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# Contract No. DPW 01/2020 Environmental Team for Drainage Improvement Works at Ngong Ping

Aquatic Fauna Translocation Plan | Hong Kong

0118/20/ED/0141h 08 | 23 December 2020

Formal Submission

**Drainage Services Department**

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## Abbreviations

|      |  |
|------|--|
| AFCD | Agriculture, Fisheries and Conservation Department |
| EIA  | Environmental Impact Assessment                    |
| EIAO | Environmental Impact Assessment Ordinance          |
| ET   | Environmental Team                                 |
| IEC  | Independent Environmental Checker                  |
| ind. | Individuals  |
| WS   | Work Section                                       |

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# 1. Introduction

## 1.1 Background

- 1.1.1 To enhance the capacity of the trunk drainage system and reduce the flood risk in Ngong Ping, long term drainage improvement works are proposed to be implemented under "PWP Item No. 4163CD – Drainage Improvement Works at Ngong Ping" (hereafter referred to as "the Project").
- 1.1.2 The Project is a designated project under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap.499). An Environmental Impact Assessment (EIA) Report together with an Environmental Monitoring and Audit (EM&A) Manual (hereafter referred to as the "approved EM&A Manual") (Register No. AEIAR-169/2013) was prepared for the Project and approved by Environmental Protection Department (EPD) on 21 April 2013. An Environmental Permit (EP) was first issued on 7 August 2013 and its current version (EP No. EP-456/2013/A) as issued on 29 March 2019. These documents are available through the EIAO Register.
- 1.1.3 Fugro Technical Services Limited (FTS) has been appointed as the Environmental Team (ET) by Drainage Services Department (DSD) to implement the EM&A programme in accordance with the EP No. EP-456/2013/A and the approved EM&A Manual. As the ET, part of the scope of FTS, is to prepare and submit an Aquatic Fauna Translocation Plan (hereafter referred to as the "Plan")

## 1.2 Purpose of the Plan

- 1.2.1 Aquatic fauna species of conservation interest were observed in the streams and tributaries just outside the Works Area as described in **Section 6 of the EIA report** and **Section 5 of the approved EM&A Manual**. Despite their locations, these species may be present in the Project Area at the time the works commence and consequently may be potentially affected by the Project due to the connectivity of waterbodies.
- 1.2.2 As a necessary avoidance measure, this Plan was prepared and submitted by the qualified ecologist of the ET to describe the aquatic fauna species of conservation interest and their potential numbers; the methodology for the Aquatic Fauna Translocation Survey (hereafter referred to as the "Survey"); the programme; and the proposed receptor site.
- 1.2.3 This Plan is prepared and deposited in accordance with the requirements and methodology as stipulated in **EP Condition 2.10; Sections 5.5.2.15 and 5.5.2.16 of the approved EM&A Manual; and Section 6.12.3.5 of the EIA report.**

### 1.3 Relevant Legislations, Standards, guidelines and Criteria

This Plan was prepared and shall be undertaken in accordance with the guidelines, standards, documents, government ordinances and regulations as described below:

- *Building Department (BD) Practice Note for Authorized Persons and Registered Structural Engineers 295: Protection of Natural Streams/Rivers from Adverse Impacts Arising from Construction Works.* A practice note for authorized persons and registered structural engineers which advises that construction works in or affecting natural streams/rivers (EIS) should be restrained where possible to minimise possible disturbance to these streams/rivers;
- *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 created mainly for the purpose of nature conservation;
- *Drainage Services Department (DSD) Practice Note No. 1/2015.* A practice note which specifies guidelines on environmental and ecological considerations for river channel design;
- *Environmental Impact Assessment Ordinance (EIAO) (Cap. 499).* An ordinance for assessing the impact on the environment of certain projects and proposals, for protecting the environment and for incidental matters;
- *Environment, Transport and Works Bureau Technical Circular (Works) / ETWB TC (W) No. 5/2005.* A circular that designates the 690 m long section of the Ngong Ping Stream as an Ecologically Important Stream/River (EIS) in 2005;
- *EIAO Technical Memorandum Annexes 8 and 16.* Ecological assessment specific annexes which provide the criteria for evaluating ecological impact and guidelines for ecological assessment, respectively;
- *EIAO Guidance Notes No.7/2010 and 10/2010.* Guidance notes on the general guidelines for conducting an ecological baseline survey for ecological assessment and on some methodologies in conducting terrestrial and freshwater ecological baseline surveys, respectively;
- *Hong Kong Planning Standards and Guidelines Chapter 10 (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;

- *Hong Kong Planning Standards and Guidelines (HKPSG) Chapter 10 "Conservation"*. Provides landscape and conservation guidelines to achieve a balance between the need for development and the need to minimise disruption of the landscape and natural resources;
- *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;
- *Site of Special Scientific Interest (SSSI) Register*. Lists the designated sites under the Town Planning Ordinance with special faunal, floral, ecological or geographical features;
- *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;
- *Town Planning Ordinance (Cap. 131)*. Provides for the designation of coastal protection areas, Sites of Special Scientific Interest (SSSIs), Conservation Area, Country Park, Green Belt or other specified uses that promote conservation or protection of the environment;
- *United Nations Convention on Biodiversity (1992)*. Requires signatories to make active efforts to protect and manage their biodiversity resources. Hong Kong Government has stated that it will be 'committed to meeting the environmental objectives' of the Convention (PELB 1996); and
- *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.

## 1.4 Structure of the Plan

1.4.1 Succeeding Section 1 Introduction, the remainder of this Plan is presented as follows:

- Section 2 details the methodology of the Survey;
- Section 3 describes the proposed receptor site;
- Section 4 describes the reporting of the Survey;
- Section 5 describes the requirement of post-translocation monitoring; and
- Section 6 details the translocation programme.



## 2. Methodology

This section presents the methodology and approach of the Survey during the pre-construction stage of the Project.

### 2.1 Personnel

The Survey shall be conducted by a qualified ecologist supported by a team of experienced ecologists as part of the Environmental Team (ET).

### 2.2 Survey Area

The Survey shall be conducted in the affected sections of the stream courses at Works Sections (WS) 1 and 6 and shall cover the stretch of the stream course 5 m upstream and 5 m downstream of the works as described in **Section 2.11 of the EP, Section 5.5.2.17 of the approved EM&A Manual, and Section 6.12.3.7 of the EIA report** and identified potential receptor site. The Survey Area are presented in **Appendix A.1a to Appendix A.1d**.

### 2.3 Species and Potential Numbers

Any aquatic fauna species of conservation interest (including but not limited to the Romer's tree frog *Liuixalus romeri*) found during the Survey, in addition to the three initially identified target species described in the EIA report (i.e. the stream crab *Somanniathelphusa zanklon*, reptile Reeves' terrapin *Mauremys reevesii*, and the amphibian lesser spiny frog *Quasipaa exilispinosa*) shall be translocated. The estimated numbers of aquatic fauna species of conservation interest to be translocated shall be based from their baseline relative abundance described in the EIA report. The potential numbers for translocation are discussed in the succeeding sections.

Indicative locations of these three species relative to the Project Area as described in **Table 6.6** and shown in **Figures 6.5a and 6.5b of the EIA Report** are presented in **Appendix A.1a to Appendix A.1c** while photographs are shown in **Appendix B**.

#### 2.3.1 Stream Crab

**2.3.1.1** *S. zanklon* (**Appendix B.1**) is of Global Concern (Fellowes et al., 2002) and Endangered (Esser and Cumberlidge, 2008). However, it is widely distributed within Hong Kong with records from at least 43 sites in Lantau Island, northwestern and northeastern New Territories (Stanton and Leven, 2016). This species forages in irrigation ditches, flooded furrows; and slow-flowing stream and rivers (Dudgeon and Corlett, 1994).

**2.3.1.2** *S. zanklon* individuals (ind.) were recorded in streams outside but close to the Project Area particularly at sampling points R2 and W2 near WS 1; and point W8 near WS 6. Relative abundance of this species ranged from 1 to 10 ind. in these three sampling points (**Table E7.1 of Appendix E7 of the EIA Report**).

## 2.3.2 Reptile

2.3.2.1 The Reeves' terrapin (**Appendix B.2**) although fairly common in Hong Kong (Karsen et al. 1998) is of Global Concern (Fellowes et al. 2002) and Endangered (van Dijk, 2011). This species is protected locally under the Wild Animals Protection Ordinance (Cap. 170). This inhabits reservoirs, ponds, rivers and slow-flowing streams.

2.3.2.2 Only one of individual of the Reeves' terrapin was recorded in the downstream survey point of W8 (**Table E4.2 of Appendix E4 of the EIA Report**).

## 2.3.3 Amphibian

2.3.3.1 The lesser spiny frog (**Appendix B.3**) which is a common and widely distributed species in Hong Kong and is present in hill streams and its adjacent areas, is considered to be of Potential Global Concern by Fellowes et al. (2002) and Vulnerable (Lau and Baorong, 2004).

2.3.3.2 Individuals of this species were recorded in the streams outside but close to the WS 1 of the Project Area particularly at sampling points R2, W1, and W2 with relative abundance ranging from 1 to 10 ind. during the wet season freshwater stream fauna survey of the EIA study (**Table E7.1 of Appendix E7 of the EIA Report**). Tadpoles were also recorded at point R2 during the dry season surveys.

2.3.3.3 The Romer's tree frog *Liuixalus romeri* (**Appendix B.4**) an endemic species in Hong Kong and distributed in woodlands of Lantau Island, has its largest population present in Ngong Ping (**Section 6.3.1.3 of the EIA Report**). This species is listed in Wild Animals Protection Ordinance (Cap. 170); considered to be of Potential Global Concern by Fellowes et al. (2002) and Endangered (Lau and Zhao, 2004).

## 2.4 Survey Methodology

Since most of these species are nocturnal, night-time survey activities shall be conducted. The survey shall start after sunset with reference to the Hong Kong Observatory and shall last for three hours. Aquatic fauna of conservation interest found and collected during the Survey shall be translocated to the approved receptor site on the same survey date. Separate plastic containers shall be used as temporary storage for each of the fauna category during the translocation process. Translocation duration from the collection sites to the receptor site may only take less than one hour as both areas have accessible routes.

### 2.4.1 Stream Crab

Night-time surveys shall be conducted by kick and sweep netting. The net contents shall be sorted in a white sorting tray to retrieve the freshwater crab for translocation. The crab shall be temporarily stored in a separate plastic container (**Figure 2.1**) with thin layer of plant debris and small amount of water before release.



Figure 2.1: Plastic container for translocation

#### 2.4.1.1 Kick Netting

Survey activity shall be done in the water with the mouth of the net facing the water current. The substrate shall be disturbed by kicking such that the crab dislodged from the stream bed shall be trapped in the net. Other organisms accidentally collected during the process shall be returned to the streams.

#### 2.4.1.2 Sweep Netting

Survey activity shall include trailing of emergent vegetation and roots along the stream banks.

#### 2.4.2 Reptile

Night-time surveys shall be conducted by active searching and hand collection. Appropriate microhabitats and refugia such as stones, crevices, woody debris and leaves along the riparian areas shall be actively searched. Species of conservation interest such as the Reeve's terrapin, when found, will be gently hand-picked and shall be temporarily stored in a separate plastic container before release. The plastic container (**Figure 2.1**) shall have some leaf litter and moist soil to provide cover and moisture for the species before the immediate release.

#### 2.4.3 Amphibian

Night-time surveys shall be conducted by active searching, hand collection, sweep netting and setting of pitfall traps for adult amphibians of conservation interest while sweep-netting for their tadpoles. The collected individuals shall be temporarily stored in separate plastic container (**Figure 2.1**) before release. The plastic container shall have enough amount of water to maintain amphibian moisture.

### 2.4.3.1 Active Search and Hand Collection

Active searching of appropriate microhabitats and refugia such as stones, crevices and leaf litter/debris along the riparian area shall be conducted. One hand can cup over the frog to prevent its escape and then gently grab the frog by the waist (Chan et al., 2005).

### 2.4.3.2 Sweep Net

Amphibians found that could not be collected by hand shall be caught using sweep net. Tadpoles shall also be collected using this equipment.

### 2.4.3.3 Pitfall Trap

Traps shall be set using drift fence and sinking a plastic bucket (10 L) (Steinhilber et. al., unpublished) in the ground with the top of the bucket on ground level (Figure 2.2). Sections of drift fence shall be placed at intervals (Figure 2.3) where applicable on the riparian area or part of the aquatic/terrestrial interface (Willson and Gibbons, 2010) such that incoming and outgoing amphibians shall be guided into the pitfall traps. The top portion of the bucket shall have a cover made of wooden board or corrugated plastic that shall be supported at one end with a small stone/branch about 1-2cm thick. The cover shall attract the animals to hide under it and consequently fall into the trap. Small holes shall be punched into the bottom of the buckets to avoid drowning of other organisms accidentally trapped inside due to accumulation of water in the bucket. The traps shall be left on the sites for three consecutive nights and shall be checked early the following mornings. Traps shall be closed during daytime intervals between night time surveys and be removed from the sites after the completion of all survey activities.

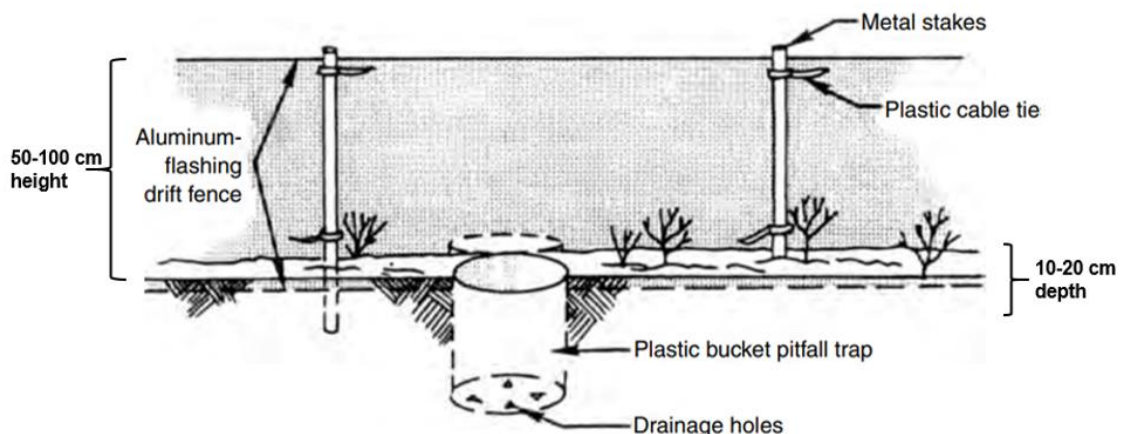


Figure 2.2: Schematic of a terrestrial drift fence with pitfall trap (Gibbons and Semlitsch, 1981)

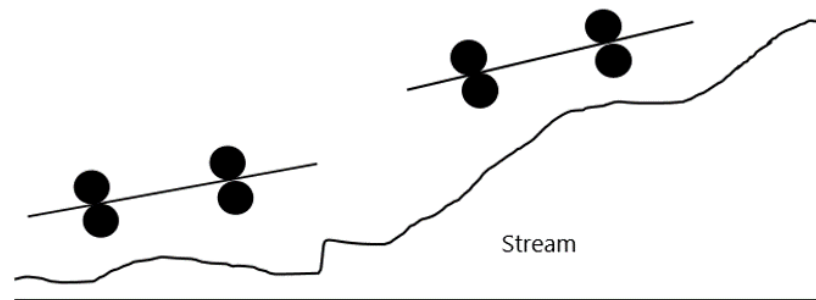


Figure 2.3: Drift fence and pitfall traps configuration. Solid lines represent sections of the drift fence while filled circles as pitfall traps (Willson and Gibbons, 2010)

## 2.5 Contingency Measures

Given the time gap between the EIA Study and the translocation Surveys, several natural factors could have already affected the baseline relative abundance of the target species. Thus, to ensure that the maximum number of individuals of aquatic fauna species with conservation interest are surveyed and translocated, various methodologies shall be employed as aforementioned in **Section 2.4**. Furthermore, if no individuals are observed during the Survey, a second sweep of the collection sites shall be conducted on a different Survey date employing the various aforementioned methodologies. After the second sweep and still no individuals are found from the Survey Areas, the Survey can be ceased.

It will be endeavoured that all of the aquatic fauna species with conservation interest found during the Survey shall be translocated. However, it may be possible that residual individuals may remain in the collection sites. For the vicinity within the proposed Outfall B and Intake C areas, fence shall be installed from the ground around it to prevent re-entry of the targeted species before the work starts. Nonetheless, to further ascertain that there are no aquatic fauna species with conservation interest present in other parts of the Project Area before commencement of construction works, the Survey shall be completed no more than one week before start of construction activities at WS 1 and 6 and prior to site clearance works. The ecologist of the ET may also carry out a visual inspection of the streams adjacent to the Project Area prior to the actual commencement of the relevant construction activities. During construction works, the ET regular water quality monitoring may provide information on the possible residual presence of these organisms and the regular site environmental audits shall ensure strict compliance to the recommendation in **Sections 5.8.8.1 and 6.12 of the EIA Report** such as the design of efficient silt removal facilities as based on the guidelines by ProPECC PN 1/94; and regular inspection and maintenance of all drainage facilities, among others; and **Section 5.5.2.19 of the approved EM&A Manual** to minimize and/or mitigate potential impact

to the aquatic ecosystem, including these species of conservation interest. In addition, environmental briefing/training sessions shall be provided for site staff to raise their awareness on environmental protection.

To avoid the translocated individuals from re-entering the streams within the Project Area, a suitable receptor site outside and far from the Project Area shall be selected. The details of the proposed receptor site are described in the succeeding section.

### 3. Receptor Site

Prior to commencement of the construction activities, all aquatic fauna of conservation interest collected from the collection sites during the Surveys shall be translocated to a suitable habitat at a portion of the Ecologically Important Stream/River (EIS) inside the Ngong Ping Site of Special Scientific Interest (SSSI) (**Appendix A.1d** and **Appendix A.2d**). The proposed receptor site was selected among other areas as majority of the streams present outside the Project Area are currently dried-up and are seasonal in nature. Seasonal streams might not be able to support the population of newly translocated individuals. Furthermore, it has a comparable width, water level, substrate type, and riparian vegetation with the collection sites in addition to its being an EIS. As an EIS, it has a high ecological value and already supported two fauna species of conservation interest including *S. zanklon* and *L. romeri* (Meinhardt Environment, Ltd., 2013). During the EIA study, *S. zanklon* was present in the area with relative abundance of 10-50 individuals (**Table E7.1 of Appendix E7 of the EIA Report**). Furthermore, it being located within an SSSI will be beneficial for the survival of the translocated individuals as, normally, no new development will be permitted within this zone unless it is necessary for conservation of the site (Hong Kong Planning Standards and Guidelines, Chapter 10).

### 4. Reporting

As described in **EP Condition 2.10** the Plan shall be certified by the ET Leader and verified by the IEC before submission to the Director. Furthermore, *The Permit Holder shall, at least two months before the commencement of construction of the Project, deposit with the Director three hard copies and one electronic copy of the "Aquatic Fauna Translocation Plan"*.

For the Survey, a data sheet (**Table 4.1**) shall be used for recording and reporting the data and findings of the Survey activities. Photos of the collected species and the locations where they are released shall be included in the 'Aquatic Fauna Translocation Survey' report.

Table 4.1: Data sheet for aquatic fauna translocation survey

| Details        | Individual Number |   |   |   |   |
|----------------|-------------------|---|---|---|---|
|                | 1                 | 2 | 3 | 4 | 5 |
| Date:          |                   |   |   |   |   |
| Weather:       |                   |   |   |   |   |
| Fauna species: |                   |   |   |   |   |

| Details  | Individual Number |   |   |   |   |
|--|-------------------|---|---|---|---|
|  | 1                 | 2 | 3 | 4 | 5 |
| Capture location coordinates:  |                   |   |   |   |   |
| Capture location description (substrate type, water body width, water body depth, water flow velocity, presence of plant litter, riparian vegetation characteristics): |                   |   |   |   |   |
| Capture equipment:   |                   |   |   |   |   |
| Size (mm):   |                   |   |   |   |   |
| Health condition (healthy, fair, poor):  |                   |   |   |   |   |
| Release Date/Time:   |                   |   |   |   |   |
| Release location coordinates:  |                   |   |   |   |   |
| Release location description: substrate type, water body width, water body depth, presence of plant litter, riparian vegetation characteristics)                       |                   |   |   |   |   |

## 5. Post-translocation Monitoring

No post-translocation monitoring is recommended as the receptor site is located outside the Project Area and inside an SSSI where no direct disturbance from the construction activities are expected. The regular construction phase monitoring programme shall ensure that the potential off-site disturbance impacts from the construction works are minimized to environmentally acceptable level and/or mitigated.

## 6. Implementation Programme

### 6.1 Preparation and Deposit of Aquatic Fauna Translocation Plan

As per EP Condition 2.10 *The Permit Holder shall, at least two months before the commencement of construction of the Project, deposit with the Director three hard copies and one electronic copy of the "Aquatic Fauna Translocation Plan".*

### 6.2 Permit Application and Approval

Relevant permits for aquatic fauna translocation survey and works shall be applied upon approval of the aquatic fauna translocation plan. Permit applications shall be done before commencing the translocation works.

### 6.3 Aquatic Fauna Translocation Survey

Upon instruction from DSD, survey activities shall be completed no more than one week before the commencement of construction works at Works Sections 1 and 6 (**Condition 2.11 of the EP**) and prior to site clearance works as per **Section 5.5.2.17 of the approved EM&A Manual** and **Section 6.12.3.7 of the EIA report**.

### 6.4 Aquatic Fauna Translocation Survey Report

The survey report shall be prepared by a qualified ecologist of the ET as **per Section 5.5.2.18 of the approved EM&A Manual** and **Section 6.12.3.8 of the EIA report**. The survey report shall be certified by the ET Leader and verified by the IEC to conform to the information and recommendations contained in the "Aquatic Fauna Translocation Plan" required under **Condition 2.10 of the EP**. Three hard copies and one electronic copy of the report shall be deposited to the Director within two weeks after completion of the faunal translocation as per **EP Condition 2.11**.



## 6.5 Summary

Table 6.1: Tentative Aquatic Fauna Translocation Implementation Programme

| Activities  | Pre-construction Phase |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | Construction Phase |  |
|---|------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--------------------|--|
|   | M1                     |    |    | M2 |    |    |    | M3 |    |    |    | M4 |    |    |    | M5 |    |    |    | M1 |                    |  |
|   | W2                     | W3 | W4 | W1 | W2 | W3 | W4 | W1 | W2 | W3 | W4 | W1 | W2 | W3 | W4 | W1 | W2 | W3 | W4 | W1 | W2                 |  |
| Deposit of three hard copies and one electronic copy of the Plan with the Director  |                        |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                    |  |
| Permit application and approval   |                        |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                    |  |
| Aquatic fauna translocation survey and translocation works (shall be undertaken in the pre-construction phase no more than a week before the relevant site works) |                        |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                    |  |
| Aquatic fauna translocation survey report (to be submitted for approval within two weeks after translocation survey)  |                        |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                    |  |

## 7. References

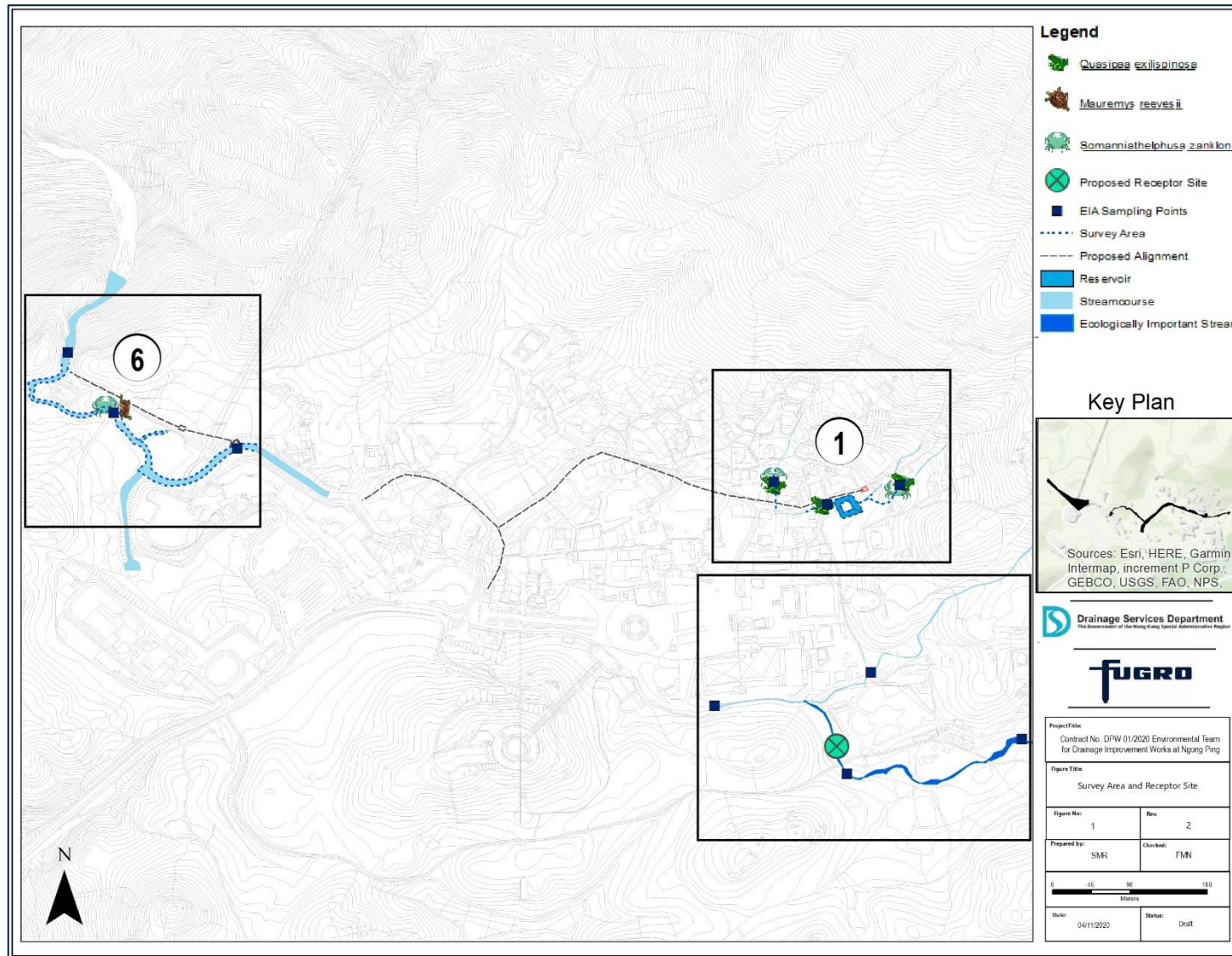
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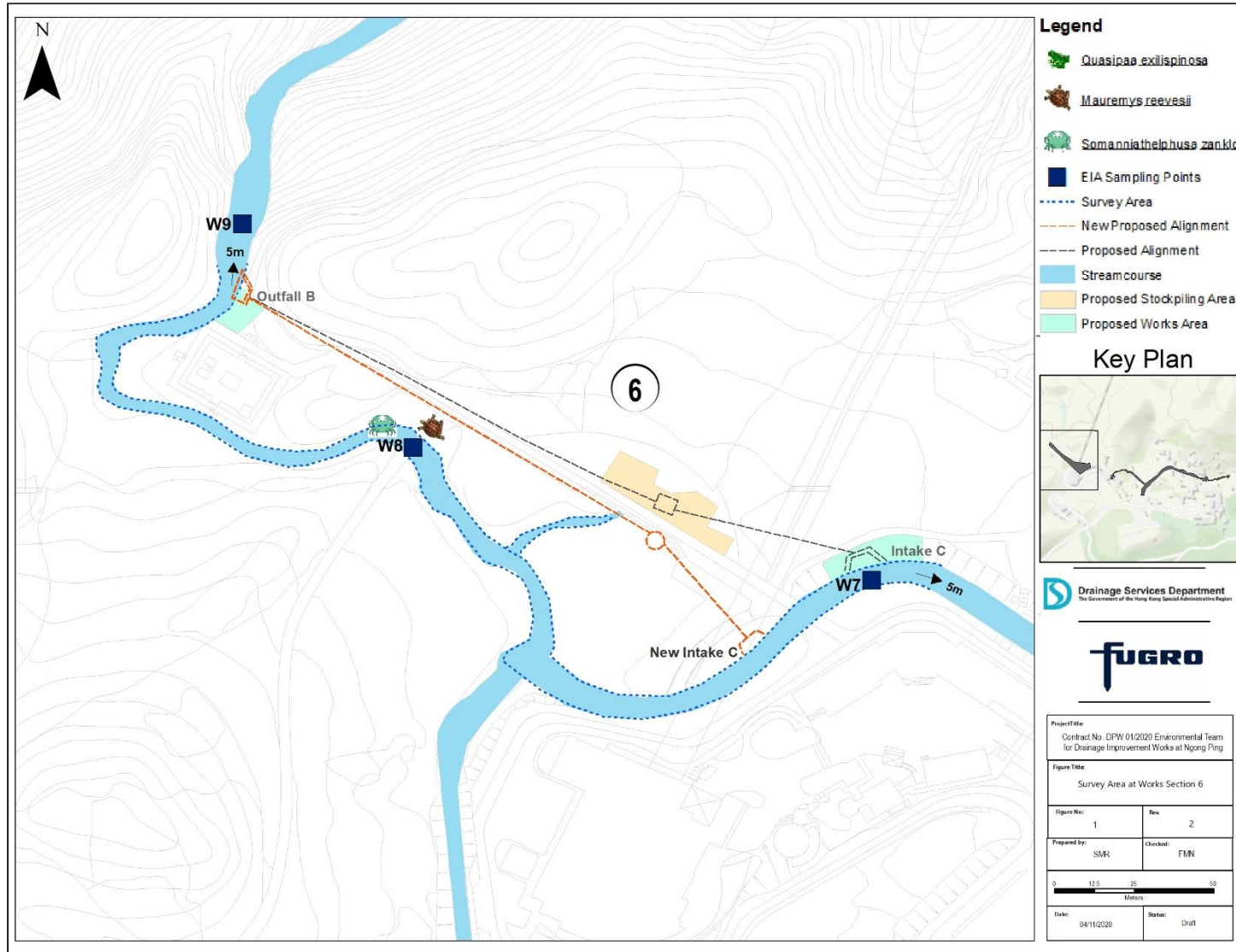
# Appendix A

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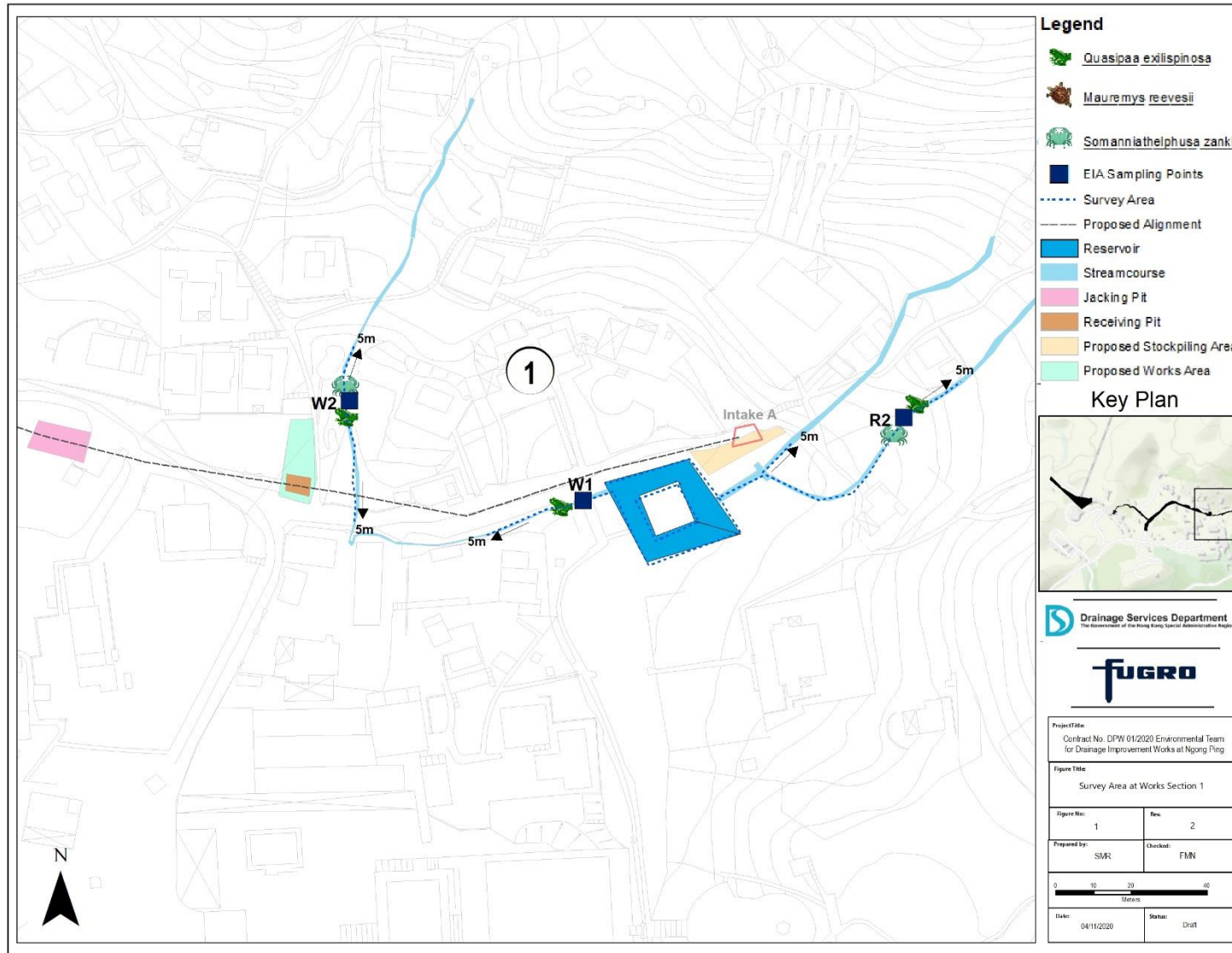
Collection sites and proposed  
receptor site



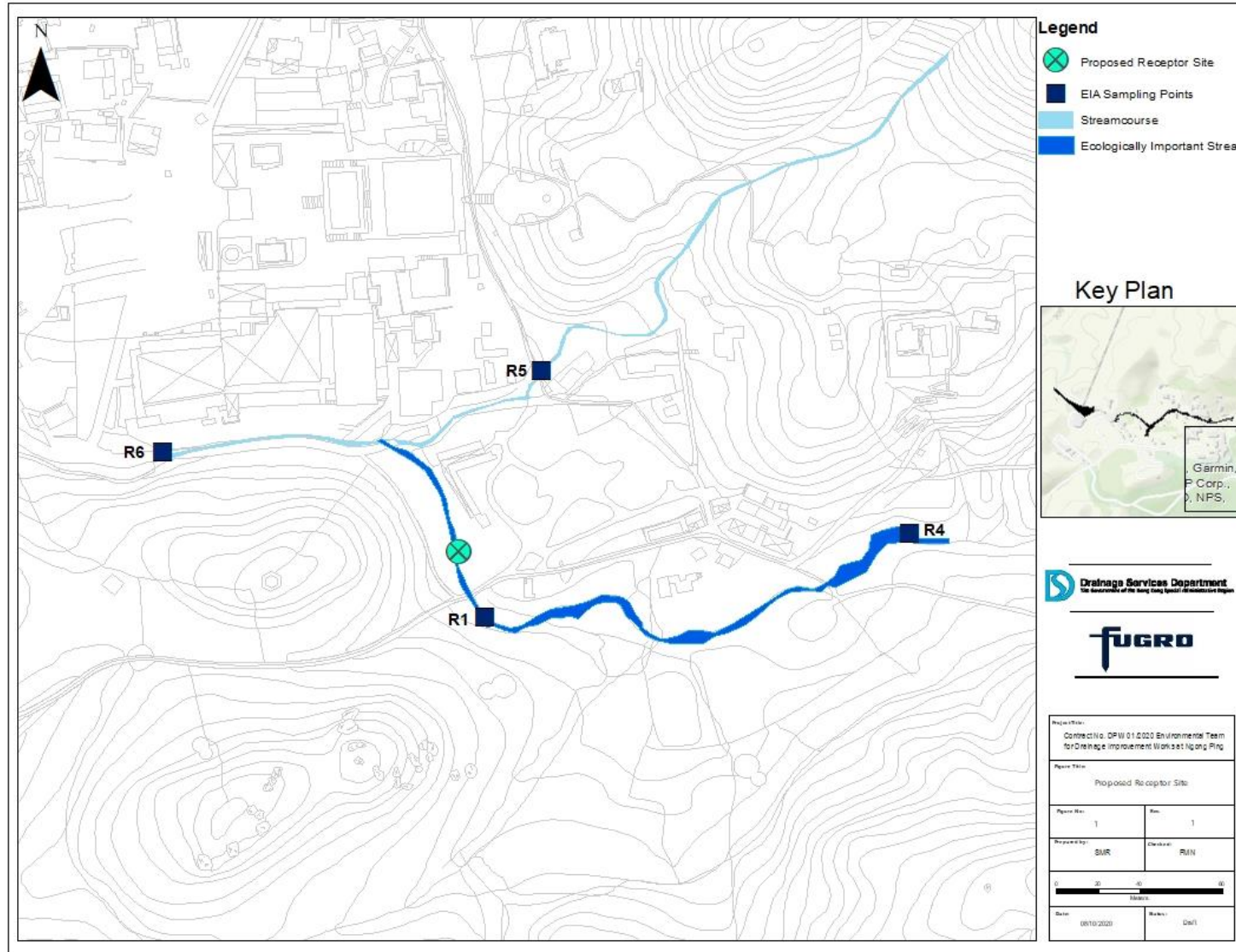
Appendix A.1a: Map of the survey area and proposed receptor site for translocation



Appendix A.1b: Map of the survey area at Works Section 6



Appendix A.1c: Map of the survey area at Works Section 1



Appendix A.1d: Map of the proposed receptor site





Appendix A.2a: Collection site adjacent to Works Section 1



Appendix A.2b: Collection site adjacent to Works Section 1



Appendix A.2c: Collection site adjacent to Works Section 6



Appendix A.2d: Proposed receptor site at a portion of Ngong Ping EIS

# Appendix B

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Target species of aquatic fauna  
of conservation interest for  
translocation



Appendix B.1: The stream crab *Somanniathelphusa zanklon* (Huang, et al. 2018)



Appendix B.2: The Turtle Reeves' Terrapin *Mauremys reevesii* (Meinhardt Environment, Ltd., 2013)



Appendix B.3: The Lesser Spiny Frog *Quasipaa exilispinosa* (AFCD, 2020)



Appendix B.4: The Romer's Tree Frog *Liuixalus romeri* (To, und.)