

**Provision of Services for Fish Capture and
Translocation Survey at Tsang Tsui, Tuen Mun,
Stage 1 – Pre-Survey (Quotation Ref.: 23-01319)**

Pre-Survey Proposal

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CONTENTS

	Page
1. INTRODUCTION	4
1.1 Background	4
2. GENERAL PHYSICAL AND ENVIRONMENTAL INFORMATION OF THE SITE	4
2.1 WENT Landfill Extension	4
2.2 Tsang Kok Stream	5
2.3 Stream A	5
3. LITERATURE REVIEW	5
3.1 Target Species	5
3.2 <i>Squaliobarbus curriculus</i>	5
3.3 <i>Osteochilus vittatus (Osteochilus salsburyi)</i>	6
3.4 <i>Kuhlia marginata</i>	6
4. RELEVANT LEGISLATION, STANDARDS AND GUIDELINES	6
4.1 This plan is prepared and shall be executed in accordance with the guidelines, standards, documents, government ordinances and regulations as described below:	6
4.2 Freshwater Species of conservation importance	7
5. SURVEY METHODOLOGY AND SAFETY MEASURES	8
5.1 Pre-Survey Methodology	8
5.2 Safety measures during Surveys	8
6. PERSONNEL	9
6.1 Qualified Ecologists	9
6.2 Independent Environmental Checker (IEC)	10
6.3 Organization Chart of the Service Management Team	10
7. REFERENCES	11

Figure 1 **Photos of the Three Target Species**

Figure 2 **Photo of the Baited Fish Trap**

Appendix A: Map showing WENT Landfill Extension Boundary, Stream A and Tsang Kok Stream, and Tentative Sampling Locations

1. INTRODUCTION

1.1 Background

- 1.1.1 The West New Territories (WENT) Landfill is reaching its full capacity. The Environmental Protection Department (EPD) is actively pressing ahead the WENT Landfill Extension (WENTX) project to extend the capacity of the corresponding WENT Landfill, with a view to meeting the long-term waste disposal needs of Hong Kong.
- 1.1.2 The WENTX project is a Designated Project under Environmental Impact Assessment (EIA) Ordinance. In accordance with the EIA report for the WENTX project (Ref No. AEIAR-147/2009) (approved EIA Report) approved on 20 November 2009, impacts to loss of streams and fish species of conservation concern are considered minor and insignificant. In accordance with the approved EIA Report and Section 10.2 of the respective Environmental Monitoring and Audit (EM&A) Manual, as a precautionary measure, a capture and translocation survey for fish species of conservation concern is recommended at the Tsang Kok Stream and the Stream A (**Appendix A**), to be carried out in wet season prior to the commencement of the WENTX construction works, tentatively in November 2023. The fish species of conservation concern include *Squaliobarbus curriculus*, *Osteochilus vittatus* and *Kuhlia marginata* (Target Species). Target Species, if found during the survey, should be collected and translocated to suitable location(s).
- 1.1.3 Ecosystems Ltd. was commissioned by the EPD in July 2023 to carry out the services entitled "Provision of Services for Fish Capture and Translocation Survey at Tsang Tsui, Tuen Mun (Quotation Ref.: 23-01319)" which consisted of 3 stages including Stage 1 – Pre-survey; Stage 2 – Fish Capture and Translocation Survey (FCT-Survey) and Stage 3 – Post-translocation Monitoring (PT-Monitoring).
- 1.1.4 This proposal outlines the implementation programme of Stage 1 - Pre-Survey; ecology and conservation status of the target species; methodology and safety measures of the Pre-Survey and others related information, in order to fulfill the requirement of the Section 10.2 under the EM&A Manual of the approved EIA report (AEIAR-147/2009).

2. GENERAL PHYSICAL AND ENVIRONMENTAL INFORMATION OF THE SITE

2.1 WENT Landfill Extension

- 2.1.1 The eastern part of the site is located in Tsang Kok Valley which is a hilly terrain site sparsely vegetated with grass and limited patched of shrubs. The easterly ridge forms a boundary with the existing landfill. The northern part is the CLP Tsang Tsui Ash Lagoons and the former BBC Relay Station. The southern area is bounded by the natural topography, with ridgelines rising southwards from the coastline to meet the major east-west trending ridgeline at about +290mPD. The southern part of the site will also encroach onto the Tsing Shan Firing Range. The location plan of the WENT Landfill Extension site is shown in **Appendix A**.

2.2 Tsang Kok Stream

2.2.1 Tsang Kok Stream is a small stream flowing from Tsing Shan Firing Range into the southern part of Deep Bay. It is described as one of minor streams in Deep Bay Water Control Zone monitored in the EPD regular river water quality programme (EPD 2007). This stream was located immediately adjacent to the existing WENT landfill and subject to modifications previously. The headwater of Tsang Kok Stream, which is immediately outside the existing WENT landfill together with part of its catchment area was found to be filled, probably during the construction of the existing landfill. The middle section of this stream was basically in natural conditions, while its lower section had been modified into a concrete drainage channel. The connecting point of the lower section drainage channel and the natural middle section was a steep and smooth concrete slope with structures for dispersing the energy during flushing flow. This slope prevents the upstream movement of aquatic life from estuary, and thus the stream was fragmented. The concrete drainage channel ran northward along the western boundary of the existing WENT landfill, passed Nim Wan Road through box culverts, and finally joined the Tsang Kok Stream Outfall which separated WENT landfill and the CLP ash lagoon site. While the headwater area was filled, the middle section of this stream was covered by large sized boulders and rocks. The stream flow in Tsang Kok Stream was low year-round and found murky and mostly beneath the boulders, and the stream bed was covered by sediment which was likely brought into the stream by sedimentation within the catchments.

2.3 Stream A

2.3.1 Stream A originated on the hill slope immediately to the southeast of Nim Wan Road. It had box culvert modification at its middle section during the construction of Nim Wan Road and was thus more or less fragmented. After passing Nim Wan Road, the stream substratum was mainly bare bedrock of fairly steep gradient until it passed through a orchard, flowing northward and joining Tsang Kok Stream Outfall. Flow volume of the perennial section of Stream A was fair in wet season and low in dry season. A few seasonal tributaries of Stream A joined the main course at different locations. They were either fragmented by Nim Wan Road or of narrow channel width, and all without surface flow during dry season.

3. LITERATURE REVIEW

3.1 Target Species

3.1.1 There are three main target fish species for the Pre-survey including the *Squaliobarbus curriculus*, *Osteochilus vittatus* and *Kuhlia marginata*. Photo of the three target species is shown in **Figure 1**. To understand the preliminary ecological information of the freshwater fishes of conservation concern, status, potential habitat, and records from literature review were reviewed in this proposal.

3.2 *Squaliobarbus curriculus*

3.2.1 *S. curriculus* mainly distributed in East Asia which includes China, Vietnam, Western Korea and Amur River drainage in Russia (IUCN, 2022; FishBase). In South China region, *S. curriculus* is one of the economically important and dominant fish species in the western Peral River area (Wang et al., 2021). Its suitable and potential habitat includes freshwater and brackish rivers. Although *S. curriculus* is considered to be a native species in China, its occurrence in Hong Kong still remains doubtful and is considered to be an introduced species in Hong Kong (Jeffery

et al., 2023), as the watercourse in Hong Kong is not connected with Zhujiang tributaries (ARUP, 2009). There are only several records of this species with a limited distribution in Hong Kong, the first record of it was reported in concrete silt-trap pool at the channelized section of Tsang Kok Stream near the sea and in the channelized section of Stream A in year 2003 within the current survey area (ERM, 2003; ARUP, 2009). It is also recorded in the Ng Tung River in New Territories and Tai Ho River in Lantau (GBIF. Org, 2021). This species is considered of no conservation importance since it is not listed in relevant Hong Kong laws/ regulations/ conventions, CITES; List of Wild Animals under State Priority Conservation; Fellowes et al. (2002) and it is evaluated as “Least Concern” in both Red List of China’s Vertebrates and IUCN Red List.

3.3 *Osteochilus vittatus (Osteochilus salsburyi)*

3.3.1 The scientific name *O. vittatus* was used in early literature and previous EIA reports for this Genus *Osteochilus* target species. (ERM, 2003; ARUP, 2009; Lee et al., 2004; Reels, 2001; Yam et al., 2002). However, recent literature and AFCD updated database suggested that *O. salsburyi* should be the only species in the Genus *Osteochilus* (AFCD, 2023; Jeffery et al., 2023; Ichthyological Society of Hong Kong, 2009). Therefore, this proposal would regard *O. salsburyi* as the target species. *O. salsburyi* distributed in Asia which includes Laos, northern Vietnam, and southern China with its freshwater rivers and reservoir being its suitable/ potential habitat (FishBase). *O. salsburyi* is regarded as a native inland freshwater fish species with feral population in Hong Kong since the native population was regarded to be extinct (Chong & Dudgeon, 1992; Jeffery et al., 2023). *O. salsburyi* could be found in a few local reservoirs, including Tai Lam Chung Reservoir, Plover Cove Reservoir and High Island Reservoir (Lee et al., 2004) and their population is likely to be introduced through water transfer from Dongjiang water. This species is considered of no conservation importance since it is not listed in relevant Hong Kong laws/ regulations/ conventions, CITES; List of Wild Animals under State Priority Conservation; Fellowes et al. (2002) and it is evaluated as “Least Concern” in both Red List of China’s Vertebrates and IUCN Red List.

3.4 *Kuhlia marginata*

3.4.1 *K. marginata* distributed throughout Asia including Taiwan, Philippines, and Indonesia to islands in the Pacific (FishBase). The species mainly inhabits clean freshwater streams. Although it is catadromous meaning that they are able to migrate in between freshwater and marine water, it is considered to be a freshwater species primarily (KFBG, 2019). Its suitable/potential habitat includes freshwater watercourses and brackish water estuaries. In Hong Kong it is recorded in Lantau Island, Hong Kong Island and Sai Kung (AFCD, 2023). It was also reported in Stream A in a survey for STF ES (Metcalf and Eddy 2006). This species is considered of conservation importance since it is listed in Fellowes et al. (2002) and evaluated as “Regional Concern”, however is it not listed in relevant Hong Kong laws/ regulations/ conventions, CITES; List of Wild Animals under State Priority Conservation; Red List of China’s Vertebrates and it is evaluated as “Least Concern” in IUCN Red List.

4. RELEVANT LEGISLATION, STANDARD AND GUIDELINES

4.1 This proposal is prepared and shall be executed in accordance with the guidelines, standards, documents, government ordinances and regulations as described below:

- Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586) and its subsidiary legislation. Regulates the import, introduction from the sea, export, reexport, and possession of specimens of a scheduled species, including live, dead, parts or derivatives. The Ordinance applies to all activities involving endangered species which include the parties of traders, tourists and individuals;
- The IUCN Red List of Threatened Species. Widely recognised as the most comprehensive, objective global approach for evaluating the conservation status of plant and animal species. Provides information and analyses on the status, trends and threats to species in order to inform and catalyse action for biodiversity conservation;
- Wild Animals Protection Ordinance (Cap. 170). Protects wild animals from being hunted, whilst their nests and eggs are protected from injury, destruction and removal. All birds and most mammals are protected under this Ordinance.
- Environmental Impact Assessment Ordinance (Cap. 499) and the associated TM
- Ecological Baseline Survey for Ecological Assessment (EIAO Guidance Note No. 7/2022)
- Methodologies for Terrestrial and Freshwater Ecological Baseline Survey (EIAO Guidance Note No. 10/2004)

4.2 Freshwater Species of Conservation Importance

- 4.2.1 In accordance with Table 3, Annex 8 of the TM-EIAO, the ecological value of species will be assessed in terms of protection status, distribution, and rarity. For freshwater species, the protection status (e.g. fauna protected under the Wild Animals Protection Ordinance, Protection of Endangered Species of Animals and Plants Ordinance, and/or regional/global laws/conventions), the species distribution (e.g. endemic), listed by IUCN or CITES, or listed as Category I or II protected species in mainland China); and the rarity (e.g. rare or restricted, or level of concern highlighted in Fellowes et al. (2002)) will be considered.
- 4.2.2 The following laws/regulations/conventions/books/publications are relevant to the evaluation of the conservation importance of freshwater species.
- Forestry Regulations (Cap. 96A) which are subsidiary legislation of the Forests and Countryside Ordinance (Cap. 96);
 - Wild Animals Protection Ordinance (Cap. 170);
 - Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586);
 - The International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species (Species which are classified by IUCN as Near Threatened (NT), Least Concern (LC), Data Deficient (DD), or Not Evaluated (NE), and not covered by any other laws/regulations/conventions are not considered of conservation importance in the present study);
 - The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);

- Category I or II of List of Wild Animals under State Priority Conservation;
- PRC Wild Animal Protection Law;
- Red List of China's Vertebrates (Jiang et al. (2016)); and
- Fauna species considered of concern in Fellowes et al. (2002).

5. SURVEY METHODOLOGY AND SAFETY MEASURES

5.1 Pre-Survey Methodology

- 5.1.1 The proposed Daytime Pre-Survey will be carried out 3 times (preferable in 3 consecutive days), starting from around 10 am to around 4 pm, in August 2023 at both Tsang Kok Stream and Stream A, and their downstream watercourses leading to the sea outlet (the Site) (shown in **Appendix A**). The tentative dates of the Pre-survey have been scheduled from 16th August 2023 to 18th August 2023.
- 5.1.2 Freshwater survey team with at least three surveyors with relevant experience (led by the proposed qualified ecologist) in conducting freshwater surveys will be responsible for the Pre-Survey. Survey date, weather and temperature will be recorded referencing the regional weather from Hong Kong Observatory before the commencement of each Pre-survey.
- 5.1.3 A preliminary walk-through will be conducted along both Tsang Kok Stream and Stream A to obtain the general information of the streams, and confirm the location for fish trap deployment. After the preliminary walk-through, a walk-through survey with direct observation and active searching using hand-net will be carried out from the accessible section of downstream to upper section of both Tsang Kok Stream and Stream A. If any of the Target Species or other fish species of conservation importance observed/caught, species, size and condition of it would be immediately recorded along with photographic record.
- 5.1.4 Baited fish traps with bread as baits, with dimension about 30cm x 30cm x 60cm (**Figure 2**) will also be placed along the survey streams in three sections including lower, middle and upper stream for at least one hour. Tentative sampling locations are shown in **Appendix A**. i.e. Three sampling locations at each watercourse, the exact sampling locations will subject to the site condition during the Pre-survey.

5.2 Safety Measures During Pre-surveys

- 5.2.1 The following measures will be followed when field surveys are conducted so as to ensure the safety of field staffs.
- Surveyors will work in pairs/ groups;
 - The surveys will be re-scheduled in cases of adverse weather conditions, e.g., typhoon (No. 3 or above), heavy rain (Red or Black signal), Very Hot Weather Warning and follow the instructions of Heat Stress at Work Warning ;
 - The surveyors will also wear proper clothing (e.g., light-color clothes, and waterproof boots) suitable for freshwater field surveys;
 - The surveyors will use insect repellent when working near the watercourses;

- The surveyors will have their mobile phone on and will carry walkie-talkie for communications and emergency contact;
- For hygiene purpose, there will be water and disinfection liquid in the vehicle for hand washing after field surveys;
- Anti-slippery diving boots will be used for freshwater surveys.

6. PERSONNEL

6.1 Qualified Ecologists

6.1.1 The Pre-survey suggested by this proposal shall be conducted by qualified ecologists supported by a team of experienced ecologists as part of the Ecosystems Ltd.

- **Mr. Vincent LAI** – Environmental Team Leader/Service Management Team Leader
Mr. Lai has over 25 years of experience in environmental monitoring and auditing or environmental management. He has managed many ecological studies for major EIA studies such as the Hong Kong Zhuhai Macao Bridge, and development of translocation proposal such as translocation plan for an aquatic species of conservation importance under Site Formation and Infrastructure Works for Public Housing developments at Ma On Shan Tsuen Road - IDC. Mr. Lai will serve as the Environmental Team Leader / Service Management Team Leader. He will develop and implement strategic and operational plans for the Services, and oversee the progress of the Services.
- **Dr. Klinsmann CHEUNG** - Qualified Ecologist
Dr. Cheung has over 15 years of working experience in ecological and fisheries study as well as survey in Hong Kong. He is familiar with the aquatic wildlife through his experience in Hong Kong Wetland Park and Mai Po Nature Reserve. He is experienced in fisheries surveys and studies in Hong Kong. He also has experience in formulating translocation proposal, and actual translocation experience for aquatic organisms. He will be a member of the field survey team and conduct aquatic fauna surveys.
- **Mr. Martin LI** – Aquatic Ecologist
Mr. Li has deepened his interest in freshwater fauna when working a part time Research Assistant at the Freshwater Ecology Laboratory in the University of Hong Kong and studied the taxonomy of freshwater macro-invertebrates in Hong Kong. He is experienced in fisheries surveys and translocation of aquatic organisms in Hong Kong.
- **Mr. Sunny TANG** – Aquatic surveyor
Mr. Tang has gained experience in understanding the ecology of freshwater and estuary fauna by being student helper and part-time research assistant in different laboratories at the University of Hong Kong. By participating in aquatic surveys such as surveying freshwater fishes in lowland streams of Hong Kong and subtidal fisheries survey, Mr. Tang has acquired identification skills of freshwater and estuary fishes.
- **Mr. Michael MA** – Aquatic surveyor
Mr. Ma is particularly interested in marine ecology and acquired practical knowledge and experience in marine biology, conservation biology, nearshore marine and estuarine ecology and experimental intertidal ecology from his academic background at HKU.

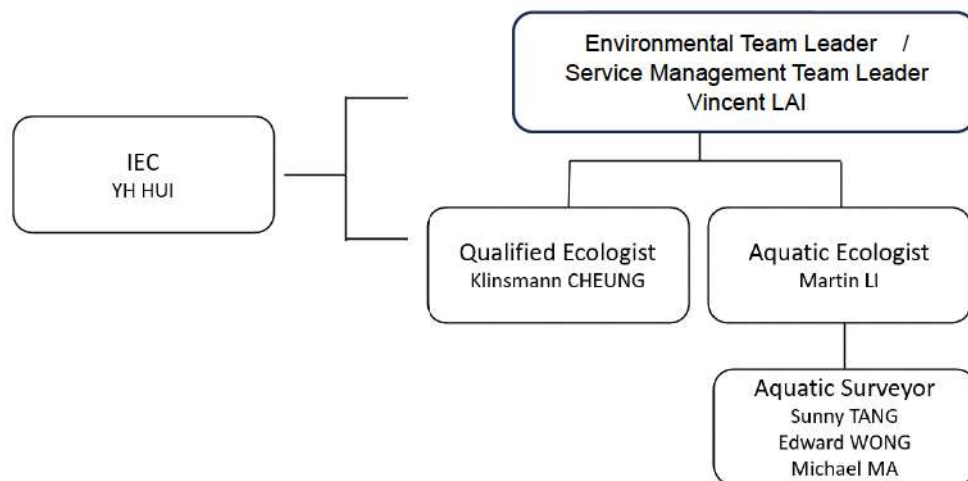
- **Mr. Edward WONG** – Aquatic surveyor
He has deepened his survey experience in herpetofauna and aquatic fauna when working as a Part-time Research Assistant at the Since Unit of Lingnan University. His identification was deepened through regular amphibians and reptiles survey among Hong Kong Country Parks and different natural streams.

6.2 Independent Environmental Checker (IEC)

6.2.1 An Independent Environmental Check (IEC) from Ramboll is hired for the performance of this Services. The information of the IEC is described below.

- **Mr. Y. H. Hui** is a highly experienced environmental scientist with over 20 years of experience in the environmental studies, assessment and monitoring. His primary expertise is on ecology and he has undertaken numerous ecological assessments and monitoring for major infra-structure projects in Hong Kong. He also developed expertise in the related water quality and sediment quality assessment and management. His focus has been on the EIA, EM&A, and IEC processes under the EIAO framework and has also been involved in many field surveys, monitoring, and assessment of potential water/sediment quality and ecological/fisheries impacts for major infrastructure projects in Hong Kong. He will be the Independent Environmental Checker for the Services.

6.3 Organization Chart of the Service Management Team



7.

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Squaliobarbus curriculus



Osteochilus vittatus (Osteochilus salsburyi)



Kuhlia marginata

Figure 1 Photos of the Three Target Species (source FishBase and Ichthyological Society of Hong Kong)



Figure 2 **Photo of the Baited Fish Trap**

Appendix A.

**Map showing WENT Landfill Extension Boundary, Stream A and Tsang Kok Stream, and
Tentative Sampling Location**

