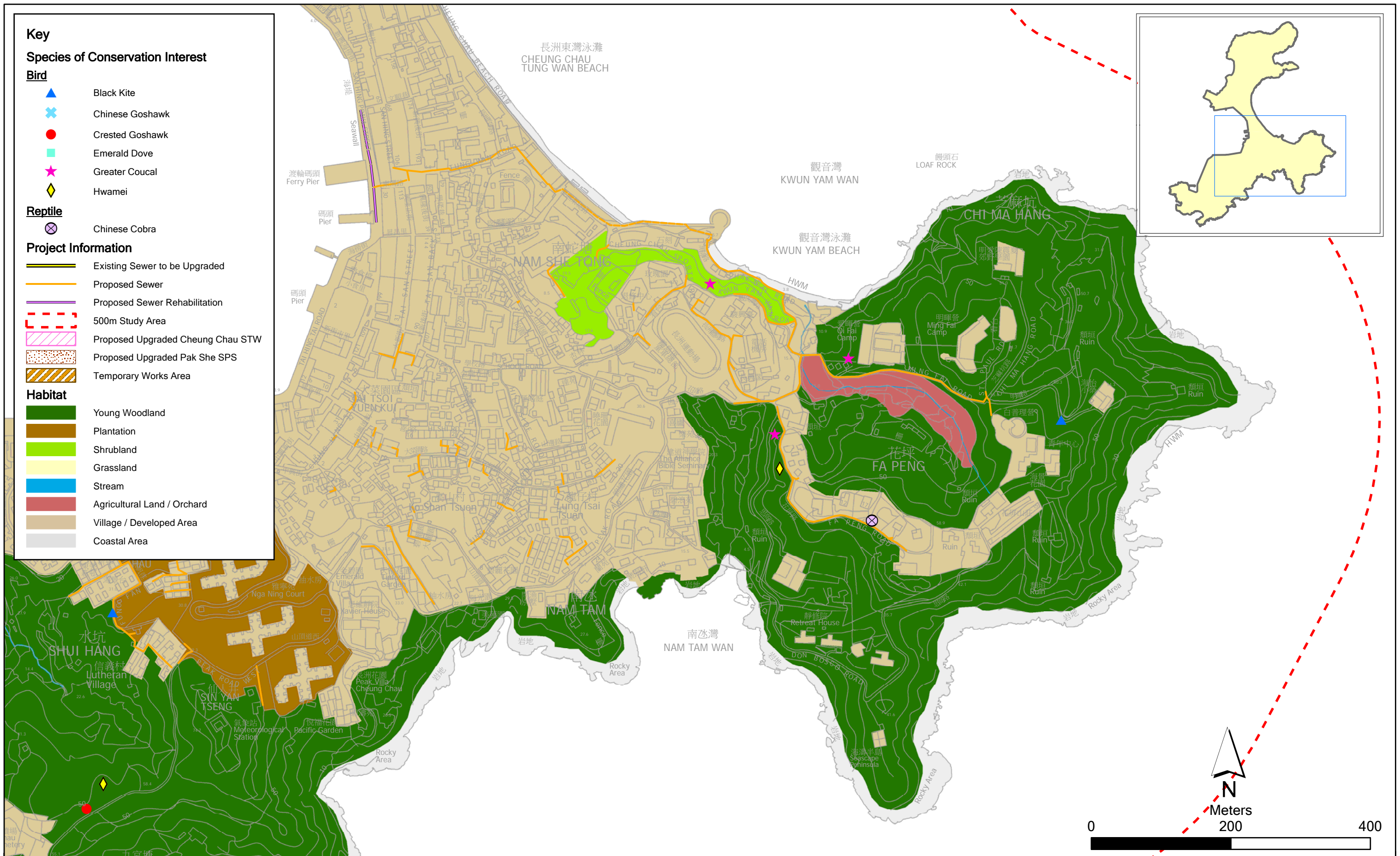


Figure 1.3c

Habitat Map and Species of Conservation Interest - Cheung Chau (c)

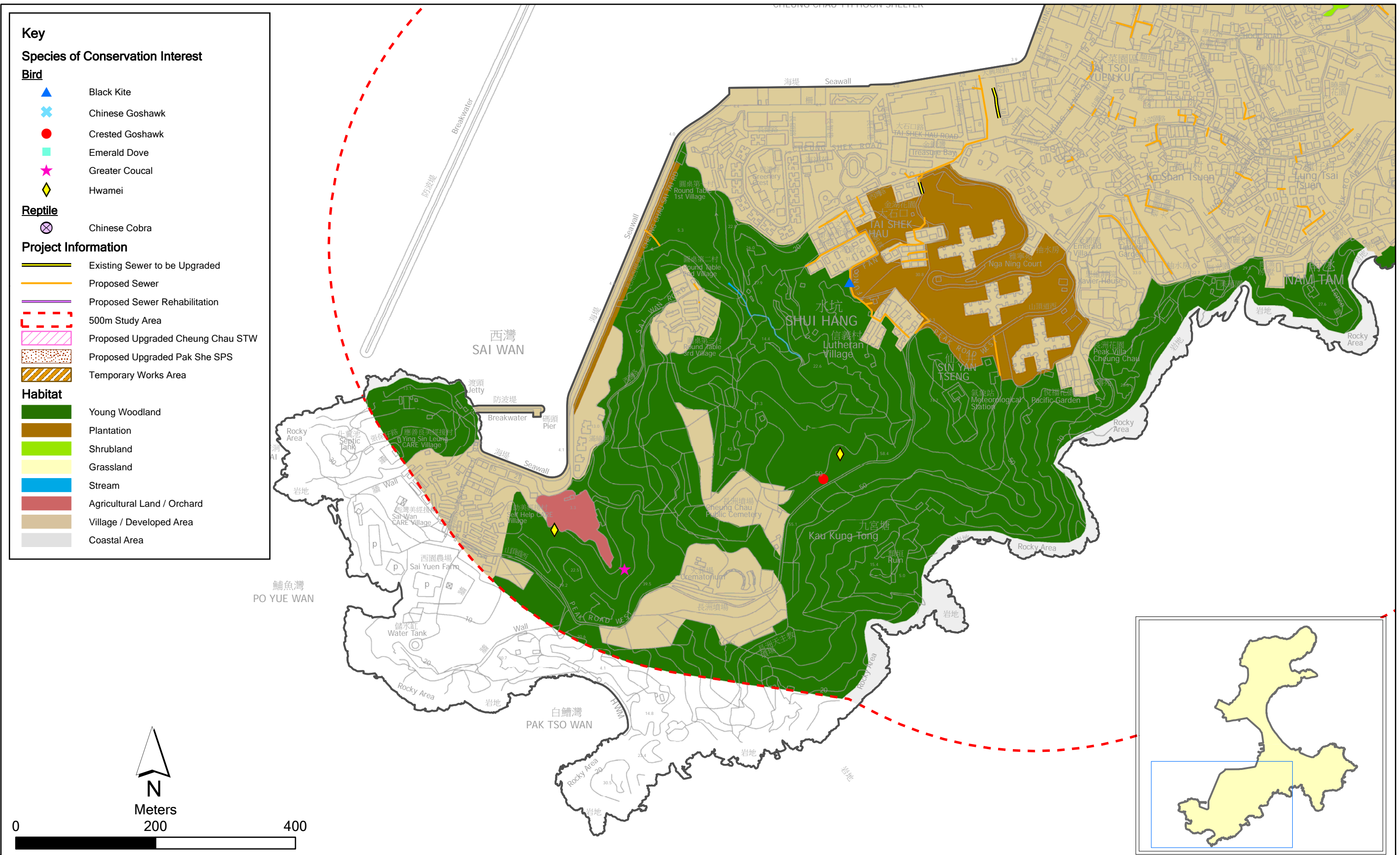


Figure 1.3d

Habitat Map and Species of Conservation Interest - Cheung Chau (d)



Young Woodland



Plantation



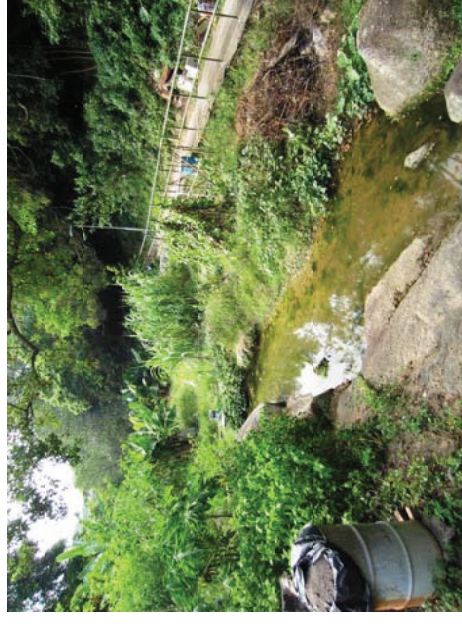
Shrubland



Grassland



Stream - Shui Hang

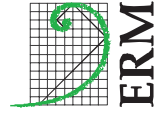


Stream - Fa Peng

Figure 1.4a

Photographic Records of Habitats Identified within the Study Area
- Cheung Chau (1 of 2)

Date: 30/09/2011



**Environmental
Resources
Management** **ERM**



Agricultural Land/Orchard



Developed Area/Village



Coastal Area

Figure 1.4b

Photographic Records of Habitats Identified within the Study Area
– Cheung Chau (2 of 2)

Date: 30/09/2011



Chinese Cobra (*Naja atra*)

Figure 1.5

Photographic Record of Species of Ecological Conservation Interest
– Cheung Chau

FILE: 0133209
DATE: 30/09/2011

Environmental
Resources
Management



Annex A

Terrestrial Ecological Resources

Annex A1 Relative Abundance of Plant Species Recorded Within the Study Area - Cheung Chau

Origin: E = Exotic; N = Native

Status: c = Common; vc = Very Common; p = Planted, vr = Very Rare, re = Restricted, na = Not Applicable

Habitat: YW = Young Woodland, SH = Shrubland, GR = Grassland, PL = Plantation, ST = Stream, AO = Agricultural Land/Orchard, DV = Developed Area/Village, CA = Coastal Area

Relative abundance: 1=scarce, 2=uncommon, 3=common, 4=abundant, 5=very abundant

Growth Form	Species Name	Origin	Status	YW	SH	GR	PL	ST	AO	DV	CA
Tree	<i>Acacia auriculiformis</i>	E	c				3				
Tree	<i>Acacia confusa</i>	E	c	2			3			2	
Tree	<i>Acacia mangium</i>	E	c				3				
Tree	<i>Aleurites moluccana</i>	E	c							2	
Tree	<i>Aporosa dioica</i>	N	vc	2	2						
Tree	<i>Archidendron lucida</i>	N	c	1							
Tree	<i>Artocarpus heterophyllus</i>	E	c						1		
Tree	<i>Averrhoa carambola</i>	E	p							2	
Tree	<i>Bambusa</i> sp.	E	na	2				3			
Tree	<i>Bauhinia blakeana</i>	N	p							4	
Tree	<i>Bauhinia variegata</i> var. <i>candida</i>	E	p							2	
Tree	<i>Bombax ceiba</i>	E	p							2	
Tree	<i>Bridelia tomentosa</i>	N	vc	3	2				1	1	
Tree	<i>Callistemon viminalis</i>	E	p							2	
Tree	<i>Carica papaya</i>	E	p						1		
Tree	<i>Cassia surattensis</i>	E	c							2	
Tree	<i>Casuarina equisetifolia</i>	E	p	1						3	3
Tree	<i>Celtis biondii</i>	N	re	3	2						
Tree	<i>Celtis sinensis</i>	N	c	3	2			3	1	1	
Tree	<i>Citrus maxima</i>	E	p							1	
Tree	<i>Citrus reticulata</i>	E	p						2	2	
Tree	<i>Clausena lansium</i>	E	p							2	
Tree	<i>Cleistocalyx operculata</i>	N	c	1							
Tree	<i>Cocos nucifera</i>	E	p							1	
Tree	<i>Crateva trifoliata</i>	E	p							2	
Tree	<i>Cratoxylum cochinchinense</i>	N	vc	1	1						

Growth Form	Species Name	Origin	Status	YW	SH	GR	PL	ST	AO	DV	CA
Tree	<i>Cycas revoluta</i>	E	p				1				
Tree	<i>Daphniphyllum calycinum</i>	N	c	1							
Tree	<i>Delonix regia</i>	E	p				1			3	
Tree	<i>Dimocarpus longan</i>	E	p	1					3	3	
Tree	<i>Eriobotrya japonica</i>	E	p						2		
Tree	<i>Erythrina speciosa</i>	E	p								1
Tree	<i>Eucalyptus citriodora</i>	E	p	1							
Tree	<i>Ficus altissima</i>	E	p							2	
Tree	<i>Ficus benjamina</i>	E	p							2	
Tree	<i>Ficus elastica</i>	E	p							1	
Tree	<i>Ficus hispida</i>	N	c	1	1			2	1	2	
Tree	<i>Ficus microcarpa</i>	N	c				1	2		3	
Tree	<i>Ficus superba</i> var. <i>japonica</i>	N	c							3	
Tree	<i>Ficus tinctoria</i> subsp. <i>gibbosa</i>	N	c							1	
Tree	<i>Ficus variegata</i>	N	c	1						1	
Tree	<i>Ficus virens</i>	N	c							2	
Tree	<i>Grevillea robusta</i>	E	p							2	
Tree	<i>Hibiscus tiliacous</i>	N	vc				4			4	
Tree	<i>Homalium cochinchinensis</i>	N	c	1							
Tree	<i>Juniperus chinensis</i>	E	p						1		
Tree	<i>Lagerstroemia indica</i>	E	p							3	
Tree	<i>Lagerstroemia speciosa</i>	E	p							2	
Tree	<i>Leucaena leucocephala</i>	E	vc	3	1	1			2	3	2
Tree	<i>Lindera aggregata</i>	N	c	1							
Tree	<i>Liquidambar formosana</i>	N	c						1		
Tree	<i>Litchi chinensis</i>	E	p						3	2	
Tree	<i>Litsea glutinosa</i>	N	vc	3	2	1		1		2	
Tree	<i>Livistona chinensis</i>	E	vc				1	1		2	
Tree	<i>Lophostemon confertus</i>	E	c	2							
Tree	<i>Macaranga tanarius</i>	N	vc	2	1	1		2		2	1
Tree	<i>Mallotus paniculatus</i>	N	vc	3	1				1	1	
Tree	<i>Mangifera indica</i>	E	p						2	2	

Growth Form	Species Name	Origin	Status	YW	SH	GR	PL	ST	AO	DV	CA
Tree	<i>Manilkara zapota</i>	E	p							1	
Tree	<i>Melaleuca quinquenevia</i>	E	c							2	
Tree	<i>Melia azedarach</i>	E	c	1	1						
Tree	<i>Michelia alba</i>	E	vc							2	
Tree	<i>Microcos paniculata</i>	N	vc	4	2						
Tree	<i>Morus alba</i>	N	c							3	
Tree	<i>Murraya paniculata</i>	E	p						2	2	
Tree	<i>Phoenix hanceana</i>	E	p							2	
Tree	<i>Phyllanthus emblica</i>	N	vc	2	1						
Tree	<i>Plumeria rubra</i>	E	c							3	
Tree	<i>Podocarpus macrophyllus</i>	N	p							1	
Tree	<i>Psidium guajava</i>	E	c						1	2	
Tree	<i>Ravenala madagascariensis</i>	E	p				2				
Tree	<i>Rhus chinensis</i>	N	c	1	2						
Tree	<i>Rhus hypoleuca</i>	N	c	1	2						
Tree	<i>Rhus succedanea</i>	N	c	2	3						
Tree	<i>Sapium discolor</i>	N	vc	2	2						
Tree	<i>Sapium sebiferum</i>	N	vc	2	1						
Tree	<i>Schefflera heptahylla</i>	N	vc	2	1						
Tree	<i>Scolopia chinensis</i>	N	c	1							
Tree	<i>Sterculia lanceolata</i>	N	vc	4	3					1	
Tree	<i>Syzygium jambos</i>	E	c	1						1	
Tree	<i>Terminalia catappa</i>	E	p								2
Tree	<i>Thevetia peruviana</i>	E	p							2	
Shrub	<i>Acalypha wilkesiana</i>	E	p							3	
Shrub	<i>Aglaia odorata</i>	E	p						3	3	
Shrub	<i>Alchornea trewioides</i>	N	c								1
Shrub	<i>Allamanda cathartica</i>	E	p				3			3	
Shrub	<i>Allamanda schottii</i>	E	p				3			3	
Shrub	<i>Breynia fruticosa</i>	N	vc	2	2	2					
Shrub	<i>Brucea javanica</i>	N	c							1	1
Shrub	<i>Capsicum annuum L. var. conoides</i>	E	p						1		

Growth Form	Species Name	Origin	Status	YW	SH	GR	PL	ST	AO	DV	CA
Shrub	<i>Chrysalidocarpus lutescens</i>	E	c				2			4	
Shrub	<i>Clerodendrum inerme</i>	N	c								3
Shrub	<i>Codiaeum variegatum</i>	E	p							4	
Shrub	<i>Daphniphyllum calycinum</i>	N	c	1							
Shrub	<i>Desmodium heterocarpon</i>	N	vc		1	3				1	1
Shrub	<i>Dracaena fragrans</i>	E	p							3	
Shrub	<i>Duranta erecta</i>	E	p				2			4	
Shrub	<i>Eurya nitida</i>	N	c	1							
Shrub	<i>Glochidion eriocarpum</i>	N	c	1	2	1					
Shrub	<i>Helicteres angustifolia</i>	N	vc	2							
Shrub	<i>Hibiscus rosa-sinensis</i>	E	c				2			4	
Shrub	<i>Ilex asprella</i>	N	vc	2	3						
Shrub	<i>Indigofera hirsuta</i>	E	c			1					
Shrub	<i>Jatropha podagrica</i>	E	p							1	
Shrub	<i>Lantana camara</i>	E	vc	1	1					2	
Shrub	<i>Ligustrum sinense</i>	N	vc	1	2	3			1	1	
Shrub	<i>Litsea rotundifolia</i> var. <i>oblongifolia</i>	N	vc	2	1						
Shrub	<i>Manihot esculenta</i>	E	c					3			
Shrub	<i>Melastoma sanguineum</i>	N	c		1	2					
Shrub	<i>Mimosa pudica</i>	E	vc			1					
Shrub	<i>Pandanus tectorius</i>	N	vc	2				1			1
Shrub	<i>Phoenix hanceana</i>	E	p							3	
Shrub	<i>Phyllanthus cochinchinensis</i>	N	vc	3	3	2					
Shrub	<i>Phyllanthus reticulatus</i>	N	c	2							
Shrub	<i>Phyllodium pulchellum</i>	N	vc			1					
Shrub	<i>Polyscias fruticosa</i>	E	p							3	
Shrub	<i>Psychotria asiatica</i>	N	vc	4	2						
Shrub	<i>Rhaphiolepis indica</i>	N	vc		1						
Shrub	<i>Rhapis excelsa</i>	N	c							3	
Shrub	<i>Rhodomyrtus tomentosa</i>	N	vc			1					
Shrub	<i>Rubus parvifolius</i>	N	vc	1		1					
Shrub	<i>Sageretia thea</i>	N	vc	2	3	2					

Growth Form	Species Name	Origin	Status	YW	SH	GR	PL	ST	AO	DV	CA
Shrub	<i>Schefflera arboricola</i>	E	p				2			4	
Shrub	<i>Severinia buxifolia</i>	N	c	1							
Shrub	<i>Sida cordata</i>	N	c							1	
Shrub	<i>Side rhombifolia</i>	N	c							1	
Shrub	<i>Solanum toroum</i>	E	c							1	
Shrub	<i>Tarenna attenuata</i>	N	c	1							
Shrub	<i>Thunbergia erecta</i>	E	c							1	
Shrub	<i>Vitex negundo</i> var. <i>negundo</i>	N	c	2							
Shrub	<i>Wikstroemia indica</i>	N	c		2						
Herb	<i>Achyranthes aspera</i>	N	c		2	2	1			4	1
Herb	<i>Ageratum conyzoides</i>	E	vc						1	2	
Herb	<i>Aglaonema modestum</i>	E	p							2	
Herb	<i>Alocasia odora</i>	N	vc	1	1			3	1	2	
Herb	<i>Alpinia hainanensis</i>	N	c	1	1			2			
Herb	<i>Alpinia zerumbet</i>	N	vc	2							
Herb	<i>Alysicarpus vaginalis</i>	N	vc			1					
Herb	<i>Amaranthus viridis</i>	N	vc			2			1	1	
Herb	<i>Antirrhinum majus</i>	E	p							1	
Herb	<i>Apluda mutica</i>	N	c							1	
Herb	<i>Aster baccharoides</i>	N	vc	1	2	1					
Herb	<i>Axonopus compressus</i>	E	c							2	
Herb	<i>Bidens alba</i>	E	vc	1	1	3	2		2	2	1
Herb	<i>Borreria spp.</i>	N	c	1	2	2		2		1	
Herb	<i>Brassica alboglabra</i>	E	p						1		
Herb	<i>Catharanthus roseus</i>	E	c							2	
Herb	<i>Centotheca lappacea</i>	N	c	2				3		1	
Herb	<i>Cheilosoria tenuifolia</i>	N	c	1							
Herb	<i>Chloris barbata</i>	N	c		2						
Herb	<i>Commelina sp.</i>	N	na					4			
Herb	<i>Conyza canadensis</i>	E	c			1				2	
Herb	<i>Corchorus aestuans</i>	N	c							1	
Herb	<i>Cyclosorus heterocarpus</i>	N	c	2							

Growth Form	Species Name	Origin	Status	YW	SH	GR	PL	ST	AO	DV	CA
Herb	<i>Cyclosorus parasiticus</i>	N	vc		2			1		1	
Herb	<i>Cynodon dactylon</i>	E	vc			1				2	
Herb	<i>Cyperus compressus</i>	N	c		1						
Herb	<i>Cyperus rotundus</i>	N	vc								2
Herb	<i>Dactyloctenium aegyptium</i>	N	c		2						
Herb	<i>Denanthemum indicum</i>	E	c	1							
Herb	<i>Dicranopteris pedata</i>	N	vc	2							
Herb	<i>Digitaria radicata</i>	N	vc			2				3	
Herb	<i>Eclipta prostrata</i>	N	c							2	
Herb	<i>Elephantopus tomentosus</i>	N	c			2				1	
Herb	<i>Eleusine indica</i>	N	vc			2				2	
Herb	<i>Emilia sonchifolia</i>	E	vc							2	
Herb	<i>Eragrostis unioloides</i>	N	c							2	
Herb	<i>Euphorbia hirta</i>	E	vc	1	1	1				2	
Herb	<i>Euphorbia prostrata</i>	E	vc							2	
Herb	<i>Hedyotis corymbosa</i>	N	vc						1	3	
Herb	<i>Hedyotis hedyotideae</i>	N	c	1							
Herb	<i>Hymenocallis littoralis</i>	E	p				2			4	
Herb	<i>Ipomoea batatas</i>	E	p						3		
Herb	<i>Kyllinga nemoralis</i>	N	vc							1	
Herb	<i>Lindsaea orbiculata</i>	N	c	2							
Herb	<i>Liriope spicata</i>	N	vc	1							
Herb	<i>Mirabilis jalapa</i>	E	c							2	
Herb	<i>Miscanthus floridulus</i>	N	vc			2					
Herb	<i>Miscanthus sinensis</i>	N	vc			2					
Herb	<i>Musa sp.</i>	E	p					1	2	1	
Herb	<i>Myriophyllum sp.</i>	N	na					2			
Herb	<i>Neyraudia reyraudiana</i>	N	vc			1					
Herb	<i>Nymphaea sp.</i>	E	na					2			
Herb	<i>Ocimum basilicum</i>	N	c						1		
Herb	<i>Oxalis corniculata</i>	N	vc							2	
Herb	<i>Panicum maximum</i>	E	vc		2	3	1	3	1		

Growth Form	Species Name	Origin	Status	YW	SH	GR	PL	ST	AO	DV	CA
Herb	<i>Paraixeris denticulata</i>	N	vc							2	
Herb	<i>Paspalum conjugatum</i>	E	c					1			
Herb	<i>Pennisetum purpureum</i>	E	vc							2	
Herb	<i>Peperomia pellucida</i>	E	vc		2					2	
Herb	<i>Perotis indica</i>	N	c		2	2					
Herb	<i>Phyllanthus urinaria</i>	N	c							2	
Herb	<i>Pilea microphylla</i>	E	vc					1		3	
Herb	<i>Piper sarmentosum</i>	N	re		2					1	
Herb	<i>Pistia stratiotes</i>	E	c					2			
Herb	<i>Polygonum chinense</i>	N	vc	2	1			2	1		
Herb	<i>Portulaca grandiflora</i>	E	p							2	1
Herb	<i>Portulaca oleracea</i>	N	vc					1		3	1
Herb	<i>Pteris linearis</i>	N	c	1		1					
Herb	<i>Pteris semipinnata</i>	N	vc	2	1						
Herb	<i>Pteris vittata</i>	N	vc							1	
Herb	<i>Rhynchelytrum repens</i>	E	vc		2						
Herb	<i>Saccharum officinarum</i>	E	p						2		
Herb	<i>Sansevieria trifasciata</i>	E	c	1				1			
Herb	<i>Scleria ciliaris</i>	N	c	1							
Herb	<i>Senecio scandens</i>	N	c	1							
Herb	<i>Setaria glauca</i>	N	vc		1					1	
Herb	<i>Solanum americanum</i>	E	vc							2	
Herb	<i>Sonchus oleraceus</i>	E	vc	1							
Herb	<i>Sphenomeris biflora</i>	N	c								1
Herb	<i>Sporobolus fertilis</i>	N	vc		1					2	
Herb	<i>Syngonium auritum</i>	E	p							2	
Herb	<i>Talinum paniculatum</i>	E	c							1	
Herb	<i>Torenia fournieri</i>	E	c							1	
Herb	<i>Tradescantia spathacea</i>	E	p						2	2	
Herb	<i>Tridax procumbens</i>	E	vc							2	
Herb	<i>Vernonia cinerea</i>	N	vc							2	
Herb	<i>Wedelia biflora</i>	N	c								2

Growth Form	Species Name	Origin	Status	YW	SH	GR	PL	ST	AO	DV	CA
Herb	<i>Wedelia trilobata</i>	E	c		3					2	
Herb	<i>Youngia japonica</i>	N	vc	1	1					1	
Climber	<i>Antigonon leptopus</i>	E	na							3	
Climber	<i>Asparagus cochinchinensis</i>	N	c	1				1		2	
Climber	<i>Bauhinia glauca</i>	N	c					3			
Climber	<i>Benincasa hispida</i>	E	p						2		
Climber	<i>Bougainvillea spectabilis</i>	E	vc							2	
Climber	<i>Caesalpinia crist</i>	N	vc					4			
Climber	<i>Cajanus scarabaeoides</i>	N	c			1					
Climber	<i>Cassytha filiformis</i>	N	vc		3	1					
Climber	<i>Cayratia corniculata</i>	N	c	2							
Climber	<i>Celastrus hindsii</i>	N	c	1							
Climber	<i>Clerodendrum splendens</i>	E	p							2	
Climber	<i>Cocculus orbiculatus</i>	N	c	3	2					3	
Climber	<i>Dalbergia hancei</i>	N	c	1							
Climber	<i>Desmos chinensis</i>	N	c	1	2						
Climber	<i>Epipremnum aureum</i>	E	p	2						2	
Climber	<i>Ficus hederacea</i>	N	c	2							
Climber	<i>Ficus pumila</i>	N	vc	2							
Climber	<i>Heterosmilax japonica var. gaudichaudiana</i>	N	vc	3	1						
Climber	<i>Ipomoea cairica</i>	E	vc	1	1					2	1
Climber	<i>Ipomoea obscura</i>	N	c	1							
Climber	<i>Jasminum mesnyi</i>	E	p	1							
Climber	<i>Lygodium japonicum</i>	N	vc	2	2	1				2	
Climber	<i>Lygodium scandens</i>	N	c	1				1			
Climber	<i>Mikania micrantha</i>	E	vc	1	1	2		1		3	
Climber	<i>Millettia nitida</i>	N	vc	1							
Climber	<i>Morinda umbellata</i>	N	c	1	2					1	
Climber	<i>Paederia scandens</i>	N	vc	3	2					3	1
Climber	<i>Parthenocissus dalzielii</i>	E	p							2	
Climber	<i>Passiflora foetida</i>	E	c		1					1	
Climber	<i>Pueraria lobata var. montana</i>	N	c					1		1	

Growth Form	Species Name	Origin	Status	YW	SH	GR	PL	ST	AO	DV	CA	
Climber	<i>Solena amplexicaulis</i>	N	c	1								
Climber	<i>Stephania longa</i>	N	c	1								
Climber	<i>Strophanthus divaricatus</i>	N	c	1								
Climber	<i>Strychnos angustifolia</i>	N	c	1								
Climber	<i>Toxocarpus wightianus</i>	N	c	1							1	
Climber	<i>Tylophora ovata</i>	N	c		1							
Climber	<i>Zanthoxylum nitidum</i>	N	vc	1	1			2				
Total no. of species recorded				257	100	67	37	18	32	33	136	20

Remarks:

The habit of the plants, name of species and the origin follow The Checklist of Hong Kong Plants 2004 (AFCD).

The status of species follows Xing et. al (2000).

No species of conservation interest was found but one of the *Ficus microcarpa* was classified as an Old and Valuable Tree (LCSD Is/4).

Annex A2 Mammal Species Recorded within the Study Area - Cheung Chau

Common Name	Scientific Name	Chinese Name	Status ¹	Habitat
Shrew	Unidentified	鼯鼠	Two shrew species in Hong Kong: Must Shrew (<i>Suncus murinus</i>): Common; Grey Shrew (<i>Crocidura attenuata</i>): uncommon.	In young woodland east of the Self Help Care Village.

Notes:

1. Commonness as per AFCD database. Available at <http://www.afcd.gov.hk/english/conservation/hkbiodiversity/database/search.asp?lang=en>.

Annex A3 Bird Species Recorded within the Study Area - Cheung Chau

Common Name	Scientific Name	Chinese Name	Commonness	Status in HK†	PRC List/China Red Data Book/CITES/IUCN	Habitats*
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	夜鷺	Common	p		ST
Black Kite*#	<i>Milvus migrans</i>	黑鳶	Common	R, W	Class II Protected Animal of PRC Listed in <i>Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586)</i> Listed in Appendix II of CITES	YW, PL, SH, AO, DV, CA
Crested Goshawk*	<i>Accipiter trivirgatus</i>	鳳頭鷹	Uncommon	R	Class II Protected Animal of PRC Listed in <i>Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586)</i> <i>China Red Data Book Status - Rare</i> Listed in Appendix II of CITES	YW
Chinese Goshawk*	<i>Accipiter soloensis</i>	赤腹鷹	Uncommon	SpM	Class II Protected Animal of PRC Listed in <i>Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586)</i> Listed in Appendix II of CITES	YW
Slaty-legged Crane	<i>Rallina eurizonoides</i>	白喉斑秧雞	Common	Su		YW
Domestic Pigeon	<i>Columba livia</i>	原鴿	Common	R		SH
Spotted Dove	<i>Streptopelia chinensis</i>	珠頸斑鳩	Abundant	R		YW, SH, DV, CA
Common Emerald Dove	<i>Chalcophaps indica</i>	綠翅金鳩	Scarce	R	<i>China Red Data Book Status - Vulnerable</i>	YW, DV
Greater Coucal	<i>Centropus sinensis</i>	褐翅鴉鵂	Common	R	Class II Protected Animal of PRC <i>China Red Data Book Status - Vulnerable</i>	YW, SH
Asian Koel	<i>Eudynamis scolopacea</i>	噪鵲	Common	Su,R		YW, PL, AO
Indian Cuckoo	<i>Cuculus micropterus</i>	四聲杜鵑	Uncommon	Su		YW, PL, DV
Pacific Swift	<i>Apus pacificus</i>	白腰雨燕	Common	SpM,Su		DV
House Swift	<i>Apus nipalensis</i>	小白腰雨燕	Common	R,SpM		SH, DV
Oriental Dollarbird	<i>Eurystomus orientalis</i>	三寶鳥	Uncommon	M		YW
White-throated Kingfisher#	<i>Halcyon smyrnensis</i>	白胸翡翠	Common	AM,P		YW
Black Drongo	<i>Dicrurus macrocercus</i>	黑卷尾	Common	M,Su		YW, SH, GR, DV
Hair-crested Drongo	<i>Dicrurus hottentottus</i>	髮冠卷尾	Common	M,Su,W		YW
Red-billed Blue Magpie	<i>Urocissa erythrorhyncha</i>	紅嘴藍鵲	Common	R		DV
Eurasian Magpie	<i>Pica pica</i>	喜鵲	Common	R		DV

Common Name	Scientific Name	Chinese Name	Commonness	Status in HK†	PRC List/China Red Data Book/CITES/IUCN	Habitats*
Large-billed Crow	<i>Corvus macrorhynchus</i>	大嘴烏鴉	Common	R		YW, DV
Great Tit	<i>Parus major</i>	大山雀	Common	R		ST, DV
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	紅耳鶇	Abundant	R		YW, PL, GR, ST
Chinese Bulbul	<i>Pycnonotus sinensis</i>	白頭鶇	Abundant	R		YW, SH, GR, ST, DV, CA
Sooty-headed Bulbul	<i>Pycnonotus aurigaster</i>	白喉紅臀鶇	Uncommon	R		GR, DV
Barn Swallow	<i>Hirundo rustica</i>	家燕	Abundant	SpM,Su		SH,AO, DV, CA
Yellow-bellied Prinia	<i>Prinia flaviventris</i>	黃腹鷦鶯	Common	R		SH, DV
Common Tailorbird	<i>Orthotomus sutorius</i>	長尾縫葉鶯	Common	R		YW
Chinese Hwamei	<i>Garrulax canorus</i>	畫眉	Common	R	Listed in Appendix II of CITES	YW, SH
White-browed Laughingthrush	<i>Garrulax sannio</i>	白頰噪鶇	Scarce	R		YW
Japanese White-eye	<i>Zosterops japonicus</i>	暗綠繡眼鳥	Abundant	R,?W		YW, SH, DV
Crested Myna	<i>Acridotheres cristatellus</i>	八哥	Common	R		PL, SH, DV, CA
Black-collared Starling	<i>Gracupica nigricollis</i>	黑領椋鳥	Common	R		DV, AO
Oriental Magpie Robin	<i>Copsychus saularis</i>	鵲鶇	Abundant	R		YW, PL, SH, GR, ST, AO, DV, CA
Grey-streaked Flycatcher	<i>Muscicapa griseisticta</i>	灰紋鶇	Uncommon	M		YW
Fork-tailed Sunbird	<i>Aethopyga christinae</i>	叉尾太陽鳥	Common	R		DV
Eurasian Tree Sparrow	<i>Passer montanus</i>	樹麻雀	Abundant	R		YW, SH, AO, DV, CA
White-rumped Munia	<i>Lonchura striata</i>	白腰文鳥	Common	R		SH, GR, DV
Scaly-breasted Munia	<i>Lonchura punctulata</i>	斑文鳥	Common	R		DV
White Wagtail	<i>Motacilla alba</i>	白鶇鶇	Common	W,R		YW, CA

Notes:

- All wild birds are Protected under Wild Animal Protection Ordinance (Cap. 170).
- † Status according to Viney et al. The Birds of Hong Kong and South China (2005) (8th Edition):
R=resident; W=winter visitor; Su=summer visitor; M=migrant; A=autumn; Sp=spring; P=present all year, exact composition unknown.
- * Habitats: YW = Young Woodland, SH = Shrubland, GR = Grassland, PL = Plantation, ST = Stream, AO= Agricultural Land/Orchard, DV = Developed Area/Village, CA = Coastal Area

Annex A4 Herpetofauna Species Recorded within the Study Area - Cheung Chau

Common Name	Scientific Name	Chinese Name	Status ¹	Habitat ²
Amphibian				
Asian Common Toad	<i>Bufo melanostictus</i>	黑眶蟾蜍	Abundant	YW, SH, ST, DV
Asiatic Painted Frog	<i>Kaloula pulchra pulchra</i>	花狹口蛙	Widely distributed	ST, DV
Paddy Frog	<i>Rana limnocharis</i>	澤蛙	Widely distributed	ST
Gunther's Frog	<i>Rana guentheri</i>	沼蛙	Widely distributed	YW, ST, DV
Brown Tree Frog	<i>Polypedates megacephalus</i>	斑腿泛樹蛙	Widely distributed	YW, ST, DV
Reptile				
Four-clawed Gecko	<i>Gehyra mutilata</i>	截趾虎	Widely distributed	DV
Chinese Gecko	<i>Gekko chinensis</i>	壁虎	Very common and widely distributed	YW, DV
Long-tailed Skink	<i>Mabuya longicaudata</i>	長尾南蜥	Widely distributed	DV
Common Blind Snake	<i>Ramphotyphlops braminus</i>	鈎盲蛇	Abundant	DV
Chinese Cobra	<i>Naja atra</i>	眼鏡蛇	Protected under Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586) China Red Data Book Status - Vulnerable Listed in Appendix II of CITES	DV (In the vicinity of the village settlements along Fa Peng Road)

Notes:

1. Commonness as per AFCD database. Available at <http://www.afcd.gov.hk/english/conservation/hkbiodiversity/database/search.asp?lang=en>.
2. Habitats: YW = Young Woodland, SH = Shrubland, ST = Stream, DV = Developed Area/Village.

Annex A5 Butterfly Species Recorded within the Study Area - Cheung Chau

Common Name	Scientific Name	Chinese Name	Commonness ¹	Habitats ²
Hesperiidae				
Indian Palm Bob	<i>Suastus gremius gremius</i>	素弄蝶	Common	YW
Papilionidae				
Common Bluebottle	<i>Graphium sarpedon sarpedon</i>	青鳳蝶	Common	DV
Tailed Jay	<i>Graphium agamemnon agamemnon</i>	統帥青鳳蝶	Common	DV
Red Helen	<i>Papilio helenus helenus</i>	玉斑鳳蝶	Common	YW, DV
Common Mormon	<i>Papilio polytes polytes</i>	玉帶鳳蝶	Common	YW, SH, DV, CA
Great Mormon	<i>Papilio memnon agenor</i>	美鳳蝶	Common	DV
Spangle	<i>Papilio protenor protenor</i>	藍鳳蝶	Common	YW, SH, DV
Chinese Peacock	<i>Papilio bianor bianor</i>	碧鳳蝶	Common	YW, DV
Paris Peacock	<i>Papilio paris paris</i>	巴黎翠鳳蝶	Common	DV
Pieridae				
Red-base Jezebel	<i>Delias pasithoe pasithoe</i>	報喜斑粉蝶	Common	YW, GR
Indian Cabbage White	<i>Pieris canidia canidia</i>	東方菜粉蝶	Common	YW, SH, ST, AO, DV
Common Gull	<i>Cepora nerissa nerissa</i>	黑脈園粉蝶	Common	YW
Great Orange Tip	<i>Hebomoia glaucippe glaucippe</i>	鶴頂粉蝶	Common	DV
Mottled Emigrant	<i>Catopsilia pyranthe pyranthe</i>	梨花遷粉蝶	Common	SH
Lemon Emigrant	<i>Catopsilia pomona pomona</i>	遷粉蝶	Common	YW, PL, SH, GR, AO, DV
Common Grass Yellow	<i>Eurema hecabe hecabe</i>	寬邊黃粉蝶	Common	YW, PL, SH, GR
Lycaenidae				
Slate Flash	<i>Rapala manea schistacea</i>	燕灰蝶	Common	YW, SH, DV
Pale Grass Blue	<i>Zizeeria maha serica</i>	酢漿灰蝶	Common	YW, PL, SH, DV
Lime Blue	<i>Chilades lajus leucofasciatus</i>	紫灰蝶	Common	YW, SH, DV
Plains Cupid	<i>Chilades pandava pandava</i>	曲紋紫灰蝶	Uncommon	YW
Riodinidae				
Plum Judy	<i>Abisara echerius echerius</i>	蛇目褐蛺蝶	Common	GR
Satyridae				
Large Eight-ring	<i>Neope muirheadii muirheadii</i>	蒙鍾陰眼蝶	Uncommon	YW
Common Palmfly	<i>Elymnias hypermnestra hainana</i>	翠袖鋸眼蝶	Common	SH, DV
Dark Brand Bush Brown	<i>Mycalasis mineus mineus</i>	小眉眼蝶	Common	YW

Common Name	Scientific Name	Chinese Name	Commonness ¹	Habitats ²
Amathusiidae				
Large Faun	<i>Faunis eumeus eumeus</i>	串珠環蝶	Common	YW
Nymphalidae				
Rustic	<i>Cupha erymanthis erymanthis</i>	黃襟蛺蝶	Common	YW, SH
Common Jester	<i>Symbrenthia lilaea lilaea</i>	散紋盛蛺蝶	Common	ST
Common Sailer	<i>Neptis hylas hylas</i>	中環蛺蝶	Common	YW
Common Mapwing	<i>Cyrestis thyodamas chinensis</i>	網絲蛺蝶	Common	SH, GR, DV
Red Ring Skirt	<i>Hestina assimilis assimilis</i>	黑脈蛺蝶	Common	YW

Notes:

1. Commonness as per AFCD database. Available at <http://www.afcd.gov.hk/english/conservation/hkbiodiversity/database/search.asp?lang=en>.
2. Habitats: YW = Young Woodland, SH = Shrubland, GR = Grassland, PL = Plantation, ST = Stream, AO= Agricultural Land/Orchard, DV = Developed Area/Village, CA = Coastal Area.

Annex A6 Dragonfly Species Recorded within the Study Area - Cheung Chau

Common Name	Scientific Name	Chinese	Family	Distribution in Hong Kong ¹	Habitat ²
Crimson Darter	<i>Crocothemis servilia servilia</i>	紅蜻	Libellulidae	Abundant	ST
Common Blue Skimmer	<i>Orthetrum glaucum</i>	黑尾灰蜻	Libellulidae	Abundant	YW
Common Red Skimmer	<i>Orthetrum pruinatum neglectum</i>	赤褐灰蜻	Libellulidae	Abundant	SH
Wandering Glider	<i>Pantala flavescens</i>	黃蜻	Libellulidae	Abundant	SH, DV

Notes:

1. Distribution as per AFCD database. Available at <http://www.afcd.gov.hk/english/conservation/hkbiodiversity/database/search.asp?lang=en>.
2. Habitats: YW = Young Woodland, SH = Shrubland, ST = Stream, DV = Developed Area/Village.

Annex A7 Freshwater Fauna Recorded within the Study Area - Cheung Chau

Taxa	Species / Family Name	Common Name	Relative Abundance ¹	
			Stream in Shui Hang	Stream in Fa Peng
Lower Invertebrates				
	Oligochaeta		+	+++
	Hirudinea	leech	+	+
Insects				
Heteroptera	<i>Enithares</i> sp. (Naucoridae)	backswimmer	+	
	<i>Metrocoris</i> sp. (Gerrinae)			+
Diptera (True flies)	Chironomidae	Non-biting midges	++	++
Odonata (Damselflies & Dragonflies)	<i>Zygonyx iris</i> (Libellulidae)		+	
	Coenagrionidae		+	
Ephemeroptera (Mayflies)	<i>Procloeon</i> sp. (Baetidae)		++++	+++
	<i>Isca purpurea</i> (Leptophlebiidae)		+	
	<i>Choroterpes</i> sp. (Leptophlebiidae)		++	+
	<i>Caenodes</i> sp. (Caenidae)			+
	Ephemerellidae		++	+
Trichoptera (Caddisflies)	Odontoceridae		++	
	Philopotamidae		+	
Coleoptera (Beetles)	Scirtidae		+	+
Fishes				
	<i>Gambusia affinis</i> (Poeciliidae)	Mosquito Fish	+++	+++
	<i>Poecilia reticulata</i> (Poeciliidae)	Guppy		+
Tadpoles				
	<i>Bufo melanostictus</i>	Asian Common Toad	+++	

Note:

1. Relative abundance: +=Rare, ++=Occasional, +++=Common, ++++=Abundant.