

# Appendix 12.2 Field Survey Methodologies

# Field Survey Methodologies

## 1 Habitat Mapping and Flora Survey

- 1.1 Mapping of terrestrial, estuarine and intertidal habitats within the study area have been generated from the desktop study and verified by ground truthing. Aerial photographs, approved Outline Zoning Plans (OZPs), relevant habitat maps in approved reports were also studied to interpret the habitats and generate preliminary habitat maps for the project. Habitat maps of suitable scale (1:1000 to 1:5000) were prepared to show the types and locations of identified habitats in the study area. In order to facilitate the review of habitat quality, special attention was paid to habitats of conservation interest and those with connectivity to the north Lantau waters.
- 1.2 Since the same habitat type at distinctly different locations may have different floral species composition, the study area is divided into four locations for the purpose of habitat mapping:
  - Location A North Lantau west of North Lantau Expressway;
  - Location B North Lantau east of North Lantau Expressway;
  - Location C the airport island; and
  - Location D outlying islands
- 1.3 Floral species in the same habitat type but in different locations were recorded separately. The same habitat type at each of these four locations was also described and evaluated individually.
- 1.4 Flora survey were conducted within the study area by walk-through surveys which focused on the dominant plant species and species of conservation interest recorded at Scenic Hill, habitats with conservation importance and along the riparian zones of the stream/estuarine region.

## 2 Avifauna Survey

- 2.1 The main objective of the avifauna survey was to investigate the occurrence of regular flight movements over the area of the proposed runway. Since the proposed runway footprint is located in open sea to the north of the existing airport island, the survey was designed to focus on the avifauna that utilises the pelagic habitat. Therefore, boat surveys were conducted for avifauna over the pelagic environment in north Lantau waters including the proposed land formation area for the project and the open sea around the existing airport island. In addition, land-based surveys, with an emphasis on identifying bird species that utilise the inter-tidal area, were also conducted to investigate birds' flight movement within and near the proposed runway. The survey was conducted during early morning and late afternoon as flight movement is the most prominent within these two time periods. Night observation was not considered as it is impossible to make observation from distance at night time and the flight movement at night is usually less prominent.
- 2.2 Aside from pelagic ecology, terrestrial habitats of special conservation importance for birds were also surveyed. Special attention was given to the egretry on Sheung Sha Chau Island for identifying the relationship between breeding ardeid and the coastal habitat in the study area.



#### Boat Survey for Flight Movement Investigation

- 2.3 The boat surveys were conducted by transect method which required the survey boat to move along predetermined transect lines in survey area. The survey area that covered the proposed third runway area as well as adjacent North Lantau waters was designed to collect information on bird movements over marine area as well as to identify avifauna associated with the coastal area. The survey transects were in a north to south alignment across the study area, 1 km apart. The survey transects are shown in **Drawing MCL/P132/EIA/12-008**.
- 2.4 During surveys, the boat moved at a constant speed at approximately 18 km/hr and the two observers searched ahead of the vessel with the aid of binoculars. All bird species encountered in detectable distance were recorded for abundance, activities, flight direction and approximate elevation over the sea. The notable distance for open area generally cover 500 m from the survey point/transect. However, for open sea with mild sea state, the detectable distance could be longer. Therefore, the survey area was defined as 1 km from the survey transect and all birds within the survey area were recorded. The location of the birds recorded and the flight direction were marked on a map for further analysis. Other information such as vessel speed, sea status, visibility and distance travelled in each survey were also recorded. The boat survey was conducted twice a month for a 12-month survey period from September 2012 to August 2013.

#### Land-based Survey for Flight Movement Investigation

- 2.5 To supplement boat surveys, land-based surveys were undertaken to investigate bird flight movements in the coastal area. Four survey locations were selected at vantage points with unobstructed views over the open sea to the north of the airport island. The four survey locations included one station on Sha Chau and three stations on the airport island. The stations on the airport island were located at the north-eastern coast, at approximately the mid-way point of the seawall located north of North Runway and at a location on the western shore of HKIA. Given access restrictions close to the airport runway, a pier at the mid-point of the North Runway served as the only location on the HKIA northern coast with an unobstructed view to north Lantau waters. The survey locations are indicated in **Drawing MCL/P132/EIA/12-008**.
- 2.6 Over the course of the survey, one of the two surveyors searched over the sea surface with binoculars whilst another surveyor searched the sky and coastal area for other birds not associated with the marine habitat.
- 2.7 The survey for each section lasted for three hours, and each station was surveyed twice per month for a 12-month survey period. The survey began in early mornings or late afternoons when the bird flight movements are known to be most significant.
- 2.8 All birds observed were recorded according to species, abundance, flight movement and approximate elevation above sea surface. The sex, age and breeding stage of the birds were also recorded during the survey whenever possible based on the experience of the bird expert surveyors to provide more detailed information for the evaluation of impact significance. The locations and observable flight paths were marked on a map with flight movement over the proposed third runway and nearby areas for subsequent data analysis.

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#### **Egretry Survey**

- 2.9 The egretry on Sheung Sha Chau Island was visited five times during the egret breeding season from April to July to confirm presence, status and size. Where observable, the number of nests were counted and the result was verified with HKBWS's egretry study. In April 2013, a pre-survey visit to Sha Chau egretry was conducted to confirm the presence of the egretry and determine the survey location for the subsequent egretry survey. A total of four monthly egretry surveys were then conducted between April and July.
- 2.10 With regards to the flight movement of breeding ardeids, their flight path movement were surveyed four times during the breeding season between April and July 2013. Surveys were conducted either in early morning or late afternoon when the flight movement of the birds is more prominent. Point count survey was conducted at a vantage point that allows an unobstructed view over the egretry (survey location shown in **Drawing MCL/P132/EIA/12-008**). Over the course of the point count survey, the abundance of egrets travelling towards each direction from the egretry was marked on a map. The directions of egrets travelling towards the egretry were also marked. The flight directions were used to determine the flight origins and destinations of ardeids on Sha Chau. Where it is possible, the land-based survey observation at the Sha Chau Station, which was conducted concurrently, was used to supplement the investigation of tracing the flight destination. Other information such as the breeding status of the birds, flight elevation above sea level and any special behaviour were also recorded.

#### Avifauna Transect Survey

2.11 Avifauna on North Lantau coastal area were also recorded during the terrestrial transect survey for other fauna groups to verify and update the baseline condition of avifauna in North Lantau terrestrial habitats obtained from literature review. The transect routes were located along North Lantau from Sham Wat to Tai Ho and also covered Sha Chau. These transects are presented in Drawing MCL/P132/EIA/12-010 to MCL/P132/EIA/12-015. The surveys were conducted twice in both dry and wet seasons during daytime and nighttime. All encountered birds (through both direct sighting and hearing) during the terrestrial survey were identified to species level as far as possible and information on the abundance, location and habitat of each sighting were also recorded.

## Verification Survey for the Terrestrial Birds at Existing Runway

2.12 As part of the bird strike preventive measure, a land-based bird survey is regularly conducted for the existing two-runway system by AAHK. This information formed the background information for the identification of potential/beneficial bird communities that may utilise the habitats of the proposed project. A verification survey was arranged on 10<sup>th</sup> October 2012, to verify the current survey results from AAHK's Bird Control Unit and Expert Consultant mentioned in **Appendix 12.1**, by following the same method adopted in the ongoing terrestrial bird monitoring.

## 3 Herpetofauna

3.1 Herpetofauna surveys were conducted through active searching and detection of mating calls as set forth in EIAO Guidance Note No. 10/2010, once in wet season during both day and night times. The surveys were conducted along transect lines covering potential terrestrial and aquatic habitat types.



3.2 Species were identified to the lowest taxonomic level as far as possible. Nomenclature followed Chan *et al.*, (2005) and Karsen, *et al.* (1998).

## 4 Marcoinvertebrates

- 4.1 Butterfly and dragonfly surveys were conducted through the transect count method as set forth in EIAO Guidance Note No. 10/2010, for once in wet season and once in dry season. Both rounds of surveys were carried out during daytime.
- 4.2 During the survey, all butterflies and dragonflies observed along the transects were identified and counted. Special attention was paid to any preferable habitats for these fauna groups, including watercourse, vegetation of the stream riparian zone, ponds and vegetated areas. Hand net was used for collecting specimens when necessary to confirm the species identification, and the live specimen was released in-situ after identification.
- 4.3 Nomenclature for butterflies followed Lo and Hui (2004), while that for dragonflies followed Tam *et al.* (2011).

## 5 Stream/Estuarine Fauna

- 5.1 Stream/estuarine fauna surveys (including fish and macroinvertebrates) were conducted in the streams and estuarine regions discharging into the coast of North Lantau, which are ecologically connected to the north Lantau waters. The field surveys were conducted twice at both daytime and night time during wet and dry seasons. Surveys were undertaken at Tai Ho Stream SSSI, Tung Chung Stream, Hau Hok Wan Stream, Sha Lo Wan Stream, Sham Wat Stream and the estuarine regions (locations refer to Drawings MCL/P132/EIA/12-009 to MCL/P132/EIA/12-014). The surveys avoided cold weather when aquatic fauna become inactive, heavy rainfall periods or just after rainfall when the stream is flooding.
- 5.2 Freshwater and estuarine fish surveys were conducted by bankside counting and hand netting as set forth in EIAO Guidance Note No. 10/2010 and detailed below. The stream/estuarine fauna surveys were conducted by three surveyors in each visit. Particular effort was made during surveys to actively search for fish species of conservation interest, for example, *Plecoglossus altivelis*, *Acrossocheilus beijiangensis*, *Syngnathoides biaculeatus* and *Syngnathus schlegeli* from the estuarine region to the lower course of the stream during low tide for four hours at each site quantitatively and two hours walk through to standardise the survey effort in each stream. The two pipefishes, *Syngnathoides biaculeatus* and *Syngnathus schlegeli* were actively searched during low tide event when the waters still cover the seagrass bed habitats.
- 5.3 Direct bankside counting of fish was conducted by naked eye (observation) and with the aid of a pair of binoculars with short focal length. Counting was conducted along the streams and estuarine regions where accessible.
- 5.4 Fine mesh size hand nets were used to collect live specimens for identification with specimens released in-situ following identification and photo taking. The fish were identified to the species level as far as possible and relative abundance were recorded. Nomenclature followed Lee *et al.* (2004) and Wu *et al.* (2012).

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5.5 Aquatic macroinvertebrate surveys were conducted along with the fish surveys by individual stone sampling methods, as set forth in EIAO Guidance Note No. 10/2010. Five quadrats of size 1 m<sup>2</sup> were deployed along each of the three sampling locations (covering the lower stream course – Station A, the estuarine region of the eastern coast – Station B and estuarine region of the western coast – Station C). Individual stones were searched for invertebrates by rolling and brushing them in front of a net to obtain the stream invertebrate samples. The net contents were collected for sorting, identification and counting in the laboratory.

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