GOLDER
MEMBER OF WSP

REPORT

Fauna Baseline Study

Agri-Food Innovation Park, Kranji Road, Singapore

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20434030-R003-Final Report

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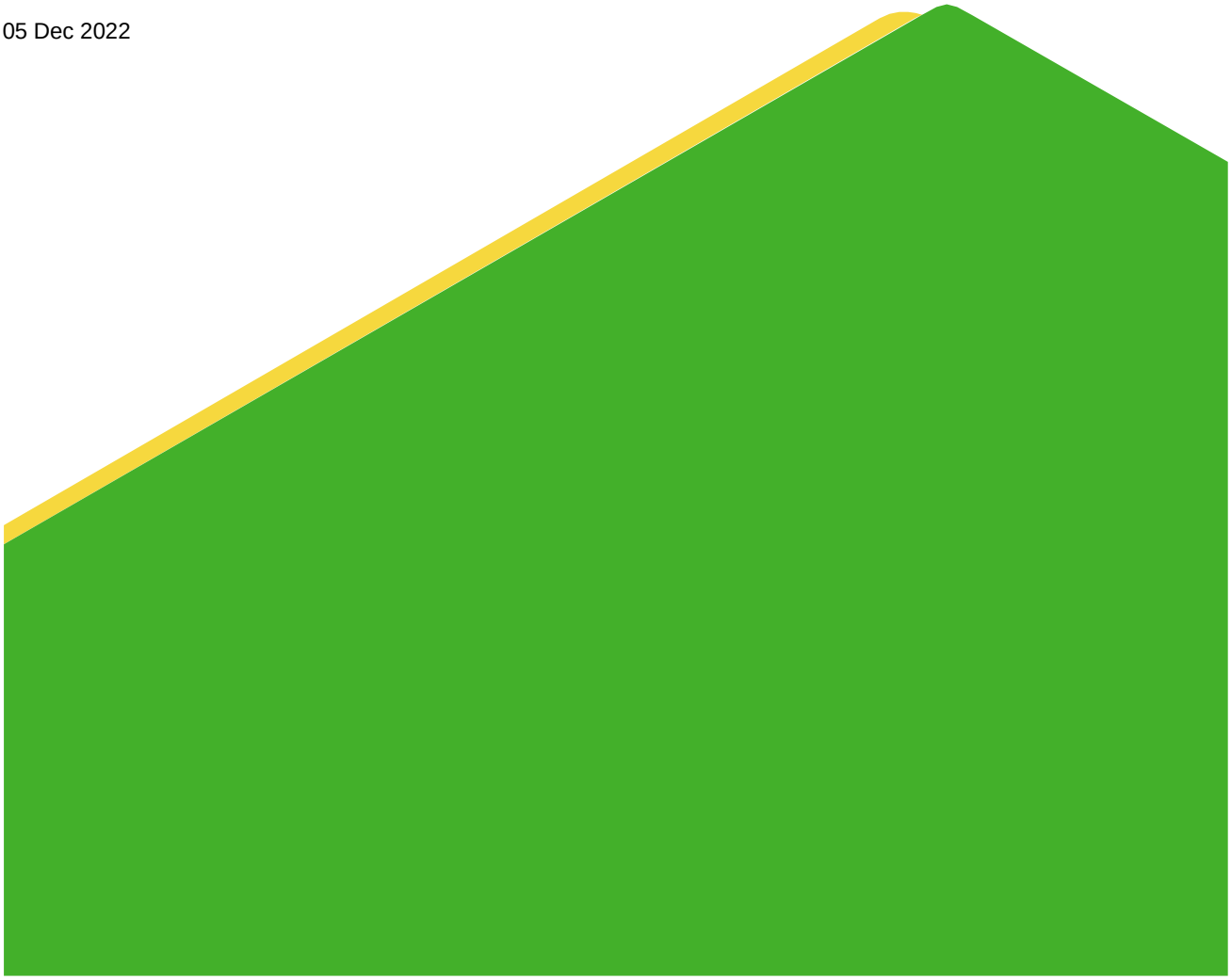

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Executive Summary

CPG Consultants Pte. Ltd. (“CPG”) engaged Golder Associates (Golder) to undertake a Fauna Baseline Study (FBS) as part of the Environmental Baseline Study (EBS) for the Earthworks and Construction of Infrastructure at Agri-Food Innovation Park (AFIP) in Kranji Road, Singapore (the “Project”). The EBS comprises Fauna Baseline Study (FBS) (including development and implementation of a biodiversity monitoring program (BMP) (herein referred to in this Report as Environmental Management and Monitoring Plan (EMMP)) and Sediment Load Study (SLS). The FBS was completed in accordance with the following:

- Golder proposal CX20434030-001-Rev1, dated 17 November 2020, as approved by CPG
- Inception Report 20434030-R001-Rev1, dated 23 March 2021, as approved by the National Parks Board (NParks)

The Project was required to undertake an EBS and EMMP implementation as a result of the Environmental Impact Assessment process. This Report describes the various field surveys carried out as part of the FBS. The FBS was performed by Golder as EBS Consultant and Camphora Pte. Ltd. (Camphora) as FBS Specialist.

Faunistic field surveys focused on the following fauna groups: Odonates, Butterflies, Herpetofauna (Amphibians and Reptiles); Birds; Mammals (including Bats); Molluscs; Marine Arthropods and Fishes. The biodiversity baseline surveys (including camera trapping results) concluded with a total of 206 species, consisting of 15 species of conservation significance and two species of interest.

For the habitat receptors, the most severe impacts are the loss of vegetation for ponds, exotic-dominated woodland and herbaceous and scrubland vegetation at the construction phase. As most of these habitats will be lost, despite implementation of mitigation measures, the residual impact significance remains as Moderate for the pond and Major for exotic-dominated woodland and herbaceous and scrubland vegetation. Other notable impacts include changes in species composition around the edges of cleared vegetation and the neighbouring vegetation during both construction and operational phase. However, with the implementation of mitigation measures, the impact significance of these impacts for habitats can be reduced to Minor. Thus, it is important that the mitigation measures be rigorously implemented.

For the faunal receptors, the most severe impacts affecting across the different taxon is the loss of/ reduction in habitats and food sources and loss of ecological connectivity for faunal movement during the construction phase. As most of the habitats will be lost, despite implementation of mitigation measures, most of the residual impact significance remains as Major and Moderate. Other notable impacts during the construction phase include injury or mortality and human presence. The implementation of mitigation measures may only be able to reduce the impact significance of these impacts for some less sensitive species. In the operational phase, light disturbances and human presence are the most severe impacts for reptiles, birds and non-volant mammals. With the successful implementation of the mitigation measures, the impact significance for most species will be reduced from Major to Moderate. Though the mitigation measures will not be able to reduce all the impact significance to Minor or Negligible, it is still important to implement them rigorously to minimize impacts on the faunal species.

A summary of the recommended mitigation measures during the design phase are as follows:

- To protect and enhance existing habitats by retention of buffer zones for areas of high conservation and value and infill planting with a graded canopy line to protect forest edges

- To create aquatic habitats, terrestrial habitats, artificial refugia for pollinators and promote dual usage of space
- To live harmoniously with nature by artificial light management, construction of bird-friendly buildings and design of buildings to avoid human-wildlife conflict

The recommended EMMP aims to prevent entrapment/injury/mortality to fauna, minimise impacts of construction works on sensitive habitats in close proximity, and prevent human-wildlife conflict. The findings from the baseline study and the recommended mitigation measures have also been incorporated into the BMP. The BMP will comprise pre-felling fauna inspections, site clearance, post-site clearance fauna inspections, monthly fauna inspections, wildlife response plan, and toolbox briefings on biodiversity awareness.

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1.0 INTRODUCTION

CPG Consultants Pte. Ltd. (“CPG”) engaged Golder Associates (Golder) to undertake a Fauna Baseline Study (FBS) as part of the Environmental Baseline Study (EBS) for the Earthworks and Construction of Infrastructure at Agri-Food Innovation Park (AFIP) (the “Project”) in Kranji Road, Singapore (the “Project area”). The EBS comprises FBS (including development and implementation of a biodiversity monitoring program (BMP) (herein referred to in this Report as Environmental Management and Monitoring Plan (EMMP)) and Sediment Load Study (SLS). This was in consideration that an Arboriculture Assessment and Flora Baseline of the Project area had previously been conducted by Camphora in 2018[1].

The FBS was completed in accordance with the following:

- Golder proposal CX20434030-001-Rev1, dated 17 November 2020, as approved by CPG
- Inception Report 20434030-R001-Rev1, dated 23 March 2021, as approved by the National Parks Board (NParks)

The Project was required to undertake an EBS and EMMP implementation as a result of the Environmental Impact Assessment process. This Report describes the activities and results of the FBS. The FBS was performed by Golder as EBS Consultant and Camphora Pte Ltd (“Camphora”) as FBS Specialist.

The FBS aimed to:

- Establish an inventory of the faunal species inhabiting the Project area and provide patterns of their distribution.
- Conduct an impact assessment which will identify the potential impacts on fauna that may occur as a result of the proposed development.
- Recommend mitigation measures to avoid, minimise and compensate for the impacts; and
- Establish the approach of the BMP that will promote the conservation of the Project area’s biodiversity. Specifically, the BMP aims to:
  - prevent entrapment/injury/mortality to fauna;
  - minimise impacts of construction works on sensitive habitats in close proximity; and,
  - prevent human-wildlife conflict.

The EMMP is to be carried out throughout the duration of the Project’s construction phase.

As much as practicable, the scope of the FBS is aligned to the Biodiversity Impact Assessment (BIA) Guidelines (“Guidelines”) Version 1, NParks, 2020 (NParks, 2020). The methods for habitat identification and fauna surveys are generally based on the NParks BIA Guidelines, which comprised targeted field surveys for aquatic molluscs, odonates, butterflies, decapod crustaceans, fish, herpetofauna, birds, non-volant mammals and bats. The EMMP tasks included pre-felling fauna inspections, site clearance, post-site clearance fauna inspections, monthly fauna inspections, wildlife response plan, and toolbox briefings on biodiversity awareness.

Results of the SLS are presented in 20434030-R002-Rev5 dated11 May 2022.

[1] Camphora (2018). Consultancy Services for Earthworks and Infrastructure Works at Kranji - Arboriculture Assessment and Flora Baseline.

1.1 Project Description

JTC Corporation ("JTC") is the Master Developer of AFIP Phase 1 (Figure 1), and CPG is the consultant for infrastructure development. The main construction contract for AFIP Phase 1 infrastructure works was awarded to Huationg Contractors Pte Ltd. ("Huationg").

AFIP is located within the greater Sungei Kadut area and will form part of a larger Northern Agri-Tech and Food Corridor. AFIP is intended to be a pilot cluster to catalyse innovation in the food- & agri-tech ecosystems and to bring together high-tech urban indoor farming, food production including alternative proteins, and associated research and development activities..

Based on the Masterplan 2019, AFIP Phase 1 consists of a total land area of approximately 25 hectares (ha), of which 18.75 hectares (ha) is allocable. The land will require existing high grounds to be cut and surplus earth disposed off-site, with the earliest site allocation expected to be in 2023. No fill materials will be brought onsite.

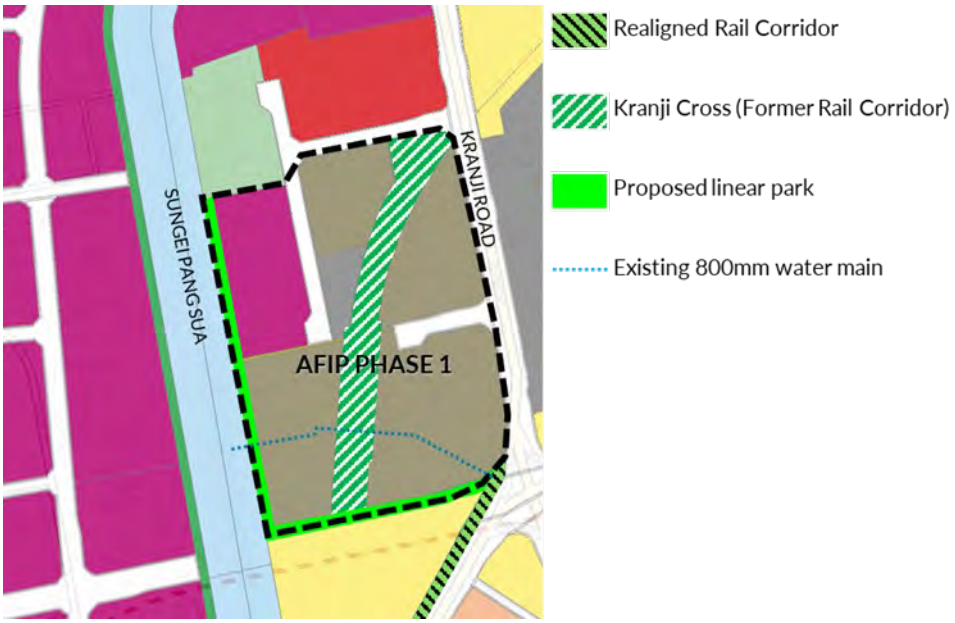

Figure 1: AFIP Phase 1

The Project area is bound by Kranji Close in the north, Kranji Road in the east, MRT track in the south and Sungei Pang Sua in the west (**Figure 2**). As of submission of this Report, the construction works at the Project area has been put on hold since 16 February 2021. No activities were being undertaken at the Project area.

The proposed development site is situated on vegetated patch composed of six different habitat types based on the previous arboriculture study conducted in 2018[2]. More than 90% of the vegetation is made up by scrubland and herbaceous vegetation and exotic-dominated woodland. The Project area lies adjacent to Sungei Pang Sua, where there is a strip of mangrove – a highly sensitive habitat in Singapore. The unlined earth drain will be affected by proposed construction works of the trapezoidal drain and the 800mm diameter raw water pipeline, mainly both in the future road reserve line.

[2] Camphora (2018) Consultancy Services for Earthworks and Infrastructure Works at Kranji - Arboriculture Assessment and Flora Baseline.

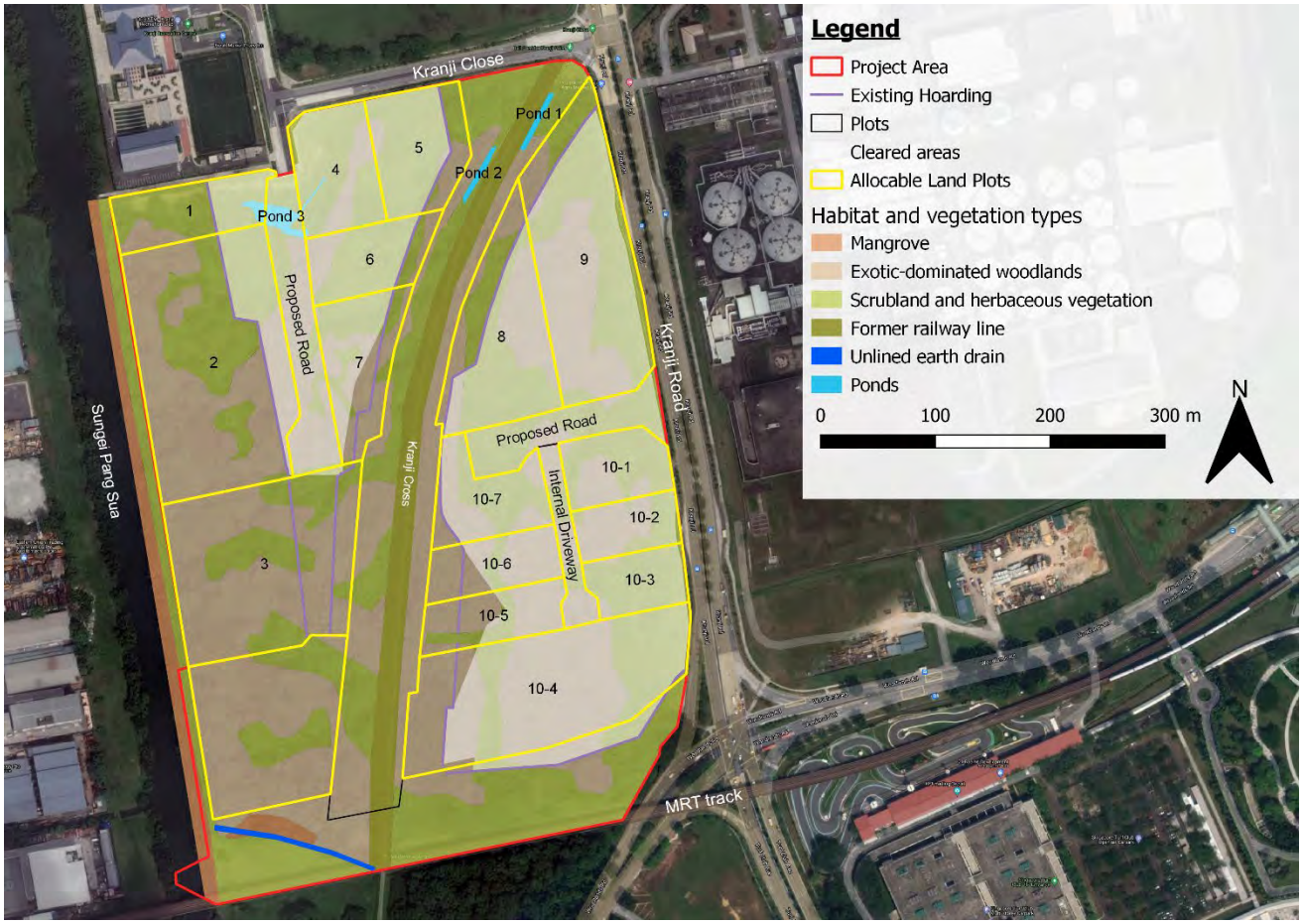

Figure 2: AFIP Phase I (Project area)[3]

1.2 Existing Land Use

The Project area is composed by six habitat types and the respective sizes are detailed in

Table 1 according to the arboriculture study conducted in 2018. The two habitat types that take up more than 90% of the Project area are exotic-dominated woodland (48.22%) and scrubland and herbaceous vegetation (45.56%). More than 40% of the original vegetation has been cleared for earthworks as of January 2021, including one of the three ponds within the Project area and more than one-third of the exotic-dominated woodland, scrubland and herbaceous vegetation within the Project area (**Figure 2**). The pond in Plot 1 that is near the proposed road has been removed. There is also a strip of mangrove habitat along the western boundary of the Project area (0.68%), adjacent to Sungei Pang Sua. This habitat is considered highly sensitive in Singapore.

[3] Cleared areas presented in Figure 2 include both cleared and partially cleared areas. Land plot boundaries are indicative and figures throughout the report may show different variations of the plots.

Table 1: Absolute (ha) and relative (%) sizes of each habitat and vegetation type within the Project area and within the existing vegetation

	Total (Within Project area)		Existing Vegetation (as of 2018)[4]	
Habitat and Vegetation Types	Absolute Size (ha)	Relative Size (%)	Absolute Size (ha)	Relative Size (%)
Mangrove	0.192	0.68	0.192	0.68
Exotic-dominated woodland	13.575	48.22	8.155	128.97
Scrubland and Herbaceous Vegetation	12.825	45.56	25.803	20.624
Kranji Cross	1.353	4.81	1.353	4.80
Waterbodies (Total) Unlined earth drain Pond 1 Pond 2 Pond 3	0.205 0.065 0.026 0.025 0.089	0.73 0.23 0.09 0.09 0.32	0.116 0.065 0.026 0.025 -	0.41 0.23 0.09 0.09 -
Total	28.150	100.00	15.619	55.48

1.3 Historical Land Use

Between the 1920s and 1940s, the Project area was predominantly occupied by mangrove swamp of Sungei Pang Sua to the West and an open field to the East. The terrain of the area was relatively flat and even. By the mid-1920s part of the site was used for the development of a railway, then known as Harbour Board Line (**Figure 3**).

By the 1950s, the northern section of the Project area was cleared for agricultural use and was well known as a Pineapple Factory. The area was situated beside the railway. It was slowly taken over and developed into an industrial estate by the 1970s (**Figure 4**).

By the 1980s, much of the mangrove swamp was lost as Sungei Pang Sua was re-routed as a result of the development of the Kranji Industrial Estate (**Figure 5**). In 2011, the government announced the decommissioning of the railway. The tracks were dismantled and returned to Malaysia by 2012 and the strip of land it occupied was reopened for public use (National Library Board Singapore, 2018).

4 The absolute sizes differ because the study boundary of the Camphora (2018) Consultancy Services for Earthworks and Infrastructure Works at Kranji - Arboriculture Assessment and Flora Baseline differs from that of the current study.

Figure 3: Topographical map of the Project area in 1924, showing that most of the Project area was dominated by mangrove swamp. The planned alignment of the railway is also shown (National Archives of Singapore, 2019).

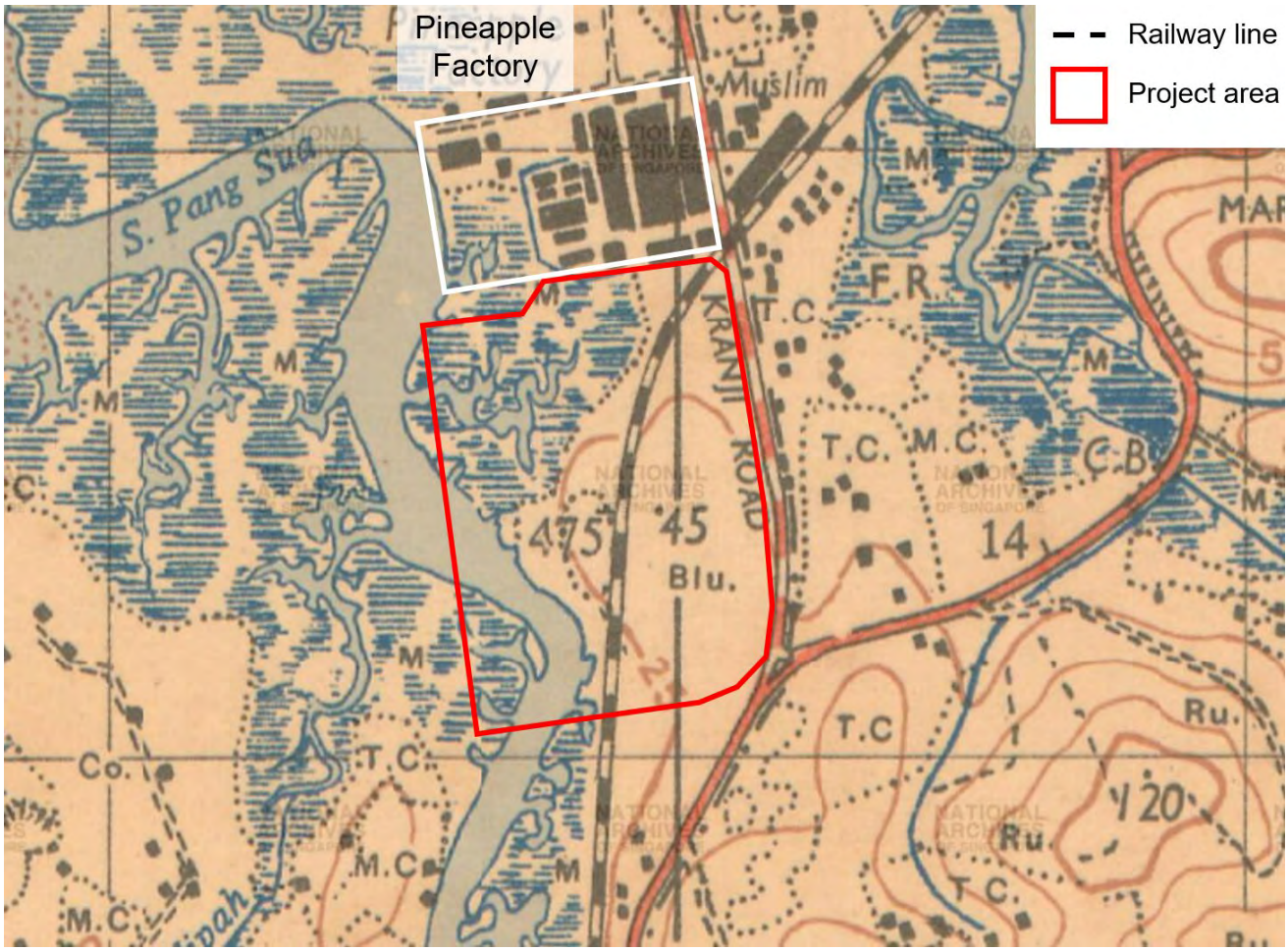

Figure 4: Topographical map of the Project area in 1953, showing the Pineapple Factory (boxed in white) that occupied the area in the north (National Archives of Singapore, 2019)

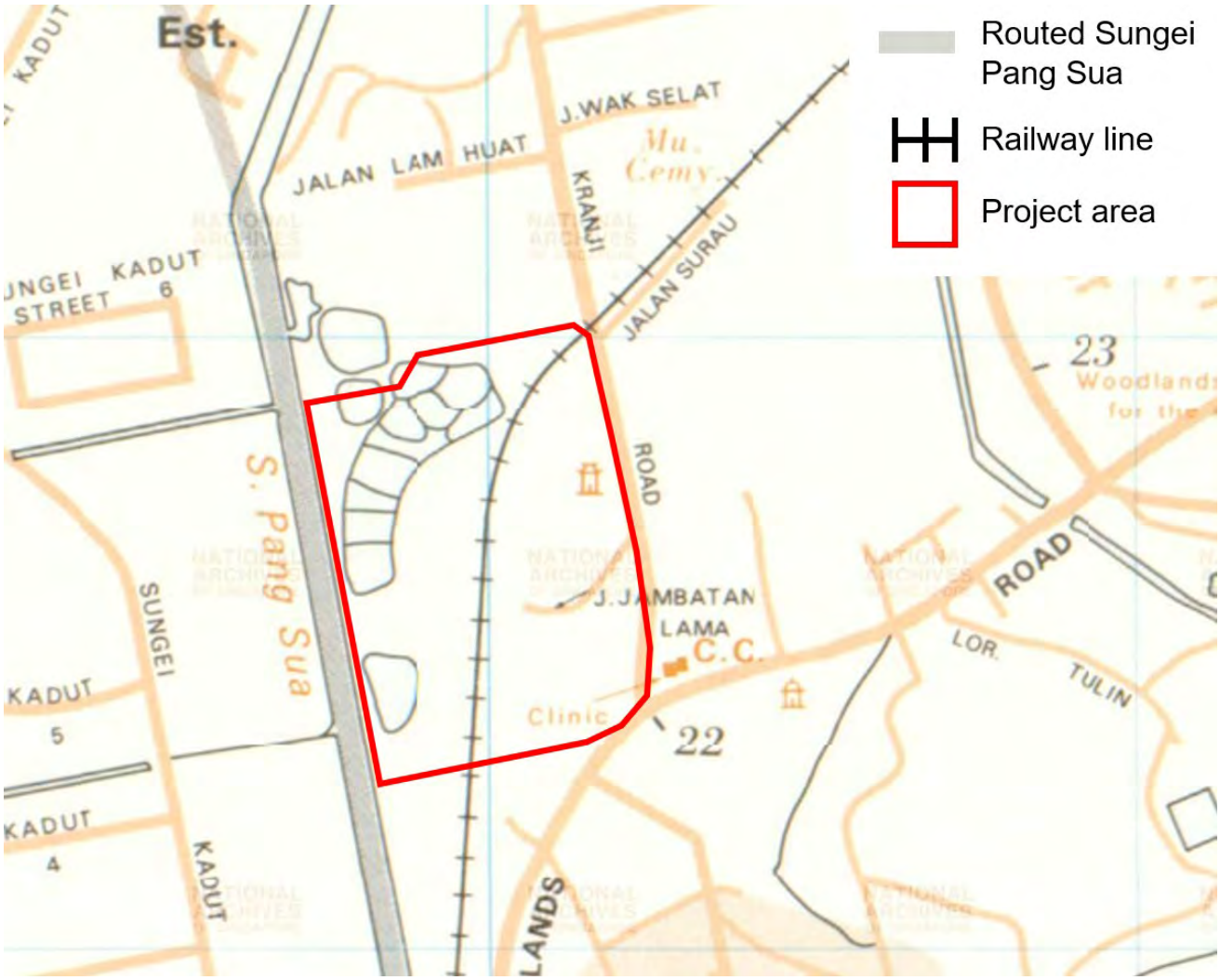

Figure 5:Topographical map of the Project area in 1988, showing the re-routed Sungei Pang Sua (National Archives of Singapore, 2019)

1.4 Sensitive Receptors

Sensitive receptors are valued components that are considered environmental elements (plant, animal or abiotic) of an ecosystem of greatest importance to the society. The selection of appropriate receptors allows effective, efficient, and focused analysis of potential impacts. The primary sensitive receptors to the Project are Sungei Pang Sua and the Mandai Mangrove and Mudflat downstream of Sungei Pang Sua.

AFIP Phase 1 is located adjacent to the existing Sungei Pang Sua. There are existing mangrove trees along the banks of this river. Sungei Pang Sua flows into the Mandai Mangrove and Mudflat, which is one of the sensitive areas.

Based on JTC's initial AFIP Masterplan, a proposed 15.0 m wide linear park will sit between the drainage reserve of Sungei Pang Sua and JTC's proposed development, and will act as a buffer between the two areas. The former railway line along Kranji Cross splits the AFIP Phase 1 development into two and JTC proposed an additional 20m wide "no earth cut zone" on either side of this corridor. This will help maintain the existing landscape and provide a buffer between the proposed rail corridor and construction activities and JTC's proposed development.

Sungei Pang Sua has a length of approximately 3.7 km and flows from Sungei Kadut industrial estate into the Johor Strait. The western side of the river is zoned for industrial use whereas the eastern side, where the Project area is on, is partially developed and undeveloped land. The development of AFIP Phase 1 runs parallel to this river for approximate 550 metres (m) covering less than 10% of the total drainage area of land besides Sungei Pang Sua. AFIP Phase 1 covers a total catchment area of approximately 25 ha, of which, presently, 20 ha discharges into the river with a theoretical maximum flow rate of 4.85 cubic metres per second (m^3/sec) based on the Public Utilities Board's (PUB) requirement for a rainfall intensity with flood return occurrence of 1 in 10 years event, i.e., a rare event.

When the AFIP Phase 1 is fully developed, drainage flow will be as follows:

- 7 ha will discharge into Sungei Pang Sua via existing outfall at Kranji Close south of Kranji Recreation Center (KRC);
- 9 ha, inclusive part of existing rail corridor, will discharge to the existing drains along Kranji Road; and,
- 10 ha will discharge into trapezoidal drain designed for this development.

The catchment area of the remaining development plots and remaining existing railway corridor is approximately 10 ha. This surface run-off water will discharge into the Sungei Pang Sua via the proposed trapezoidal drain at a theoretical peak discharge rate of 7 m^3/sec. In this case, there is slight impact on the existing Sungei Pang Sua due to the 2.15 m^3/sec increase in peak discharge rate, based on a rainfall intensity with flood return period of 10 years, from the proposed fully built area of AFIP Phase 1. This is a rare event that happens only during the heaviest rainfall with return period of 15 years based on PUB design requirement. It should be noted that the increase in peak flow rate is due to intensity of flow from urbanisation of area with the same rainfall on the same land. The outlet of this trapezoidal drain will have minimal impact due to its location being at least 14 m away from the nearest identified mangrove tree along the river bank. The trapezoidal drain for the Project, which will be located in the centre median of the future road, will be replaced by the future road drains in the side verges.

As the trapezoidal drain will only be discharging surface runoff, there is minimal transboundary impact and downstream impact to Mandai Mangrove and Mudflat.

In addition to Sungei Pang Sua and the Mandai Mangrove and Mudflat, other sensitive receptors within a 2-kilometre (km) radius of the Site were identified. **Figure 6** shows the 2 km-radius vicinity of the Project area, and **Table 2** presents the identified sensitive receptors.

Figure 6: Surrounding area and sensitive receptors within a 2-km radius of the Project area, represented by yellow circle ((A) Sungei Pang Sua; (B) Proposed Linear Park along Sungei Pang Sua; (C) Proposed Rail Corridor along Kranji Cross; (D) Rail corridor; (E) Mandai Mangrove and Mudflat; (F) Heritage tree; (G) Aquatic stream; (H) Kranji Reservoir; (I) Woodlands Town Garden; (J) Turf Club

Table 2: Sensitive receptors within a 2-km radius of the Project area

Sensitive Receptor	Approximate Distance from Project area
Sungei Pang Sua	Adjacently west
Linear park, Sungei Pang Sua	Along both sides of Sungei Pang Sua
Rail corridor (Kranji Cross)	Passing through the center, southern part of the Project area
Rail corridor	Across Kranji Road to the east
Mandai Mangrove and Mudflat	750 m northeast
Heritage tree	750 m northeast
Aquatic stream	900 m south
Kranji Reservoir	1 km west

Sensitive Receptor	Approximate Distance from Project area
Woodlands Town Garden	1 km east
Turf Club	1.5 km southeast

1.5 Project Construction

AFIP Phase 1 is planned for allocation to food- and agri-tech companies from 2023. The sequence of work for the infrastructure works in this development is as follows:

- Cutting of vegetation and levelling of land beside Kranji Road
- Cutting of vegetation and levelling of land beside Kranji Close
- Construction of new roads and associated roadside drains
- Diversion of existing 700-millimetre (mm) diameter raw water pipeline which cuts through the land parcels into the proposed 15.0 m wide linear park
- Laying and construction of new 800-mm diameter raw water pipeline, demolition of existing 700-mm diameter pipeline
- Construction of a trapezoidal drain

The proposed drainage system includes construction of reinforced concrete (RC) U drain, RC box culvert, RC sump and trapezoidal drain. The proposed construction sequence is presented in the Method Statement for Cast In-Situ Drainage Works, which was prepared by Huationg and approved by CPG on behalf of JTC in June 2020 (**Appendix A**). At the time of this FBS Report, construction stop work order was in place since 16 February 2021.

1.6 Project Operation

The AFIP is established as a pilot cluster to catalyse innovation in the food- and agri-tech ecosystems, by bringing together high-tech urban indoor farming (agriculture and aquaculture), food production including alternative proteins, and associated research and development (R&D) activities. AFIP developments may include indoor plant factories, aquaculture hatcheries, insect farms, and innovative food manufacturing industries, coupled with R&D investments for test-bedding and collaborative research (**Figure 7**).

The AFIP tenants are currently still unknown. However, it is understood that each of the tenants will have to submit their own Industrial Allocation (IA) Form to be allocated land within the AFIP. Each of the tenants are also not allowed to discharge any wastewater into Sungei Pang Sua, instead are required to design their own wastewater treatment system within their facilities.

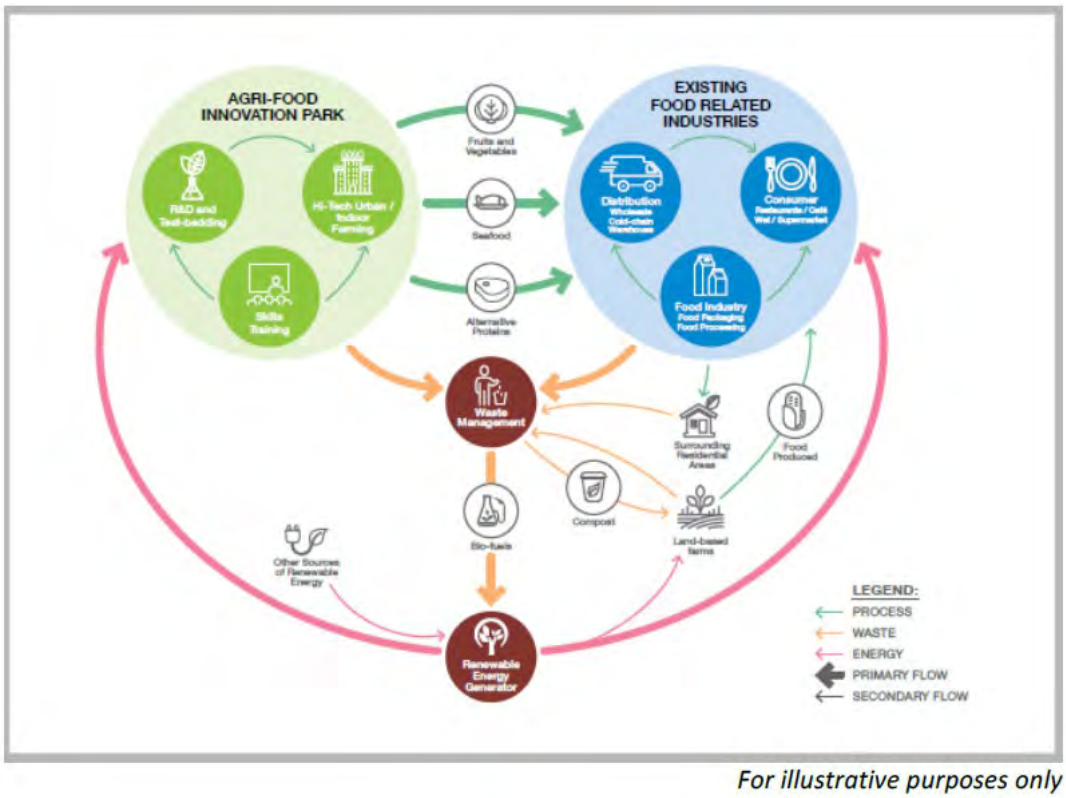

Figure 7: Circular Economy in the AFIP

1.7 Future Developments

Known future developments surrounding the Project include:

- Vehicle flyover with retaining walls structures possibly over Sungei Pang Sua
- Linear park along the eastern edge of Sungei Pang Sua

These future developments are not within the Project scope and boundary, however, these were considered in the assessment of impact to receptors. Agencies will continue to review the future plans for the area as part of the larger Sungei Kadut Eco-District (SKED) Masterplan to sensitively develop the area.

2.0 FAUNA BASELINE STUDY

2.1 Methodology

2.1.1 Nomenclature and Taxonomy

The nomenclature and taxonomy for each taxonomic group followed these key references:

- Marine molluscs: World Register of Marine Species
- Non-marine molluscs: Tan et al. (2012)
- Odonates: Soh et al. (2019)
- Butterflies: Khew (2015)
- Freshwater decapod crustaceans: Ng (1997); Cai et al. (2007)

- Marine decapod crustaceans: World Register of Marine Species
- Freshwater fish: Suzuki et al. (2015); Kottelat (2013); Ho et al. (2016)
- Marine fish: World Register of Marine Species
- Birds: Gill and Donsker (2020)
- Amphibians, reptiles, non-volant mammals and bats: Baker and Lim (2012)

2.2 Species of Conservation Significance and Other Species of Interest

The assessment of conservation significance of species is important for highlighting the need and priorities for their conservation. Local conservation status is identified in the study since the EBS was assessed in a local context and therefore intuitive to reference national (local) conservation status.

Faunal species of conservation significance includes threatened species of fauna listed as vulnerable, endangered, critically endangered, or extinct under its global or national status. Both global and national conservation statuses were considered to provide a more holistic picture of the conservation value of the project area. The global conservation status for fauna followed the International Union for Conservation of Nature (IUCN) Red List of Threatened Species, Version 2021-2 (IUCN 2021) (**Table 3**). The national conservation status for fauna followed mainly the Singapore Red Data Book (SRDB; Davison et al., 2008) with reference to updated local checklists where available (i.e., Soh and Ngiam, 2019 for odonates).

Other species of interest includes notable records of non-threatened species within the Project area. The Project area may provide important habitats for these species, including breeding sites. Species deemed sensitive to construction impacts were also highlighted as a notable record and regarded as species of interest.

Table 3: Definition of each global and/or national conservation status following the IUCN Red List (IUCN, 2012) and Singapore Red Data Book (Davison et al., 2008)

Global/National Conservation Status	Definition
Vulnerable (VU)	Species facing a high risk of extinction in the wild/in Singapore
Endangered (EN)	Species facing a very high risk of extinction in the wild/in Singapore
Critically Endangered (CR)	Species facing an extremely high risk of extinction in the wild/in Singapore
Presumed Nationally Extinct (NE)	There is no reasonable doubt that the last reproductively capable individual has died or disappeared in the last 50 years

2.2.1 Desktop Assessment

The desktop assessment involved a literature review of historical and present-day information on the Project area. This allowed for the generation of a list of faunal species that may potentially exist in the Project area ("species of probable occurrence"). This list considered faunal species previously documented within and around a 2-km radius of the Project area that are expected to occur based on the habitats present. It was completed by reviewing online databases, existing literature, technical reports and consulting specialists.

Information on land use history presented in this FBS Report was primarily gathered using old maps in the online collection of the National Archives of Singapore (NAS, 2020) as well as historical maps on the OneMap Portal (SLA, 2018). Sources of faunal databases include The Biodiversity of Singapore by Lee Kong Chian Natural History Museum (LCKNHM, 2020a) and Flora and Fauna Web by National Parks Board (NParks, 2020a). Local and regional references were examined for the various taxonomic groups: non-marine molluscs (Tan et al., 2012), odonates (Tang et al., 2010), butterflies (Khew, 2015), freshwater fish (Kottelat, 2013; Ho et al., 2016), birds (Yong et al., 2016), and herpetofauna and mammals (Baker & Lim, 2012). Other key references include the Singapore Red Data Book (Davison et al., 2008) and an encyclopaedia on Singapore's biodiversity (Ng et al., 2011). References to the floristic baseline study conducted by Camphora Pte Ltd in 2018 were also made.

2.2.2 Faunal Field Assessment

Targeted Field Surveys

Targeted field surveys were carried out for the following taxa: aquatic molluscs, odonates, butterflies, decapod crustaceans, fish, herpetofauna (amphibians and reptiles), birds, non-volant mammals and bats.

All terrestrial fauna (odonates, butterflies, amphibians, reptiles, birds, non-volant mammals, bats) were surveyed via visual and/or auditory encounter surveys along two terrestrial transects traversing major habitat types within the Project area where the vegetation has not been/will not be cleared (**Figure 8**). At least two surveyors walked along the transects at approximately 1 km/h to search for targeted fauna.

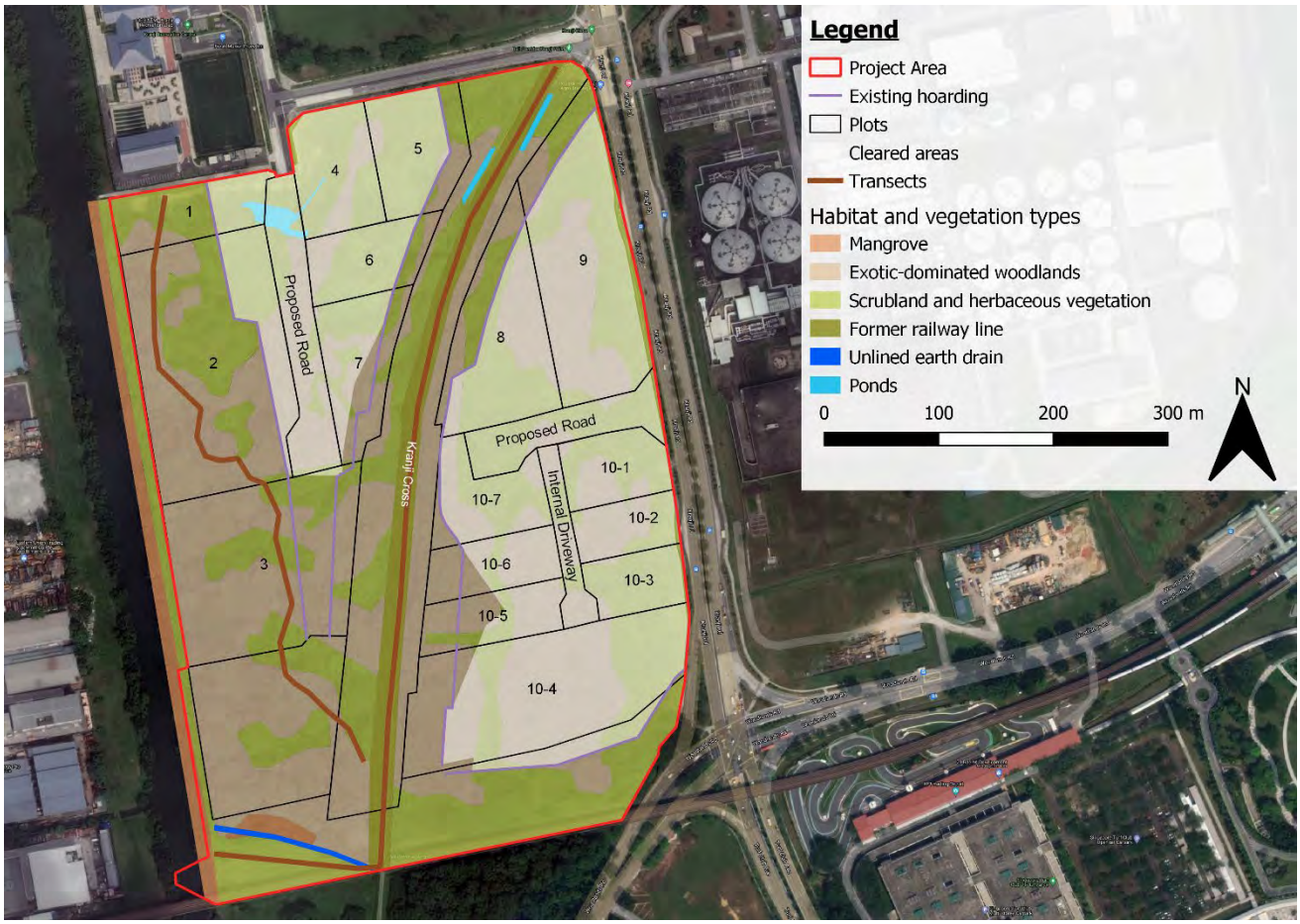

Figure 8: Alignment of the terrestrial transects

Aquatic fauna (odonates, decapod crustaceans, fish, amphibians, reptiles) were surveyed at aquatic sampling points along the unlined earth drain and at the ponds along the proposed Rail Corridor along Kranji Cross (**Figure 9**). A combination of five-minute point counts, tray/hand netting, and minnow trapping were conducted at each sampling point. Minnow traps were only be deployed at locations with sufficient water depth.

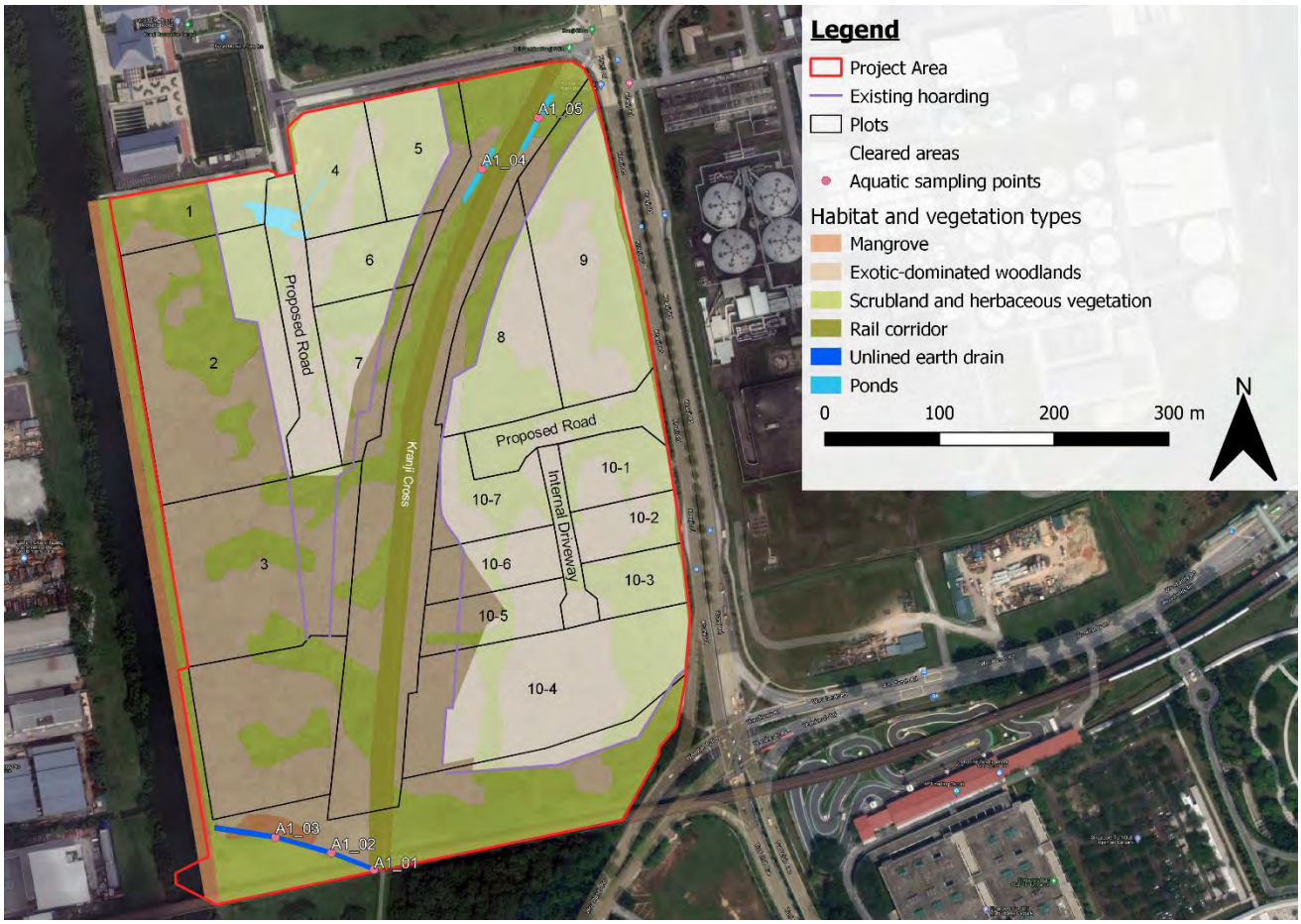

Figure 9: Locations of the aquatic sampling points

Intertidal fauna (molluscs, decapod crustaceans, fish, birds) along Sungei Pang Sua were surveyed at four sampling points using quadrat sampling, visual encounter surveys and five-minute point counts (**Figure 10**).

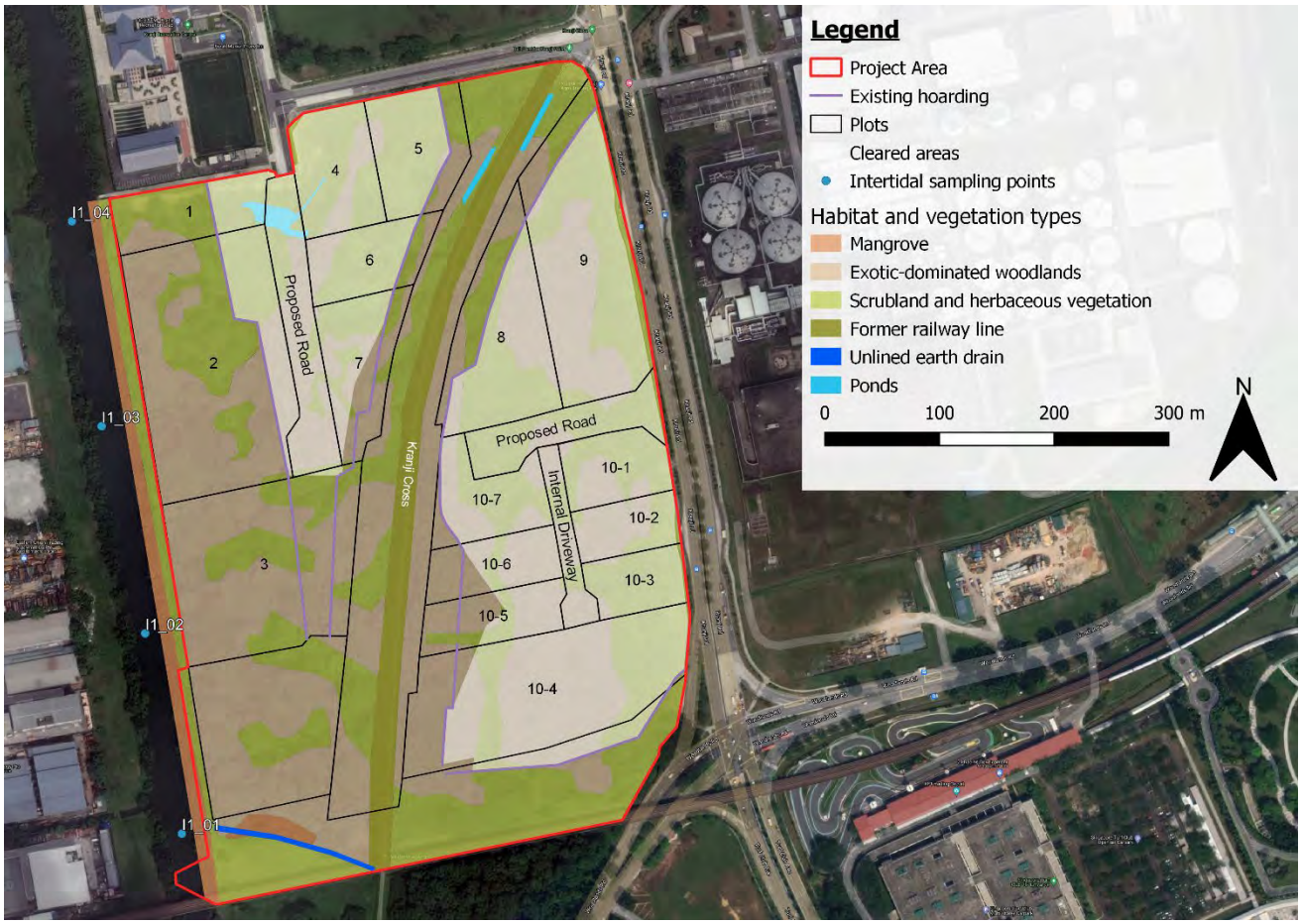

Figure 10: Locations of the intertidal sampling points

Surveys were conducted twice for each terrestrial and aquatic faunal group, where applicable. Surveys for intertidal fauna were conducted once at each sampling point.

Locations of all targeted fauna sightings were recorded using a handheld GPS receiver (Garmin GPSMap® 64s). All targeted fauna encountered were identified to species, or the next lowest taxonomic level possible. Important observations were also noted, such as reproductive behaviour (e.g., displaying, guarding, mating, ovipositing), and plant species that butterflies and birds were observed to be feeding, ovipositing, or nesting on, and/or with butterfly larvae.

In addition, five camera traps were deployed for a period of 40 days, from 4 February 2021 to 16 March 2021, to complement the documentation of non-volant mammals in the Project area.

A summary of the survey methods for each fauna group is described in **Table 4** and further described in the following section.

Table 4: Summary of survey timings and methods for each faunal group

Faunal Group	Survey Timing (h) /Conditions	Survey Method
Molluscs	■ Low tide between 0 to 0.3 m	■ Diurnal quadrat sampling in the intertidal area along Sungei Pang Sua at four intertidal sampling points

Faunal Group	Survey Timing (h) /Conditions	Survey Method
Odonates	■ 0900–1500 ■ 1700-1900	■ Diurnal visual encounter surveys along two terrestrial transects and diurnal visual encounter surveys at five aquatic sampling points ■ Dusk visual encounter surveys along two terrestrial transects and dusk visual encounter surveys at five aquatic sampling points
Butterflies	■ 0900–1500	■ Diurnal visual encounter surveys along two terrestrial transects
Decapod crustaceans	■ 0900–1500 ■ 2000–0000 ■ Low tide between 0 to 0.3 m	■ Diurnal point count surveys with tray/hand netting at five aquatic sampling points ■ Nocturnal point count surveys with spot-lighting at five aquatic sampling points ■ Minnow trapping at strategic locations along the unlined earth drain ■ Diurnal visual encounter surveys in the intertidal area along Sungei Pang Sua at four intertidal sampling points
Fish	■ 0900–1500 ■ 2000–0000 ■ Low tide between 0 to 0.3 m	■ Diurnal point count surveys with tray/hand netting at five aquatic sampling points ■ Nocturnal point count surveys with spot-lighting at five aquatic sampling points ■ Minnow trapping at strategic locations along the unlined earth drain ■ Diurnal visual encounter surveys in the intertidal area along Sungei Pang Sua at four intertidal sampling points
Herpetofauna (amphibians and reptiles)	■ 0700–1000 ■ 2000–0000	■ Diurnal visual and auditory encounter surveys along two terrestrial transects ■ Diurnal point count surveys at five aquatic sampling points ■ Nocturnal visual and auditory encounter surveys along two terrestrial transects ■ Nocturnal point count surveys at five aquatic sampling points
Birds	■ 0700–1000 ■ 2000–0000	■ Diurnal visual and auditory encounter surveys along two terrestrial sampling routes

Faunal Group	Survey Timing (h) /Conditions	Survey Method
	■ Low tide between 0 to 0.3 m	■ Nocturnal visual and auditory encounter surveys along two terrestrial sampling routes ■ Diurnal point count surveys at four intertidal sampling points
Non-volant mammals	■ 0700–1000 ■ 2000–0000 ■ Continuous	■ Diurnal visual and auditory encounter surveys along two terrestrial transects ■ Nocturnal visual and auditory encounter surveys along two terrestrial transects ■ Five camera traps deployed across the Project area
Bats	■ 2000–0000	■ Nocturnal visual encounter surveys and acoustic sampling along two terrestrial transects

Molluscs

Aquatic molluscs were surveyed using quadrat sampling in the intertidal area along Sungei Pang Sua, where it was deemed accessible and safe and devoid of mangrove roots and plants to avoid damaging them. At each sampling point, a 15-m long linear transect were set and three 0.5-m by 0.5-m quadrat samples were taken randomly on either side of the transect (**Figure 11**). Within each quadrat, the number of individuals of each species visible on the surface of the substrate were recorded. Subsequently, up to 15 cm of substrate were dug using a hand shovel to search for burrowing species. Molluscs were temporarily held in sieves and photographs were taken to aid in identification and counting. All individuals were released thereafter. Quadrat sampling were conducted in the day during low tide between 0 to 0.3 m.

Figure 11: Example of quadrat sampling in an intertidal area

Odonates

Diurnal visual encounter surveys along the terrestrial transects and five-minute point counts at aquatic sampling points were carried out between 0900h and 1500h. Dusk surveys were carried out between 1700h and 1900h. Owing to difficulties in sampling and identification, aquatic larvae and exuviae were not sampled. Adults were identified by sight (with the aid of binoculars and photography, where necessary).

Butterflies

Visual encounter surveys were carried out for adult butterflies, caterpillars, pupae and eggs along the terrestrial transects between 0900h and 1500h. Adults were identified by sight (with the aid of binoculars and photography, where necessary) and captured using insect nets, where required, for species identification. Captured individuals were released immediately upon identification.

Decapod Crustaceans

Surveys comprised of diurnal (0900–1500h) and nocturnal (2000–0000h) five-minute point counts at the aquatic sampling points. Point counts involved tray netting using a rigid-frame push net (61 × 49 cm; 5 mm mesh) to capture species within the water column or on the streambed. However, where tray netting was deemed unsuitable as a result of low water levels, hand nets or visual surveys were used instead. In addition, minnow traps baited with halal meat (e.g., sausage or liver) were deployed at locations with deeper water. Traps were left overnight, then checked and removed the following day. Nocturnal surveys involved spot-lighting for nocturnal species.

In addition, visual encounter surveys for decapod crustaceans were conducted at the sampling points in the intertidal area along Sungei Pang Sua, where it is deemed accessible and safe. Decapod crustaceans were temporarily held in pails and photographs may be taken to aid in identification. All individuals were released thereafter. Intertidal surveys were conducted in the day during low tide (0–0.3 m).

Fish

Surveys comprised of diurnal (0900–1500h) and nocturnal (2000–0000h) five-minute point counts at the aquatic sampling points. Point counts involved tray netting using a rigid-frame push net (61 × 49 cm; 5 mm mesh) to capture species within the water column or on the streambed. However, where tray netting was deemed unsuitable as a result of low water levels, hand nets or visual surveys were used instead. In addition, minnow traps baited with halal meat (e.g., sausage or liver) were deployed at locations with deeper water. Traps were left overnight, then checked and removed the following day. Nocturnal surveys involved spot-lighting for nocturnal species.

In addition, visual encounter surveys for fish were conducted at the sampling points in the intertidal area along Sungei Pang Sua, where it is deemed accessible and safe. Fish were temporarily held in pails and photographs were taken to aid in identification. All individuals were released thereafter. Intertidal surveys were conducted in the day during low tide (0–0.3 m).

Herpetofauna (Amphibians and Reptiles)

Diurnal (0700–1000h) and nocturnal (2000–0000h) visual and auditory encounter surveys were performed along both terrestrial transects and at aquatic sampling points. Visual and auditory encounter surveys were conducted along terrestrial sampling routes, while five-minute point counts were conducted at aquatic sampling points. Surveys involved searching for individuals on the ground, below rocks, logs, leaf litter and debris, in the water, and on vegetation. For nocturnal spot-lighting surveys, torches were used to elicit eyeshine. For species that are capable of quick retreats and escapes, the individuals were captured by hand, or using hooks, tongs, or dip nets for identification. Vocalising geckos and frogs were also be located or identified by call recognition, whenever possible.

Birds

Surveys comprised of diurnal (0700–1000h) and nocturnal (2000–0000h) visual encounter surveys performed along the terrestrial transects. All birds were identified by sight (with the aid of binoculars and cameras where necessary) and/or through call recognition. Nocturnal birds (e.g., owls and nightjars) were detected using torches to elicit eyeshine and through call recognition.

In addition, five-minute point counts for birds were conducted at the sampling points in the intertidal area along Sungei Pang Sua, where it is deemed accessible and safe. Intertidal surveys were conducted in the day during low tide (0–0.3 m).

Non-volant Mammals

Surveys comprised of diurnal (0700–1000h) and nocturnal (2000–0000h) visual encounter surveys performed along terrestrial transects. Mammals were surveyed on the ground and on vegetation, and in burrows and tree holes. In addition, fresh tracks and scats were also recorded as they can aid in species identification. All mammals were identified by sight (with the aid of binoculars and cameras where necessary). Squirrels were also be identified through call recognition. Nocturnal mammals were detected using torches to elicit eye shine, which aids in detection at night.

Camera traps were used to survey for non-volant ground-dwelling mammals, particularly medium- to large-sized mammals. A total of five camera traps were spaced across the Project area where the vegetation has not been cleared, at approximately 200 m apart (**Figure 12**). They were deployed at approximately 20 to 30 cm above ground, and at strategic locations with obvious animal signs. They were operational 24 hours a day and were programmed to record a 10-s footage per motion trigger with a 10-s quiet period following each trigger. Each trap was deployed for at least 40 nights per location (Si et al., 2014).

Bats

A handheld acoustic detector, the Echo Meter Touch 2 Pro (Wildlife Acoustics, Inc.), connected to a mobile device, was used during nocturnal surveys along terrestrial transects to detect insectivorous bats. Insectivorous bats produce ultrasonic echolocation calls that are unique to each species and can be used to identify bats (Fenton and Bell, 1981). The detector converts the ultrasonic calls to low frequency signals below 20 kHz, a range that is audible to the human ear, which are then streamed on a spectrogram of the Echo Meter Touch app. All bat calls were automatically recorded on the device. Fruit bats were detected via visual encounter surveys.

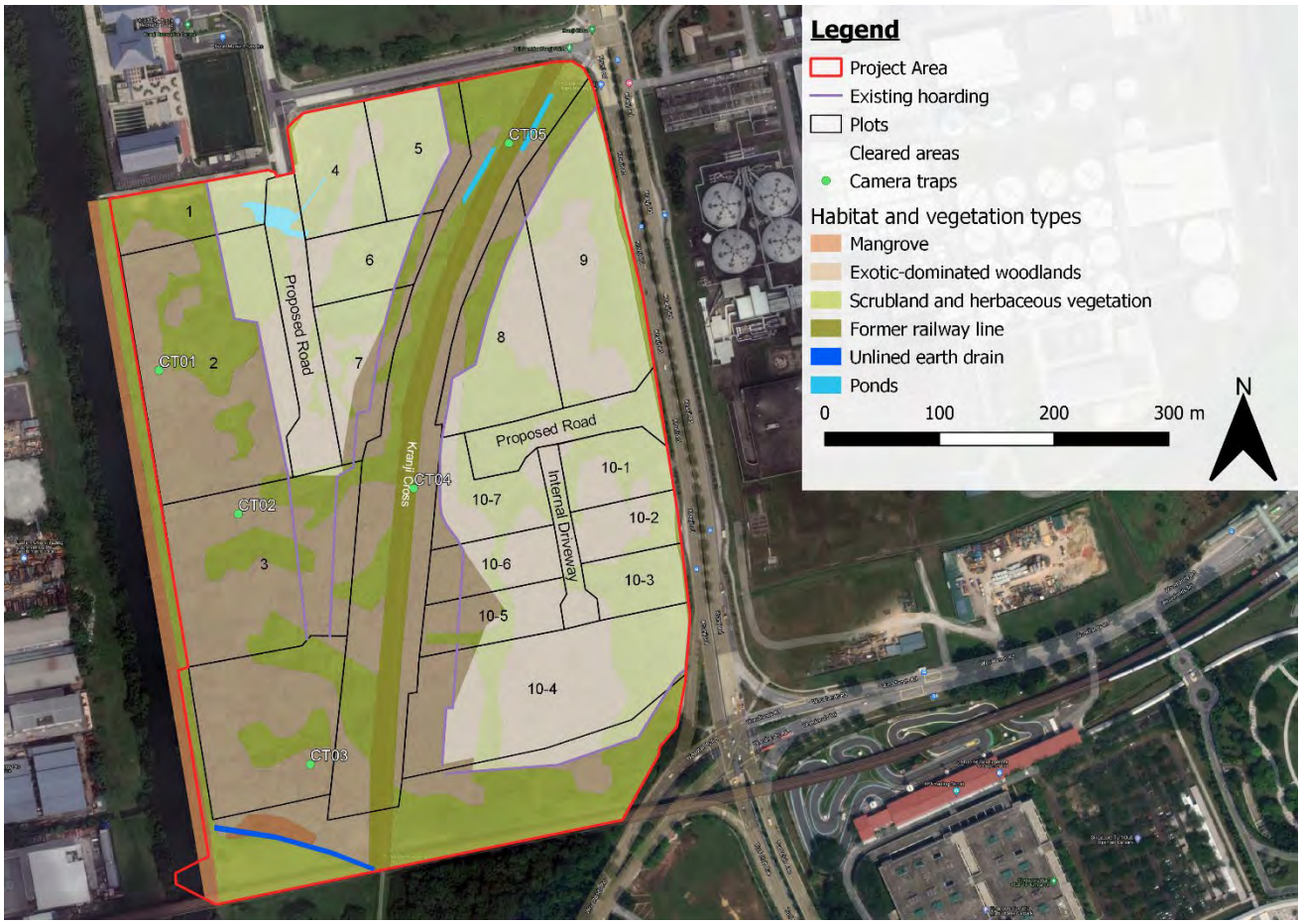

Figure 12: Camera trap locations

2.3 Data Analyses

2.3.1 Species Distribution Map for Species of Conservation Significance

The occurrences of fauna species of conservation significance sighted during surveys as well as incidental records outside official survey timings were presented in a map to show its distribution. The maps were generated using QGIS 3.40 (Quantum GIS Development Team, 2020).

2.3.2 Acoustic Bat Recordings

Bat recordings were processed using Kaleidoscope v.4.5.4 (Wildlife Acoustics, Inc.) to separate extraneous noise from files with bat echolocation calls. The signal parameters for recognising a potential bat echolocation call were configured as follows: frequency range of 20 – 200 kHz, duration of 2–500 milliseconds (ms), maximum inter-syllable gap of 500 ms and a minimum of 2 pulses. These files were then visually processed to identify bat species based on call structures, peak frequency, minimum frequency and call duration (Pottie et al., 2005). They were identified with reference to those in Pottie et al. (2005), which provides echolocation signatures for bats in Singapore, and other relevant references (Collen, 2012; Hughes et al., 2011).

2.3.3 Camera Trapping

The camera trap location, species identity, and number of individuals were recorded for each video with a positive capture of faunal species, i.e., with a faunal species recorded on the video.

2.3.4 Sampling Coverage

The sampling coverage for each taxon along terrestrial sampling routes, aquatic sampling points and camera traps was analysed using the statistical programming environment R version 3.4.3 (R Development Core Team, 2016) using the "iNEXT" package 2.0.20 (Hsieh et al., 2020).

A coverage-based sampling curve was plotted using data from targeted surveys of fauna. Species richness was plotted against sample coverage to estimate the adequacy of survey effort. According to Chao and Jost (2012), sample coverage refers to "the proportion of the total number of individuals in a community that belong to the species represented in the sample." iNEXT uses the observed sample of incidence data to compute the estimated species richness, as well as the associated standard error and 95% confidence interval. The standard error represents the uncertainty of the estimate, while the 95% confidence interval is the interval in which there is a 0.95 probability of containing the estimated true species richness.

The curve was extrapolated to provide an estimation of species richness and sample coverage if the sample size was doubled. In addition, since some species remained undetected from sampling, the total species richness was estimated via extrapolation using the Chao estimator (Chao & Jost, 2012). The respective coverage-based sampling curves was represented on a graphic plot.

2.4 Faunistic Field Findings

2.4.1 General

In the Project area, the field assessment recorded 206 species where bird species (70 species) and butterfly species (44 species) make up more than half of the record assemblage (**Table 5)**. A total of 15 species of conservation significance and two species of interest were recorded (**Appendix C**). The faunal survey and camera trap data are provided in Appendices D and E, respectively.

Table 5: Number of faunal species recorded at the Project area (CS – Species of Conservation Significance)

Faunal Group	No. of recorded species		
	All species	CS species	Species of Interest
Odonate	22	0	0
Butterfly	44	2	0
Amphibian	10	0	0
Reptile	17	2	0
Bird	70	10	1
Non-volant mammal	6	1	1
Bat	5	0	0
Mollusc	11	0	0
Marine Arthropod	6	0	0
Fish	12	0	0
Others (Polychaete, Porifera and Cnidarian)	3	0	0

Faunal Group	No. of recorded species		
	All species	CS species	Species of Interest
Total	206	15	2

A higher number of fauna species of conservation significance were recorded on the western side of the Project area as seen in **Figure 13**. Out of the 15 species of conservation significance, 10 species were birds. The remaining five species consisted two species of butterflies, Ancyra blue (*Catopyrops ancyra*) and Formosan swift (*Borbo cinnara*), and two species of reptiles, Asian softshell turtle (*Amyda cartilaginea*) and Malayan box terrapin (*Cuora amboinensis*) and one species of mammal, the smooth-coated otter (*Lutrogale perspicillata*). All species are accorded species of conservation significance due to their threatened status. Two species of interest were recorded. The white-bellied sea eagle (*Haliaeetus leucogaster*) was considered a species of interest due to the presence of an active nest within the Project area, while the Eurasian wild boar (*Sus scrofa*) was included due to their high chance of human-wildlife conflict within the Project area.

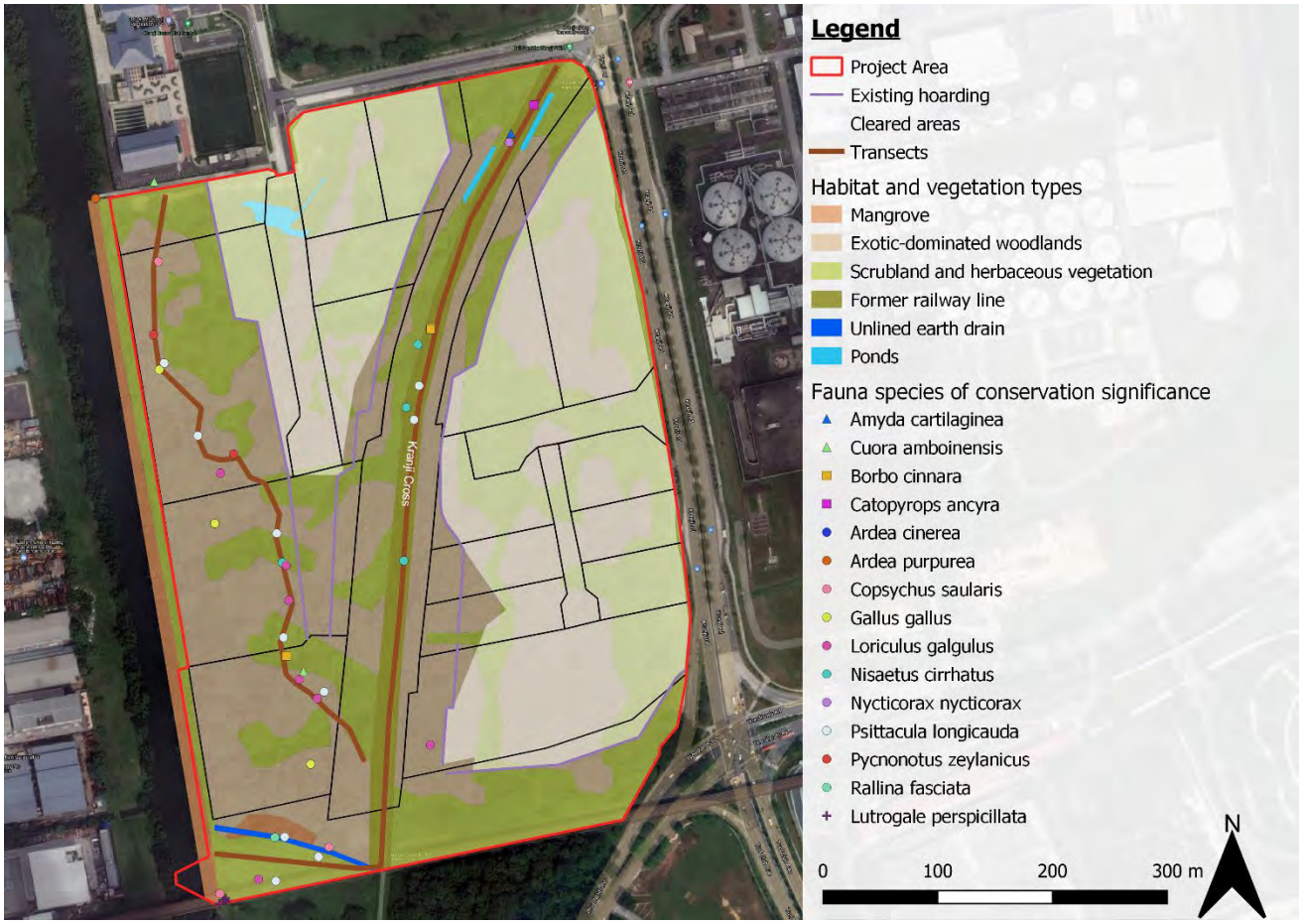

Figure 13: Occurrence map of Conservation Significant Fauna Species at the Project area

2.4.2 Taxon Sampling Curves

The sample coverages of the different fauna groups were all above 80%, reflecting the given proportion of the total number of species in the community that were recorded during field surveys (**Table 6**). Following extrapolation (i.e., sample sizes were theoretically doubled using the statistical programme), the resulting increases in sample coverage and species richness values were then interpreted accordingly. The sampling curves for non-volant mammal (terrestrial transect), bat, marine arthropod and others (polychaete, porifera and cnidarian) were not plotted as the sample sizes were too small for the plots to be meaningful (**Figure 14**, **Figure 15**, **Figure 16**).

Doubling the sampling effort of faunal surveys may yield higher sampling coverage and additional detections of 3–17 species across the faunal groups (**Table 6**). However, it is important to note that the surveys conducted serve only to provide a rapid baseline and capture a snapshot of the faunal community that may be present at the Project area. Thus, the list of probable species (**Appendix C**) was also considered in this study.

Table 6: Result summary of taxon sampling analysis

Faunal Group	Sample Coverage (%)	Observed Richness	Estimated Richness (± SE)	95% CI for Estimated Richness	Estimated Coverage with Doubled Effort (%)	Estimated Richness (and additional species) with Doubled Effort
Odonate	95.4	20	24 ± 5.0	20.5–47.1	98.6	23 (+3)
Butterfly	86.2	42	52 ± 6.6	45.1–74.4	97.5	50 (+8)
Amphibian	98.7	11	11 ± 0.5	11.0–14.4	100	11 (+0)
Reptile	91.5	13	15 ± 2.5	13.3–26.7	98.9	15 (+5)
Bird	94.6	58	69 ± 7.2	61.2–93.4	98.6	75 (+17)
Non-volant mammal	NA	NA	NA	NA	NA	NA
Bat	NA	NA	NA	NA	NA	NA
Non-volant mammal (Camera Trap)	100	5	5 ± 0.4	5.0–5.9	100	5 (+0)
Mollusc	80.8	5	19 ± 12.9	11.2–81.0	88.4	14 (+9)
Marine Arthropod	NA	NA	NA	NA	NA	NA
Fish	83.8	11	14 ± 3.0	11.4–27.0	100	14 (+3)
Others (Polychaete, Porifera and Cnidarian)	NA	NA	NA	NA	NA	NA

Note: SE = standard error; CI = confidence interval

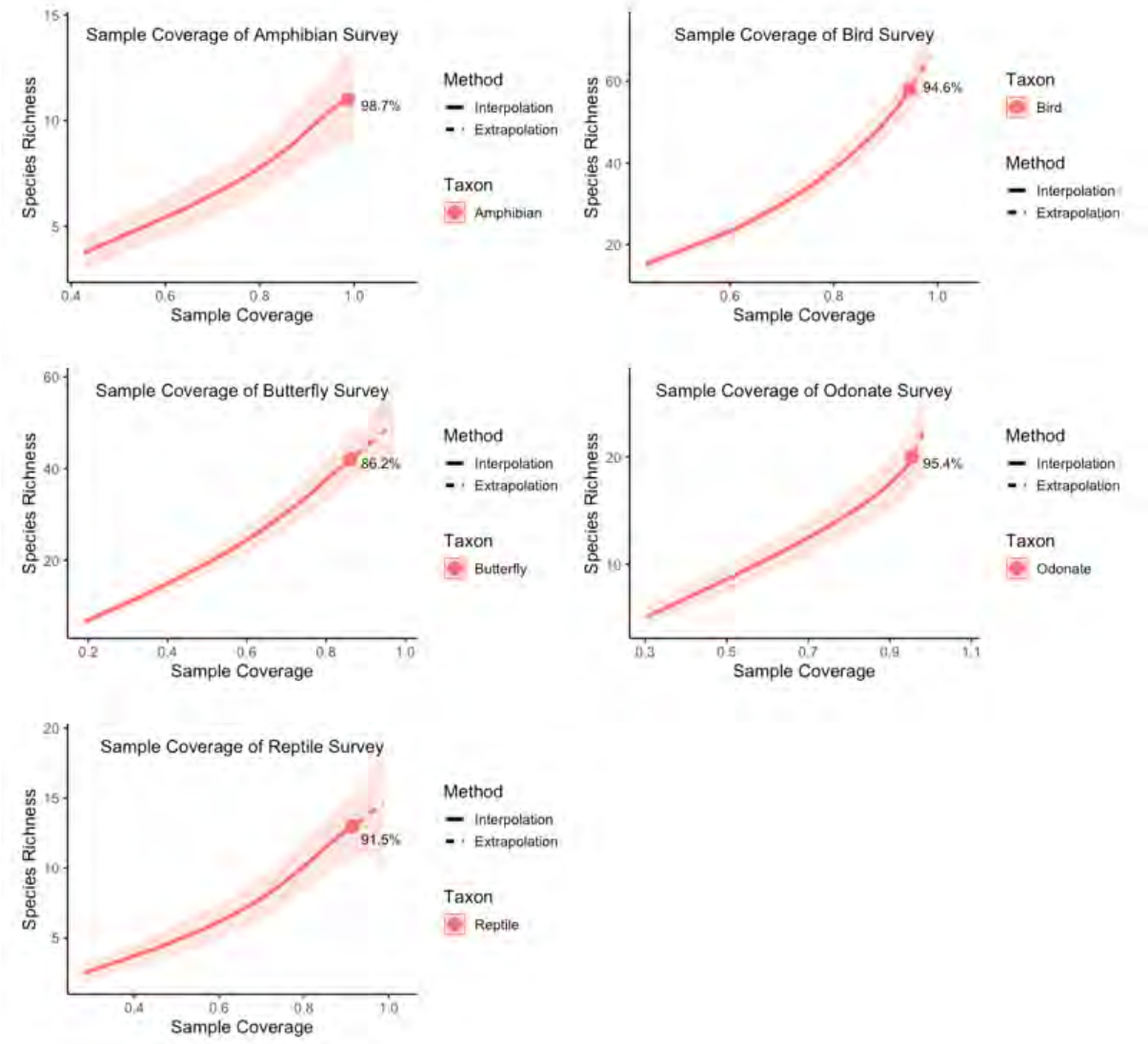

Figure 14: Taxon sampling curves for terrestrial surveys

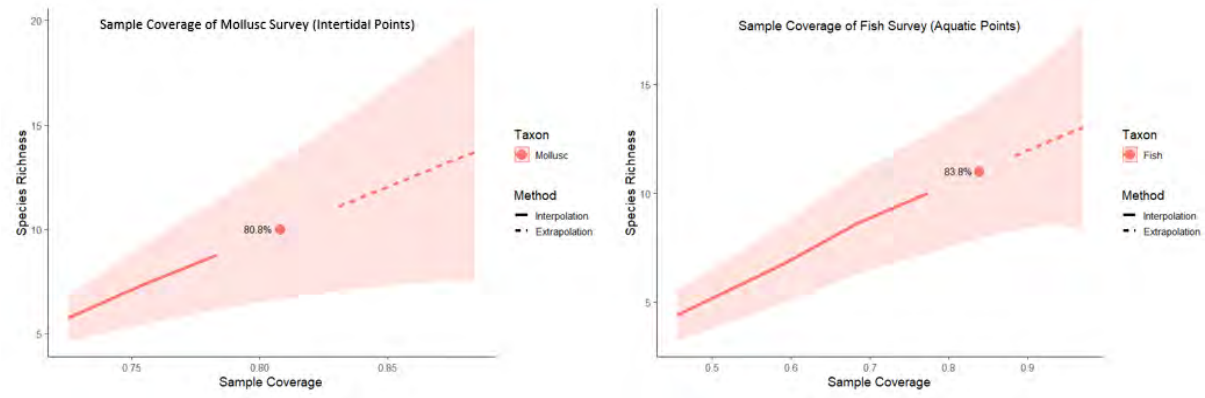

Figure 15: Taxon sampling curves for intertidal and aquatic surveys

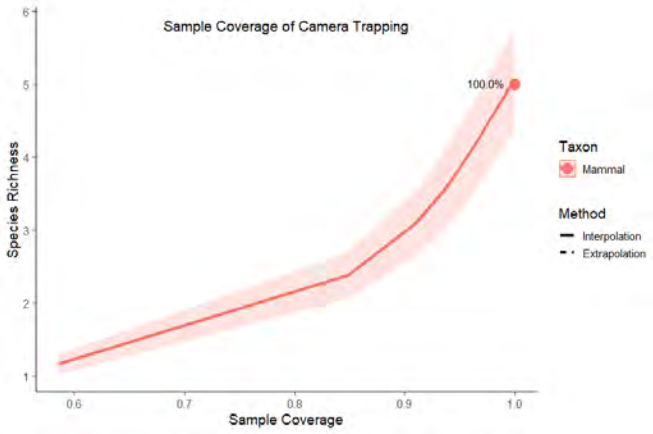

Figure 16: Taxon sampling curves for camera trapping

2.4.3 Odonates (Damselflies and Dragonflies)

During field assessment, 22 species of odonates were recorded. All of the recorded species are widespread and common, and dominated by species that are adapted to disturbed open ponds such as the white-barred duskhawk (*Tholymis tillarga*), blue dasher (*Brachydiplax chalybea*), and variable wisp (*Agriocnemis femina*) (Tang et al., 2010). Species that inhabit sluggish waterbodies shaded by the forest canopy (Tang et al., 2010) were also frequently recorded. These include the grenadier (*Agrionoptera insignis*) and scarlet grenadier (*Lathrecista asiatica*). One widespread and uncommon species was recorded – the sultan (*Camacinia gigantea*; **Figure 17**). It is an adaptable species that breeds in open ponds (Tang et al., 2010). It was recorded once at the northern tip of Kranji Cross where are large open ponds on both sides of the rail corridor.

Figure 17: Sultan (*Camacinia gigantea*) recorded at the Project area

2.4.4 Butterflies

During field assessment, 44 species of butterflies were recorded, including two species of conservation significance (**Table 5**). They are the nationally endangered Formosan swift (*Borbo cinnara*; **Figure 18A**) and nationally vulnerable ancyra blue (*Catopyrops ancyra*; **Figure 18B**). Both are cryptic species that were likely overlooked by researchers in the past (Jain et al., 2018). The Formosan swift is now regarded as moderately common and can be found in a variety of open habitats where grasses (family Poaceae), its host plants, are

abundant (Khew, 2015). The ancyra blue remains moderately rare as it is a forest-dependent butterfly. It was recorded once at the northern tip of Kranji Cross (**Figure 13**).

The recorded butterfly assemblage was characterised by common species adapted to open habitats such as the grey pansy (*Junonia atlites atlites*), common caerulean (*Jamides celeno aelianus*) and chestnut bob (*Iambrix salsala salsala*). Other moderately rare species that are typically found in shaded forests were also recorded, including the forest hopper (*Astictopterus jama jama*), full stop swift (*Caltoris cormasa*), Malayan (*Megisba malaya sikkima*), and common evening brown (*Melanitis leda leda*).

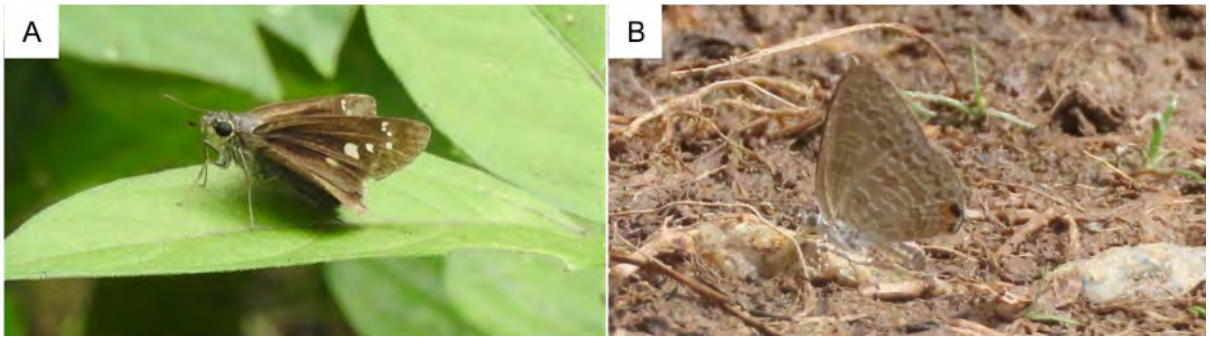

Figure 18: Butterflies of conservation significance recorded at the Project area ((A) Formosan swift (*Borbo cinnara*); (B) Ancyra blue (*Catopyrops ancyra*))

2.4.5 Amphibians

During field assessment, 10 species were recorded, of which four are non-native. The amphibian assemblage was dominated by species that are usually found in disturbed open ponds/puddles, such as the field frog (*Fejervarya limnocharis*), Guenther's frog (*Sylvirana guentheri*), and East Asian ornate chorus frog (Microhyla mukhlesuri). All these species are widespread and common, except for the restricted and rare East Asian ornate chorus frog (*M. mukhlesuri*) and the widespread but uncommon Guenther's frog (*S. guentheri*), both of which are non-native. However, the forest-dependent Malayan giant frog (*Limnonectes blythii*; **Figure 19**) was also frequently recorded.

Figure 19: Malayan giant frog (*Limnonectes blythii*) recorded at the Project area

2.4.6 Reptiles

During the field assessment, 17 species of reptiles were recorded, including two species of conservation significance. They are the Asian softshell turtle (*Amyda cartilaginea*) and Malayan box terrapin (*Cuora amboinensis*). The Asian softshell turtle was recorded in the ponds at the northern tip of Kranji Cross (**Figure 13**). As a forest dweller, the Asian softshell turtle is mostly restricted to the Central Nature Reserves (Baker & Lim, 2015). It is also globally threatened by over-harvesting for the food trade (Asian Turtle Working Group, 2000a; Asian Turtle Working Group, 2000b). The Malayan box terrapin is considered restricted but common in Singapore, and a large proportion of the population may be released individuals (Baker & Lim, 2012). It is uncertain if the individual recorded in this assessment were released individuals.

The recorded reptilian assemblage was characterised by widespread and common species adapted to open habitats such as the changeable lizard (*Calotes versicolor*), painted bronzeback (*Dendrelaphis pictus*), and Oriental whip snake (*Ahaetulla prasina*). One widespread but uncommon species, the forest-dependent green crested lizard (*Bronchocela cristatella*) was also recorded. Two snakes, the striped kukri (*Oligodon octolineatus*; **Figure 20A**) and the striped keelback (*Xenochrophis vittatus*; **Figure 20B**) were only recorded as dead specimens likely to have been trapped by the erosion control blankets that were installed in the southern part of the Project area. Fossorial snakes such as these species are prone to entrapment by the nylon mesh of such non-biodegradable erosion control blankets (ECB). The specification and use of full biodegradable ECBs without the nylon framwork has been recommended in the EMMP section.

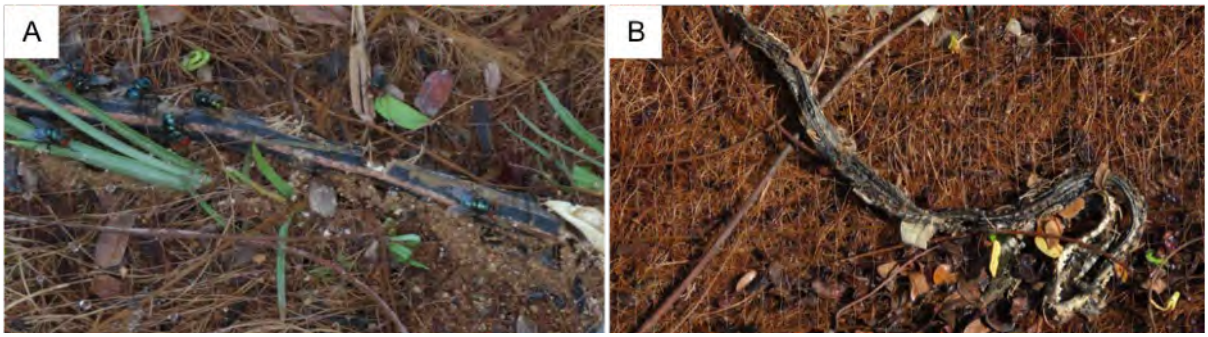

Figure 20: Carcasses of snakes trapped in the nylon mesh of non-biodegradeable erosion control blankets recorded at the Project area ((A) Striped kukri (*Oligodon octolineatus*); (B) striped keelback (*Xenochrophis vittatus*))

2.4.7 Birds

The field assessment recorded 70 species, of which 10 are of conservation significance and one of interest (**Figure 13**; **Table 5**; **Appendix C**). Five species of conservation significance are nationally threatened species that were previously regarded as rare but have since increased in range and numbers (Lim & Yong, 2013). They are the changeable hawk-eagle (*Nisaetus cirrhatus*; endangered), grey heron (*Ardea cinerea*; vulnerable), Oriental magpie-robin (*Copsychus saularis*; endangered), red junglefowl (*Gallus gallus*; endangered), and blue-crowned hanging-parrot (*Loriculus galgulus*; endangered). A pair of changeable hawk-eagles were seen nesting on an albizia (*Falcataria moluccana*) located on the western portion of the hoarded area for construction activities (herein referred to in this report as “worksite”), just outside the Project boundary (**Figure 21A**).

On the other hand, three are nationally threatened species that have shown a decreasing trend in terms of numbers (Lim & Yong, 2013). They are the purple heron (*Ardea cinerea*), black-crowned night heron (*Nycticorax nycticorax*), and red-legged crake (*Rallina fasciata*) **(Figure 21)**. Both herons are associated with mangrove and wetland habitats, such as Sungei Pang Sua. The purple heron was recorded once along Sungei Pang Sua, and

the back-crowned night heron was only recorded via camera trapping at the northern tip of Kranji Cross (**Figure 13**).

The straw-headed bulbul is listed as nationally endangered although its population appears to be growing more stable in Singapore. However, it is regarded as a globally critically endangered species due to its melodious and attractive songs, making it highly sought-after for the songbird trade. This has resulted in its extirpation throughout much of its range and making it necessary to list it as a CITES-protected species. Furthermore, it is also threatened by loss of forest habitat. Its global conservation status was recently revised in 2018 from Endangered to Critically Endangered as populations have been declining extremely rapidly (BirdLife International, 2018). According to Yong et al. (2017), the estimated population size in Singapore is slightly over 200 birds, possibly making up one-third of the global population (Neo, 2016). However, in Singapore, habitat loss to development remains a primary threat to species. There were two records of this species during the field assessment on the western part of the Project area (**Figure 13**).

The long-tailed parakeet (*Psittacula longicauda*) is a globally vulnerable species but is regarded as common in Singapore. A pair of white-bellied sea eagles (*Haliaeetus leucogaster*) were also observed nesting on an albizia tree within the western portion of the hoarded area for construction activities. While not considered threatened, the nest falls within the Project area, and may be affected by future construction. The species is hence considered a species of interest.

Aside from the species of conservation, the recorded resident bird assemblage was characterised by common species adapted to disturbed habitats, such as the spotted dove (*Spilopelia chinensis*), Asian glossy starling (*Aplonis panayensis*), and Javan myna (*Acridotheres javanicus*). Uncommon species associated with forested habitats were also recorded, such as the rufous-tailed tailorbird (*Orthotomus sericeus*), common emerald dove (*Chalcophaps indica*), and rufous woodpecker (*Micropternus brachyurus*). Ten migratory species were recorded, including the rare yellow-browed warbler (*Phylloscopus inornatus*; **Figure 22A**) and the uncommon yellow-rumped flycatcher (*Ficedula zanthopygia*; **Figure 22B**).

Figure 21: A selection of birds of conservation significance recorded at the Project area ((A) Changeable hawk-eagle (*Nisaetus cirrhatus*) on nest; (B) red junglefowl (*Gallus gallus*); (C) black-crowned night heron (*Nycticorax nycticorax*); (D) red-legged crake (*Rallina fasciata*))

Figure 22: A selection of migratory birds recorded at the Project area ((A) yellow-browed warbler (*Phylloscopus inornatus*); (B) yellow-rumped flycatcher (*Ficedula zanthopygia*))

2.4.8 Non-volant mammals

During the field assessment, six species of non-volant mammals were recorded, including one species of conservation significance: the smooth-coated otter (*Lutrogale perspicillata*) and one species of interest, the Eurasian wild boar (*Sus scrofa*). There was an incidental record of a family of up to eight individuals of smooth-coated otters resting on the bank by Sungei Pang Sua, on the southern part of the Project area (**Figure 13**; **Figure 23A**). Fresh spraints were also regularly observed in the same area (**Figure 23B**). Most of the remaining species are widespread and common, although the common palm civet (*Paradoxurus musangus*; **Figure 24A**), which is uncommon in Singapore, was also recorded. The Eurasian wild boar (**Figure 24B**) which is prone to human-wildlife conflict, was also recorded multiple times during transect surveys and on the camera traps, indicating utilization of the entire Project area.

All of the species recorded via camera trapping were also recorded via the transect surveys.

Figure 23: (A) A family of smooth-coated otters (*Lutrogale perspicillata*) recorded at the Project area; (B) smooth-coated otter spraints

Figure 24: Camera trap footage of (A) a common palm civet (*Paradoxurus musangus*); (B) a Eurasian wild boar (*Sus scrofa*)

2.4.9 Bats

During field assessment, five species of bats — four insectivorous and one frugivorous — were recorded. All these species are widespread and common, except for the Javan pipistrelle (*Pipistrellus javanicus*), which is uncommon. It was recorded roosting under the train track in the southern part of the Project area (**Figure 25**). The remaining insectivorous bats were identified via acoustic recording (**Figure 26**). An unidentified fruit bat was recorded visually during the nocturnal transect surveys.

Figure 25: Javan pipistrelle (*Pipistrellus javanicus*) observed roosting under the train track

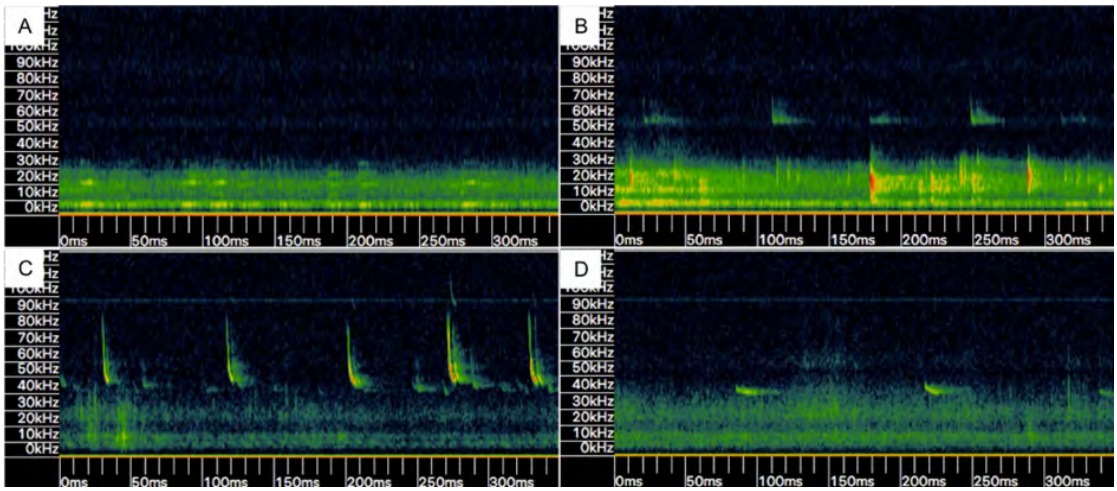

Figure 26: Spectrograms of bat echolocation calls ((A) Pouch-bearing bat (*Saccolaimus saccolaimus*); (B) whiskered myotis (*Myotis muricola*); (C) Javan pipistrelle (*Pipistrellus javanicus*); (D) Asiatic lesser yellow house bat (*Scotophilus kuhlii*))

2.4.10 Mollusc

Eleven species of molluscs were recorded during the field assessment, including three bivalves and eight gastropods. The combination of freshwater and marine species can be explained by the presence of tidal influence in the sampling points as well as the presence of streams and drain, which discharges freshwater directly into the mangrove, in the vicinity of the sampling points. Two species that were recorded in high numbers during field assessment were *Geloina expansa* (**Figure 27D**) and *Mytella strigata* **(Figure 27A**). The native marine bivalve recorded (*G. expansa*) is a highly tolerant species which filter feeds and survives in a wide range of salinities and commonly found in such mangrove swamp environments (Morton, 1976). On the other hand, the non-native marine bivalve recorded (*M. strigata*) was introduced through the ballast water from ships involved in international maritime trade and have established themselves in Johor Straits (Lim et al., 2018) which is in close vicinity to the Project area. Another interesting note is the *Pomacea canaliculate*, a non-native freshwater gastropod, which was introduced locally via the aquarium trade (Ng et al., 2014), could have arrived at the sampling point along with the drainage of freshwater.

Figure 27: Selection of mollusc recorded during field assessment ((A) *Mytella strigata* specimen; (B) *Chicoreus capucinus* specimen; (C) *Coecella horsfieldii* specimen; (D) *Geloina expansa* specimens)

2.4.11 Marine Arthropod

Six species were recorded during the field assessment. Only two species were identified to species level, *Uca vocans* and *Metaplax elegans*, which are common species found in mangrove environments.

2.4.12 Fish

Twelve species were recorded during the field assessment. All 12 species recorded have been found to be tolerant of environments with fluctuating salinity. However, five of the species are more commonly found within freshwater environments. The five species were guppy (*Poecilia reticulata*), green molly (*Poecilia sphenops*), common snakehead (*Channa striata*), threespot gourami (*Trichopodus trichopterus*) and croaking gourami (*Trichopsis vittata*). This was consistent with the records in the Project area, where they were found in the two freshwater ponds along Kranji Cross and at the aquatic sampling point A1_01 located at the start of the unlined earth drain.

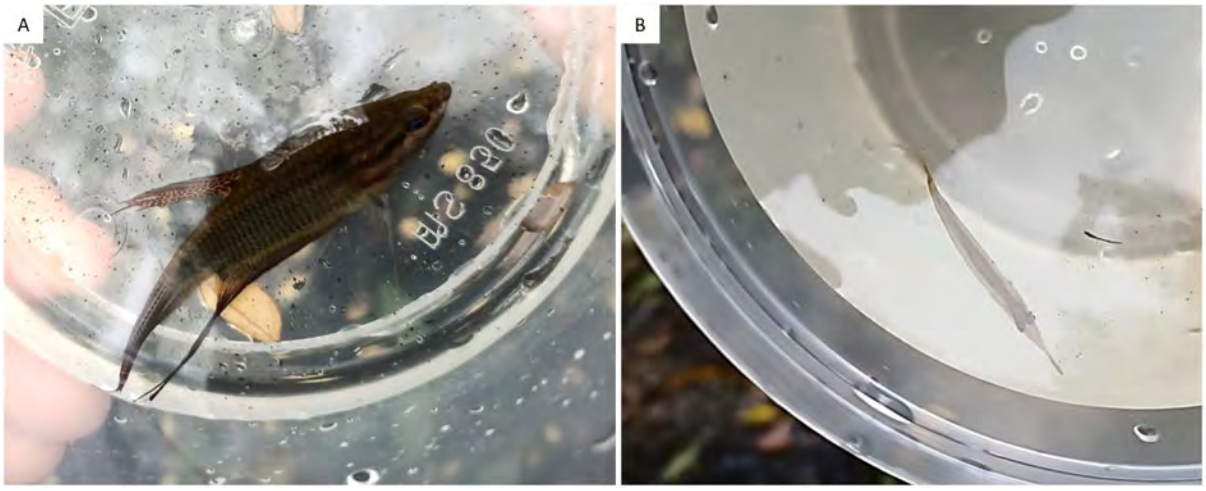

Figure 28: Selection of fish recorded during field assessment ((A) Croaking gouramy (*Trichopsis vittata*); (B) Sunda pygmy halfbeak (*Dermogenys collettei*))

2.4.13 Others (Polychaete, Porifera and Cnidarian)

As polychaetes, poriferans and cnidarians in Singapore are not well-studied. Only one species of each taxon was recorded at the Project area, of which none were identified to species level.

3.0 IMPACT ASSESSMENT

An impact assessment was conducted as part of the FBS. The impact assessment aimed to identify potential impacts that may result from the proposed development and to evaluate the significance these impacts have on the various environmental receptors and ecological components (i.e., flora, fauna) within and in the vicinity of the Project area. An impact is thus defined as an entity that alters the integrity and quality of the ecological components. Integrity refers to the “coherence of ecological structure and function, across the whole area, that enables it to sustain the habitats, complex of habitats and/or the levels of populations of the species for which it was classified” (Leicestershire County Council, 1994).

In particular, the impact assessment serves to guide appropriate mitigation methods to ensure impacts are avoided or minimised (CIEEM, 2016).

For this EBS, impacts were assessed, with consideration of the construction methods and design options, using the Impact Significance Assessment Matrix. The potential impacts from and risks associated with the Project activities (construction and operation) were assessed. This was done before and after mitigation of the potential impacts by the project activities (i.e., on residual impacts).

The methodology for the prediction of impacts was based on the following:

- Qualitative assessment to evaluate the impacts of construction and operational activities on habitat and fauna within the Project area;
- Assumption that the basic control measures adhere to the relevant regulations and guidelines (e.g., noise levels, earth control measures (ECM));
- Identification of areas of high conservation priority based on both habitat and faunal assessment results; and,
- Establishment of key ecological features in terms of ecology and biodiversity.

3.1 Impact Evaluation

Identified potential impacts were evaluated based on their significance, which is a measure of the weight that should be given to each impact in decision-making, and determines if management or mitigation measures need to be implemented.

Impacts assessed to be of negligible or minor significance require no additional management or mitigation measures (on the basis that adequate minimum controls are already included in the project design). Negligible and Minor impacts are therefore deemed “Insignificant” while Moderate and Major impacts are deemed “Significant”. Impacts assessed to be of moderate or major significance require the adoption of management and mitigation measures to minimise or reduce the impact to an “acceptable level”.

An acceptable level is the reduction of a Major impact to Moderate post-mitigation. In seeking to mitigate Moderate impacts, the emphasis is on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable. It will not always be practical to reduce Moderate impacts to Minor in consideration of the cost-ineffectiveness of such approaches (because of diminishing return of impact versus cost). Management and mitigation measures were incorporated in the EMMP (**Section 5.0**) for the Project contractor to adopt during construction phase. Impact significance will be assessed using the risk-based Impact Significance Matrix (**Table 7**) which considers two factors:

- **Impact Consequence** (**Table 8**): The consequence of an impact is a function of a range of considerations including impact spread, impact duration, impact intensity and nature, legal and guideline compliance. In evaluating the consequence of the biodiversity impacts, the following aspects were taken into consideration:
  - **Receptor Sensitivity** (**Table 9**): Categorises receptors according to their susceptibility to adverse impacts from the project’s construction and operation. It also takes into account the ecological value of the receptor. Species of conservation significance were considered of high ecological value, species not of conservation significance were considered of medium ecological value, while non-native species were considered of low ecological value.
  - **Impact Intensity** (**Table 16**, **Table 18**): Defines the magnitude of the impact and the status of the impact in relation to regulations, standards and guidelines.
- **Likelihood of Occurrence** (**Table 15,Table 17**): The likelihood of the impact occurring during the project construction and operation periods, which takes into account the probability of the event happening as well as the duration of the event. It is estimated based on experience and/or evidence that such an event has previously occurred.

Table 7: Impact significance assessment matrix

Consequence / Likelihood	Imperceptible	Very Low	Low	Medium	High
Unlikely/Remote	Negligible	Negligible	Negligible	Negligible	Negligible
Less likely/Rare	Negligible	Negligible	Minor	Minor	Minor
Possible/Occasional	Negligible	Minor	Minor	Moderate	Moderate
Likely/Regular	Negligible	Minor	Moderate	Moderate	Major
Almost Certain/Continuous	Negligible	Minor	Moderate	Major	Major

Table 8: Impact consequence matrix

Sensitivity / Intensity	Low	Medium	High
Negligible	Imperceptible	Very low	Very low
Low	Very low	Low	Low
Medium	Very low	Medium	Medium
High	Low	High	High

Table 9: Receptor sensitivity classification

Receptor Sensitivity		
Low	**Medium**	**High**
Habitats or faunal species of low ecological value; exotic faunal species	Habitats or faunal species of moderate ecological value; native faunal species	Habitats or faunal species of high ecological value; faunal species of conservation significance

The residual (post-mitigation) impact significance was assessed using the same criteria for significant impacts for which management and mitigation are recommended.

3.2 Identification of Sensitive Receptors and Assessment of Ecological Value

Habitats and fauna species were assessed for their ecological value based on the criteria described in **Table 10**. Those of high ecological value were assigned Priority 1 sensitivity level, while those of moderate or low ecological value were assigned Priority 2 or 3 sensitivity levels, respectively.

Habitat and species receptors accorded with higher ecological value were regarded of greater importance for conservation compared to other receptors within the Project area. This assessment was carried out using

biodiversity baseline findings. The habitats and zones that must be kept are highlighted in the areas of high conservation value including the buffer zones, the mangrove area and the unlined earth stream (**Figure 30**).

Table 10: Criteria for assessing the ecological value of habitats

Criterion	Definition	Classification		
		High	Medium	Low
Size	Area occupied by the habitat relative to the Project area or length of water body	≥ 40%	10–40%	≤ 10%
Naturalness	Degree to which the habitat has been modified or disturbed as a result of human activities	Habitat with minimal human disturbance	Moderately disturbed habitat that has been modified to some extent	Highly disturbed habitat that has been modified to a large extent
Occurrence of fauna species of conservation significance	Number of sightings of fauna of conservation significance recorded within habitat relative to the Project area	≥ 40%	10–40%	≤ 10%
Ecological linkage	Connectedness to a highly-value habitat	Highly connected	Moderately connected	Unconnected/ isolated
Difficulty in recreatability	Level of difficulty in re-constructing the habitat through human intervention	Very difficult	Moderately difficult	Easy

3.2.1 Habitats

The ecological value of six habitat types within the Project area was assessed (**Table 11**). Of the six habitat types found within the Project area, three are of high ecological value (mangrove, exotic-dominated woodland, unlined earth drain), two are of medium ecological value (Kranji Cross, herbaceous and scrubland vegetation) and one is of low ecological value (ponds).

Kranji Cross

Kranji Cross scored a total of one “high”, one “medium” and three “low” in the assessment of its ecological value. Occupying only approximately 5% of the Project area, its size is scored as “low” relative to the other habitats. Few fauna species of conservation significance were observed during field surveys, thus scored “low” for the abundance criterion. Being part of the Rail Corridor, Kranji Cross is a moderately modified habitat that has not experienced significant human disturbances since the closure of the Rail Corridor in 2011. While currently subject to vegetation maintenance regularly, the level of human disturbance was considered “low” as the works mainly involve grass-trimming on the main trail. As such, Kranji Cross scored “medium” for naturalness. It is also easily re-creatable as it is mainly dominated by spontaneous vegetation of scrubland and woodland habitat types, scoring “low” for recreatability. Considerable attention was paid to its ecological linkage, which scored “high”, especially given that it is part of the Rail Corridor. The Rail Corridor is a critical ecological corridor spanning 24km from north (Woodlands) to south (Tanjong Pagar) of Singapore. Considering its significant length and function as an ecological connector between high-value habitats such as Bukit Timah Nature Reserve and the Western Catchment area, the Rail Corridor is an ecological corridor that is important on an island-wide scale. Therefore, although Kranji Cross has a majority of “low” scorings, its high importance as an ecological corridor warrants a medium ecological value, i.e., Priority 2.

Mangrove

The mangrove scored a total of three “high”, one “medium” and one “low” in the assessment. An uncommon habitat in Singapore, mangroves are regarded as globally highly threatened due to the increasing rate of anthropogenic disturbances such as land reclamation, conversion for aquaculture and agriculture, rapid urbanisation, and pollution [UNEP, 2014]. Hence, there is high conservation interest to ensure the continuity and survival of this habitat type. Being small and relatively undisturbed, the mangrove in the Project area scored “low” and “high” in the size and naturalness criteria, respectively. It also scored “medium” in the abundance of fauna species of conservation significance as several sightings were observed there. It scored “high” for ecological linkage because it serves as an ecological corridor to the Western Catchment area, such as the ecologically important Sungei Buloh Wetland Reserve. Lastly, mangroves are generally complex and difficult to recreate due to the unique environmental conditions, thus it scored “high” in recreatability. Finally, with a majority of “high” scorings, the mangrove has high ecological value, i.e., Priority 1.

Exotic-dominated woodland

The exotic-dominated woodland scored a total of three “high”, one “medium” and one “low” in the assessment. It occupies almost half of the Project area, thus scoring “high” for the size criterion. As a moderately disturbed habitat that is somewhat naturalised due to the lack of significant human disturbance since the closure of the Rail Corridor in 2011, it scored “medium” for naturalness. The majority of sightings of fauna species of conservation significance was made within the exotic-dominated woodland, giving it a “high” in the abundance criterion. Its adjacency to the high-value mangrove and Kranji Cross, an important ecological corridor, warrants a “high” for its ecological linkage. Lastly, with few native plant species and little structural heterogeneity, the habitat is fairly easy to recreate with human intervention, resulting in “low” for recreatability. Albizia trees are the most dominant tree species within this habitat. This non-native species is fast-growing, able to reach heights of over 35 m in 25 years, and able to facilitate invasions by other species (Hughes et al., 2006). It is also a storm-vulnerable species, presenting itself as a risk to public safety. NSS (2013) has suggested that albizia trees are important for the survival of the white-bellied sea eagle and the locally Endangered changeable hawk-eagle. These raptors favour the Albizia trees as a roosting and nesting site, likely due to the height of these trees. The Albizia trees within the Project area served this ecological function as well, with two raptor nests observed; it is likely that the Albizia trees in the surrounding landscape may serve a similar function. The dwindling number of similar habitats within Singapore means that the number of Albizia trees are also decreasing, and the long-term success of raptor populations may be affected.

Herbaceous and Scrubland Vegetation

The herbaceous and scrubland vegetation scored a total of two “high”, two “medium” and one “low” in the assessment. Its scorings and the reasonings behind them are largely the same as the exotic-dominated woodland habitat, differing only in its “medium” scoring for abundance of fauna species of conservation significance, as only numerous sightings were made there. Overall, with equal numbers of “high” and “medium” scores, a medium ecological value, i.e., Priority 2, is accorded to the herbaceous and scrubland vegetation habitat.

Unlined earth drain

The unlined earth drain scored a total of three “high” and two “low” in the assessment. It is a short, undisturbed drain connecting Kranji Cross directly to the high-value mangrove strip adjacent to the Sungei Pang Sua, thus it scored “low”, “high” and “high” for size, naturalness and ecological linkage, respectively. Few fauna species of conservation significance were sighted at the unlined earth drain, so it scores “low” for the abundance criterion. Lastly, being an *unlined earth drain*, it cannot be recreated via human intervention, thus it scored “high” for recreatability. Finally, with a majority of “high” scorings, the unlined earth drain has high ecological value, i.e., Priority 1.

Ponds

The ponds scored a total of one “high”, one “medium” and three “low” in the assessment. Ponds 1 and 2 are likely to have started out as small ephemeral ponds, gradually deepening and naturalising in their current state today. Pond 3 could not be surveyed due to premature clearance. As such, the ponds scored “low” and “medium” for size and naturalness. Few fauna species of conservation significance were observed at the ponds, thus scoring “low” for abundance. While isolated, they have “high” ecological linkage as Ponds 1 and 2 are adjacent to Kranji Cross, an important ecological connector. Lastly, the ponds are easily recreated, thus having “low” for recreatability. Finally, with a majority of “low” scorings, the ponds have a low ecological value, i.e., Priority 3.

All habitats of Priority 1 and 2 ecological values are identified as sensitive receptors for habitats.

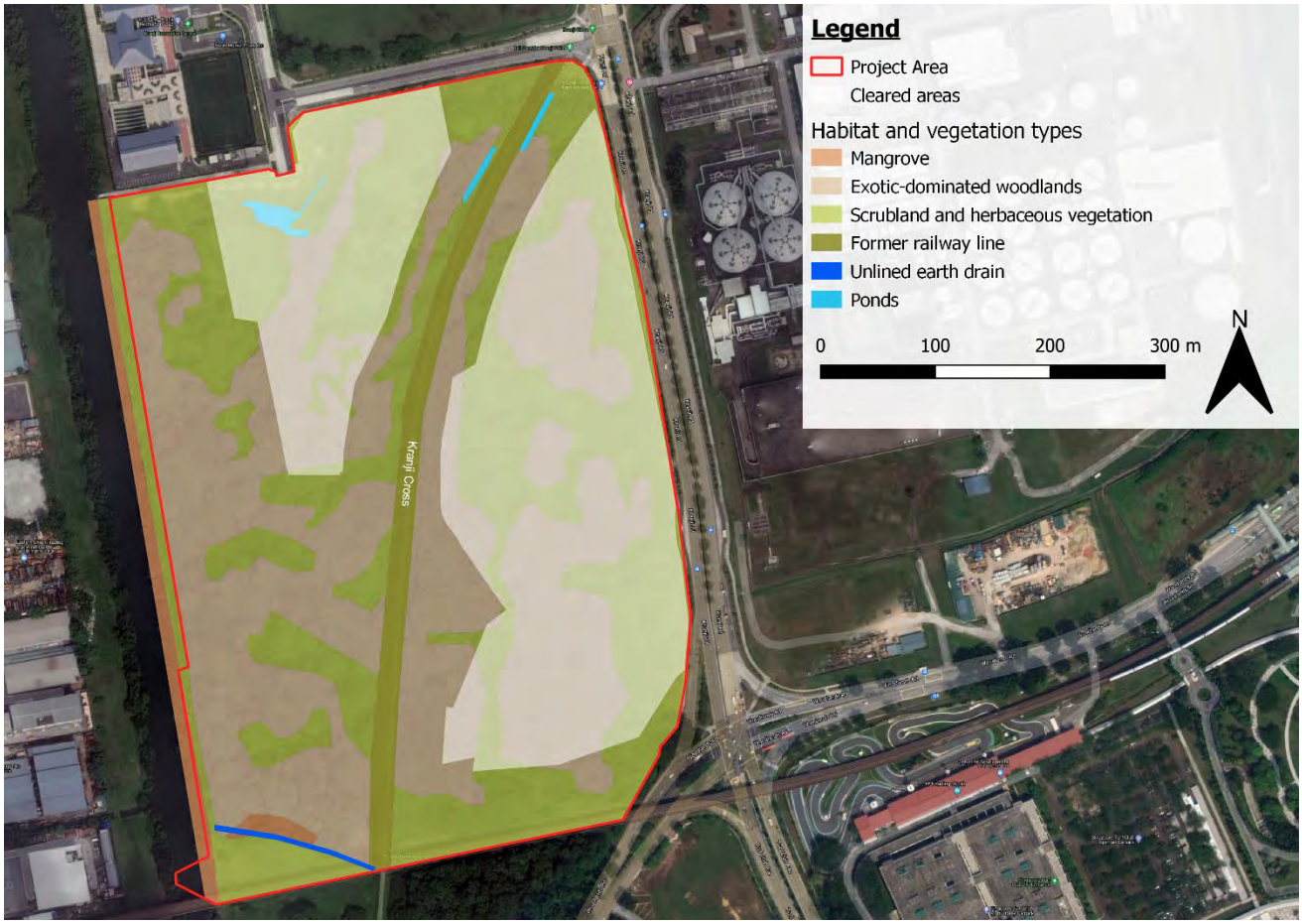

Figure 29: Habitats within the Project area

Table 11: Habitat ecological assessment table for Project area

Criterion	Kranji Cross	Mangrove	Exotic-dominated woodland	Herbaceous and scrubland vegetation	Unlined earth drain	Ponds
Size	4.80% (1.35 ha)	0.68% (0.19 ha)	48.17% (13.58 ha)	45.62% (12.86 ha)	0.23% (0.07 ha)	0.50% (0.14 ha)
Naturalness	Moderately disturbed habitat that has been modified to some extent	Habitat with minimal human disturbance	Moderately disturbed habitat that has been modified to some extent	Moderately disturbed habitat that has been modified to some extent	Habitat with minimal human disturbance	Moderately disturbed habitat that has been modified to some extent
Abundance of fauna species of conservation significance	5.21% (5)	11.46% (11)	62.50% (60)	15.63% (15)	2.08% (2)	3.13% (3)
Ecological linkage	Highly connected	Highly connected	Highly connected	Highly connected	Highly connected	Highly connected
Difficulty in recreatability	Easy	Very difficult	Easy	Easy	Very difficult	Easy
Summary of categorisations	Size: low	Size: low	Size: high	Size: high	Size: low	Size: low
	Naturalness: medium	Naturalness: high	Naturalness: medium	Naturalness: medium	Naturalness: high	Naturalness: medium
	Abundance of species of conservation significance: low	Abundance of species of conservation significance: medium	Abundance of species of conservation significance: high	Abundance of species of conservation significance: medium	Abundance of species of conservation significance: low	Abundance of species of conservation significance: low
	Ecological linkage: high	Ecological linkage: high	Ecological linkage: high	Ecological linkage: high	Ecological linkage: high	Ecological linkage: high

Criterion	Kranji Cross	Mangrove	Exotic-dominated woodland	Herbaceous and scrubland vegetation	Unlined earth drain	Ponds
	Difficulty in recreatability: low	Difficulty in recreatability: high	Difficulty in recreatability: low	Difficulty in recreatability: low	Difficulty in recreatability: high	Difficulty in recreatability: low
Total	High × 1 Medium × 1 Low × 3 (majority)	High × 3 (majority) Medium × 1 Low × 1	High × 3 (majority) Medium x 1 Low × 1	High × 2 Medium × 2 Low × 1	High × 3 (majority) Low × 2	High x 1 Medium × 1 Low × 3 (majority)
Sensitivity	Priority 2	Priority 1	Priority 1	Priority 2	Priority 1	Priority 3

3.2.2 Fauna

All fauna of either global or local threatened status observed during the study were considered to be of conservation significance. These species were identified as sensitive receptors for faunal species and are considered as high ecological value and are **Priority 1** sensitivity. A changeable hawk-eagle nest was also recorded in the Project area, and considered a sensitive receptor as well.

In addition to the species of conservation significance, the two species of interest observed during the study were both identified as sensitive receptors and were considered of high ecological value with **Priority 1** sensitivity. **Table 12** summarizes the faunal receptors with Priority 1 sensitivity.

Table 12: List of sensitive faunal receptors recorded in the Project area

Taxon	Species	Common name	Global status	National status
Reptile	*Amyda cartilaginea*	Asian softshell turtle	Vulnerable	Endangered
Reptile	*Cuora amboinensis*	Malayan box terrapin	Vulnerable	Not Assessed
Bird	*Ardea cinerea*	Grey heron	Least Concern	Vulnerable
Bird	*Ardea purpurea*	Purple heron	Least Concern	Endangered
Bird	*Copsychus saularis*	Oriental magpie-robin	Least Concern	Endangered
Bird	*Gallus gallus*	Red junglefowl	Least Concern	Endangered
Bird	*Haliaeetus leucogaster* (nest)	White-bellied sea eagle	Least Concern	Not Assessed
Bird	*Loriculus galgulus*	Blue-crowned hanging-parrot	Least Concern	Endangered
Bird	*Nisaetus cirrhatus*	Changeable hawk-eagle	Least Concern	Endangered
Bird	*Nisaetus cirrhatus* (nest)	Changeable hawk-eagle	Least Concern	Endangered
Bird	*Nycticorax nycticorax*	Black-crowned night heron	Least Concern	Critically Endangered
Bird	*Psittacula longicauda*	Long-tailed parakeet	Vulnerable	Not Assessed
Bird	*Pycnonotus zeylanicus*	Straw-headed bulbul	Critically Endangered	Endangered
Bird	*Rallina fasciata*	Red-legged crake	Least Concern	Vulnerable
Butterfly	*Borbo cinnara*	Formosan swift	Not Assessed	Endangered
Butterfly	*Catopyrops ancyra*	Ancyra blue	Not Assessed	Vulnerable
Mammal	*Lutrogale perspicillata*	Smooth-coated otter	Vulnerable	Critically Endangered

Mammal	*Sus scrofa*	Eurasian wild boar	Least Concern	Not Assessed

3.2.3 Areas of High Conservation Value

The assessment of ecological value of the habitats and species within the Project area was used to identify areas of high conservation value (**Figure 30**).

In this Project area, habitats that are identified to be of high conservation value are the mangrove, unlined earth drain, and Kranji Cross. The habitats were selected for their importance in maintaining ecological connectivity on a macro-scale within Singapore. The mangrove serves as an ecological corridor between ecologically important areas, such as Sungei Buloh Wetland Reserve and the Western Catchment area. Being directly connected to the mangrove, the unlined earth drain is thus held in equal consideration as the mangrove. As for Kranji Cross, it is part of the proposed Rail Corridor, a 24 km ecological corridor with island wide significance due to its long length spanning from north to south of Singapore. The proposed Rail Corridor also connects key biodiversity habitats such as Bukit Timah Nature Reserve and the Western Catchment area.

As these habitats are of high conservation value, these habitats and the areas within 30 m of them are designated as areas of high conservation value and should be left untouched as far as possible. These areas are assumed to experience the greatest extent of edge effects (Beacon Environmental Ltd, 2012), though some studies have shown that edge effects can reach up to 150 m (Murcia, 1995). Any developments of construction activities within them are likely to result in Moderate to Major impacts.

Additionally, the active raptors' nests have also been identified to be of high conservation value and should be left untouched especially during the raptors' nesting season. Thus, the areas within 30 m of the nesting trees have been designated as raptors' nest buffer areas and should also be left untouched. This is to minimize any disturbances to the nesting raptors, preventing them from abandoning their nests during the active nesting period. The nesting trees and the areas within 30 m of them can only be removed when the nest has been verified to be no longer be active by ecologists.

Nonetheless, while these areas have been prioritised over others, it is important to note that the remaining habitats with ecological values of Priority 1, 2 and 3 are also valuable through their contribution to the ecological integrity of the entire Project area and should be conserved where possible.

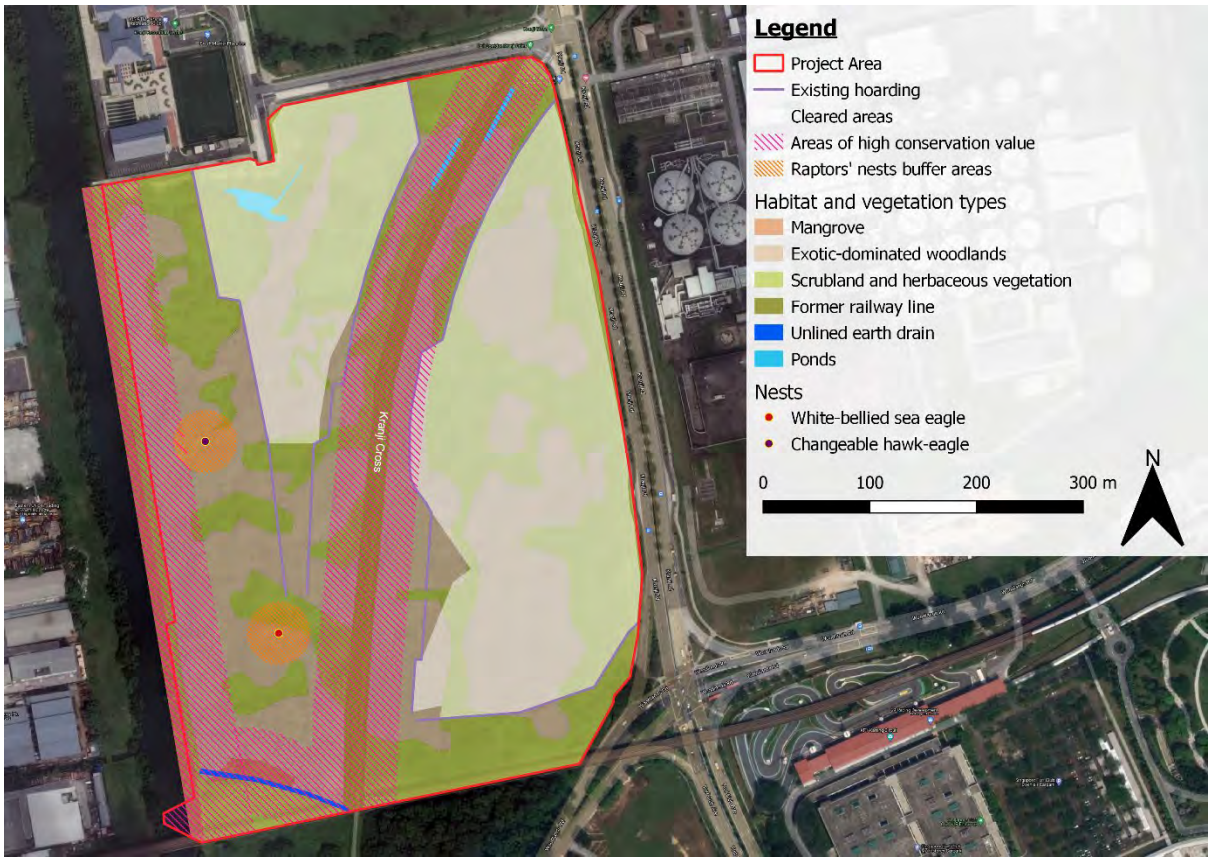

Figure 30: Areas of high conservation value and raptors' nest buffer areas

3.2.4 Potential Sources of Biodiversity Impacts

Ecological impacts were identified within the Project area based on the construction and operational activities described in Section 1. The impacts were separately assessed for habitats and faunal species (**Table 13**). Direct impacts refer to impacts occurring from the work activities within the Project area and indirect impacts refer to impact occurring outside the Project area. All impacts assessed were deemed likely to occur.

Noise disturbances are expected during the construction and operational phases while vibration disturbances are expected during the construction phase. These disturbances cannot be objectively evaluated and were not included in the FBS.

The initial stages of the construction phase will have three main activities that have direct impacts to habitat/species – i) installation of site hoarding, ii) tree felling and site clearance and iii) establishment of access roads and temporary site offices. Machineries such as excavator and lorry crane will be used for site clearance and transportation of equipment. Subsequently, the construction phase will involve earthworks and building of structures, which will comprise drilling, piling, hacking and soil excavation or levelling.

In the operational phase, there will be completed roads and structures to house food- and agri-tech-related uses such as high-tech urban indoor farming, food production including alternative proteins, and its associated research and development activities.

Table 13: List of potential ecological impacts during construction and operational phases

Receptor	Impact type	Description	Impact category
Construction Phase			
Habitats	Loss of vegetation	Direct removal of vegetation (with extensive underground root systems that protect against soil erosion) to create space for construction activities	Direct
	Habitat degradation	Improper disposal of construction waste, accidental release of hazardous materials (such as construction slurry, paint, and/or solvents), increase in dust, noise, and light levels, changes in forest hydrology	Indirect
	Change in species composition	Formation of forest edge habitats that favour the growth of certain exotic plants and fauna, and accidental introduction of exotic species from construction materials (such as soil with seeds or bio-degradable erosion blankets with insect eggs)	Indirect
Faunal species	Loss of/reduction in habitats and food sources	Direct removal of vegetation to create space for construction activities	Direct
	Injury or mortality	Collisions with machineries, entrapments in construction materials (such as non-biodegradable erosion control blankets) and structures (such as exposed pits or drains), and accidental kills by construction personnel	Direct
	Loss of ecological connectivity for faunal movement	Habitat fragmentation from the removal of vegetation	Indirect
	Light disturbances	Increase in light levels from construction activities	Indirect
	Vibration disturbances	Increase in vibration levels from construction activities	Indirect
	Noise disturbances	Increase in noise levels from the construction activities	Indirect
	Human presence	Increase in human traffic flow, such as workers and site personnel	Indirect
Operation Phase			
Habitats	Habitat degradation	Improper disposal of waste, accidental release of hazardous materials (such as agriculture biohazards), increase in dust, noise, and light levels, changes in forest hydrology	Indirect
	Change in species composition	Long-term changes in light, temperature, and humidity in habitats surrounding facility structures which favour the growth	Indirect

Receptor	Impact type	Description	Impact category
		of certain exotic plants and fauna, and accidental introduction of exotic species due to agricultural activities	
Faunal species	Injury or mortality	Navigation failures and entrapment in facility structures; collision with buildings (birds only) and vehicles; undesirable consequences of human-wildlife conflict	Direct
	Loss of ecological connectivity for faunal movement	Habitat fragmentation from the removal of vegetation	Indirect
	Light disturbances	Increase in light levels from the development	Indirect
	Noise disturbances	Increase in noise levels from the development	Indirect
	Human presence	Increase in human traffic flow, such as workers and site personnel	Indirect

3.2.4 Minimum Control for Potential Biodiversity Impacts

This section lists biodiversity-specific minimum controls commonly implemented in Singapore for similar construction activities. These are assumed to be implemented for the purpose of the impact assessment. Minimum controls for each potential impact occurring from the construction phases are listed in **Table 14** respectively.

Table 14: Description of minimum controls implemented at each phase

Phase	Minimum Controls
Construction Phase	■ Prior to vegetation removal, pre-felling fauna inspection should be conducted by an ecologist to identify wildlife or nesting features that are actively used. Examples are bird nests, tree hollows and burrows. ■ Execute wildlife response plan whenever necessary. ■ Implement soil erosion control measures. ■ Situate machineries and materials that may leech harmful chemicals away from waterbodies or sensitive habitats (unlined earth drain and ponds). ■ Ensure there are no night works (1800h to 0800h). ■ Ensure dust levels are within approved limits by the National Environment Agency (NEA). ■ Ensure noise levels are within approved limits by NEA by: ▪ Installing noise barriers for any equipment with noise level higher than 85 dbA ▪ Situating noisy equipment away from habitats of high conservation value as much as practicable ■ Ensure vibration levels are within approved limits by Building and Construction Authority (BCA). ■ Avoid fogging by removing sources of stagnant water or water-bearing receptacles to prevent mosquitoes for breeding, e.g., ▪ Providing well-maintained pitched roof, clearing discarded items daily, store materials appropriately, levelling up ground depression/uneven surfaces and ensuring effective drainage flow. ▪ Conducting daily checks by Project Manager on site, e.g., Contractor Project Manager, Resident Superintending Staff.
Operational Phase	■ Ensure dust levels are within approved limits by NEA. ■ Ensure noise levels are within approved limits by NEA. ■ Ensure vibration levels are within approved limits by BCA.

Phase	Minimum Controls
	■ Avoid fogging by implementing preventive measures for mosquito to remove sources of stagnant water or water-bearing receptacles, e.g., ▪ Providing well-maintained pitched roof, clearing discarded items daily, store materials appropriately, levelling up ground depression/uneven surfaces and ensuring effective drainage flow.

3.2.5 Prediction and Evaluation of Biodiversity Impacts

In this section, the identified key ecologically sensitive receptors were evaluated based on impact intensity (**Table 9**, **Table 18**) to yield impact consequence (**Table 8**). Impact consequence was then evaluated with likelihood (**Table 17**, **Table 15**) to give impact significance (**Table 7**).

The levels of impact intensity and likelihood for each impact type during construction have been specifically defined for the ecologically sensitive receptors. Some assumptions were made in these definitions.

For the habitat receptors, the two assumptions made in defining the levels of likelihood (**Table 15**) and impact intensity (**Table 16**) are:

1) Habitats within 30 m of the worksites (any hoarded areas for construction activities) are assumed to experience the greatest extent of edge effects (Beacon Environmental Ltd, 2012), though some studies have shown that edge effects can reach up to 150 m (Murcia, 1995). Additionally, 30 m is recommended as the minimum distance required to buffer the conservation area against tree falls, which is a key concern resulting from edge effects.

2) Based on the assumption that all minimum controls (Section 3.2.4) are adequately and properly implemented, the likelihood of habitat degradation, i.e., improper disposal of construction waste, accidental release of hazardous materials such as construction slurry, paint, and/or solvents, increase in dust, noise, and light levels, changes in forest hydrology (**Table 13**) is presumed to be “less likely” for all habitat receptors.

Table 15: Definitions of each level of likelihood for all three impact types during construction for habitat receptors

Level of likelihood	Loss of vegetation	Habitat degradation	Change in species composition
Unlikely/Remote	The habitat does not overlap with the worksites	Not applicable	No formation of forest edges, i.e., construction activities are fully underground and/or in existing built-up areas outside the forest
Less likely/Rare	Not applicable. The habitat will only either overlap or not overlap with the worksites.	Not applicable (refer to assumption 2 above)	Formation of scrubland edges in scrubland areas only

Level of likelihood	Loss of vegetation	Habitat degradation	Change in species composition
Possible/ Occasional	Not applicable. The habitat will only either overlap or not overlap with the worksites.	Not applicable	Formation of some forest and scrubland edges in a mix of managed vegetation, scrubland and forested areas
Likely/Regular	Not applicable. The habitat will only either overlap or not overlap with the worksites.	Not applicable	Formation of new forest edges, i.e., complete clearance within forested areas
Almost certain/ continuous	The habitat does overlap with the worksites.	Not applicable	Not applicable. It is unlikely to have a complete change in species composition.

Table 16: Definitions of each level of impact intensity for all three impact types during construction for habitat receptors

Impact type	Negligible	Low	Medium	High
Loss of vegetation	The habitat does not overlap with the worksites	≤ 10% of the habitat overlaps with the worksites	10–40% of the habitat overlaps with the worksites	≥ 40% of the habitat overlaps with the worksites
Habitat degradation	The habitat does not overlap with areas 30 m from the worksites	≤ 10% of the habitat overlaps with areas 30 m from the worksites	10–40% of the habitat overlaps with areas 30 m from the worksites	≥ 40% of the habitat overlaps with areas 30 m from the worksites
Changes in species composition				

For the faunal receptors, the definitions for likelihood and impact intensity are presented in **Table 17** and **Table 18**, respectively.

Table 17: Definitions of each level of likelihood for impact types during construction and operational phase for faunal species receptors

Likelihood of Occurrence	Definition
Unlikely/Remote	Not expected to occur during construction and/or operation activities
Less likely/Rare	Would less likely or rarely occur during construction and/or operation activities
Possible/Occasional	Would possibly or occasionally occur during construction and/or operation activities

Likelihood of Occurrence	Definition
Likely/Regular	Would likely occur or would occur on a regular basis during construction and/or operation activities
Almost Certain/Continuous	Would be almost certain to occur or would continuously occur during construction and operation activities

Table 18: Definitions of each level of impact intensity for impact types during construction and operational phase for faunal species receptors

Impact type	Negligible	Low	Medium	High
Loss of/reduction in habitats and food sources	No loss of original habitat	– Loss of <10% of original habitat; – Retention of >90% of original habitat	– Loss of 10–40% of original habitat; – Retention of >60% of original habitat	– Loss of >40% of original habitat; – Retention of <60% of original habitat
Injury or mortality	Negligible susceptibility to injury/mortality	Species with low susceptibility to injury/mortality: – Volant species, e.g., odonates, butterflies, birds and bats – Low susceptibility to roadkill	Species that are mobile but possibly susceptible to injury/mortality: – All amphibians – Mammals: squirrels, shrews – Possibly susceptible to roadkill	Species with high susceptibility to collisions with buildings (birds only), vehicles and machinery: – All birds, including migratory species – All reptiles – Mammals: Long- tailed macaque – Has small population size
Loss of ecological connectivity for faunal movement	– Not dependent on connected and forested habitats for dispersal and able to traverse urban infrastructures, i.e., high dispersal ability; – Negligible susceptibility to roadkill	– Slightly dependent on connected and forested habitats for dispersal and adaptable to traverse urban infrastructures if needed; – Low susceptibility to roadkill; – Has small home range	– Dependent on connected and forested habitats for dispersal, i.e., intermediate dispersal ability; – Possibly susceptible to roadkill; – Has moderate home range	– Highly dependent on connected and forested habitats for dispersal, i.e., low dispersal ability; – Susceptible to roadkill; – Has large home range
Light disturbances	Species that are not susceptible to changes in light levels: aquatic species	Species that are slightly susceptible to changes in light levels: odonates, butterflies	Species that are susceptible to changes in light levels: diurnal birds, reptiles and mammals	Species that are highly susceptible to changes in light levels: nocturnal and crepuscular fauna
Human presence	Species that are not sensitive to human presence: commonly observed in urban environments	Species that are slightly sensitive to human presence: sometimes observed in urban environments	Species that are possibly sensitive to human presence: occasionally observed in urban environments	Species that are sensitive to human presence: rarely observed in urban environments

Habitats

Table 19 gives a summary of impact significance for habitat receptors before and after mitigation measures are implemented.

Table 19: Summary of impact significance for habitat receptors before and after mitigation measures

Phase	Habitat receptors	Impact type	Pre-mitigation impact significance	Post-mitigation impact significance
Construction	Kranji Cross	Loss of vegetation	Negligible	Negligible
		Habitat degradation	Minor	Minor
		Changes in species composition	**Moderate**	Minor
	Mangrove	Loss of vegetation	Negligible	Negligible
		Habitat degradation	Negligible	Negligible
		Changes in species composition	Negligible	Negligible
	Exotic-dominated woodland	Loss of vegetation	**Major**	**Major**
		Habitat degradation	Minor	Minor
		Changes in species composition	**Major**	Minor
	Herbaceous and Scrubland Vegetation	Loss of vegetation	**Major**	**Major**
		Habitat degradation	Minor	Minor
		Changes in species composition	Minor	Minor
	Natural Stream	Loss of vegetation	**Major**	Negligible
		Habitat degradation	Minor	Minor
		Changes in species composition	**Moderate**	Minor

Phase	Habitat receptors	Impact type	Pre-mitigation impact significance	Post-mitigation impact significance
	Ponds	Loss of vegetation	**Moderate**	**Moderate**
		Habitat degradation	Negligible	Negligible
		Changes in species composition	Negligible	Negligible
Operational	Kranji Cross	Habitat degradation	Negligible	Negligible
		Changes in species composition	**Moderate**	Minor
	Mangrove	Habitat degradation	Negligible	Negligible
		Changes in species composition	Negligible	Negligible
	Exotic-dominated woodland	Habitat degradation	Negligible	Negligible
		Changes in species composition	**Moderate**	Minor
	Herbaceous and Scrubland Vegetation	Habitat degradation	Negligible	Negligible
		Changes in species composition	**Moderate**	Minor
	Natural Stream	Habitat degradation	Negligible	Negligible
		Changes in species composition	Negligible	Negligible
	Ponds	Habitat degradation	Negligible	Negligible
		Changes in species composition	Minor	Minor

Construction Phase

In the assessment of the three types of impact for the sensitive habitat receptors during the construction phase – (1) loss of vegetation, (2) habitat degradation, and (3) changes in species composition, the impact significance may range from Negligible to Major.

- **Kranji Cross**

  For Kranji Cross, the impact significance for loss of vegetation is Negligible, because it does not overlap with the worksites. The impact significance of habitat degradation is Minor as the likelihood is ranked as Less Likely should minimum controls be adequately and properly implemented. The most severe impact significance for Kranji Cross is Moderate as a result of changes in species composition, which has a likelihood of Possible since some forest and scrubland edges will be formed after site clearance.

- **Mangrove**

  For mangrove, the impact significance for loss of vegetation, habitat degradation and changes in species composition are Negligible, because the habitat does not overlap with the worksites, nor with areas 30 m from the worksites. However, extra caution should still be taken to prevent habitat degradation of the mangrove. It is also important to ensure that the change in sediment load due to the discharge of the Project is limited to 10% as reported in the Sediment Load Study (Golder, 2021). Increase in sediment load can result in high sediment accumulation that smothers the roots of the mangrove trees which leads to their death (Nardin, 2021). Based on current Project area conditions, if guidelines for ECM are not adhered to stringently, there is a likelihood of leakage of construction effluent into the mangrove. Considering the sensitivity of mangrove to pollution due to its unique environmental conditions, if constructure discharge were to leak into the mangrove under unintended circumstances, the habitat quality would be adversely affected by pollution. Reversing the impacts of pollution to restore the quality of the mangrove would be both difficult and costly. Therefore, to minimise habitat degradation of the mangrove, monitoring measures to ensure the robustness of ECM and to detect any pollutive leakage from the worksites are highly recommended.

- **Exotic-dominated woodland**

  For exotic-dominated woodland, the impact significance for loss of vegetation is Major, because more than 40% of the habitat overlaps with the worksites. The impact significance of habitat degradation is Minor as the likelihood is ranked as Less Likely should minimum controls be adequately and properly implemented. The most severe impact significance for exotic-dominated woodland is Major as a result of changes in species composition, which has a likelihood of Likely since new forest edges will be formed after site clearance.

- **Herbaceous and Scrubland Vegetation**

  For herbaceous and scrubland vegetation, the impact significance for loss of vegetation is Major, because more than 40% of the habitat overlaps with the worksites. The impact significance of habitat degradation is Minor as the likelihood is ranked as Less Likely should minimum controls be adequately and properly implemented. The impact significance of changes in species composition is Minor as herbaceous and scrubland vegetation are Less Likely to be affected from microclimatic changes as a result of edge effects.

- **Unlined earth drain**

  For unlined earth drain, the impact significance for loss of vegetation is Major and changes in species composition is Moderate due to the trapezoidal drain which is planned to cut through the unlined earth

drain. This will result in the destruction of the unlined earth drain habitat and creation of forest edges, which would change the species composition around and in the unlined earth drain.

The impact significance of habitat degradation is Minor as the likelihood is ranked as Less Likely should minimum controls be adequately and properly implemented. However, extra caution should still be taken to prevent habitat degradation of the unlined earth drain. Based on current Project area conditions, if guidelines for ECM are not adhered to stringently, there is a likelihood of leakage of construction effluent into the unlined earth drain. Similar to mangrove, if construction discharge were to leak into the unlined earth drain under unintended circumstances, the habitat quality would be adversely affected by pollution. Reversing the impacts of water pollution to restore the quality of the unlined earth drain would be both difficult and costly. Therefore, to minimise habitat degradation of the unlined earth drain, monitoring measures to ensure the robustness of ECM and to detect any pollutive leakage from the worksites are highly recommended.

- **Ponds**

  For ponds, the impact significance for loss of vegetation is Moderate, because more than 40% of the habitat overlaps with the worksites. In particular, Pond 3, which occupies approximately 64% of the pond habitat type, has already been cleared. The impact significance of habitat degradation is Minor as the likelihood is ranked as Less Likely should minimum controls be adequately and properly implemented. The impact significance of changes in species composition is also Negligible because no forest edges will be formed.

Operational Phase

During the operational phase, most of the exotic-dominated woodland and herbaceous and scrubland vegetation would have been cleared. Therefore, the two types of impacts – (1) habitat degradation and (2) changes in species composition, were assessed for the remaining habitats outside of worksites designated in the Project area, based on the activities happening in the operational phase. The impact significance may range from negligible to moderate.

Moderate impacts are expected for changes in species composition across all habitat types except for the mangrove, unlined earth drain and pond. This is because of the proximity of the other habitat types to the facility structures, which will result in exposure to long-term changes in light, temperature, and humidity, favouring growth of certain exotic plants and fauna. **Minor** impacts are expected for changes in species composition for pond. Assuming all minimum controls are adhered to, negligible impacts are expected for habitat degradation across all habitat types. The detailed evaluation of all impacts for each habitat is provided in **Appendix F**.

Fauna

Table 20 gives a summary of impact significance for habitat receptors before and after mitigation measures are implemented.

Table 20: Summary of impact significance for fauna receptors before and after mitigation measures

Phase	Fauna receptors	Impact type	Pre-mitigation impact significance	Post-mitigation impact significance
Construction	Bird	Human presence	Negligible to **Major**	Negligible to **Major**
		Injury or mortality	Negligible to **Moderate**	Negligible to Minor
		Light disturbances	Negligible	Negligible
		Loss of ecological connectivity for faunal movement	Negligible to **Major**	Negligible to **Major**
		Loss of/ reduction in habitats and food sources	Negligible to **Major**	Negligible to **Major**
	Butterfly	Human presence	**Moderate**	**Moderate**
		Injury or mortality	Negligible	Negligible
		Light disturbances	Negligible	Negligible
		Loss of ecological connectivity for faunal movement	**Major**	**Major**
		Loss of/ reduction in habitats and food sources	**Major**	**Major**
	Mammal	Human presence	Negligible to **Major**	Negligible to **Major**
		Injury or mortality	Negligible to **Moderate**	Negligible to Minor
		Light disturbances	Negligible	Negligible
		Loss of ecological connectivity for faunal movement	Negligible to **Major**	Negligible to **Major**
		Loss of/ reduction in habitats and food sources	Negligible to **Major**	Negligible to **Major**
	Reptile	Human presence	**Moderate**	Minor

Phase	Fauna receptors	Impact type	Pre-mitigation impact significance	Post-mitigation impact significance
		Injury or mortality	**Moderate**	Minor
		Light disturbances	Negligible	Negligible
		Loss of ecological connectivity for faunal movement	**Major**	**Major**
		Loss of/ reduction in habitats and food sources	Negligible to **Major**	Negligible to **Major**
Operational	Bird	Human presence	Minor to **Major**	Minor to **Moderate**
		Injury or mortality	**Moderate**	Minor
		Light disturbances	**Moderate** to **Major**	**Moderate**
		Loss of ecological connectivity for faunal movement	Minor	Minor
	Butterfly	Human presence	Minor	Minor
		Injury or mortality	**Moderate**	Minor
		Light disturbances	Minor	Minor
		Loss of ecological connectivity for faunal movement	Negligible	Negligible
	Mammal	Human presence	Minor to **Major**	Minor to **Moderate**
		Injury or mortality	**Moderate**	Minor
		Light disturbances	**Moderate** to **Major**	**Moderate**
		Loss of ecological connectivity for faunal movement	Minor	Minor
	Reptile	Human presence	**Major**	**Moderate**
		Injury or mortality	**Moderate**	Minor

Phase	Fauna receptors	Impact type	Pre-mitigation impact significance	Post-mitigation impact significance
		Light disturbances	**Major**	**Moderate**
		Loss of ecological connectivity for faunal movement	Minor	Minor

Construction Phase

- **Butterflies**

Out of the recorded species, two butterfly species of conservation significance were recorded: the Formosan swift (*Borbo cinnara*) and the Ancyra blue (*Catopyrops Ancyra*) (**Appendix C**). For both the Formosan swift and Ancyra blue, the impact significance of injury and mortality and light disturbances is Negligible. These butterflies are unlikely to be killed or injured by the operation of machinery and are not likely to be affected by the sound of construction from the project. Minimum controls for construction work also means that there should not be any night work, so these butterflies should not be affected by light at night. The impact significance of human disturbances is Moderate. The impact significance of loss and reduction of habitat and food sources and loss of ecological connectivity is Major. The removal of open habitats where the host plant of the Formosan swift, grasses from the Poaceae family, are present would reduce their source of food. The removal of forests, on which the Ancyra blue is dependant, would also lead to the removal of food and suitable habitat for that butterfly species. The removal of the habitats of both butterflies would also lead to greater difficulty in dispersal since they rely on connected habitats to disperse.

One other species of conservation significance that was expected but was not recorded during the field assessment, the Bengal swift (*Pelopidas agna agna*) (**Appendix C – List of Probable and Recorded Faunal Species**), had similar impact significance for all impact types.

- **Reptiles**

Three reptiles of conservation significance were recorded during the field assessment. These are the Asian softshell turtle (*Amyda cartilaginea*) and Malayan box terrapin (*Cuora amboinensis*) (**Appendix C**). For both species, the impact significance of light disturbances is Negligible. Minimum controls indicate that night works should not be carried out. For the Asian softshell turtle, the impact significance of loss and reduction of habitat and food is Negligible. The current worksite does not include the waterbodies in the Project area, so it is unlikely that more habitat or food sources would be lost. However, for the Malayan box terrapin, the impact significance of loss and reduction of habitat and food is Minor. The Malayan box terrapin was recorded further away from a waterbody, within a patch of scrubland in the Project area. Hence, there is a chance that this species does make use of other habitats and thus might be more likely to be affected by the clearing of habitats other than waterbodies. Injury and mortality and human disturbances is Moderate for both species. For both species, loss of ecological connectivity has an impact significance of Major because both species have low dispersal ability, relying largely on connected forest patches with existing waterbodies to disperse successfully.

One other species of conservation significance that was expected but was not recorded during the field assessment was the common Malayan racer (*Coelognathus flavolineatus*) (**Appendix C – List of Probable and Recorded Faunal Species**). The impact significance of light disturbances is Negligible. Minimum controls indicate that night works should not be carried out. The impact significance of human disturbances is Moderate as this species is not known to be common in urban environments. The impact significance of injury or mortality is Moderate while the impact significances of loss and reduction of habitat and food sources and loss of ecological connectivity are Major. The removal of forested areas in the project boundary is likely to reduce the available habitats for their prey species and thus reduce their source of food. Like the turtle species, this snake has low dispersal ability, relying largely on connected forest patches to disperse successfully.

- **Birds**

A total of 10 species of birds of conservation significance and one species of interest were recorded during the field assessment (**Appendix C**). Another 14 species of conservation significance were expected in the Project area but were not recorded (**Appendix C – List of Probable and Recorded Faunal Species**). These 14 species were all determined to have similar impact types as the species that were recorded due to similarities in habitat preferences and behaviours and would thus not be additionally evaluated. For all bird species, the impact significance of light disturbances is Negligible.

For the grey heron and purple heron, the impact significance of loss and reduction of habitat and food sources, injury or mortality, loss of ecological connectivity and human disturbances is Negligible because these bird species were recorded in the mangroves. They make use of waterbodies that would not be cleared or affected by the Project.

For the black-crowned night heron, the impact significance of loss and reduction of habitats and food sources and injury and mortality is Negligible. The waterbodies that remain in the Project area which this species uses for its source of food is unlikely to be affected by the construction in the Project area. The impact significance of loss of ecological connectivity and human disturbances is Moderate. The field assessment recorded the black-crowned night heron closer to Pond 2, suggesting that it makes use of Kranji Cross. Construction in the Project area might possibly affect the movement and connectivity for this species.

For the Oriental magpie robin, the impact significance of injury or mortality is Minor. This species is highly volant and is likely to be able to avoid entrapment and suffer injury or mortality within the project. The impact significance of human disturbances and loss of ecological connectivity is Moderate since the species is highly volant and sometimes observed in areas that are more urbanised, showing they are able to adapt to human disturbance and human presence. The impact significance of loss and reduction of habitat and food sources is Major. The clearing of forested areas in the Project area will likely reduce the available habitat for this species, reducing food sources and fragment forested patches that the species uses to move around.

For the red junglefowl, the impact significance of injury or mortality is Minor. This species is highly volant and is likely to be able to avoid entrapment and suffer injury or mortality within the Project area. The impact significance of human disturbances is Minor since the species is often observed in areas that are more urbanised, showing they are able to adapt to human disturbance and human presence. The impact significance of loss of ecological connectivity Moderate since they are able to make use of a variety of habitats for connectivity. The impact significance of loss and reduction of habitat and food sources is Major. The clearing of forested areas in the Project area will likely reduce the available habitat for this species, reducing food sources.

For the blue-crowned hanging parrot, the impact significance of injury or mortality and loss of ecological connectivity is Minor because these species are volant and are able to move away easily to other nearby similar habitats. The impact significance of human disturbances is Moderate. They have been observed in more urban environments, indicating they have a tolerance for the presence of humans. The impact significance of loss and reduction of habitat and food sources is Major. The clearing of forested areas in the Project area will likely reduce the available habitat for this species, reducing food sources.

For the long-tailed parakeet, the impact significance of injury or mortality and loss of ecological connectivity is Minor. This species is highly volant and can move away easily to other nearby similar habitats. The impact significance of human disturbances is Minor since they have also been observed in more urban environments, indicating they have a tolerance for the presence of humans. The impact significance of loss and reduction of habitat and food sources is Moderate. The clearing of forested areas in the Project

area will likely reduce the available habitat for this species, reducing food sources, although they will be able to make use of other similar habitats for food sources.

For the straw-headed bulbul, the impact significance of injury or mortality is Moderate while the impact significance of loss and reduction of habitats and food sources, loss of ecological connectivity and human disturbances is Major. The clearing of forested areas in the Project area will likely reduce the available habitat for this species, reducing food sources and fragment forested patches that the species uses to move around. The low dispersal ability and reliance on connected forest patches also means that this species is likely to suffer injury and mortality through the clearing of forests in the Project area. The species is also not tolerant of human disturbance and is not found in urban environments.

For the red-legged crake, the impact significance of injury or mortality is Moderate while the impact significance of loss and reduction of habitats and food sources, loss of ecological connectivity and human disturbances is Major. The clearing of forested areas in the Project area will likely reduce the available habitat for this species, reducing food sources and fragment forested patches that the species uses to move around. The low dispersal ability and reliance on connected forest patches also means that this species is likely to suffer injury and mortality through the clearing of forests in the Project area. The species is also not tolerant of human disturbance and is not found in urban environments.

For the changeable hawk-eagle, the impact significance for injury and mortality and loss of ecological connectivity is Negligible. Compared to the nesting individuals, non-nesting individuals are likely to be more volant and is thus unlikely to be trapped and injured due to the construction in the Project area. The impact significance of loss of habitat and food sources and human disturbances are Major. The removal of forested areas in the project boundary is likely to reduce the available habitats for their prey species and thus reduce their source of food. The impact intensity of human disturbances is Medium since these birds can sometimes be found in suburban areas, although the impact of human disturbances is almost likely.

The nests of a changeable hawk-eagle and a white-bellied sea eagle (*Haliaeetus leucogaster*; globally least concern) were also identified within the Project area, on two separate albizias (*Falcataria moluccana*), although the trees are outside the Project area boundary. For the nests of both species, the impact significance of injury or mortality is Moderate while the impact significance of loss or reduction of habitat and food, loss of ecological connectivity and human disturbances is Major. While the white-bellied sea eagle is not globally or locally threatened, the nest of this species is considered to be of notable significance as the species is known to reuse their nesting sites (Ferguson-Lees & Christie, 2001). Their use of the habitat in this manner adds to the value of the habitat within the Project area. The presence of these nests indicate that these birds will continue returning to the area as long as their offspring are in the nests. The abandonment of the nest within the Project area is almost certain to result in the loss of all potential offspring from that nest. Due to the presence of nests, these individuals are also unlikely to be as volant and are thus more likely to be injured.

- **Non-volant Mammals**

One mammal species of conservation significance, the smooth-coated otter (*Lutrogale perspicillata*), and one species of interest, the Eurasian wild boar (*Sus scrofa*), were recorded during the field assessment (**Appendix C**). For the smooth-coated otter, the impact significance of loss and reduction of habitat and food sources, injury and mortality, loss of ecological connectivity, light disturbances and human disturbances is Negligible. This species was recorded at the southwestern tip of the Project area and likely make use of Sungei Pang Sua for their habitats and food source. The project are does not overlap with their habitat and is thus unlikely to cause any loss in habitat, food source, injury, mortality or loss of ecological connectivity. Noise, light and human disturbance occurring within the Project area is also

unlikely to affect the otters that make use of Sungei Pang Sua. As for the Eurasian wild boar, the impact significance of the loss and reduction of habitat and food sources, injury and mortality and loss of ecological connectivity is Moderate. This species was recorded throughout the Project area, such that any loss of habitats will affect them. Moreover, they are ground-dwelling species dependent on vegetation for effective ecological connectivity. They are also prone to human-wildlife conflicts as they frequently dwell at forest edges which are used by humans.

Two other mammal species of conversation significance, Sunda pangolin (*Manis javanica*; nationally critically endangered) and long-tailed macaque (*Macaca fascicularis*; globally vulnerable), were not recorded during the field assessment (**Appendix C – List of Probable and Recorded Faunal Species**). These species, however, are identified to be likely present at the Project area. For both species, the impact significance of light disturbances is Negligible since the minimum control means no construction work will take place at night. For the Sunda pangolin, the impact significance for injury or mortality is Moderate while the impact significance of loss and reduction of habitat and food sources, loss of ecological connectivity and human disturbances is Major. The habitat in which they might potentially occur directly overlaps with the Project area and the Project is likely to cause entrapment, injury, mortality should they be found within the Project area. The clearing of forested area in the Project area also reduces the available habitat for this species, reducing food sources and fragmented forested patches that the species uses to move around. The low dispersal ability and reliance on connected forest patches also means that this species is likely to suffer injury and mortality through the clearing of forests in the Project area. The species is also not tolerant of human disturbance and is not found in urban environments. For the long-tailed macaque, the impact significance of human disturbances is Negligible. This species is commonly found in areas with high human presence. The impact significance of loss of ecological connectivity is Minor since this species can make use of a variety of habitats for dispersal and sometimes uses the ground for movement and foraging. The impact significance of loss and reduction of habitats and food sources is Moderate since they have a varied diet from a mix of habitats. The impact significance of injury and mortality is Moderate as they can be at risk of roadkill.

Operational Phase

- **Butterflies**

  The impact significance for all impacts assessed in the operational phase for Formosan swift (*Borbo cinnara*), Ancyra blue (*Catopyrops Ancyra*) and Bengal swift (*Pelopidas agna agna*) are Negligible or Minor with the exception of injury or mortality (**Appendix F**). The impact significance of injury or mortality is **Moderate**. In the operational phase, the usage of large amounts of pesticides for agricultural purposes can have a spill over effect in the natural areas resulting in the death of these butterflies and their larvae.

- **Reptiles**

  Amongst the impact assessed for the two species of conservation significance recorded in the Project area, the Asian softshell turtle (*Amyda cartilaginea*; nationally endangered) and Malayan box terrapin (*Cuora amboinensis*; globally vulnerable), the impact significance for injury or mortality is Moderate while the impact significance for light and human disturbances are major. With infrastructures like road in place within the Project area, these two species are vulnerable to road kills. Moreover, being nocturnal and elusive species, they are likely to be impacted by activities carried out within the built facilities. Another probable species but not recorded during the field assessment was the common Malayan racer (*Coelognathus flavolineatus*) (**Appendix C – List of Probable and Recorded Faunal Species**). This species shares similar impact significance with the other two reptiles due to similar reasonings.

- **Birds**

All ten species of birds with threatened statuses and the two raptors' nests recorded in the Project area were assessed. Another 14 species of conservation significance were expected in the Project area but were not recorded (**Appendix C – List of Probable and Recorded Faunal Species**). These 14 species were all determined to have similar impact types as the species that were recorded due to similarities in habitat preferences and behaviours and would thus not be additionally evaluated.

All the recorded birds have been given Moderate impact significance for injury or mortality. The ground dwelling species (red junglefowl and red-legged crake) are prone to roadkill risk, while the arboreal birds also are prone to bird strikes with the buildings in the built facilities. Bird strikes are common in Singapore, especially in areas where buildings are designed with glass surfaces, as the birds fail to perceive glass as a barrier due to the reflection on the glass surfaces. The nests were also given Moderate impact significance for injury or mortality as the activities in the built facility might result in abandonment of nest and thus, death of the chicks. The impact significance for light disturbances is Major for the black-crowned night heron and red-legged crake, as they are nocturnal species. The impact significance for light disturbances is Moderate for the rest of the bird species and nests. The impact significance for human disturbances is Major for black-crowned night heron and red-legged crake as they are typically shy and elusive. The impact significance for human disturbances is Minor for the red junglefowl as they have been frequency recorded in the vicinity of human activities and the impact significance for human disturbances is Moderate for the rest of the birds and nest.

- **Non-volant Mammals**

  Four species of non-volant mammals were considered for the impact assessment for the operational phase: the smooth-coated otter (*Lutrogale perspicillata*; nationally critically endangered), Sunda pangolin (*Manis javanica*; nationally critically endangered) and long-tailed macaque (*Macaca fascicularis*; globally vulnerable) and Eurasian wild boar (*Sus scrofa*; nationally not assessed). The impact significance of injury or mortality for all four species is Moderate as all four species are vulnerable to road kills. The long-tailed macaque and the Eurasian wild boar are likely to be involved in human-wildlife conflicts as they are forest-edge dwelling species that have learned to be habituated to human behaviours. Thus, even though the long-tailed macaques were not recorded during the field assessment but a probable species (**Appendix C – List of Probable and Recorded Faunal Species**), they were deemed to have the same impact significance as the other three recorded species. The impact significance of light disturbance to the smooth-coated otter, the Eurasian wild boar and the long-tailed macaque is Moderate while the impact significance of light disturbance to the Sunda pangolin is Major as it is a nocturnal species. Lastly, the impact significance of human disturbances to the Sunda pangolin is Major as they are shy and elusive unlike the other two species which have been regularly spotted in vicinity of human disturbances.

4.0 RECOMMENDATION OF MITIGATION MEASURES

The implementation of minimum controls is insufficient to alleviate some significant environmental construction impacts (Moderate to Major impacts) of the Project. Project-specific mitigation measures are proposed for each phase of the Project – design, construction and operation. For instance, as the impact of habitat lost is Major and cannot be avoided if development is to proceed, the impact remains as Major and mitigation measures are recommended to be carried out for the design phase of the project. These mitigation measures should focus on protecting and enhancing the remaining habitats and minimizing the impacts on wildlife as deliberate process to achieve compensation of the lost greenery.

Mitigation measures are proposed in accordance with the following principles and mitigation hierarchy as reflected in **Figure 31**.

- **Elimination/ Avoidance –** Where changes to the Project design and construction methodology can be made to eliminate or avoid an impact. If a full elimination is not possible, the next level of mitigation is to minimize the identified impact;
- **Minimisation (Substitution) –** Where changes to the Project design and construction methodology cannot affect impact elimination or avoidance, use of alternative construction methodology or any enhancement measures can be adopted to minimize identified impacts. For example, use of silent piling instead of bore or sheet piling where practical, pipejacking instead of tunnel boring, etc.;
- **Minimisation (Engineering controls) –** Where changes to the Project design and construction cannot affect impact avoidance and impact minimization via substitution, engineering controls can be adopted to further reduce identified impacts (and possibly an enhancement measure). For example, use of noise barriers to reduce noise, application of silt curtains to curb silt flow into drains, etc.;
- **Minimisation (Administrative controls) –** Where applicable, enhanced mitigation can be achieved by applying administrative controls on top of engineering controls. These controls do not remove environmental hazards, but limit or prevent receptor's exposure to hazards;
- **Remedy/ Repair/ Restore –** Where residual impacts need to be further reduced, measures should be taken to remedy/ restore/ repair the situation after the impact. For example, replanting of trees and shrubs in appropriate locations on the impacted site to restore part of the habitat after construction; and
- **Compensation/ Offset –** Where possible, measures should be taken to compensate/ offset the impacts in a different part of the development, wherever technically and financially feasible.

The above mitigation approach is in line with the NParks BIA 2020 Guidelines (NParks, 2020) and the Hong Kong Environmental Impact Assessment (EIA) Ordinance Annex 16 (2019).

Mitigation measures stated here should be enforced if applicable. Most of the mitigation measures stated have overlapping and cascading effects on other impacts. Therefore, the relevant mitigation measures proposed should be implemented as good practice even if the impacts were evaluated as insignificant (i.e., Negligible or Minor). The following recommended mitigation measures are for the design, construction, and operation phases.

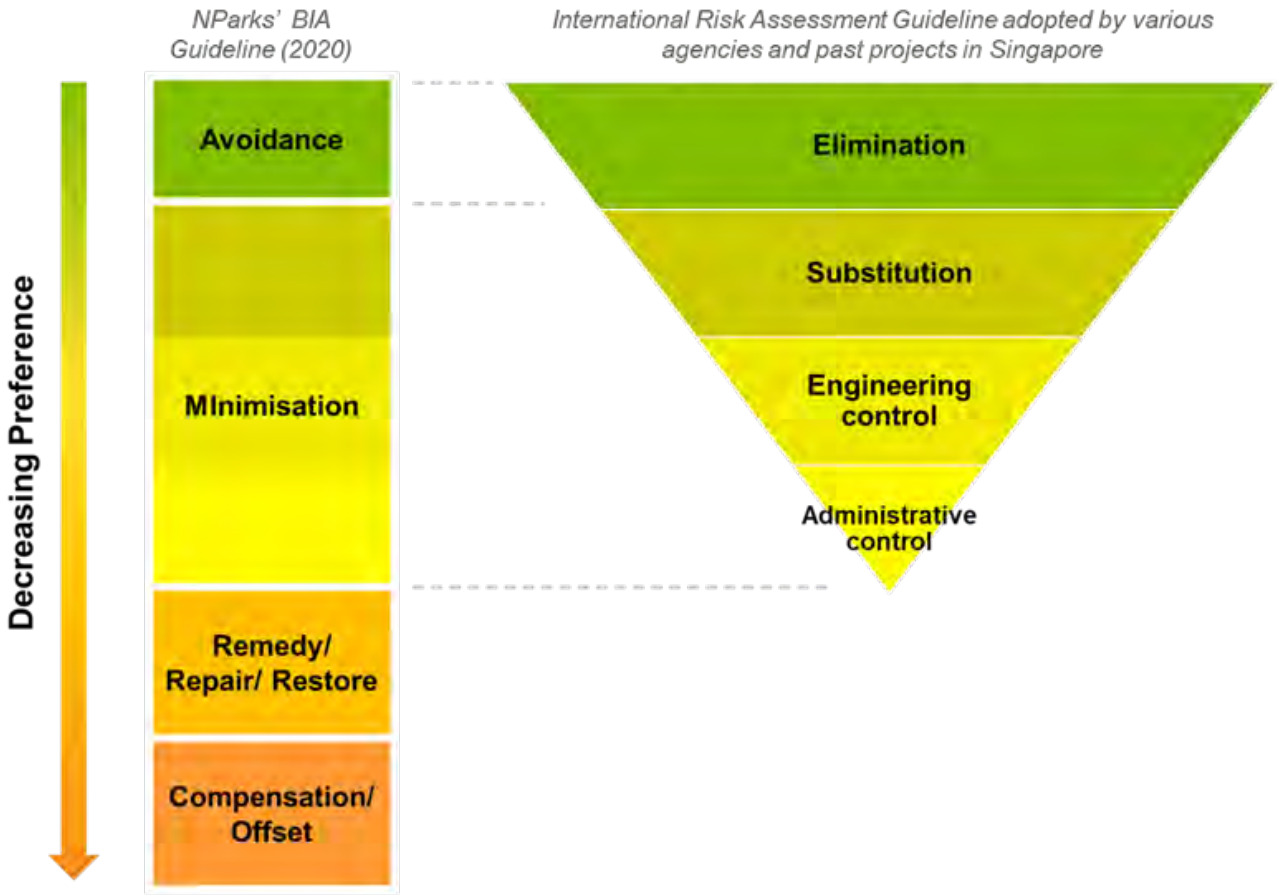

Figure 31: Mitigation hierarchy

While all mitigation measures recommended below serve to enhance the biodiversity to the site, some may achieve a larger positive impact on the development, or are key to ensuring certain objectives are met (e.g. preventing human-wildlife conflicts). **Table 21** provides a summary of recommended mitigation strategies.

Table 21: Summary of mitigation strategies

Phase	Habitats	Fauna
Design	Elimination/ Avoidance ■ Retention of buffer zones for areas of high conservation value considering existing and future plans for the Project area ■ Remedy/Repair/ Restore ■ Infill planting with a graded canopy line to protect forest edges ■ Compensation/ Offset ■ Enhancement of ecological connectivity to surrounding green areas ■ Creation of aquatic habitat ■ Creation of terrestrial habitat ■ Creation of artificial refugia for pollinators ■ Dual usage of space	Minimisation ■ Artificial light management ■ Bird-friendly buildings ■ Building designs to avoid human-wildlife conflict ■ Interface between uneven levels for vegetated buffer and plots
Construction	Elimination/ Avoidance ■ Ensure there are no works in and disturbances to areas outside of the worksite. ■ Ensure any associated slope stabilisation and grading works will not impact topography, water quality and hydrology of areas outside the worksite. Minimisation (Engineering Controls)	Elimination/ Avoidance ■ Avoid felling remaining trees and clearing remaining vegetation during the peak bird breeding season (March to July). Minimisation (Substitution) ■ Carry out wildlife shepherding via clearing of the remaining vegetation towards the forested refuge area south of the Project area.

Phase	Habitats	Fauna
	■ Engage a Qualified Erosion Control Professional (QECP) to formulate and implement the ECM plans in accordance with the requirements slated by the PUB. ■ Implement dust control measures, such as installing dust screens and water suppression systems. Minimisation (Administrative Controls) ■ Monitor the habitat quality at Kranji Cross. ■ Monitor the water quality in the mangrove. ■ Monitor the water quality and aquatic faunal community in the unlined earth drain. ■ Ensure silt fences or other silt control measures along the site hoarding are installed and properly maintained. ■ Practise due diligence in proper storage and handling of machinery to prevent leaching of oil or harmful materials, such as bentonite slurry, especially into waterbodies.	■ Keep the northern access of Kranji Cross hoarded throughout the duration of the construction. ■ Conduct pre-felling inspections for fauna before felling any remaining trees or removing any remaining vegetation. This should be conducted by an ecologist. ■ Use quieter construction machinery/ equipment whenever possible. Minimisation (Engineering Controls) ■ Adopt road calming measures such as speed bumps to minimise roadkill accidents at the roads around the Project area. ■ Retain ground cover for as long as possible before removal. When ground cover is removed, ECM are to be in place. Use only fully biodegradable erosion control blankets (ECB) that do not contain plastic/nylon meshes. ■ Implement acoustic barriers to reduce noise pollution outside worksites. ■ In situations where night-works are necessary and approved by the relevant authorities, it is essential to adopt the following framework: ■ Install lighting only where/when necessary. ■ Limit the duration of lighting. ■ Reduce the trespass of lighting by using minimal number of luminaires.

Phase	Habitats	Fauna
		■ Use warm colour temperature light sources, preferably at less than 2,700 K. ■ Minimise noise levels at night. Minimisation (Administrative Controls) ■ Execute the Wildlife Response Plan if any fauna is found on-site. ■ Conduct biodiversity awareness training for site personnel. ■ Restrict site personnel access to areas of high conservation value and buffer areas. ■ Monitor the nests of the changeable hawk-eagle (*N. cirrhatus*) and white-bellied sea eagle (*Haliaeetus leucogaster*) that are adjacent to the worksite on a monthly basis to ensure that they are not affected/disturbed by works on-site. ■ Conduct monthly surveys for straw-headed bulbuls (*P. zeylanicus*) to determine its persistence in adjacent habitats, identify important feeding or breeding grounds if any, and recommend mitigation measures where necessary (e.g., avoidance of noisy works in the vicinity of a nesting site). ■ Conduct monthly ecologist site inspections to ensure contractor compliance and to identify potential fauna entrapments. ■ The Project Owner should consider carrying out a full EIA to quantify the impacts of light, airborne noise, ground-borne

Phase	Habitats	Fauna
		vibration, and air quality on ecological receptors, so as to better inform the mitigation measures required to alleviate them.
Operational	Minimisation ■ Pesticides are only used at targeted areas and avoid spraying them outdoors to limit the unintended negative impact on habitats. ■ Where feasible, use alternative pest control strategies and avoid the use of pesticides to allow insect diversity to thrive.	Minimisation ■ Activate adaptive features for preventing bird-building collisions such as exterior shades in a timely manner during the peak migratory season (September to February). ■ Adopt an adaptive wildlife management strategy such as restricting access to areas with frequent human-wildlife conflict and putting up additional educational signages where necessary. ■ Establish a wildlife response plan in consultation with NParks Animal Management Centre for encounters with trapped, injured or dead wildlife, as well as incidents of human-wildlife conflict.

4.1 Design Phase

Table 22 lists a summary of the design strategies for biodiversity.

Table 22: Summary of design strategies for biodiversity

Habitats			**Fauna**
Protect Protect and enhance existing habitats	**Amplify** Restore ecological connections	**Create** Create habitats	**Thrive** Live harmoniously with nature
Elimination/ Avoidance ■ Retention of buffer zones for areas of high conservation value considering existing and future plans for the Project area Remedy/Repair/ Restore ■ Infill planting with a graded canopy line to protect forest edges	Compensation/ Offset ■ Enhancement of ecological connectivity to surrounding green areas	Compensation/ Offset ■ Creation of aquatic habitats ■ Creation of terrestrial habitats ■ Creation of artificial refugia for pollinators ■ Dual usage of space	Minimisation ■ Artificial light management ■ Bird-friendly buildings ■ Building designs to avoid human-wildlife conflict

4.1.1 Habitats

Protect (Elimination/ Avoidance) – Buffer Zone

Habitats of high conservation value have been identified within the Project area (**Figure 32**). These habitats include the mangrove, unlined earth drain and Kranji Cross. These areas should be retained, together with a buffer zone of at least 30-m wide (**Figure 33**), throughout the development. For mangroves along Sungei Pang Sua, the 30-m buffer should be calculated from the drainage reserve line for Sungei Pang Sua. Considering the 30-m buffer along Sungei Pang Sua for the future NParks' Linear Park as well as the no earth cut zones safeguarded along Kranji Cross set aside by JTC in this development, sufficient buffer areas from Kranji Cross and the mangroves are provided as per recommended in Section 0 (**Figure 32**). The only exception is the eastern patch cleared area which have been accidentally cleared past the no earth cut zone, resulting in a 0.14ha area which should have been left untouched as areas of high conservation value. Infill planting will be implemented to ensure a seamless buffer in that area. To safeguard the areas of high conservation value around the unlined earth drain, plans have been proposed to avoid constructing of the trapezoidal drain over the unlined earth drain (**Figure 37**).

Habitat loss due to the development can expose habitats of high conservation value to detrimental effects arising from edge effects if not managed properly. New forest edges that are exposed to increased light and sound will result in colonization of exotic species, resulting in undesirable changes of species composition. Fauna that are sensitive will retreat further into the forest, leaving edge specialists to dominate the landscape.

Thus, in the proposal of a 30-m buffer, the following factors were considered:

- While edge effects of vegetation have been documented up to 150 m (Murcia, 1995), 30 m is regarded as the minimum distance required to buffer the conservation area against tree falls, which is a key concern resulting from edge effects, since the tree height ranges up to 30 m. It also helps to protect the conservation area from other associated edge effects, such as changes in microclimatic conditions;
- Literature suggests 30 m buffers to be most effective in maintaining the water quality of waterbodies (Beacon Environmental Ltd, 2012; Dillaha et al.,1986; Environmental Law Institute 2003; Wenger 1999) as they allow for more consistent and complete attenuation of nutrients and sediments; and,
- Maintaining a distance away from work activities minimizes physical spillage, damage and disturbances to the habitat to be conserved.

In addition to the areas of high conservation value and its buffer areas, the trees with active raptors' nest and its surrounding 30-m vegetation should also be retained during the construction and should only be removed when the nests have been observed to be abandoned by the raptors. These areas have been highlighted as raptors' nest buffer area in **Figure 30**.

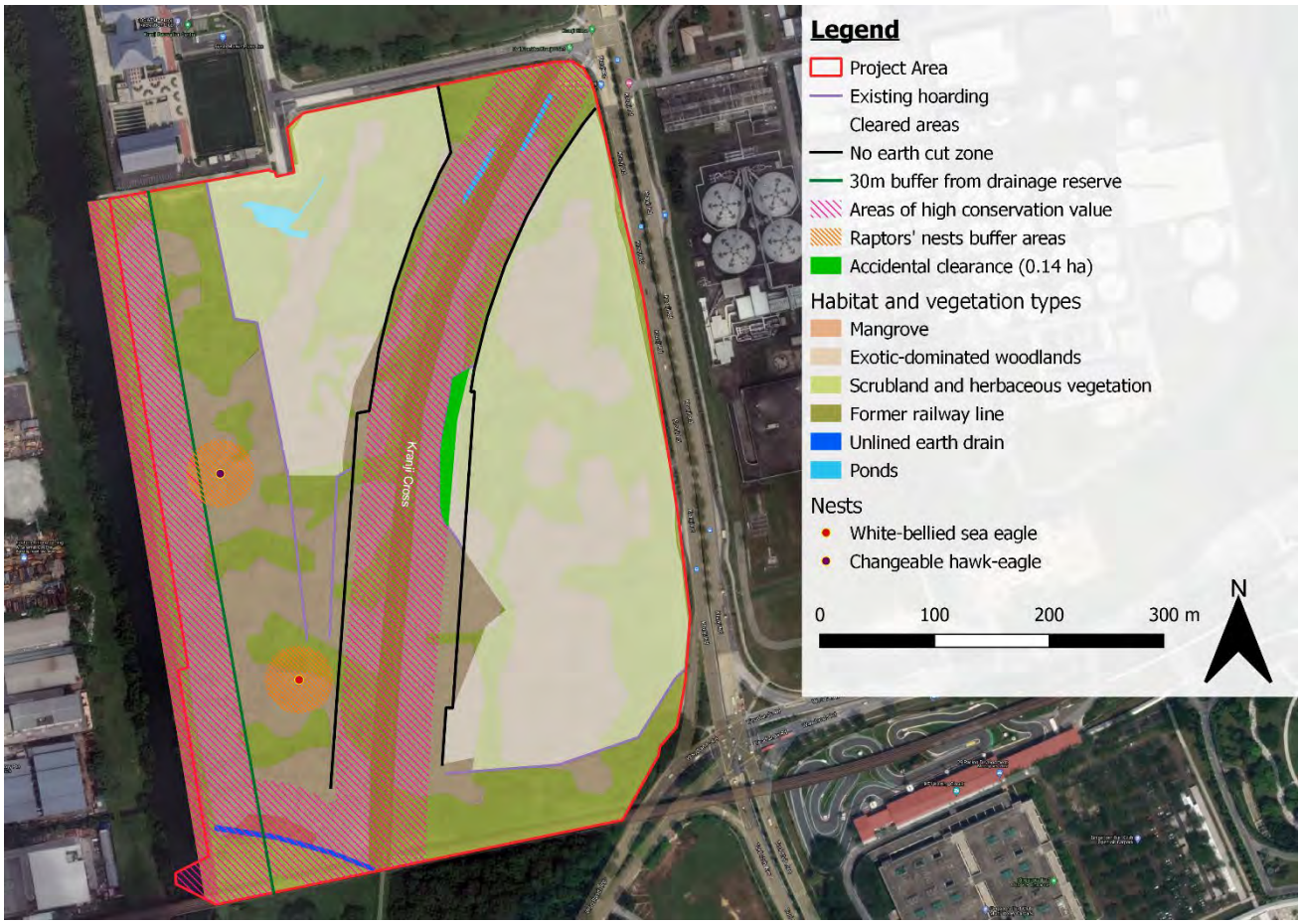

Figure 32: Areas of high conservation value and raptors' nest buffer area overlaid with no earth cut zone and 30-m buffer from drainage reserve

Figure 33: Example of buffer zone between forest and development

Additional areas to be retained have been considered in the southwestern portion of the Project area to provide additional refugia for wildlife and to improve connectivity between Sungei Pang Sua and Kranji Cross. The portion in the southwest of the Project area, which includes a cluster of albizia trees with the nest of the white-bellied sea eagle, is considered, and will meet the buffer recommended for the unlined earth drain (**Figure 34**). Please note that the proposed buffer in **Figure 34** presents this assessment's recommended further mitigating measure.

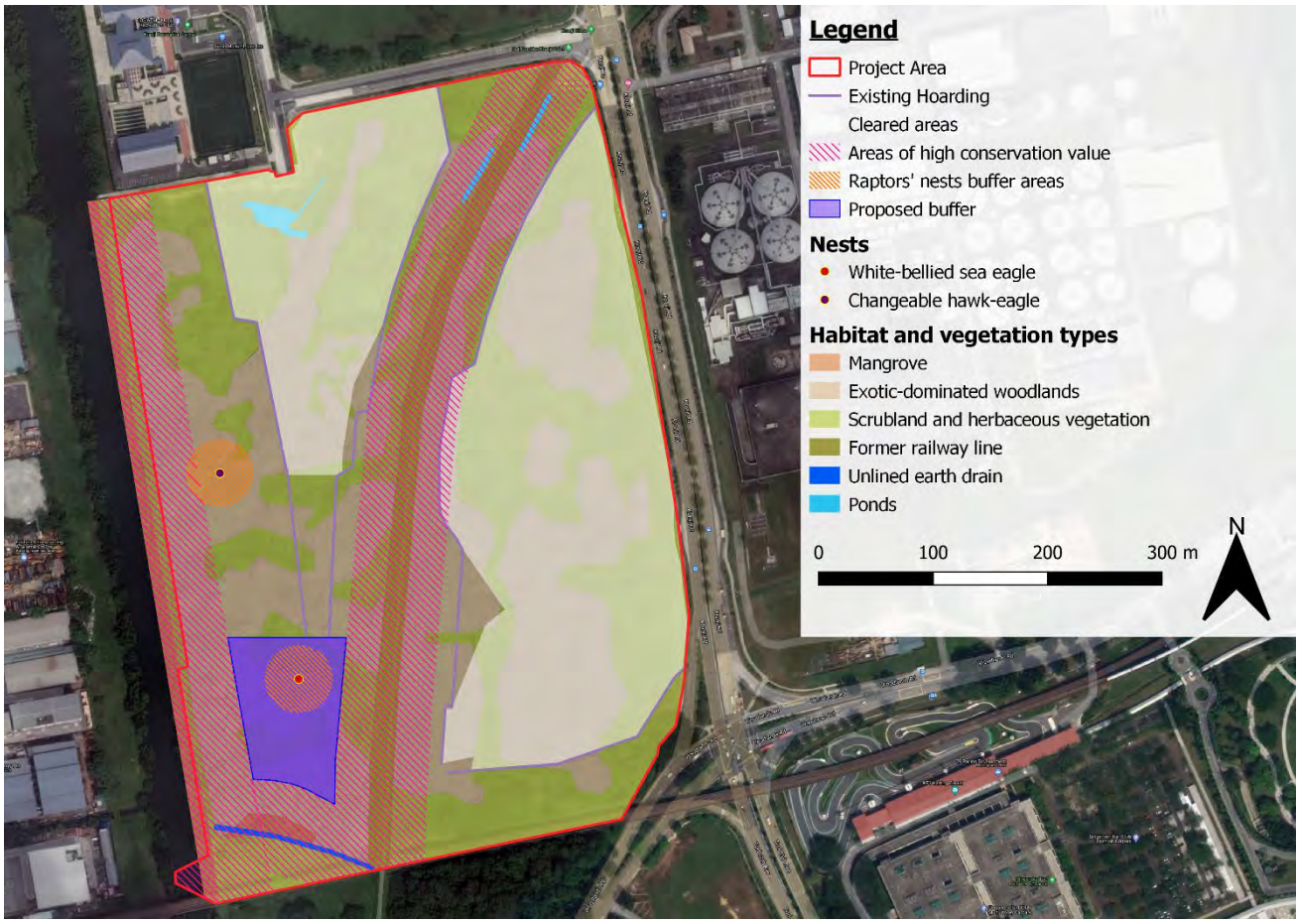

Figure 34: Proposed buffer for additional wildlife refugia[5]

Additionally, programming for human activities within these areas of high conservation value should be limited to light and quiet activities, e.g., walking trails, in the day only. The current plan is to build connecting structures between the eastern and western portions of the Project area and to design Kranji Cross as a communal space for human use. To achieve this objective while minimizing the impact to the biodiversity, it is recommended that the connecting structure be a grade-separated structure, so as to avoid the clearance of as many threatened flora species as possible while maximizing the connectivity of the buffer zones. The placement of the structure can be guided by the arboriculture plan of the Project area. As shown in **Figure 35**, the proposed potential locations to build such connecting structures do not overlap with any existing threatened flora species (Camphora, 2018). It is also important to ensure that these connecting structures are wildlife-friendly with graded crossings such that the connectivity within the buffer zones is not broken.

[5] Presented as FBS-recommended potential further mitigating measure, and not based on JTC's land use plan.

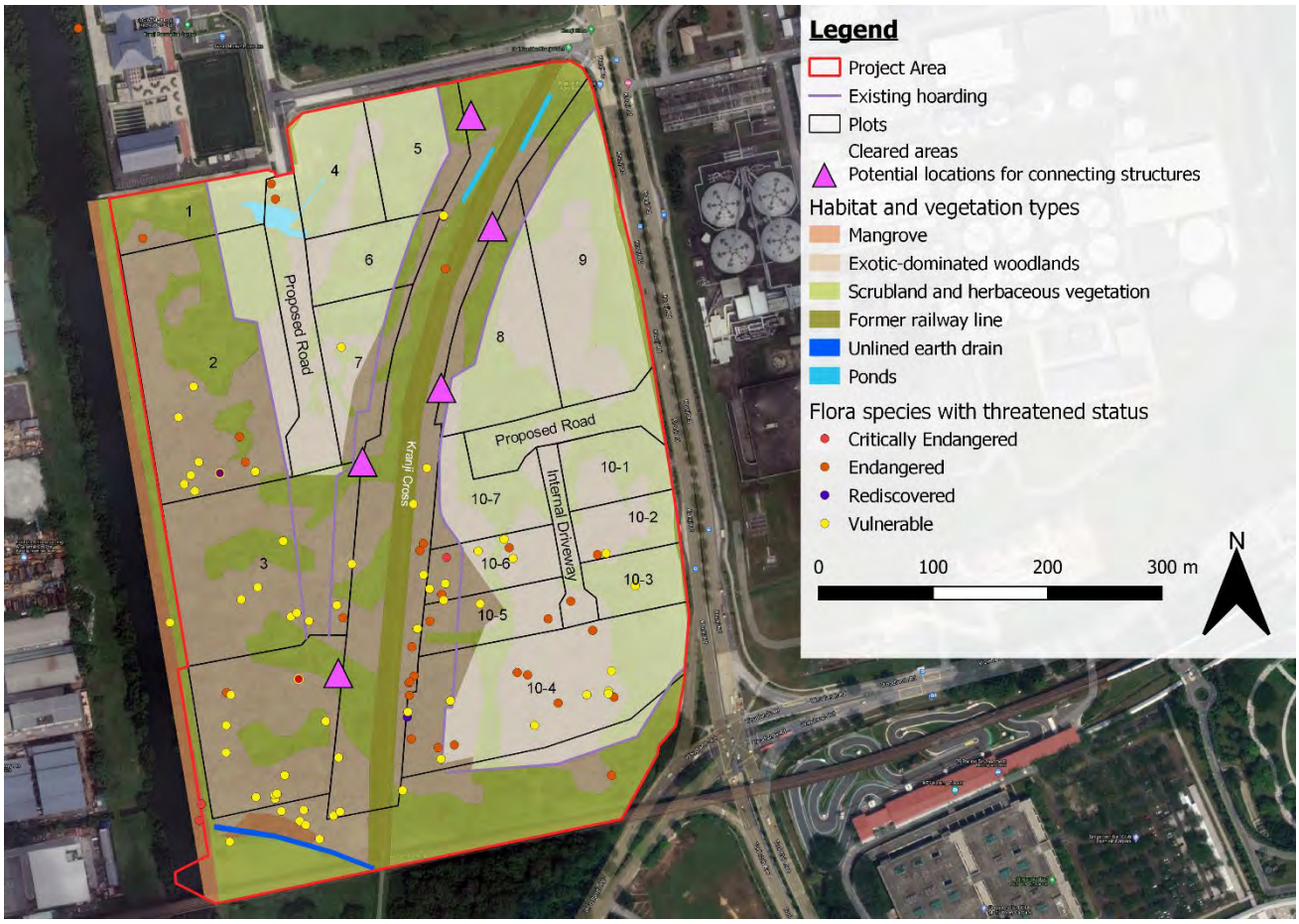

Figure 35: Proposed potential locations for connecting structures between the eastern and western portions of the Project area

A trapezoidal drain is proposed to be built over the unlined earth drain as part of the Project (**Figure 36**). This would result in the destruction of the unlined earth drain habitat. However, given that the unlined earth drain is a habitat of high ecological value, it should be retained with as little impact as possible. Thus, it is recommended that the trapezoidal drain be connected directly to the existing earth drain on the east side of the Kranji Cross. The water will then flow through the existing pipe culvert under Kranji Cross and into the unlined earth drain (**Figure 37**).The discharge from the trapezoidal drain should be within approved limits and mimic the natural hydrology of the current unlined earth drain while construction works around the unlined earth drain should be minimised to maintain its hydrology.

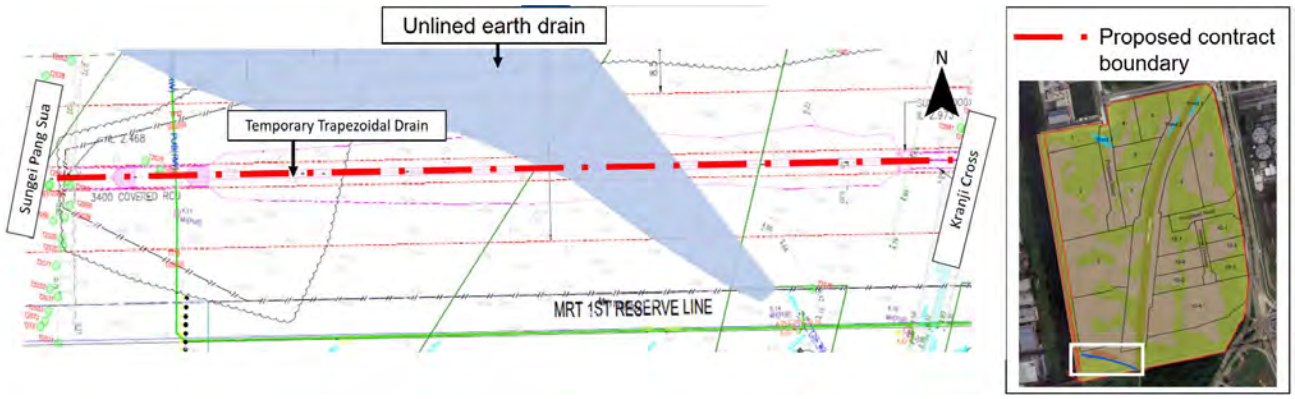

Figure 36: Current plan for the temporary trapezoidal drain which goes over the unlined earth drain *(Source: CPG)*

Figure 37: Proposed layout of trapezoidal drain and its connection to the unlined earth drain on the east of Kranji Cross *(Source: CPG)*

The existing plan for the 800-mm diameter water main is designed such that it cuts into the unlined earth drain and bends 90 degrees northwards (**Figure 38**). This will result in increased disturbances and possibly irreversible damage to the unlined earth drain. It is recommended that the watermain be diverted around the northern outer boundary of stream with at least 10-m no-construction-zone from the water edge (**Figure 38**).

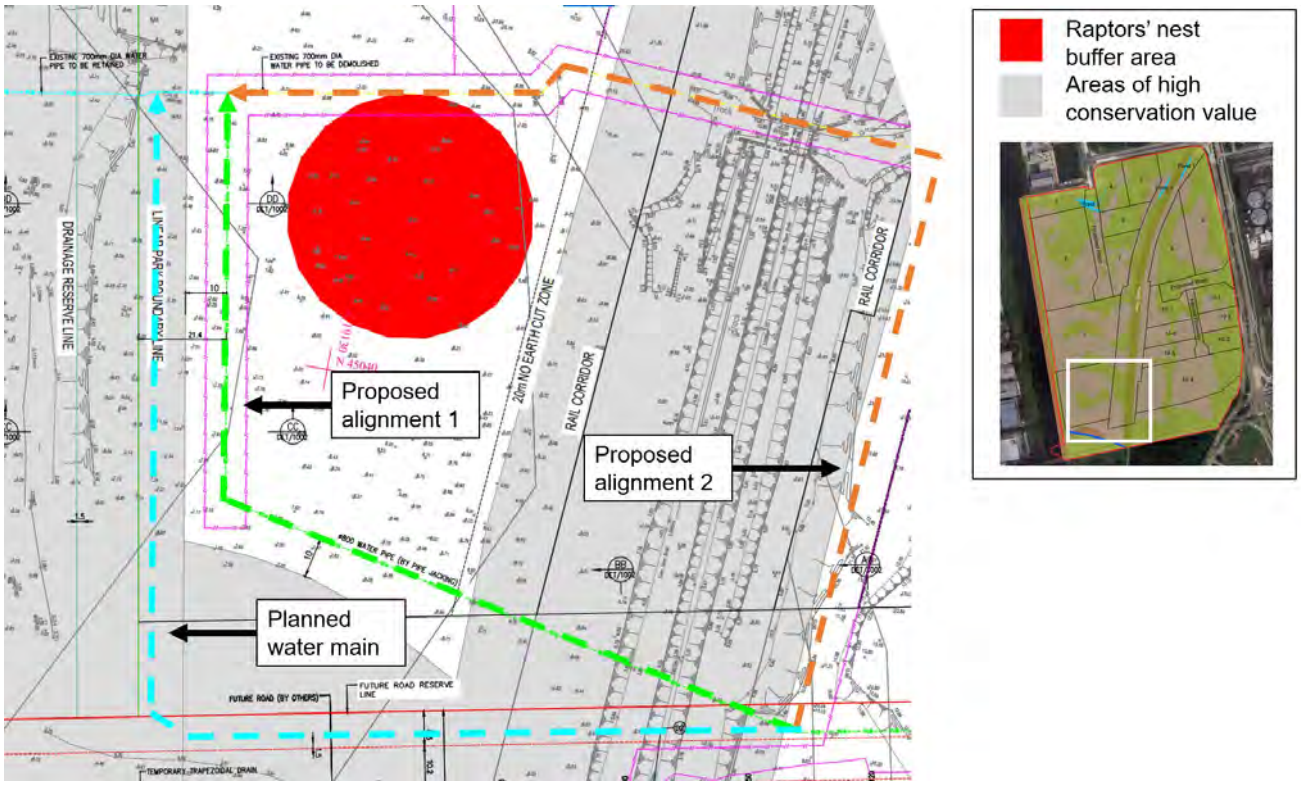

Figure 38: Existing plan and proposed diversion of water main (Source: CPG)

Protect (Remedy/ Repair/ Restore) – Infill Planting within the Buffer Zones

Vegetation density is an important factor for an effective forest buffer (DaWalle, 2010). Wherever possible, existing vegetation should be retained within the 30-m buffer set as areas of high conservation value (**Figure 32**), especially those along the mangroves, Kranji Cross and the unlined earth drain. If this is not possible, cleared buffers will be planted using infill planting to emulate the density and vegetation structure (i.e., trees and shrubs making up the canopy and understory) of the natural forest. Infill planting makes use of the existing forest framework, and with a native plant palette (**Appendix I**), jump starts succession into a more native-dominated forest. It is a common reforestation strategy and is not difficult to implement. Given that the height of trees in the site can be 20 to 30 m, the 30-m strip also serves as a buffer in the scenario of a tree fall. The planted vegetation will be deliberately tiered with shrubs at the outer edge followed by tree species of different mature height. This produces a graded canopy line that is shape-optimized to buffer wind and rain to reduce tree failure at the forest edges (**Figure 39**). Taking into consideration the cost efficiency of coordinating the infill planting efforts and maintenance of the buffer zones, it is recommended to have a centralised management system, preferably led by JTC instead of having individual management systems by the tenants.

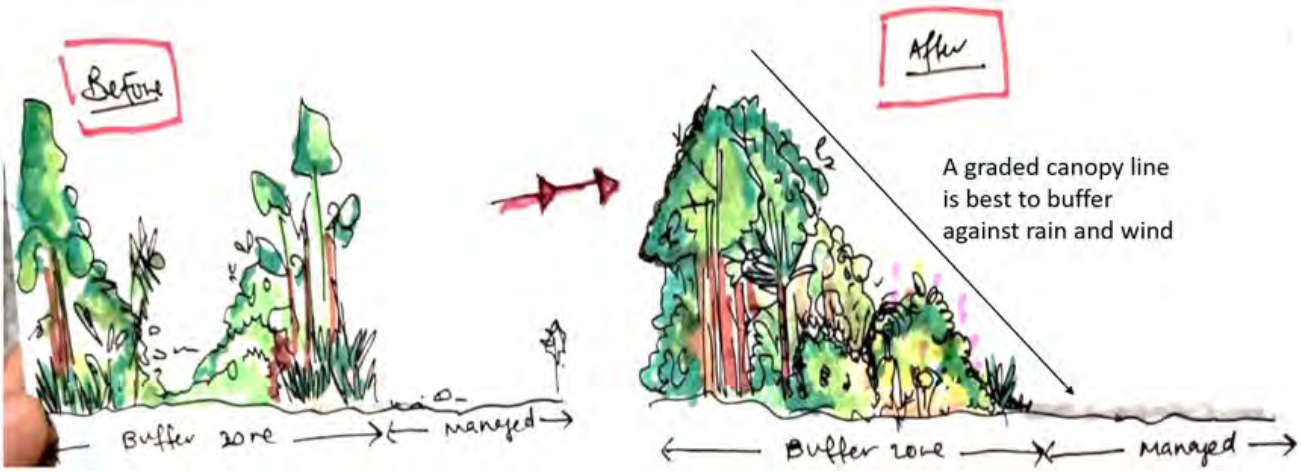

Figure 39: Effect of infill planting within the buffer zone

Amplify (Compensation/ Offset) – Ecological Connectivity

As the major impacts identified for this Project are the loss of habitat and the loss of ecological connectivity for faunal movement, the compensatory measures are recommended here to offset some of these impacts. One way is to ensure that connectivity within the site and to the surrounding green spaces is maintained. As Kranji Cross is a key node for ecological connectivity between Mandai Mudflat to the north and Bukit Timah Nature Reserve and Central Catchment Nature Reserve to the south (**Figure 40**), it is important to maintain the vegetation along Kranji Cross as a densely wooded corridor to facilitate the movement of forest-dependent fauna species across the landscape. A 15.0 m-wide linear park proposed will sit between the drainage reserve of Sungei Pang Sua and JTC's proposed development and will act as a buffer between the two areas under the existing Masterplan 2019. Infill planting as described above should be implemented along Kranji Cross to compensate for the loss of forest within the Project area and amplify the suitability of Kranji Cross as a corridor for forest-dependent fauna species.

Within the development plots, lush biodiversity-friendly landscaping can help to increase connectivity and facilitate movement of fauna among the surrounding green patches (**Figure 41**). The following recommendations could be included in the design specifications for the sale of the remaining plots to prospective tenants.

- Plant keystone species such as fig trees. Figs have uncoordinated fruiting periods but fruit abundantly when in season. Thus, they are important food sources for avian fauna and small mammals.
- Increase vertical vegetation structures, i.e., ground cover, shrub, understorey and canopy layers, and forms, e.g., epiphytes, shrubs, ferns, trees.
- Use a native plant palette, examples of which are presented in the Guidelines on Urban Ecology and the Guidelines on Skyrise Greenery of NParks' Centre for Urban Greenery and Ecology and **Appendix I**.
- Select a diversity of flowering and fruiting plant species, including butterfly- and bird-attracting plant species. The selected species should preferably flower or fruit throughout the year so as to continuously attract pollinators such as butterflies, bees, and wasps, which contribute to forest ecosystems and services.
- Prioritise greening along streets or in areas with low disturbances, e.g., low traffic volumes and speeds, low human activities.

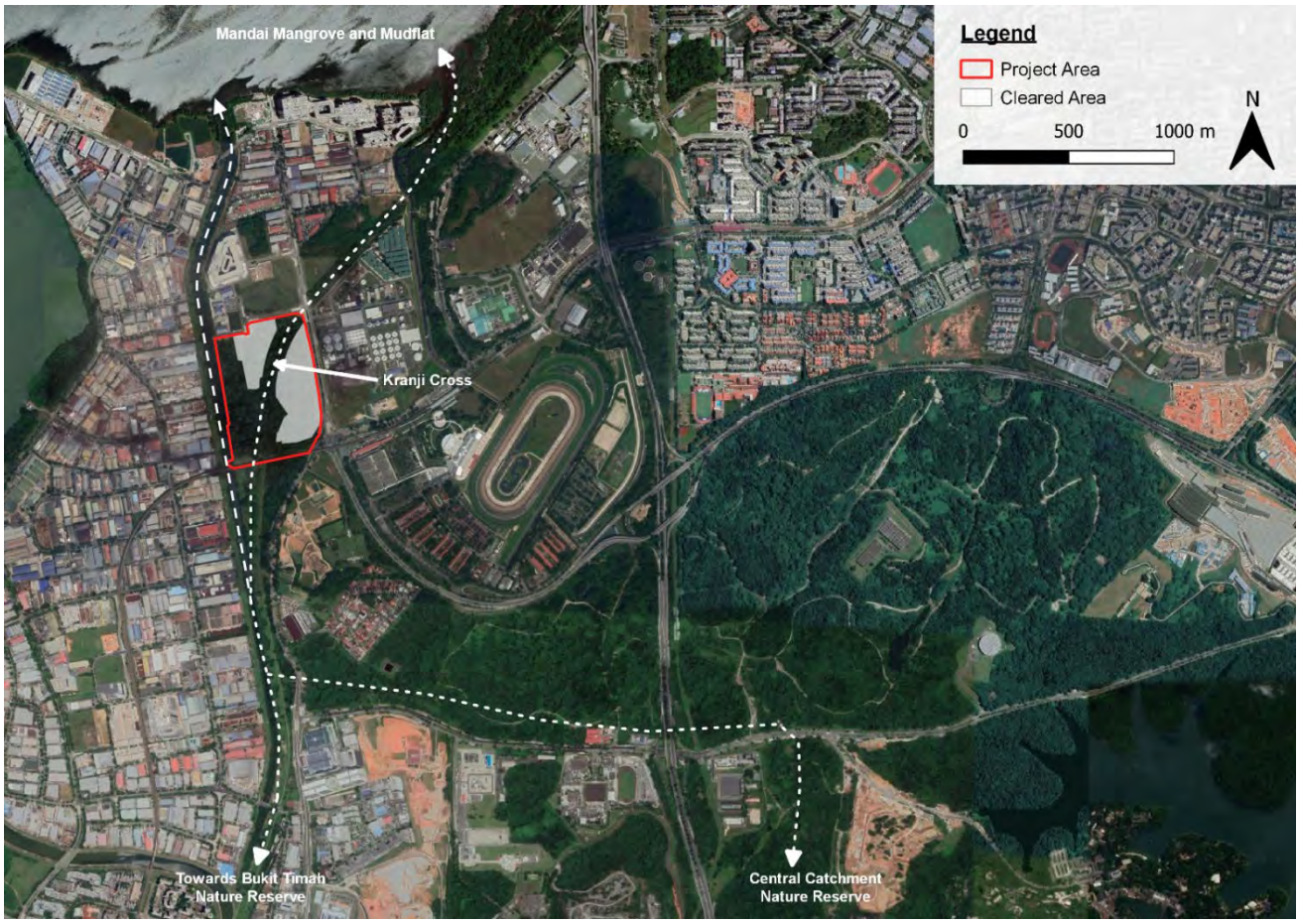

Figure 40: Kranji Cross as an ecological corridor between surrounding green spaces

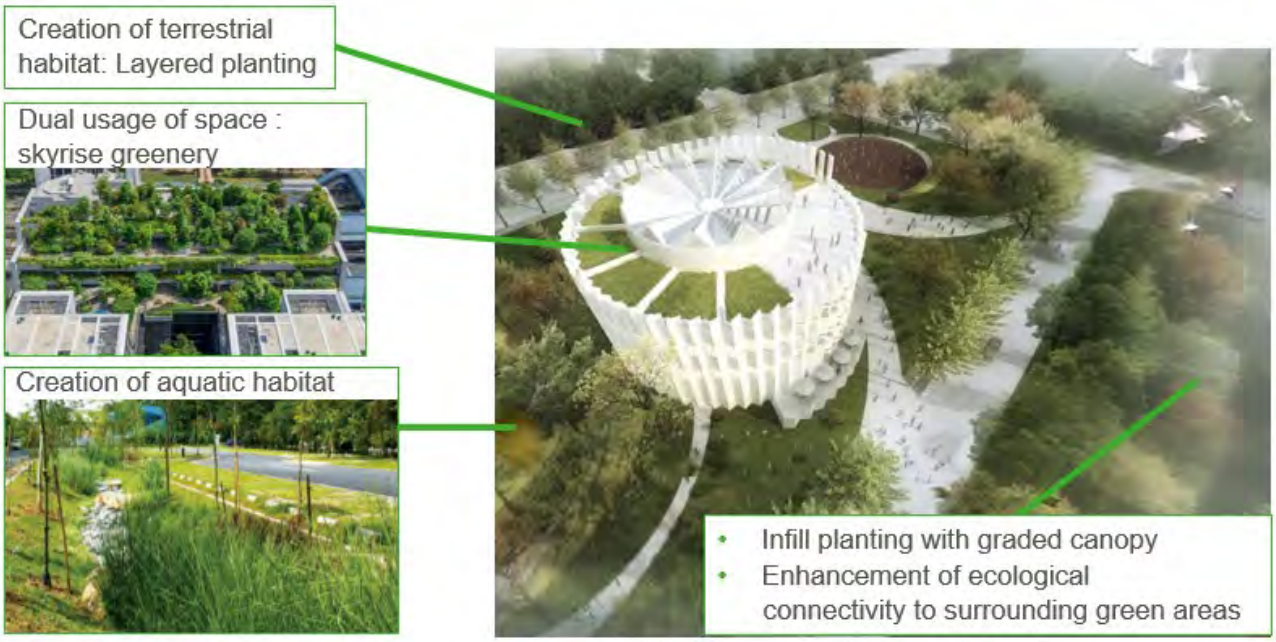

Figure 41: Proposed options to enhance ecological connectivity

Create (Compensation/ Offset) – Create Habitats

Habitat loss is inevitable in the process of development, but there are also opportunities to create and enhance habitats for biodiversity in the area. These strategies may help to offset some of the negative impacts resulting from the development. The following recommendations could be included in the design specifications for the sale of the remaining plots to prospective tenants.

Creation of aquatic habitats

ABC Waters Features are stormwater management systems built to mimic natural systems and can be integrated into the landscape. These features include vegetated swales, bio-retention basins (also known as rain gardens), detention ponds and wetlands and they replace the traditional stormwater management features such as concrete drains, canals, culverts and underground detention tanks (**Figure 42**). Various types of pathways should be provided to either cross these features, such as detention walls and boardwalks, or to run alongside them, such as stepping stones and gravel paths, allowing people to enjoy the environment visually as well as get up close to the flora and fauna as well. Studies have shown that fauna species richness and composition in these type of stormwater features is higher than that of lawn-type or garden-bed type of greenspaces (Kazemi et al., 2009) and therefore, by inference, concrete-based infrastructure. The presence of plants, leaf litter, soil, gravel and rocks create habitats that provide both food and refuge (Kazemi et al., 2009, Sng, 2012) for animals such as invertebrates, amphibians and reptiles. On the larger precinct scale, the presence of these aquatic and semi-aquatic features in the landscape increase habitat heterogeneity (Kazemi et al., 2009, Sng, 2012 Zhang et al., 2018). **Table 23** describes the specific recommendations for each feature.

Figure 42: (A) Example of vegetated swales integrated in carpark facility; (B) Example of bio-retention basins

Table 23: ABC waters features and specific recommendations for habitat creation

ABC Waters Feature	Temporary or Permanent Waterbody	Habitat Created	Specific Recommendations
Swale	Temporary	Ephemeral freshwater stream after a rain event	■ Swale should be vegetated on the side of slopes and base. ■ For fauna to move in and out of the swale, the slope should be at a gradient of at least 1:4.
Rain garden	Temporary	Ephemeral freshwater body after a rain event	■ Rain garden should be vegetated on the sides and base. ■ For fauna to move in and out of the rain garden, the slope should be at a gradient of at least 1:4. ■ Flowering and fruiting plants should be used to attract wildlife such as butterflies and birds.
Detention/ retention pond/ wetland	Permanent	Pond with plants on water edge	■ Detention ponds normally serve as temporary waterbodies and drain out shortly after a rain event to meet PUB's Code of Practice on Surface Water Drainage, whereas retention ponds are permanent waterbodies. The designed pond may have both detention and retention functions, therefore having a permanent water level with an additional fluctuating water depth. Designing smaller and shallower pockets of water at the edges will be beneficial to fauna that are dependent on semi-aquatic habitats. Water depth of these pockets may vary from 30 to 100 mm. ■ Keep the edges and base of the pond as natural as possible. Some organic matter such as fallen leaves should be kept at the base of the pond as this acts as a food source for detritivores, which in turn are a food source for other fauna. ■ For fauna to move in and out of the pond, the gradient of portions of the slope should be at least 1:4. ■ Have a mix of ground cover, water-tolerant, floating and emergent plants, which will provide different perching and refuge structures for fauna around the edges of the pond. ■ Consider a maintenance strategy for the clearing of the plants that is naturalistic and removes plants in an alternating fashion. This will ensure that there will always be mature plants in the pond/wetland.

Creation of terrestrial habitats

Habitat enhancement and creation of terrestrial habitats can be done along buffer zones (Section 4.1.1) to accelerate forest succession via reforestation (specifically, infill planting) to increase floristic diversity and structural complexity (**Figure 43**).

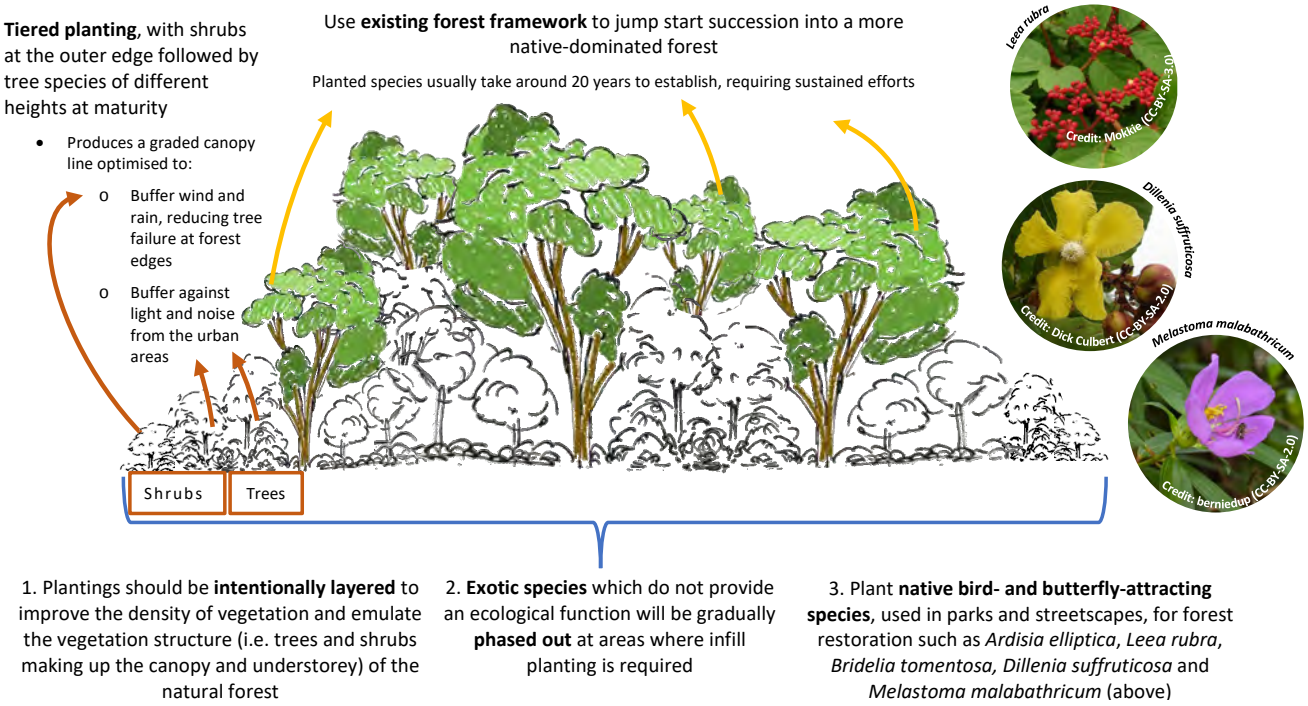

Figure 43: Summary of strategies in creation and enhancement of terrestrial habitats

Creation of artificial refugia for pollinators

Artificial refugia for pollinators can be incorporated with skyrise greenery. These pollinator houses attract solitary bees and wasps to take refuge, and to serve as an educational element for visitors. This could be included in the design specifications for the sale of remaining plots to prospective tenants. **Figure 44** shows examples of pollinator houses that can be constructed. However, it is important to consider the factors below to avoid doing more harm than good, especially when environmental factors result in unsuccessful brooding (Krombein, 1967).

- Use natural materials such as bamboo or wooden tubes to construct the pollinator houses.
- Avoid using plastic materials as they are difficult for the pollinators to cling onto, causing them to tire out while nesting.
- Ensure that the design allows water to drain so as to prevent flooding from rainfall and excessive humidity, fungal growth and brooding failure.
- Locate the pollinator houses in partial shade to prevent overheating.
- Use tubes of varying sizes to attract more species.

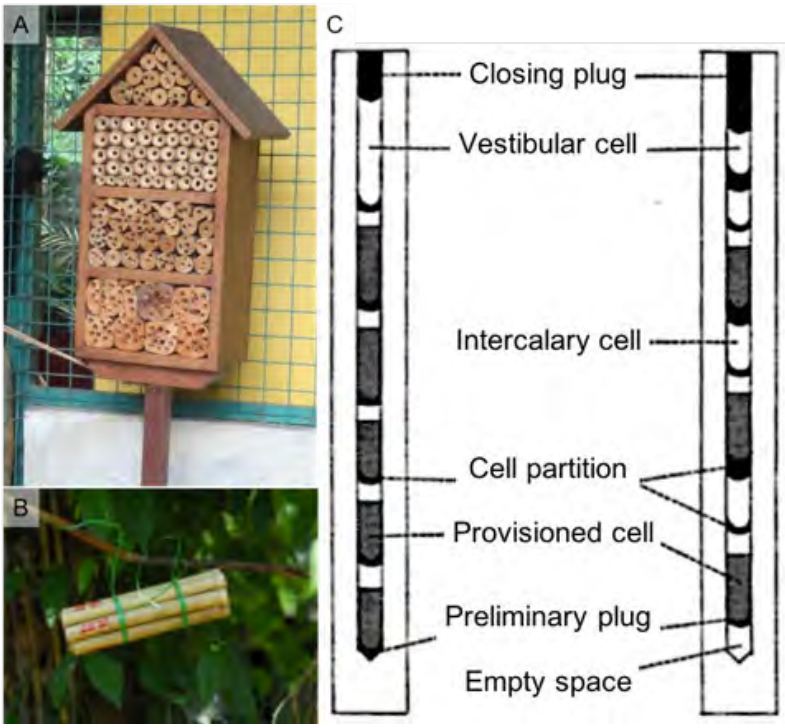

Figure 44: Examples of pollinator houses ((A) A specially constructed house with tubes of varying sizes; (B) A simple trap bundle that may also serve as a pollinator house (Barthelemy, 2012); (C) Nest architecture of solitary bees and wasps (Krombein, 2967))

Dual usage of space

Spaces allocated for human usage can also benefit wildlife if they are designed using ecological concepts. An example is skyrise greenery, which allows both human and wildlife to utilize the sample space whilst minimizing conflict. This could be included in the design specifications for the sale of the remaining plots to prospective tenants.

Roof gardens, green roofs, green terraces and green walls have the potential to be functional habitats for biodiversity. Through appropriate planting and landscaping, skyrise greenery can provide food and shelter for fauna, particularly flying taxa such as birds, butterflies, bats and odonates. Skyrise greenery also serves as ecological stepping stones, enhancing ecological connectivity in the broader urban landscape (Mayrand & Clergeau, 2018).

The inclusion of skyrise greenery will soften the facade of the buildings, allowing them to blend into the surrounding forest backdrop. Roof gardens, green terraces and green walls can follow the design principles for biodiversity-attracting skyrise greenery as described in **Appendix G** (Centre for Urban Greenery and Ecology, 2017). The tenants should take their own management measures from design of facilities to workflow to avoid any cross contamination from the natural biodiversity to their agricultural products.

4.1.2 Fauna

Thrive (Miniminisation)

As the Project area is designated as an Agri-Food Innovation Park, it is important for humans and wildlife to coexist within the same space harmoniously. To allow for this coexistence, there are several design strategies

that can be implemented and included in the specifications for the sale of the remaining plots to prospective tenants.

Artificial Light Management

Ecological light pollution includes chronic or periodically increased illumination, unexpected changes in illumination, and direct glare experienced by flora and fauna (Longcore & Rich, 2004). Ecological light pollution has demonstrable effects on the behavioural and population ecology of organisms in natural settings. A source of ecological light pollution is sky glow, which is the brightness of the night sky caused by the reflected light scattered from particles in the atmosphere. Sky glow comprises both natural and artificial sky glow. As sky glow increases so does the potential for adverse impacts on wildlife. As a whole, these effects may affect foraging, reproduction, migration, and communication of wildlife.

Artificial light management aims to minimize ecological light pollution to reduce associated impacts on flora and fauna, through the guidelines stated below.

- Establish lighting buffer zones with no artificial illumination around the areas of high conservation value, and vary illuminance limits from the lighting buffer zones (**Figure 45**).
  - There should be no artificial illumination within the areas of high conservation value.
  - Permanent artificial lightings should be directed away from the areas of high conservation value. Higher levels of illuminance can be tolerated with increasing distance from the areas of high conservation value.
  - An illuminance upper limit of 0.5 lux is recommended within the lighting buffer zone (Bath and North East Somerset Council, 2018), but site conditions should be factored into consideration as well, e.g. ambient light levels within the Project area; if a lighting buffer zone is not possible, minimise illuminance in the transition zone between the areas of high conservation value and urban areas.

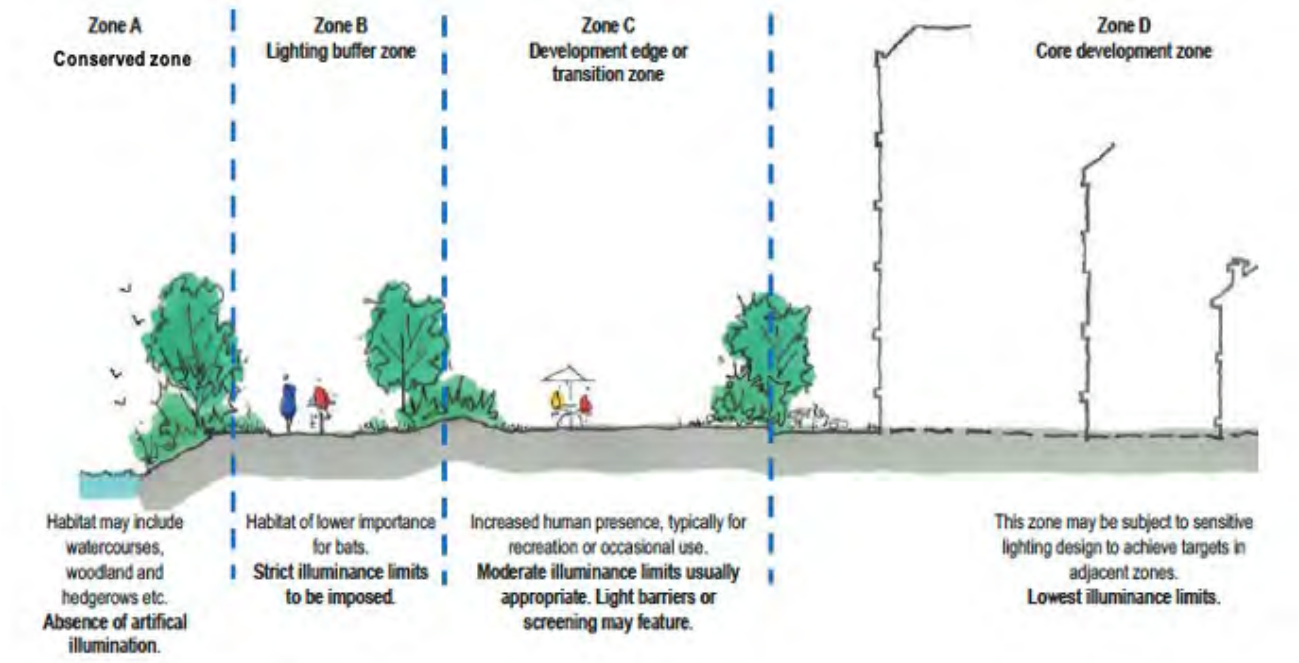

Figure 45: Example of illuminance limit zonation, adapted from BCT and ILP, 2018

- Start with natural darkness. Add artificial light only when necessary, and use lighting appropriate for the task. Use only the minimum number and intensity of lights needed to provide safe and secure illumination for the area at the time required to meet the lighting objectives. For example, **Figure 46** provides options from best to worst for lighting for a parking lot.

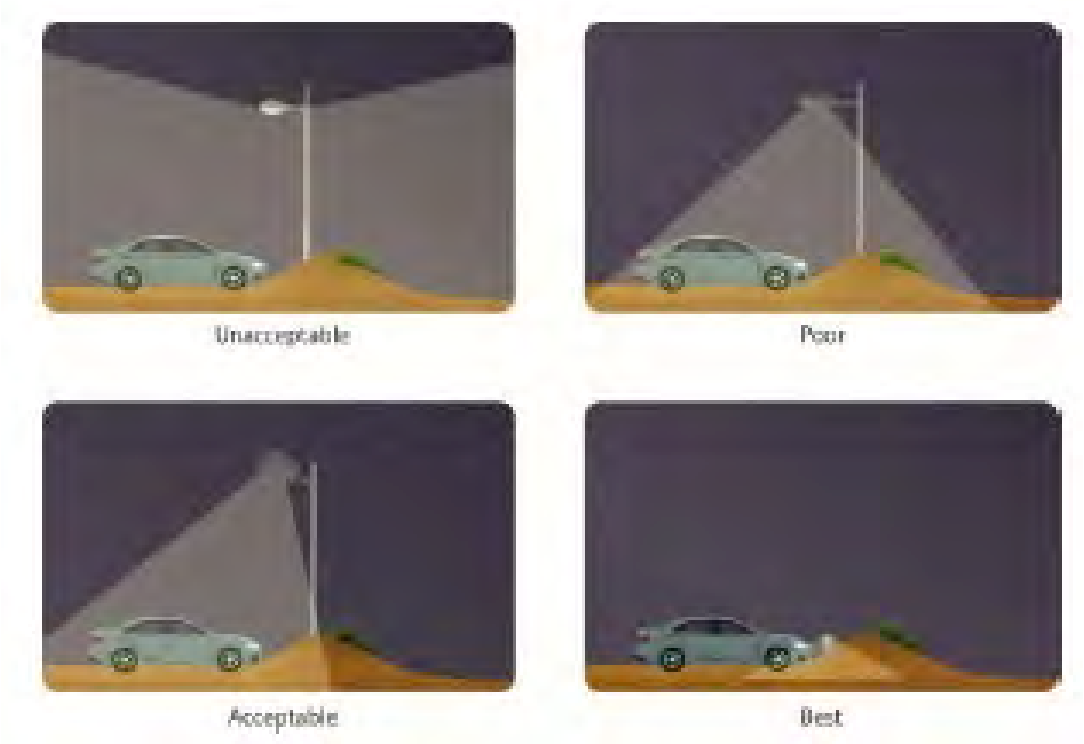

Figure 46: Lighting options for a parking lot. Reproduced from source: Pendoley et al. (2020) adapted from Withering and Martin (2003)

- Use adaptive light controls, such as smart controlled LED lights, to manage light timing, intensity and colour. The use of lights should be minimized during hours just before dawn and after dusk when crepuscular and nocturnal animals are the most active.
- Optimise the placement of lights to minimize light spill, i.e., the light that falls outside of the area intended to be lit. Light only the object or area intended and keep lights close to the ground, directed and shielded to avoid light spill **(Figure 46**, **Figure 47**).
  - Existing lights can be modified by installing a shield.
  - Ensure the luminaire is mounted horizontally (no upward tilt) relative to the ground and not at an angle, or mounted on a building so that the structure prevents the light shining above the horizontal plane, for example recess a light into an overhanging roof eave. Use luminaires with an upward light ratio of 0%. When determining angle of the mounting, consideration should be given to the reflective properties of the receiving environment.
  - If an unshielded fitting is to be used, consideration should be given to the direction of the light and the need for some form of permanent physical opaque barrier that will provide the shielding requirement. This can be a cover or part of a building. Care should be taken to also shield adjacent surfaces, if they

are lightly coloured, to prevent excessive reflected light from adding to sky glow. Examples of acceptable and unacceptable fixtures are shown in **Figure 49**.

- Reduce the height of light units to keep light as close to the ground as possible and reduce the volume of illuminated space. This allows nocturnal fauna, such as bats, to fly over the light units in the dark area above the light. An example from Netherlands is shown in **Figure 50**.

Figure 47: Lights should be shielded to avoid lighting anything but the target area or object. Figure adapted from Withering and Martin (2003)

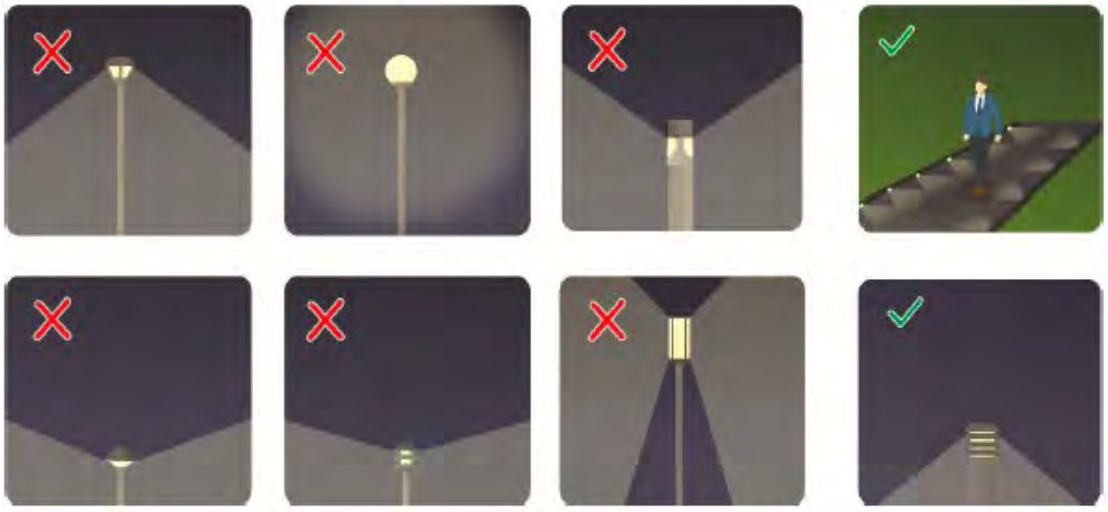

Figure 48: Walkway lighting should be mounted as low as possible and shielded. Figure adapted from Withering & Martin (2003)

Figure 49: Examples of acceptable and unacceptable lighting fixtures. Source: Bob Crelin (2005)

Figure 50: Installation of luminaires on short poles to reduce artificial light at night on a commuting route for bats through an underpass in the Netherlands (the same place in daylight and at night). Source: Voigt et al. (2018); photograph by F. Brekelmans

- Configure the location, orientation and height of structures to minimize light spill on key habitats and features.
  - Buildings, walls and hardscapes may be sited and designed to block light spill from reaching habitats (**Figure 51**).
  - Taller buildings may be best located towards the centre of the site or sufficiently set back from key habitats to minimise light spill.
  - Streetlights can be located so that the rear shields are adjacent to habitats thereby directing light into the task area where needed.

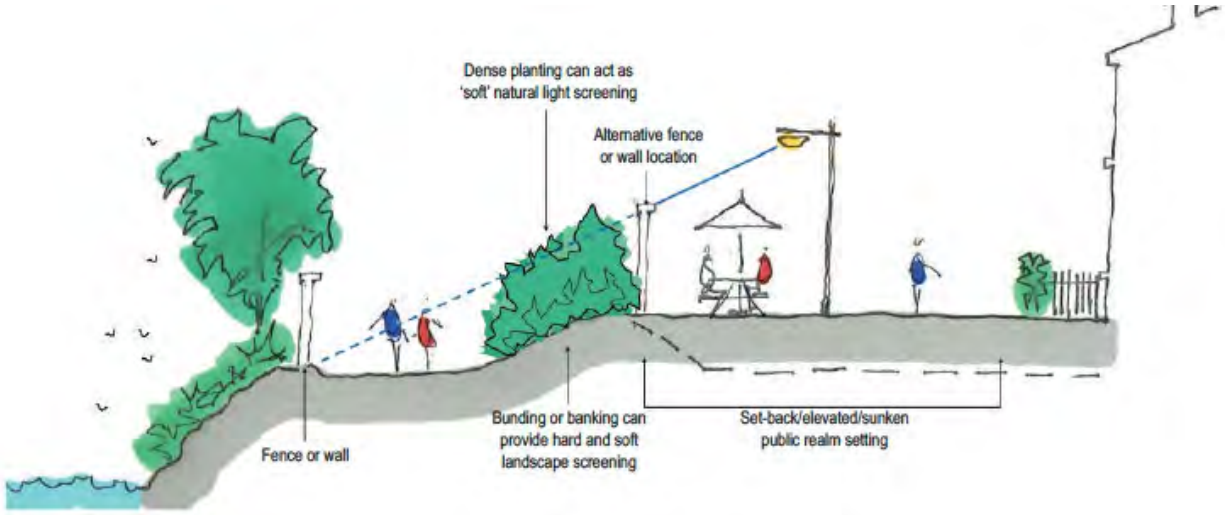

Figure 51: Examples of physical light screening options (BCT & ILP, 2018)

- Screening of light spills or light trespass through soft landscaping and installation of walls, fences and bunding. Fencing can also be overplanted with climbers to soften its appearance and provide a vegetated feature for fauna. While newly planted vegetation (trees, shrubs and scrub) is unlikely to adequately contribute to light attenuation on key habitats for a number of years until it is well established, it should never be relied on as the sole means of attenuating light spill.
- Use wildlife-friendly light properties or features:
  - Low-glare lighting enhances visibility for the user at night, reduces eye fatigue, improves night vision and delivers light where it is needed.
  - Non-reflective, dark-coloured surfaces. Light reflected from highly polished, shiny or light-coloured surfaces such as white painted infrastructure, polished marble or white sand can contribute to sky glow. In considering surface reflectance, the need to view the surface should be taken into consideration as darker surfaces will require more light to be visible.
  - Reduced or filtered blue, violet and ultra-violet wavelengths.
    - Short wavelength light (blue) scatters more readily in the atmosphere and therefore contributes more to sky glow than longer wavelength light. Further, most wildlife is sensitive to short wavelength (blue/violet) light.
    - As a general rule, only lights with little or no short wavelength (400–500 nm) violet or blue light should be used to avoid unintended effects.
    - It is not possible to tell how much blue light is emitted from an artificial light source by the colour of light it produces. LEDs of all colours, particularly white, can emit a high amount of blue light and the Colour Correlated Temperature (CCT) only provides a proxy for the blue light content of a light source. Consideration should be given to the spectral characteristics (spectral power distribution curve) of the lighting to ensure short wavelength (400–500 nm) light is minimised.
    - Warm colour temperature light sources to be employed preferably at <2,700 Kelvin (K).
    - It is important to point out that UV light is useless in streetlights since it cannot be perceived by humans. Hence, wavelengths in the UV range can be filtered without any decrease in illuminance level. In contrast to humans, many bats can perceive UV light. For them, light sources emitting UV

waste light presumably appear brighter than light sources with longer wavelength spectra. Consequently, UV-emitting lamps are particularly disturbing for light-averse bats and filtering the UV part of the spectrum may mitigate the effect of artificial night lighting on them.

Bird-friendly buildings

Bird-building collisions occur when birds fail to perceive glass as a barrier due to reflection of sky, trees, or flyway on the glass surface. Bird-building collisions can be reduced by integrating bird-friendly designs to add visual cues to birds (Sheppard & Phillips, 2015), such as:

- Reduce the amount of glass façade or break up reflections on glass façade by installing a decorative cladding over it.
- Incorporate features that increase the visibility of glass (including mirrored and non-mirrored reflective glass, and transparent glass) or dampen reflections to reduce the appearance of clear passage to sky or vegetation. Possible strategies include film coating (e.g., CollidEscape; http://www.collidescape.org), angled glass, interior or exterior shades, decals, fenestration patterns, grilles, sunshades, screens, blinds and netting. Exterior shades confer the freedom of choosing to only use it during periods where bird collisions are expected to be most frequent, such as during the migratory seasons (**Figure 52**).
- Decals or patterns can be used to increase the visibility of the glass (Figure 11). The pattern should be as dense as possible to appear more clearly as a solid object to birds and be more effective. The City of Toronto (2016) recommends:
  - A pattern density of 10 cm by 10 cm or less;
  - Visual markers to be at least 5 mm in diameter;
  - Visual markers should be high contrast; and
  - Targeting exterior surface as it is the most effective for deterring bird collisions.
- Avoid interior or exterior vegetation near windows as birds may confuse this with exterior vegetation and fly towards them. If they are close to natural vegetation, the façade should have shades or netting installed near the glass to prevent birds from crashing into it.
- Buildings should not have courtyards or corridors that are enclosed by glass as these may confuse birds to fly through.

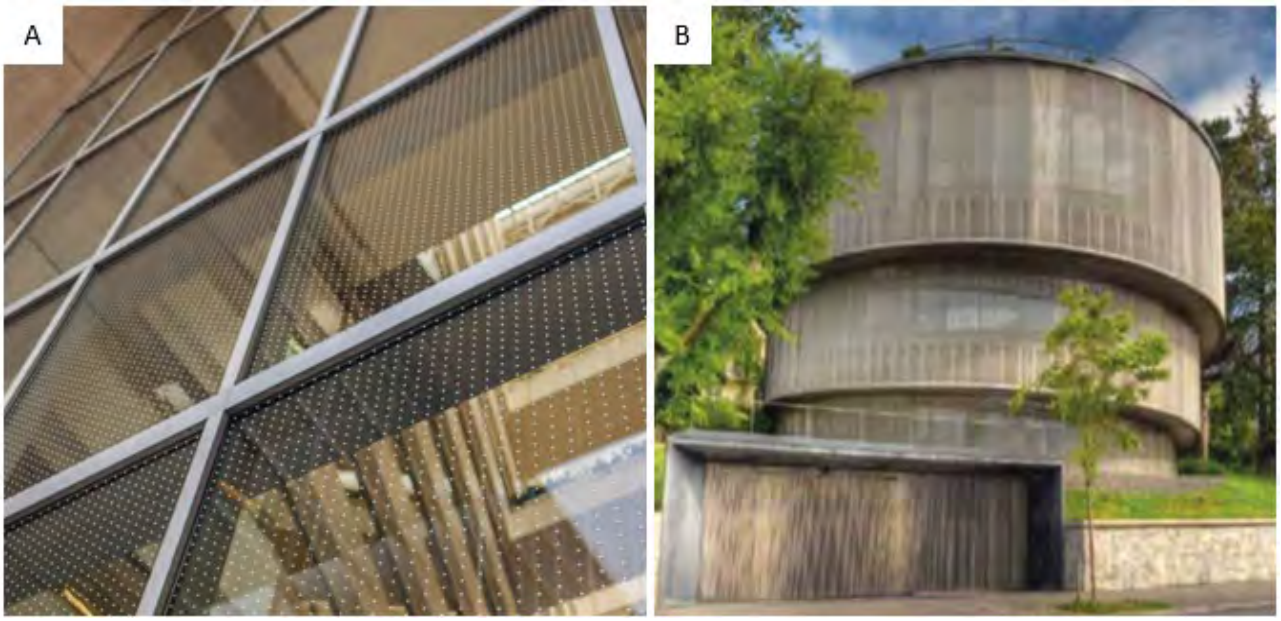

Figure 52: (A) Example of visible visual markers recommended by City of Toronto (2016); (B) Example of exterior shades in front of glass surfaces in the building

Building designs to prevent human-wildlife conflict

Species that can be implicated in human-wildlife conflict were identified in the desktop and field assessment. These include the long-tailed macaque (Macaca fascicularis), Eurasian wild boar (Sus scrofa), snakes, and small mammals (e.g., rodents). These are often viewed as pests as they may enter urban areas in search of food. Refuse represents an easily accessible, high yield, and reliable food source for these animals. As such, any food and beverage establishments in the development on the lower floors should be kept indoors. This is to prevent macaques and Eurasian wild boars from venturing in to obtain food sources. Moreover, considering that the space will be used for high-tech food and agricultural purposes, it is important that the landscaping and infrastructure should keep in mind the capabilities and behaviour of the arboreal species such as macaques.

Furthermore, to prevent any potential entrapment of fauna which can escalate to a human-wildlife conflict, design features such as controlled ancillary openings in the buildings and educating tenants against food provisioning can encourage the fauna to remain within the vegetated buffer areas. For tenants whose facilities necessitate fencing, one-way trap doors are recommended to be included in part of the design, facing the natural vegetation to allow for any accidental entrapment of Eurasian wild boars to exit the facility safely.

Proper waste management techniques are extremely crucial within the development. For instance, all waste bins should be wildlife-proof and waste management centres should be enclosed (**Figure 53**).

However, reducing human-wildlife conflict will require behavioural change on the public's part as well. Thus, it is important to educate the public and ensure there is no provisioning of food that can lead to human-wildlife conflicts. Educational signages in linear parks along Kranji Cross (**Figure 54**) are cost-effective methods that can increase awareness and engage visitors in local wildlife.

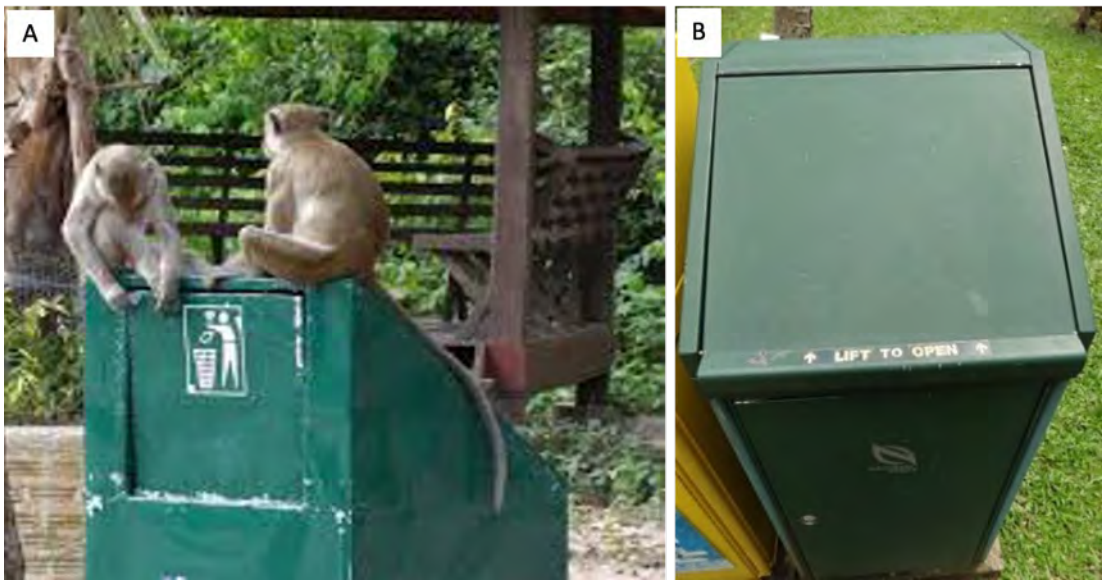

Figure 53: (A) Long-tailed macaques (*Macaca fascicularis*) rummaging a bin; (B) wildlife-proof waste bin

Figure 54: Educational signboards to educate visitors not to feed wildlife

Interface between uneven levels for vegetated buffer and plots

Based on the development platform levels planned by the project and the levels in the vegetated buffer (no earth cut zone), there are differences in the levels across the buffers along Kranji Cross. In the areas where the buffer's levels are at a lower level than the plot's development level, a gentle vegetated slope should be maintained towards the developmental plots to maintain the green connectivity throughout the Project area. In the areas where the buffer's levels are at a higher level than the plot's development level (where a retaining wall is required), there should be a fence along the buffer edge to prevent ground dwelling animals, e.g., Eurasian wild boar and Sunda pangolin, from falling into the infrastructure within the plot and becoming potential road kills or cases of human-wildlife conflict. As both the notable ground-dwelling species, the Eurasian wild boar and Sunda pangolin, are excellent diggers, typical Green-Chain linked fences will not be

effective as they can easily go under the fence. Effective fencing that will also minimize accidental entrapment of ground-dwelling fauna should consider the following guidelines:

- All fencing/hoarding should be start at least 20cm underground to prevent animals from burrowing through them (The Deer Initiative, 2009). An example would be having a cement base beneath the fence (**Figure 55A**).
- All fences should be at least 1.8m in height to prevent animals from jumping over the fence. (Scott, 2003; The Deer Initiative, 2009)
- Fences should be maintained regularly to ensure there are no climbers smothering them as that could result in wildlife scaling the fence, reducing the effectiveness of the fence. Also, it is essential to ensure no failure in the fences.
- Thus, to reduce the failure rates of the fences, the durability of the fences should be considered, e.g., BRC or weldfences made with high tensile strength steel wires (**Figure 55B**).
- To prevent entrapment of wildlife (especially the Sunda Pangolin), a 20mm x 20mm wire mesh size is recommended (Nguyen et al., 2014).

Figure 55: (A) Fences with cement base to prevent animals from burrowing through them; (B) BRC or weldfences along a vegetated area at Pasir Ris Park

Two parcel options have been proposed, and the approximate difference in platform levels is given in **Figure 56** (Option 1) and **Figure 57** (Option 2). Fencing is recommended to be installed in areas where the planned platform level and current platform level exceeds 1.0 m, as adult Eurasian wild boars have been recorded to have a shoulder height of 0.9 m (University of Michigan, 2021).

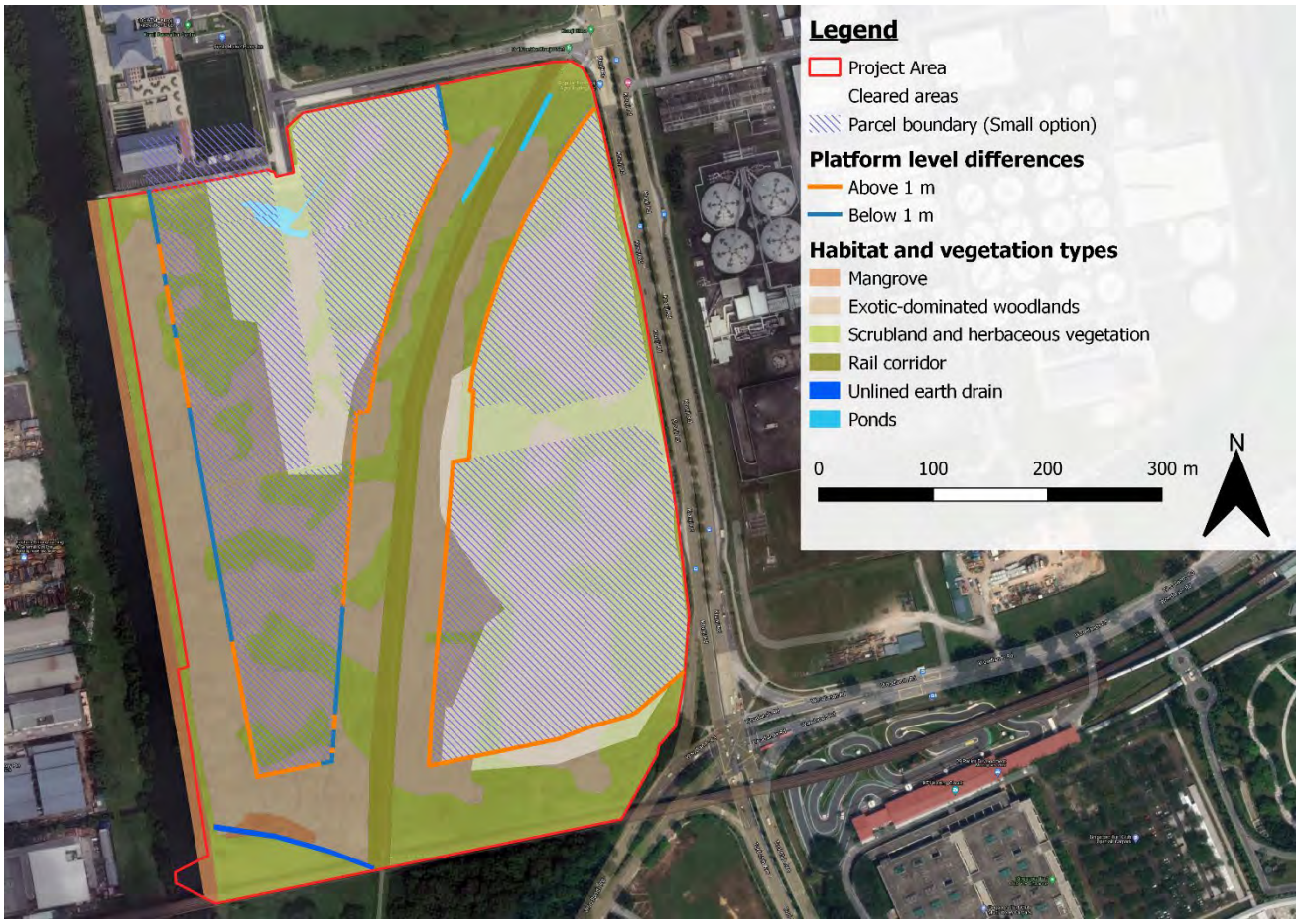

Figure 56: Height difference between the current and future platform levels along the parcel boundary (Option 1)

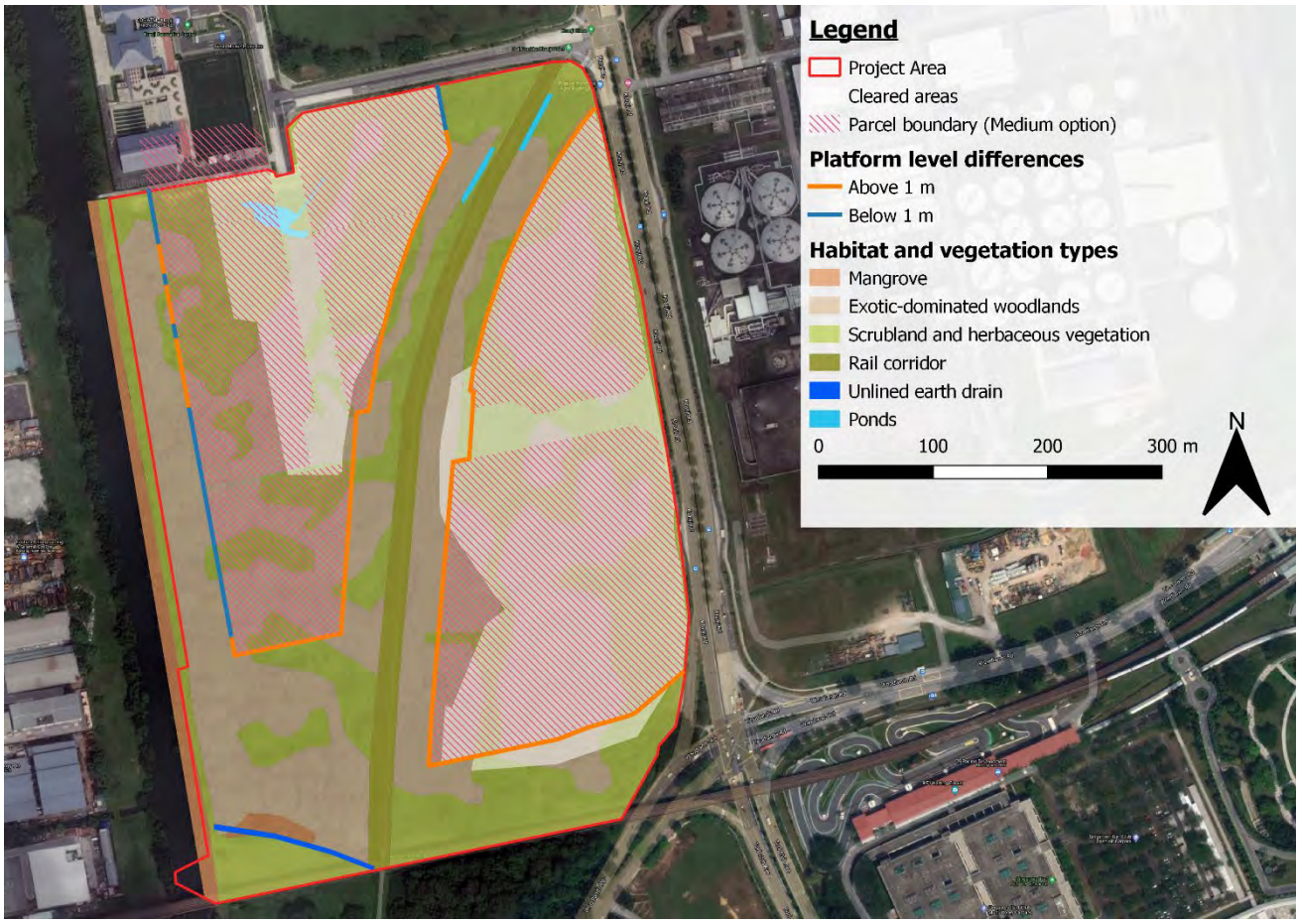

Figure 57: Height difference between the current and future platform levels along the parcel boundary (Option 2)

4.2 Construction Phase

The EMMP (Section 4.5) has been updated to reflect the recommendations applicable during the construction phase.

4.2.1 Habitats

- Elimination/ Avoidance
  - Ensure there are no works in and disturbances to areas outside of the worksites, especially at the areas of high conservation value - Kranji Cross, the mangrove, and unlined earth drain.
  - Ensure any associated slope stabilisation and grading works will not impact topography of areas outside the worksites as well as water quality and hydrology of the mangrove and unlined earth drain.
- Minimisation (Engineering Controls)
  - Engage a QECP to formulate and implement the ECM plans in accordance with the requirements slated by the PUB.
  - Implement dust control measures, such as installing dust screens and water suppression systems.
- Minimisation (Administrative Controls)

- Monitor the habitat quality at Kranji Cross.
- Monitor the water quality in the mangrove.
- Monitor the water quality and aquatic faunal community in the unlined earth drain.
- Ensure silt fences or other silt control measures along the site hoarding are installed and properly maintained.
- Practise due diligence in proper storage and handling of machinery to prevent leaching of oil or harmful materials, such as bentonite slurry, especially into waterbodies.

4.2.2 Fauna

- Elimination/ Avoidance
  - Avoid felling remaining trees and clearing remaining vegetation during the peak bird breeding season (March to July).
- Minimisation (Substitution)
  - Carry out wildlife shepherding via clearing of the remaining vegetation. This entails clearing the site from existing cleared areas towards the forested refuge area south of the Project area.
  - Keep the northern access of Kranji Cross hoarded throughout the duration of the construction to prevent ground-dwelling fauna such as Eurasian wild boars (*S. scrofa*) and Sunda pangolins (*M. javanica*) from being displaced onto adjacent roads (i.e., Kranji Road and Kranji Close) and colliding with vehicles.
  - Conduct pre-felling inspections for fauna before felling any remaining trees or removing any remaining vegetation. This should be conducted by an ecologist.
  - Use quieter construction machinery/equipment as opposed to loud and noisy machinery/equipment whenever possible.
- Minimisation (Engineering Controls)
  - Adopt road calming measures such as speed bumps, and other mitigation measures such as restriction on speed of vehicles, to minimise roadkill accidents at the roads around the Project area.
  - Retain ground cover for as long as possible before removal. When ground cover is removed, ECM are to be in place. Use only fully biodegradable ECB that do not contain plastic/nylon meshes to avoid trapping fauna, particularly fossorial snakes.
  - Implement acoustic barriers to reduce noise pollution outside the worksites.
  - In situations where night-works are necessary and approved by the relevant authorities, it is essential to develop a night work-specific EMMP, including but not limited to the following framework:
    - Install lighting only where/when necessary.
    - Limit the duration of lighting.
    - Reduce the trespass of lighting by using minimal number of luminaires, positioning the light sources at low positions relative to the ground, directing and shielding the area to minimise light spills into adjacent habitats while having the necessary lighting levels for working safely.

  - Use warm colour temperature light sources, preferably at less than 2,700 K.
  - Minimise noise levels at night.
- The Project Owner should consider carrying out a full EIA to quantify the impacts of light, airborne noise, ground-borne vibration, and air quality on ecological receptors, so as to better inform the mitigation measures required to alleviate them.

- Minimisation (Administrative Controls)
  - Execute the Wildlife Response Plan if any fauna is found on-site.
  - Conduct biodiversity awareness training for site personnel.
  - Restrict site personnel access to areas of high conservation value and buffer areas.
  - Monitor the nests of the changeable hawk-eagle (*N. cirrhatus*) and white-bellied sea eagle (*Haliaeetus leucogaster*) that are adjacent to the worksites on a monthly basis to ensure that they are not affected/disturbed by works on-site.
  - Conduct monthly surveys for straw-headed bulbuls (*P. zeylanicus*) to determine its persistence in adjacent habitats, identify important feeding or breeding grounds if any, and recommend mitigation measures where necessary, e.g., avoidance of noisy works in the vicinity of a nesting site.
  - Conduct monthly ecologist site inspections to ensure contractor compliance and to identify potential fauna entrapments.

4.3 Operational Phase

Due diligence should be exercised by the management and tenants of the development to implement operational procedures and maintenance regimes that are in line with the design intents set out during the design phase (Section 4.1).

4.3.1 Habitats

Planted landscapes should be judiciously maintained according to design intents:

- Allow areas designated as buffer zones to naturalise. Maintenance in buffer zones, if any, should be infrequent and light (Section 4.1.1)
- For ABC Waters Features, adopt a maintenance regime where removal of plants is done in a partial alternating manner to ensure there will always be mature plants in the pond/wetland (Section 4.1.1)
- Where feasible, use alternative pest control strategies and avoid the use of pesticides to allow insect diversity to thrive. When pesticides are required, only use them at targeted areas and avoid spraying them outdoors to limit the unintended negative impact on habitats.

4.3.2 Fauna

- Where buildings adopt adaptive features for preventing bird-building collisions such as exterior shades (Section 4.1.2), ensure these are activated in a timely manner during the peak migratory season (September to February)

- Adopt an adaptive wildlife management strategy such as restricting access to areas with frequent human-wildlife conflict and putting up additional educational signages where necessary.
- Establish a wildlife response plan in consultation with NParks Animal Management Centre for encounters with trapped, injured or dead wildlife, as well as incidents of human-wildlife conflict

4.4 Residual Impacts

4.4.1 Construction Phase

Habitats

The assessment of residual impacts during the construction phase was conducted for the selected sensitive habitat receptors. Before mitigation measures were theoretically implemented, the impact significance for the loss of vegetation was Major for exotic-dominated woodland as well as scrubland and herbaceous vegetation while the impact significance for changes in species composition was Moderate for Kranji Cross and Major for exotic-dominated woodland.

As the major level impacts are mainly a result of loss of vegetation, the appropriate mitigation measure to implement would be to retain the areas of high conservation value with a vegetated buffer of at least 30-m wide (Section 4.1.1) at the design phase. However, given that the majority of the habitats will still be removed, the residual impact significance will remain as Major.

As for the changes in species composition, with enhancement of habitat through infill planting (Section 4.1.1) at the design phase, it is possible to reduce edge effects and reduce the impact significance to Minor.

Fauna

- **Butterflies**

  The most severe impact during construction phase before mitigation measures were implemented is of Major significance to threatened butterfly species as a result of loss of/ reduction in habitats and food sources. With the implementation of the recommended retention of areas of high conservation value and buffer zones, the butterflies may still persist, but as most of the habitats will be lost, the impact significance will remain Major.

- **Reptiles**

  The most severe impacts during construction phase before mitigation measures were implemented is of Major significance to the threatened reptiles as a result of loss of/ reduction in habitats and food sources as well as loss of ecological connectivity. With the implementation of the recommended retention of areas of high conservation value and buffer zones, the reptiles may still utilize the habitat as a corridor, but as most of the habitats will be lost, the impact significance will remain Major.

- **Birds**

  The most severe impacts during construction phase before mitigation measures were implemented is of Major significance to most of the forest-dependent threatened birds as a result of loss of/ reduction in habitats and food sources as well as loss of ecological connectivity. With the implementation of the recommended retention of areas of high conservation value and buffer zones, the more sensitive bird species may still utilize the Project area as a corridor, but as most of the habitats will be lost, the impact significance will remain Major. For the more urban-adapted species such as the Oriental magpie-robin (*C. saularis*) and red junglefowl (*G. gallus*), the retention of areas of high conservation value and vegetated buffer zones may be sufficient to sustain the populations, reducing the impact significance to Moderate.

Other impacts of Major significance to birds include human presence. Provision of vegetated buffer zones and restricting personnel access to areas of high conservation value may alleviate the impact on the more disturbance-tolerant species and the impact significance may be reduced to Moderate. However, the more sensitive species will likely still be displaced from the habitats adjacent to the worksites, and the impact significance remains Major.

- **Non-volant Mammals**

  The species that is likely to be the most severely impacted during construction phase is the Sunda pangolin (*M. javanica*). Before mitigation measures were implemented, loss of/reduction in habitats and food sources, loss of ecological connectivity and human presence are all of Major significance. Retention of areas of high conservation value and buffer zones and restriction of personnel access to these areas, the pangolin may still utilize the Project area as a corridor, but as they are highly sensitive and most of the habitats will be lost, the impact significance will remain Major.

4.4.2 Operational Phase

Habitats

In the assessment of residual impacts during the operational phase for the selected sensitive habitat receptors, the impact significance was Moderate for Kranji Cross, exotic-dominated woodland as well as scrubland and herbaceous vegetation before mitigation measures were theoretically implemented.

As the major level impacts are mainly a result of changes in species composition, the appropriate mitigation measure to implement would be to implement a judicious landscape maintenance regime (Section 4.3.1). This will reduce the residual impact significance to Minor.

Fauna

- **Butterflies**

  The most severe impact during operational phase before mitigation measures were implemented is of Moderate significance to the threatened butterflies as a result of injury or mortality. By limiting the indiscriminate use of pesticides and other promoting the use of other pest control strategies, the impact significance will be reduced to Minor.

- **Reptiles**

  The most severe impacts during operational phase before mitigation measures were implemented is of Major significance to the threatened reptiles as a result of light disturbances and human presence. With the implementation of artificial light management strategies and limiting human activities in areas of high conservation value and buffer zones, the impact significance will be reduced to Moderate.

- **Birds**

  The most severe impacts during operational phase before mitigation measures were implemented is of Major significance to the threatened birds as a result of light disturbance and human presence. With the implementation of artificial light management strategies and limiting human activities in areas of high conservation value and buffer zones, the impact significance will be reduced to Moderate.

- **Non-volant Mammals**

  The most severe impacts during operational phase before mitigation measures were implemented is of Major significance to the threatened mammals as a result of light disturbance and human presence. With

the implementation of artificial light management strategies and limiting human activities in areas of high conservation value and buffer zones, the impact significance will be reduced to Moderate.

4.5 Future Developments

Subsequent developments in the vicinity of the Project were identified and high-level mitigation are considered based on potential impact to receptors identified as part of the FBS. These recommendations are beyond the current Project scope and boundary and the scope of work of this FBS. These recommendations will be subject to the developer's discussion/s with relevant agencies when the designs of the developments are available. (**Appendix G**).

5.0 BIODIVERSITY MONITORING PROGRAMME

5.1 Scope of Work and Objectives

The BMP will be conducted during the construction phase, over an initial period of 15 months, based on agreed EBS scope of work (Section 1).

Table 24 summarises the objectives and management measures/monitoring parameters that will be carried out.

Table 24: Summary of objectives and management measures/monitoring parameters for the biodiversity monitoring programme

Objectives	Management Measures/Monitoring Parameters	Location	Frequency
Prevent entrapment/ injury/ mortality to fauna	Site clearance	Within worksites	During site clearance
	Pre-felling fauna inspections prior to tree felling or vegetation removal	Within worksites	During site clearance
	Post-site clearance fauna inspections	Within worksites	After site clearance
	Site inspections to check for presence of trapped/ injured/ dead fauna, potential fauna entrapments and gaps in site hoarding	Within worksites	Monthly and upon installation of new hoarding sections
	Closure of northern access of Kranji Cross to prevent fauna road kills	Kranji Cross	Throughout duration of construction
	Phasing of trapezoidal drain construction	Trapezoidal drain	Throughout duration of construction
Minimise impacts of construction works on sensitive habitats in close proximity	Monitoring of sensitive habitats in the vicinity, e.g., excessive vegetation removal, illegal dumping	Sungei Pang Sua, unlined earth drain, Kranji Cross, ponds	Monthly
Monitor and mitigate impacts to raptor nests	Observations of nesting activity	Raptor nests adjacent to worksites	Monthly

Objectives	Management Measures/Monitoring Parameters	Location	Frequency
Monitor and mitigate impacts to straw-headed bulbuls (*P. zeylanicus*)	Presence, abundance, locations and behaviour of straw-headed bulbuls (*P. zeylanicus*)	Adjacent to worksites	Monthly
Prevent human-wildlife conflict	Toolbox briefings on biodiversity awareness	Within worksites	When required, up to quarterly

5.2 Pre-felling Fauna Inspection and Site Clearance

The objective of pre-felling fauna inspection and site clearance is to remove target fauna from the worksites before construction works begin to prevent fauna entrapment, injury and mortality, whilst minimising contact between human and wildlife. Target fauna species include ground-dwelling mammals such as the Eurasian wild boar (*Sus scrofa*) and Sunda pangolin (*Manis javanica*), as well as animals that may be implicated in human-wildlife conflicts, e.g., snakes, during site clearance. The general direction of the site clearance in Plot 3 should be towards the south. The following sub-sections detail the workflow for the site clearance.

5.2.1 Pre-felling Fauna Inspection

The following will be achieved during the pre-felling fauna inspections:

- Inspection for (potentially) active animal nests, hollows and other nesting structures, and any animals that may potentially get trapped/injured or die during site clearance. Animals, e.g., snakes, that may be implicated in human-wildlife conflict during site clearance will also be identified. The pre-felling inspection by the ecologist is valid for seven days. Trees that are not felled and vegetation that is not cleared within this period will have to be re-inspected by the ecologist. The workflow for the inspection is shown in **Figure 59**.
- Reporting and documentation of fauna observations and recommend mitigating measures.
- Coordination of the Wildlife Response Plan (Section 5.7) for dealing with wildlife encounters.

Figure 58: Pre-felling fauna inspection conducted by ecologists to identify active nests, presence of fauna, and other habitat structures that may require vegetation or trees to be removed or felled under the supervision of an ecologist

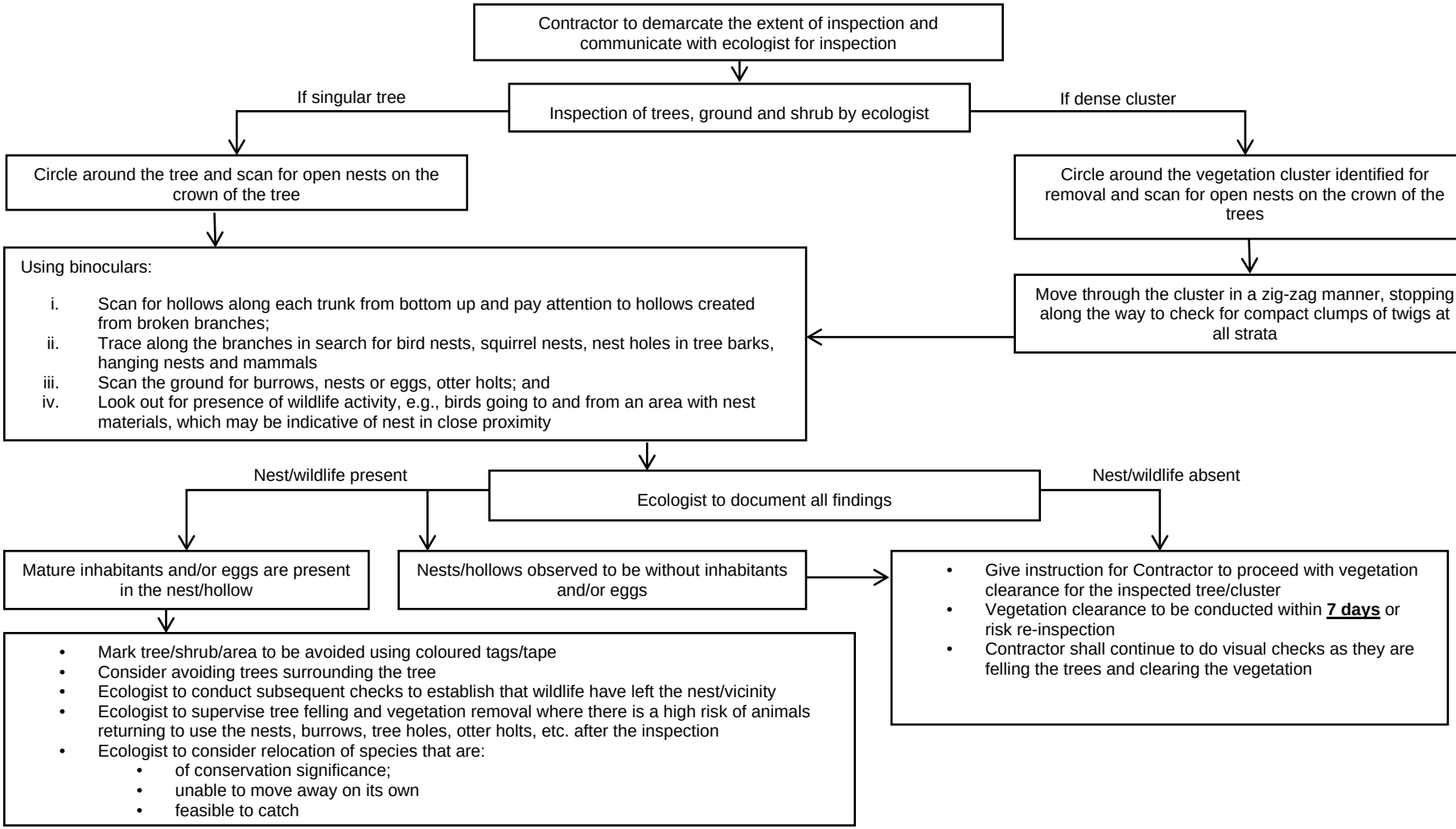

Figure 59: The workflow for a pre-felling fauna inspection

5.2.2 Site Clearance

Clearance of the remaining vegetation within the Project area, as well as clearance of vegetation within the working space for the proposed trapezoidal drain, will be required. Prior to clearance, the worksite hoarding will need to be completed, after which a drone with a thermal imaging camera will be deployed to assess if there are any remaining fauna within the Project area.

The drone will be flown at least three hours after sunset, and will detect larger-bodied mammals (e.g., Eurasian wild boars) that may be within the Project area. Camera traps will also be deployed in the remaining vegetation within the site over a period of at least three full days; with traps spaced approximately 50 m apart. Upon retrieving the camera traps, the videos will be processed to determine if there are any remaining fauna trapped within the worksite hoarding.

If any Eurasian wild boar is spotted within or around the Project area at any time during the project, NParks must be informed at e-mail address *nparks_wildlife_management@nparks.gov.sg* as soon as possible for advice and subsequent action. An approved wild boar removal contractor must also be engaged to trap and remove the said wild boar. The trapping and removal process may take about 4-8 weeks. If there are remaining fauna within the worksite hoarding, the ecologists will develop methods to remove them in consultation with the Project contractor, NParks, and relevant stakeholders.

5.2.3 Post-site Clearance Fauna Inspection

After site clearance has been completed for each plot, the ecologist will visually inspect the site for presence of target fauna. The hoarding will be inspected to ensure there are no gaps where fauna can re-enter the Project area. If there are remaining fauna on-site, the ecologist will develop methods to remove them in consultation with the contractor and relevant authorities, e.g., NParks.

5.3 Closure of Kranji Cross to Prevent Fauna Roadkills and Phasing of Trapezoidal Drain Construction

The northern access of Kranji Cross will be hoarded throughout the duration of the construction to prevent fauna displaced from the cleared worksite venturing onto Kranji Road and Kranji Close and becoming susceptible to collision with vehicles. The construction of the proposed trapezoidal drain along the southern-eastern edge of the Project area should be phased in a manner that ensures there is an accessible corridor, Kranji Cross, that allows ground-dwelling animals to move between the Project area and the vegetated refuge area to the south.

5.4 Monthly Fauna Inspection

Fauna inspections encompassing the following activities will occur as monthly inspections (**Figure 60**):

- Visual inspection of Sungei Pang Sua, the unlined earth drain, Kranji Cross, and ponds to ensure that the habitats have not been damaged or affected.
- Visual checks for animal entrapments on-site, particularly in ECM sedimentation ponds, erosion control blankets and among construction materials and equipment. ECBs should be fully biodegradable and not contain plastic/nylon meshes to avoid trapping fauna, particularly fossorial snakes.
- Inspection of site hoarding to ensure that integrity is maintained throughout the duration of the construction to prevent entry of ground-dwelling fauna.
- Reporting and documentation of all findings and recommendations.

Figure 60: Photographs showing monthly fauna inspections to ensure integrity of hoarding, inspect sensitive habitats in proximity, ensure there is no trapped fauna (e.g., in ECM sedimentation ponds, erosion control blankets), and biodiversity awareness training for site personnel

5.5 Monthly Raptor Nest Monitoring

The changeable hawk-eagle (*N. cirrhatus*) and white-bellied sea eagle (*H. leucogaster*) nests identified during the baseline study will be monitored on a monthly basis. The monitoring will be conducted between 0700h–1000 h each month. Observations of nesting activity will be documented. Mitigation measures to alleviate any disturbance or impacts arising from the construction will be provided if necessary.

5.6 Monthly Straw-headed Bulbul Monitoring

Targeted surveys for straw-headed bulbuls (*P. zeylanicus*) will be conducted monthly in the habitats adjacent to the worksites. The survey transect will closely correspond to that undertaken during the FBS. The surveys will be conducted between 0700h–1000 h each month. The presence, abundance, locations, and behaviours of straw-headed bulbuls seen or heard will be documented. Important feeding or breeding grounds if any, will be identified and mitigation measures to protect them will be recommended, e.g., avoidance of noisy works in the vicinity of a nesting site.

5.7 Wildlife Response Plan

The Wildlife Response Plan will be enacted when a trapped/ injured/ dead/ dangerous animal is encountered around or within the worksites. The objective of the wildlife response plan is to minimise animal injury and mortality by responding appropriately to the different scenarios in **Figure 61**. This will be emphasized during the toolbox briefings (Section 5.8).

All wildlife incidents shall be reported and documented in a Wildlife Incident Form (**Appendix H**). The Wildlife Incident Form shall be completed and submitted by the Huationg's worker and/or supervisor to Huationg's Project Manager, i.e., Contractor's Official Representative, and to the Superintendent Officer (SO)/SO Representative. The Wildlife Incident Form can also be completed and submitted by the Registered Site Supervisor to the SO/ SO Representative. JTC's Project Manager and Deputy Director as well as Golder Project Manager, i.e., EMMP Consultant, will be copied in all communications pertaining to Wildlife Incident Form submission.

Where fauna is trapped on-site, various options (species-specific) will be explored to remove it from site (e.g., capture and relocate, partition site, use of one-way exit door) (**Figure 62**).

In scenarios where certain animal groups are encountered around or within the worksites, external specialists may be contacted to handle the animal. A registry of approved wildlife management companies is available at the Public Registry of Certified Animal Management Specialists[6]. These scenarios are shown below:

- For encounters with snakes that require relocation/handling, a snake specialist should be contacted.
- For animal carcasses that require disposal, an animal carcass disposal service should be contacted.
- For injured animals that require medical attention, a veterinarian should be contacted.

[6] https://www.nparks.gov.sg/avs/animals/animal-related-businesses/animal-management-companies/public-registry-of-certified-animal-management-specialists

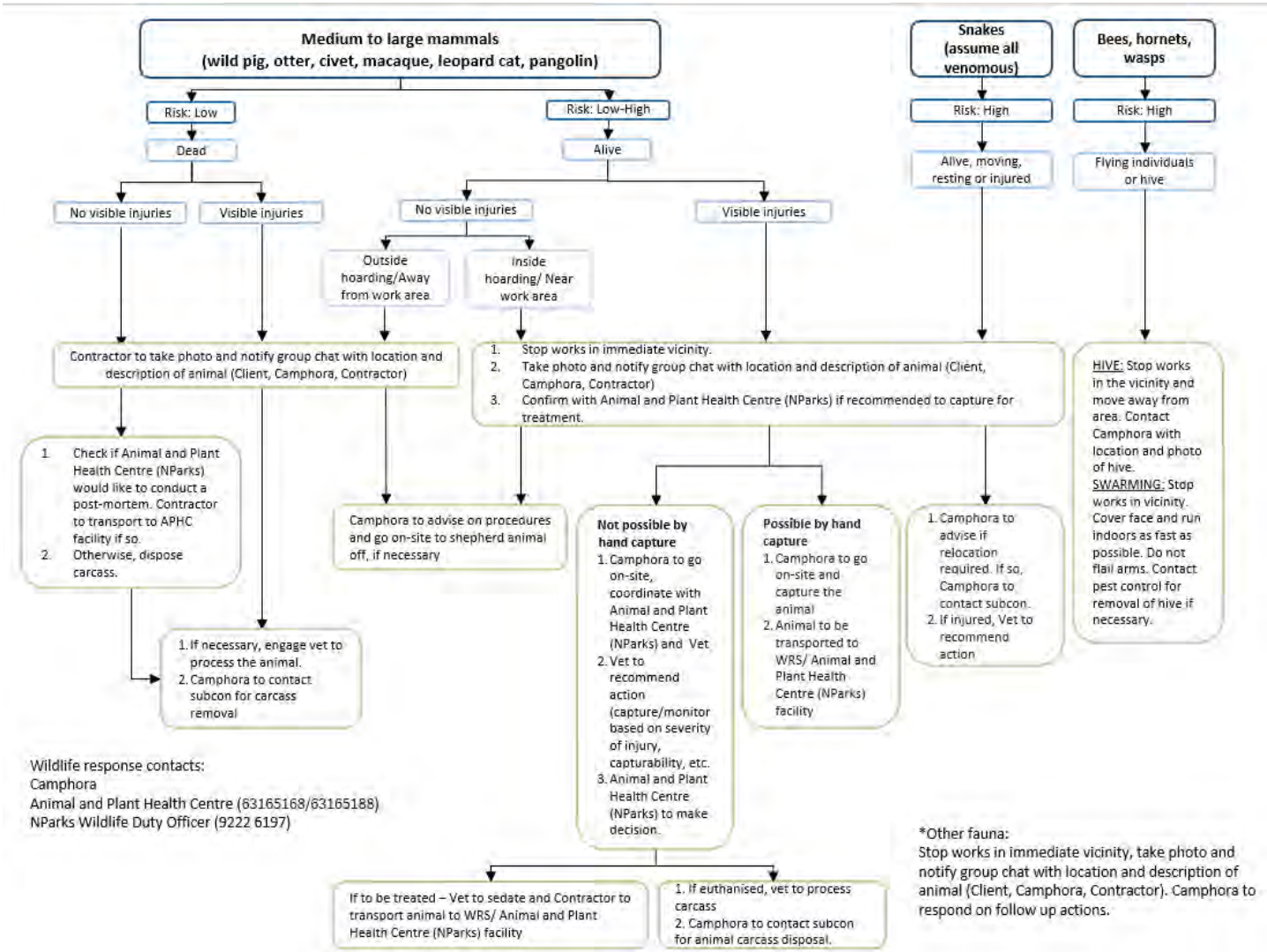

Figure 61: Wildlife Response Plan

Figure 62: Example of a one-way flap door to allow fauna to exit independently

5.8 Toolbox Briefing on Biodiversity Awareness

The ecologist will conduct toolbox briefings (when necessary, up to once per quarter) to inform site personnel of their responsibilities towards fauna, how to minimise impacts to wildlife and how to respond to fauna encounters (**Figure 61**).

6.0 CONCLUSION

Faunistic field surveys focused on the following fauna groups: Odonates, Butterflies, Herpetofauna (Amphibians and Reptiles); Birds; Mammals (including Bats); Molluscs; Marine Arthropods and Fishes. The biodiversity baseline surveys (including camera trapping results) concluded with a total of 206 species, consisting of 15 species of conservation significance and two species of interest.

For the habitat receptors, the most severe impacts are the loss of vegetation for ponds, exotic-dominated woodland and herbaceous and scrubland vegetation at the construction phase. As most of these habitats will be lost, despite implementation of mitigation measures, the residual impact significance remains as Moderate for the pond and Major for exotic-dominated woodland and herbaceous and scrubland vegetation. Other notable impacts include changes in species composition around the edges of cleared vegetation and the neighbouring vegetation during both construction and operational phase. However, with the implementation of mitigation measures, the impact significance of these impacts for habitats can be reduced to Minor. Thus, it is important for the mitigation measures be rigorously implemented.

For the faunal receptors, the most severe impacts affecting across the different taxa is the loss of/ reduction in habitats and food sources and loss of ecological connectivity for faunal movement during the construction phase. As most of the habitats will be lost, despite implementation of mitigation measures, most of the residual impact significance remains as Major and Moderate. Other notable impacts during the construction phase include injury or mortality and human presence. The implementation of mitigation measures may only be able to reduce the impact significance of these impacts for some less sensitive species. In the operational phase, light disturbances and human presence are the most severe impacts for reptiles, birds and non-volant mammals. With the successful implementation of the mitigation measures, the impact significance for most species will be reduced from Major to Moderate. Though the mitigation measures will not be able to reduce all the impact significance to Minor or Negligible, it is still important to implement them rigorously to minimize impacts on the faunal species.

The recommended EMMP aims to prevent entrapment/injury/mortality to fauna, minimise impacts of construction works on sensitive habitats in close proximity, and prevent human-wildlife conflict. The findings from the baseline study and the recommended mitigation measures have also been incorporated into the BMP. The programme will comprise pre-felling fauna inspections, site clearance, post-site clearance fauna inspections, monthly fauna inspections, wildlife response plan, and toolbox briefings on biodiversity awareness.

Signature Page

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APPENDIX A

Method Statement for Cast In-Situ Drainage Works

METHOD STATEMENT
FOR
Cast In-situ Drainage Works

Rev.	Date	Description	Prepared	Reviewed
00	01 Jun 2020	MS for Cast In-situ drainage works	Wong Wai Yuen	Chua Ngee Hwee
01	09 Jun 2020	MS for Cast In-situ drainage works	Wong Wai Yuen	Chua Ngee Hwee
02	17 Jun 2020	MS for Cast In-situ drainage works	Wong Wai Yuen	Chua Ngee Hwee

Method Statement for Cast In-situ Drainage Works

Contents

1 Purpose

Proposed drainage system involved in this contract include construction of reinforced concrete (RC) U drain, RC box culvert, RC sump and Trapezoidal drain. This method statement presents the proposed construction sequence, which subject to amendment according to the approved drawing by Consultant.

2 Types of RCU, RCS and RCBC

The type of drain, location and drain size is illustrated in Table 1:

No	Location	Road	Type	Size (mm)
1	B3- island	Road 2	RCBC	600 x 800
2	B5-B6	Road 2	RCBC	1200 x 900
3	E2-island	Road 2	RCBC	600 x 800
4	B7-B2	Road 2	RCBC	1500 x 1300
5	B5	Road 2	RCS	1800 x 1800
6	B6	Road 2	RCS	1800 x 1800
7	B2	Road 2	RCS	2850 x 2250
8	B7	Road 2	RCS	2850 x 2250
9	B3	Kranji Road	RCS	2250 x 900
10	Island near B3	Kranji Road	RCS	900 x 900
11	E2	Kranji Road	RCS	2250 x 900
12	Island near B3	Kranji Road	RCS	900 x 900
13	D2	Future road	RCS	3000 x 2250
14	D3	Future road	RCS	3000 x 2250
15	B1-B2	Road 2	RCU	1200
16	B2-B3	Road 2	RCU	1500
17	B3-B4	Road 2	RCU	1500
18	B1-B5	Road 2	RCU	1200
19	B6-B7	Road 2	RCU	1200
20	B7-E2	Road 2	RCU	1500
21	E2-E1	Kranji Road	RCU	1500
22	B6-C4	Int. driveway	RCU	600
23	B5-C1	Int. driveway	RCU	600
24	B6-C4	Int. driveway	RCU	600
25	C4-C5	Int. driveway	RCU	800
26	C5-C2	Int. driveway	RCU	800
27	B5-C1	Int. driveway	RCU	600
28	C1-C2	Int. driveway	RCU	800
29	D4 end	Future road	RCU	3400
30	A1-A3	Road 1	RCU	900
31	A1-A2	Road 1	RCU	900
32	F1-F2	Kranji Close	RCU	900
33	Island near B3	Kranji Road	RCU	600
34	Island near E2	Kranji Road	RCU	600
35	C2-C3	Future road	Trapezoidal	1600
36	D1-C3	Future road	Trapezoidal	7000
37	C3-D2	Future road	Trapezoidal	7000
38	D3-D4	Future road	Trapezoidal	7000
39	Overall plot	Overall plot	C7	-

Table 1: Summary of RCU, RCBC, RCS and Trapezoidal drain

3 Preparation works for drainage works

The following preparatory works shall be accomplished before commencement of drainage construction works:

- Precondition, Topo survey and Precomputation plan
  - Engage registered surveyor to carry out precondition photographic survey.
  - Engage registered surveyor to carry out topographical survey.
  - Registered surveyor to prepare precomputation plan of drainage alignment.
  - Contractor to get concurrence from SO on precomputation plan of drainage alignment.
- Cable detection and NCE
  - Contractor shall verify at the beginning of the work that there are no existing services running below or across the proposed drains by conducting cable detection.
  - Contractor shall highlight to the SO's rep where there are existing services affecting or would be affected by the proposed drains upon cable detection.
  - Engage LCDW to purchase services plan from authorities and carry out services detection on site.
  - LCDW to apply NCE / NCD from authorities.
  - Trial hole is to be done at area to be excavated for drainage system if necessary.
  - Ensure all the affected services are removed or diverted with acknowledgement of SO, authority or owner of property.
- ERSS for the drainage works
  - Engage PE to design the ERSS required for construction of drains.
  - Submit the ERSS design to SO for review and subsequently submit to BCA.
  - Obtain clearance and PTW from BCA for the commencement of ERSS.
- Contractor shall verify on site that the invert levels of all the exiting drains against the levels as shown in the drawings are in order.
- Drainage diversion (if necessary)
  - Identify if there is any drain to be diverted to facilitate the construction works.
  - Engage PE to design the drain diversion and make submission to PUB, if necessary.
  - Obtain clearance from PUB and SO on the proposed drain diversion before carrying out any physical diversion work.
  - Divert existing drainage system to ensure continuous flow of water before demolition of the existing drainage system, if any.
- Demolition of drain (if any)
  - Demolish existing drain if it happens to obstruct the proposed drainage works.
  - Demolish all the affected structures before commencement of drainage works.
- Ensure the area is free of any form of obstruction before excavating the trench for drainage system. Remove the obstruction with acknowledgement of SO, authority or owner of property before removing any obstruction of site.
- Remove the debris off site.
- If the existing ground is higher than the proposed platform level, excavate the ground to proposed platform level to facilitate the excavation of drain trench in future.

- Mobilize necessary machineries to site such as excavator, excavator with LM certificate and vibratory roller.
- Equipment such as lifting gears, concrete bucket, air compressor and vibrator shall be onsite before commencement of drainage works.
- Material such as steel reinforcement (rebar and wire mesh), ordinary portland cement (OPC), hardcore, formwork, concrete spacer and any other material which deemed to be required to accomplish the drainage works are mobilized to site.
- Provide barricade and waning signage along the excavated drainage trench.

4 Equipment, materials to be used for Drainage Works

Machineries and equipment to be used for the operation are shown as below:

a) CAT 312 / CAT 320
b) Lorry Crane
c) Tipper Truck / Dump Truck
d) 4-tonne Roller
e) 1-tonne Roller
f) 10-tonne Roller
g) Air Compressor
h) Vibrator
i) Concrete Bucket
j) Water Pump
k) Portable Generator
l) Electrical Hand Cutter
m) Hand Drilling Machine
n) Electrical Hand Breaker

Materials to be used for the operation are shown as below:

a) Rebar / Wire Mesh
b) Ordinary Portland Cement (OPC)
c) Hardcore
d) Formwork
e) Concrete Spacer
f) Curing Compound
g) Bonding Agent
h) Expansion Joint
i) Grating with frame
j) Aluminium Rung
k) Sand
l) Geo-textile
m) Geo-composite
n) Neoprene pad
o) Building paper
p) Galvanised rebar (dowel bar for approach slab)
q) Quarry dust
r) Graded granite/ Recycled Concrete Aggregate

5 Procedure of constructing RCU, RCS, RCBC and Trapezoidal drain

Construction of drainage works are categorized in the type of drain as below:

a) Construction of RCU
b) Construction of RCS
c) Construction of RCBC
d) Construction of Trapezoidal drain

5.1 Construction of RCU

a) Setting out of drain alignment
   - Surveyor to identify the drain location on site. The locations are marked on site using timber peg.

b) Excavation of drainage trench
   - Excavator to excavate the drain trench up to the hardcore base level.
   - Ensure the proposed drain area is excavated to sufficient width and depth.
   - Implement earth retaining stability structure (ERSS) when the depth is more than 1.5m. Contractor have to implement the approved ERSS on site to ensure the stability of soil at both sides of drain trench.
   - Cut the ground to form the ERSS profile. All the excavated soil is loaded onto tipper truck and send to approved dumping ground.
   - Barricade the drain trench and safety signage is put up.

c) Preparation of drain base
   - Compact the hardcore base level by using 1-tonne roller
   - On top of the compacted ground, put pegs at reasonable intervals to mark the proposed level of hardcore base.
   - Lay hardcore base and compact it using 1-tonne
   - roller. The hardcore base after compaction shall be the stipulated thickness as of drawings.
   - On top of compacted hardcore base, put pegs at reasonable intervals to mark the proposed level of lean concrete.
   - Casting lean concrete on top of compacted hardcore base and level the lean concrete surface.
   - Surveyor to peg and mark proposed drain centerline on lean concrete.
   - Drain edge line is established and marked on the lean concrete as well.

d) Construction of drain base slab, wall and top slab.
   - Deploy excavator with LM to hoist down the prefabricated rebars for drain base slab, and commence the rebar tying and fabrication of formworks according to approved construction drawing.
   - Request RTO for inspection before casting of base slab. Further to order for concrete from approved concrete plant once the inspection is passed, and complete the concreting of base slab.
   - Dismantle base slab formworks on the following day.
   - Install drain channels (invert level of the drain channels to be checked) and cast benching with mass concrete. The grade of benching is as indicated in construction drawing.

- Steel reinforcement and formwork of drain wall are then installed. Mark the required drain top level.
- Steel reinforcement is as indicated in construction drawing. Request RTO for inspection before closing formwork (external side). Ensure aluminum rung is installed at distance and interval indicated in construction drawing.
- Ensure weep hole is installed at distance and interval indicated in construction drawing as well. The diameter of weep hole is indicated in construction drawing.
- Once drain wall rebar inspection is cleared, proceed to close the remaining formwork.
- Cast concrete of drain wall using appropriate grade. Engine vibrator is used during concreting to ensure evenly distribution of concrete within formwork.
- The level of concrete has to match with the drain top slab (mesh/ rebar anchorage) marked previously.
- Dismantling of internal drain wall formwork on the following day.
- Plaster the drain inner wall to seal up the opening of formwork tie.
- Apply curing compound to the freshly done concrete structure.
- Erection of falsework and formwork for the drain top slab.
- Installation of rebar/ mesh for drain top slab including the grating frame.
- Request RTO for inspection before casting of top slab. Further to order for concrete from approved concrete plant once the inspection is passed, and complete the concreting of top slab.
- Drain top slab to be broom finished; tactile tiles (if any) and expansion joints to be installed before the concrete set.
- Dismantling of external drain wall formwork on the following day.
- Falsework to be maintained for supporting the top slab for 7 days before dismantling.

e) Drain wall treatment and backfilling

- Installation of geo-composite on both side of drain outer wall before backfilling both side of drain with soil.
- The soil backfilled at both sides of drain shall be at least 50mm lower to prevent soil being washed into drain.
- Backfill both sides of completed drain wall with earth and immediately compact the ground using roller.
- Reinstate slope at both sides of drain to required level, alignment and gradient.
- Turf the ground.
- Repeat whole process for next stretch of U drain.

f) Typical work sequence for RCU construction
Generally, RCU construction is consists of setting out and excavation, preparation of drain base, structural works for drain base slab, drain wall and drain top slab and finally the drain wall treatment plus backfilling. The preparation of drain base until the completion of drain top slab is illustrated as Figure 1.

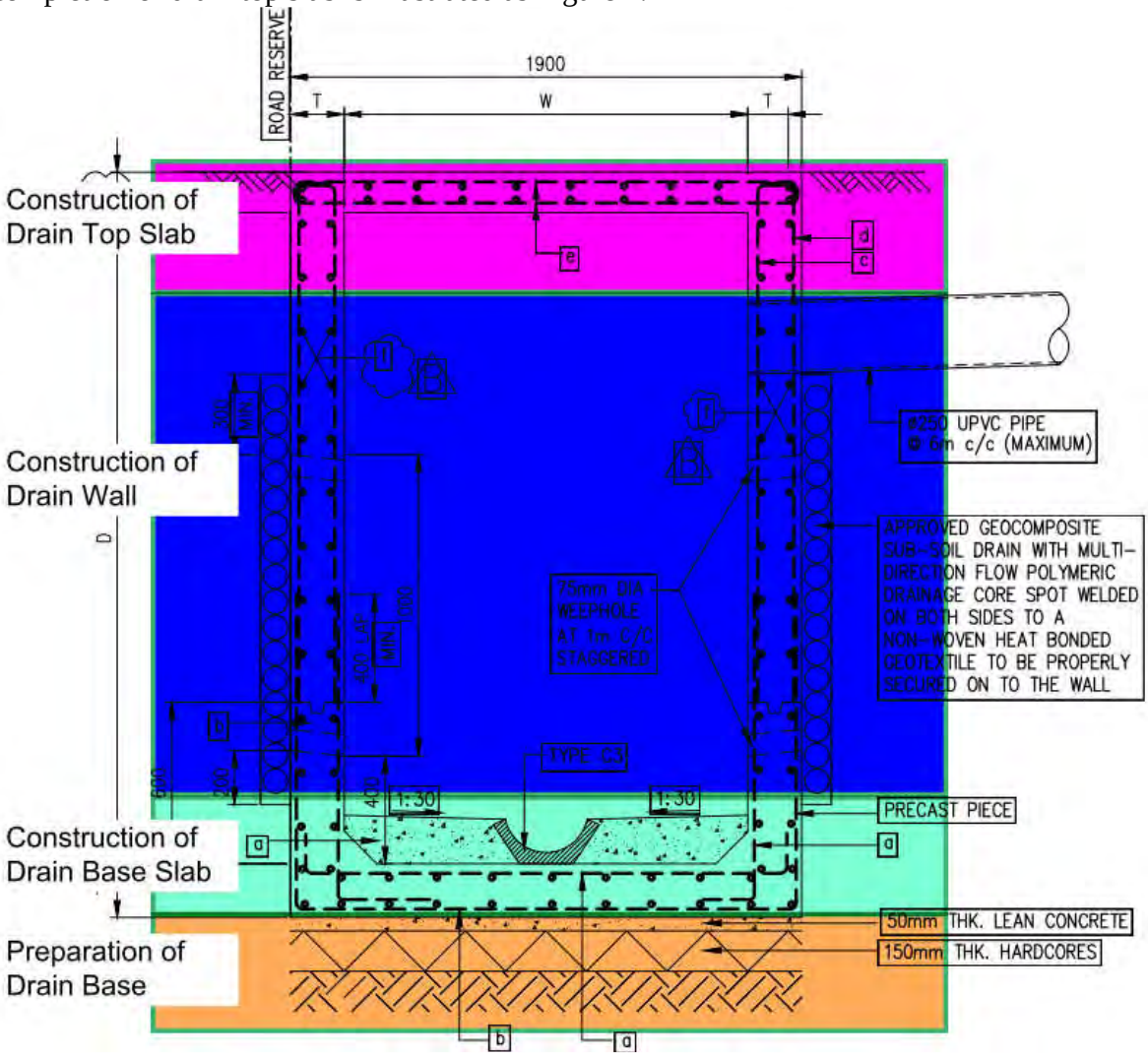


Figure 1: Typical RCU construction work sequence

5.2 Construction of RCS

a) Setting out of sump position
- Surveyor to mark the center point of proposed RC sump.

b) Excavation of sump
- Excavator operator to excavate the ground to required level, i.e. the hardcore base level.
- Ensure the proposed sump area is excavated to sufficient width and depth.
- The opening excavated shall be large enough for the construction of sump including working space.
- Supervisor to check the opening size and ditch level.
- Implement earth retaining stability structure (ERSS) when the depth is more than 1.5m. Contractor have to implement the approved ERSS on site to ensure the stability of soil at all sides of sump ditch.
- Cut the ground to form the ERSS profile. All the excavated soil is loaded onto tipper truck and send to approved dumping ground.
- Barricade the sump ditch and safety signage is put up.

c) Preparation of sump base
- Compact the hardcore base level by using 1-tonne roller
- On top of the compacted ground, put pegs to mark the proposed level of hardcore base.
- Lay hardcore base and compact it using 1-tonne roller. The hardcore base after compaction shall be the stipulated thickness as of drawings.
- On top of compacted hardcore base, put pegs to mark the proposed level of lean concrete.
- Casting lean concrete on top of compacted hardcore base and level the lean concrete surface.
- Surveyor to peg and mark proposed sump on lean concrete.

d) Construction of sump base slab, wall and top slab
- Fabricate rebar and formwork for sump base and wall.
- Request RTO for inspection before casting of base slab. Further to order for concrete from approved concrete plant once the inspection is passed, and complete the concreting of base slab.
- Dismantle base slab formworks on the following day; fabricate rebar and formwork for sump wall.
- Install drain channels and cast benching with mass concrete. The grade of benching is as indicated in construction drawing.
- Steel reinforcement and formwork of sump wall are then installed. Mark the required sump top level.
- Steel reinforcement is as indicated in construction drawing. Request RTO for inspection before closing formwork (external side). Ensure aluminum rung is installed as indicated in construction drawing.
- Install 75mm pvc pipe at 1m c/c staggered for week hole.
- Once drain wall rebar inspection is cleared, proceed to close the balance formwork.

- Cast concrete of drain wall using appropriate grade. Engine vibrator is used during concreting to ensure evenly distribution of concrete within formwork.
- The level of concrete has to match with the sump top slab (mesh/ rebar anchorage) marked previously.
- Dismantling of internal drain wall formwork on the following day.
- Plaster the drain inner wall to seal up the opening of formwork tie.
- Apply curing compound to the freshly done concrete structure.
- Erection of falsework and formwork for the sump top slab.
- Installation of rebar/ mesh for drain top slab including the grating frame.
- Request RTO for inspection before casting of top slab. Further to order for concrete from approved concrete plant once the inspection is passed, and complete the concreting of top slab.
- Sump top slab to be broom finished; tactile tiles (if any) and expansion joints to be installed before the concrete set.
- Dismantling of external drain wall formwork on the following day.
- Falsework to be maintained for supporting the top slab for 7 days before dismantling.
- Depending on the height of sump wall, it may require more than one operation to cast the sump wall up to top slab soffit level.

e) Sump wall treatment and backfilling
- Installation of geo-composite on both side of drain outer wall before backfilling both side of sump with soil.
- The soil backfilled at both sides of sump shall be at least 50mm lower.
- Backfill both sides of completed sump wall with earth and immediately compact the ground using roller.
- Reinstate slope at both sides of sump to required level, alignment and gradient.
- Turf the ground.
- Repeat whole process for next sump.

f) Typical work sequence for RCS construction

Generally, RCS construction is consists of setting out and excavation, preparation of sump base, structural works for sump base slab, sump wall and sump top slab and finally the sump wall treatment plus backfilling. The preparation of sump base until the completion of sump top slab is illustrated as Figure 2.

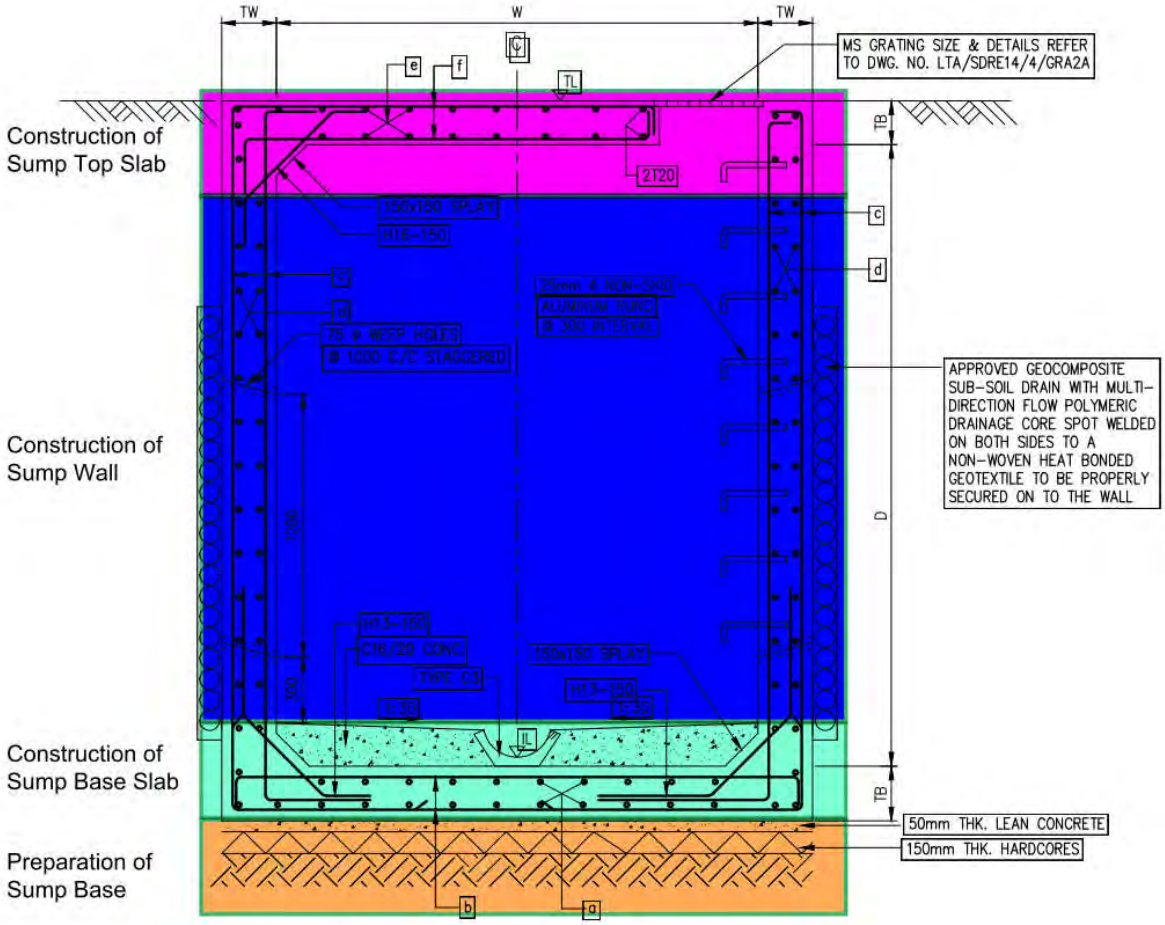


Figure 2: Typical RCS construction work sequence

5.3 Construction of RCBC

a) Setting out of RCBC alignment
- Surveyor to identify the box culvert location on site. The locations are marked on site using timber peg.

b) Excavation of RCBC
- Excavator to excavate the box culvert trench up to the hardcore base level.
- Ensure the proposed box culvert area is excavated to sufficient width and depth.
- Implement earth retaining stability structure (ERSS) when the depth is more than 1.5m. Contractor have to implement the approved ERSS on site to ensure the stability of soil at both sides of box culvert trench.
- Cut the ground to form the ERSS profile. All the excavated soil is loaded onto tipper truck and send to approved dumping ground.
- Barricade the box culvert trench and safety signage is put up.

c) Preparation of RCBC base
- Compact the hardcore base level by using 1-tonne roller
- On top of the compacted ground, put pegs at reasonable intervals to mark the proposed level of hardcore base.
- Lay hardcore base and compact it using 1-tonne roller. The hardcore base after compaction shall be the stipulated thickness as of drawings.
- On top of compacted hardcore base, put pegs at reasonable intervals to mark the proposed level of lean concrete.
- Casting lean concrete on top of compacted hardcore base and level the lean concrete surface.
- Surveyor to peg and mark proposed RCBC centerline on lean concrete.
- RCBC edge line is established and marked on the lean concrete as well.

d) Construction of RCBC base slab, wall and top slab
- Deploy excavator with LM to hoist down the prefabricated rebars for box culvert base slab, and commence the rebar tying and fabrication of formworks according to approved construction drawing.
- Request RTO for inspection before casting of base slab. Further to order for concrete from approved concrete plant once the inspection is passed, and complete the concreting of base slab.
- Dismantle base slab formworks on the following day.
- Install drain channels (invert level of the drain channels to be checked) and cast benching with mass concrete. The grade of benching is as indicated in construction drawing.
- Steel reinforcement and formwork of box culvert wall are then installed. Mark the required box culvert top level.
- Steel reinforcement is as indicated in construction drawing. Request RTO for inspection before closing formwork (external side).
- Ensure weep hole is installed at distance and interval indicated in construction drawing as well. The diameter of weep hole is indicated in construction drawing.
- Once box culvert wall rebar inspection is cleared, proceed to close the remaining formwork.

- Installation of corbel formwork and rebar (box culvert rebar anchorage to be installed as well). Request RTO for inspection before casting box culvert wall and corbel.
- Cast concrete of box culvert wall and corbel by using appropriate grade. Engine vibrator is used during concreting to ensure evenly distribution of concrete within formwork.
- The level of concrete has to match with the corbel top level.
- Dismantling of drain wall formwork (internal and external side of box culvert) on the following day.
- Plaster the drain inner wall to seal up the opening of formwork tie.
- Apply curing compound to the freshly done concrete structure.
- Erection of falsework and formwork for the box culvert top slab.
- Installation of rebar for box culvert top slab, including the galvanized dowel bars.
- Request RTO for inspection before casting of top slab. Further to order for concrete from approved concrete plant once the inspection is passed, and complete the concreting of top slab.
- Dismantling of external box culvert wall formwork on the following day.
- Falsework to be maintained for supporting the top slab for 7 days before dismantling.

e) RCBC wall treatment and backfilling
- Installation of geo-composite on both side of drain outer wall before backfilling both side of sump with soil.
- Backfill both sides of box culvert wall with quarry dusts and compacted it using 10-tonne roller.
- The filling of quarry dusts shall stop at bottom of graded aggregate bottom below the approach slab.
- The alignment of approach slab on compacted quarry dusts is established.
- Excavator operator to top up graded aggregate and the aggregate shall be well compacted by 10-tonne roller. The final thickness of compacted aggregate shall be 250mm.

f) Construction of approach slab
- Installation of geo-textile on top of the compacted graded aggregate, installation of building paper and neoprene pad.
- Installation of rebar and fabrication of formwork for approach slab.
- Request RTO for inspection before casting of approach slab. Further to order for concrete from approved concrete plant once the inspection is passed, and complete the concreting of base slab.
- Use concrete vibrator during concrete casting to ensure the concrete is poured evenly and thoroughly within formwork.
- Dismantling of formwork on the next day.
- Repeat the above steps for construction of next stretch of box culverts.

g) Typical work sequence for RCBC construction
Generally, RCBC construction is consists of setting out and excavation, preparation of box culvert base, structural works for box culvert base slab, box culvert wall and box culvert top slab and finally the box culvert approach slab. The preparation of box culvert base until the completion of box culvert approach slab is illustrated as Figure 3.

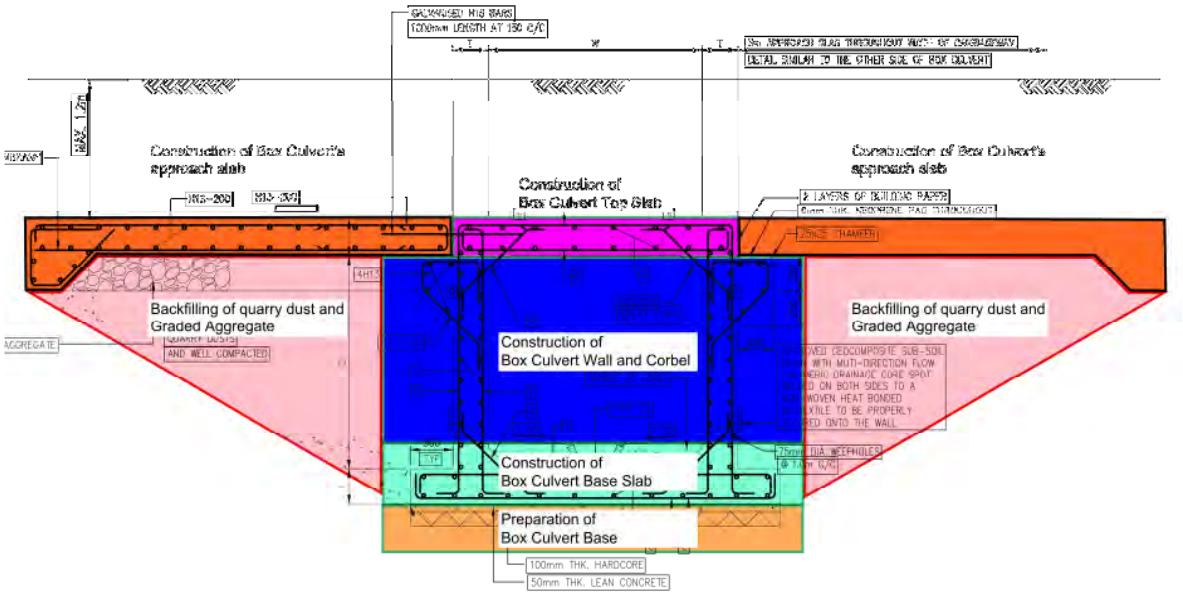


Figure 3: Typical RCBC construction work sequence

5.4 Construction of Trapezoidal drain

a) Setting out of trapezoidal drain alignment
- Surveyor to identify the drain location on site. The locations are marked on site using timber peg.

b) Excavation of Trapezoidal Drain trench
- Excavator to excavate the trapezoidal drain trench up to the hardcore base level.
- Ensure the proposed drain area is excavated to sufficient width and depth.
- Implement earth retaining stability structure (ERSS) when the depth is more than 1.5m. Contractor have to implement the approved ERSS on site to ensure the stability of soil at both sides of drain trench.
- Cut the ground to form the ERSS profile. All the excavated soil is loaded onto tipper truck and send to approved dumping ground.
- Barricade the drain trench and safety signage is put up.

c) Preparation of drain base
- Compact the hardcore base level by using 1-tonne roller
- On top of the compacted ground, put pegs at reasonable intervals to mark the proposed level of hardcore base.
- Lay hardcore base and compact it using 1-tonne roller. The hardcore base after compaction shall be the stipulated thickness as of drawings.
- On top of compacted hardcore base, put pegs at reasonable intervals to mark the proposed level of lean concrete.
- Ensure weep hole and geo-textile are installed at distance and interval indicated in construction drawing as well. The diameter of weep hole is indicated in construction drawing.
- Casting lean concrete on top of compacted hardcore base and level the lean concrete surface.
- Surveyor to peg and mark proposed drain centerline on lean concrete.
- Drain edge line is established and marked on the lean concrete as well.

d) Construction of trapezoidal drain concrete lining (without access)
- Deploy excavator with LM to hoist down the welded mesh (BRC) for drain concrete lining according to approved construction drawing.
- Install drain channels (invert level of the drain channels to be checked); benching to be cast together with the concrete lining.
- Request RTO for inspection before casting of concrete lining. Further to order for concrete from approved concrete plant once the inspection is passed, and complete the concreting of concrete lining.

e) Construction of trapezoidal drain concrete lining and slope (with access).
- Deploy excavator with LM to hoist down the welded mesh (BRC) for drain concrete lining according to approved construction drawing.
- Steps to be formed by using formwork and secured at both edge of the steps; rebar to be installed as of construction drawings.
- Install drain channels (invert level of the drain channels to be checked); benching to be cast together with the concrete lining.
- Request RTO for inspection before casting of concrete lining. Further to order for

concrete from approved concrete plant once the inspection is passed, and complete the concreting of concrete lining.

f) Railing and turfing works
- Installation of Type-B railing as stipulated in the construction drawing.
- The soil to be backfilled and compacted by using 1-tonne roller.
- Reinstate slope at both sides of drain to required level, alignment and gradient.
- Turf the ground.
- Repeat whole process for next stretch of Trapezoidal Drain.

g) Typical work sequence for Trapezoidal Drain construction
Generally, Trapezoidal construction is consisting of setting out and excavation, preparation of drain base, structural works for drain concrete lining and finally the finishing works. The preparation of trapezoidal drain base until the completion of trapezoidal drain is illustrated as Figure 4.

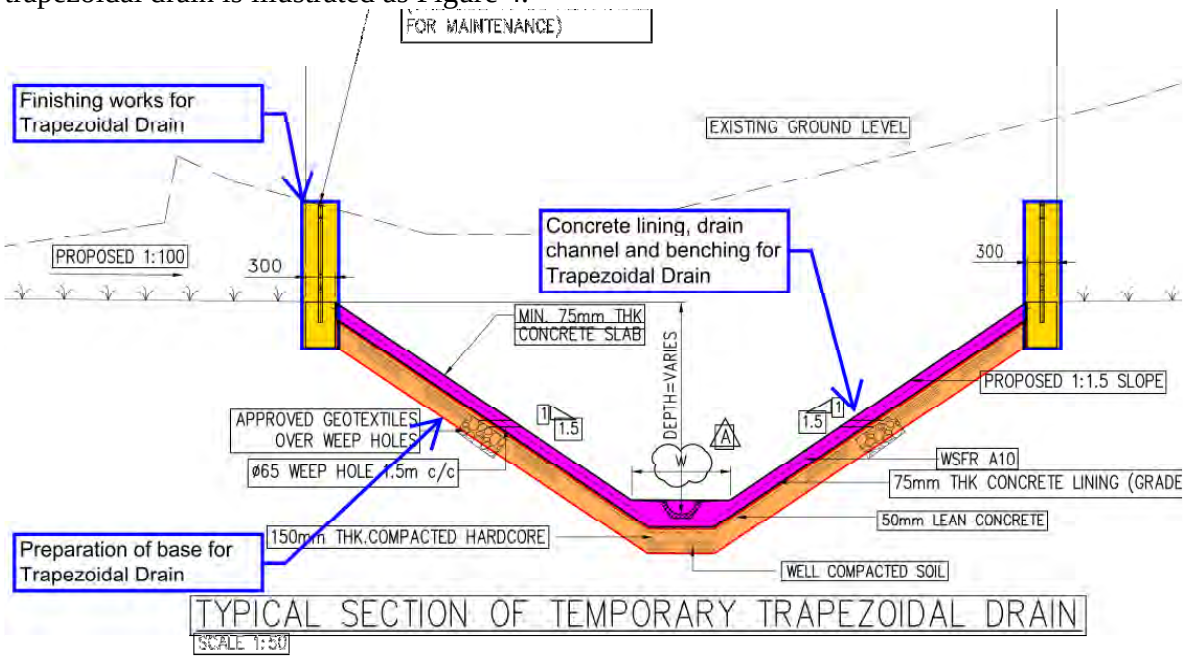


Figure 4: Typical Trapezoidal Drain construction work sequence

5.5 Construction of C7 drain, silt trap and cascade drain

There are C7 drains to be constructed after the plot trimmed into desired profile.
Contractor will either fabricate the precast C7R drain or directly purchase from suppliers.

- Contractor shall prepare sufficient steel mould of C7R.
- Precast C7R drain daily with stipulated concrete grade. Request RTO to witness the casting regularly.
- Contractor shall include BRC A5 in precast C7R drain. Refer to Figure 5 for detail of precast C7R drain.

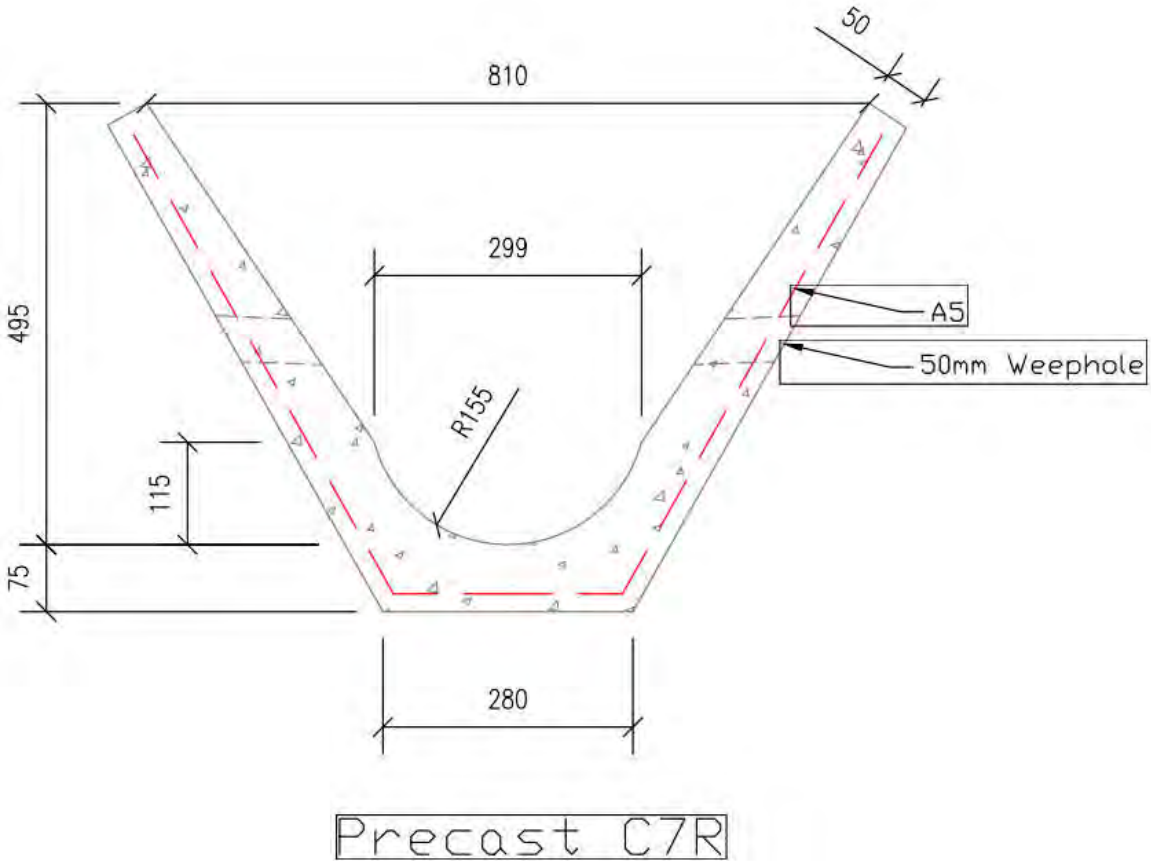


Figure 5: Detail of Precast C7R

C7 drain construction is shown as below:

a) Setting out of C7 drain alignment
   - Surveyor to identify the drain location on site. The locations are marked on site using timber peg.

b) Excavation of C7 trench
   - Supervisor to identify the excavation depth from existing ground level to sand base of precast C7R.
   - Open cut method with 1:1 slope is adopted to excavate the trench.
   - Excavator operator to excavate the ground to desired level.

c) Preparation of drain base
   - Compact the ground using 1-tonne roller.
   - Supervisor to check the level. If the level is higher than desired level, instruct excavator operator to trim ground to desired level; if level is lower than desired level, top up the ground with unwashed sand.
   - Lay 50mm thick sand as of Figure 6.

Figure 6: Laying of sand for C7 drain

   - Compact the sand base again using 1-tonne roller.
   - Ensure the stretch of sand base is in required gradient. The sand base level shall be as precise as possible as it will affect the invert level.

d) Installation of C7 drain
- Excavator with LM certificate is deployed to lift and lay the precast C7R drain on sand base.
- Supervisor to ensure the precast drain is placed correctly on the proposed alignment.
- Seal up the gap between precast drains with 1:3 cement mortar as of Figure 7.

Figure 7: Laying of C7 drain

e) Backfilling for C7 drain line.
- Backfill both side of precast C7R.
- Excavator operator to compact the adjacent slopes of drain, if the drain top level is lower than the platform proposed level.
- The gradient of slope shall be 1:1 from the top of drain wall to the proposed platform level as shown in Figure 8.

Figure 8: Compaction of slope adjacent to C7 drain

- Cast 50mm thick concrete as lining to slope as of Figure 9.

Figure 9: Casting of concrete lining for the C7 drain slope

- Turf the adjacent slopes of drain.
- Repeat the above steps for next stretch of C7R.

6 Drainage that involve over-pumping, demolition or ERSS (other than open cut)

There are several drains which require over-pumping, involve demolition works as well as different type of ERSS (other than open cut). The type of drain and its special arrangement shall be listed in Table 2.

No	Location	Road	Type	Size (mm)	Excavation	Diversion/ Demolition
1	B3- island	Road 2	RCBC	600 x 800	Open cut	NA
2	B5-B6	Road 2	RCBC	1200 x 900	Open cut	NA
3	E2-island	Road 2	RCBC	600 x 800	Open cut	NA
4	B7-B2	Road 2	RCBC	1500 x 1300	Open cut	NA
5	B5	Road 2	RCS	1800 x 1800	Open cut	NA
6	B6	Road 2	RCS	1800 x 1800	Open cut	NA
7	B2	Road 2	RCS	2850 x 2250	Open cut	NA
8	B7	Road 2	RCS	2850 x 2250	Open cut	NA
9	B3	Kranji Road	RCS	2250 x 900	Open cut	NA
10	Island near B3	Kranji Road	RCS	900 x 900	Open cut	NA
11	E2	Kranji Road	RCS	2250 x 900	Open cut	NA
12	Island near B3	Kranji Road	RCS	900 x 900	Open cut	NA
13	D2	Future road	RCS	3000 x 2250	Open cut	NA
14	D3	Future road	RCS	3000 x 2250	Open cut	NA
15	B1-B2	Road 2	RCU	1200	Open cut	NA
16	B2-B3	Road 2	RCU	1500	Open cut	NA
17	B3-B4	Road 2	RCU	1500	Open cut	NA
18	B1-B5	Road 2	RCU	1200	Open cut	NA
19	B6-B7	Road 2	RCU	1200	Open cut	NA
20	B7-E2	Road 2	RCU	1500	Open cut	NA
21	E1-E2	Kranji Road	RCU	1500	Shoring excavation	Over-pumping
22	B6-C4	Int. driveway	RCU	600	Open cut	NA
23	B5-C1	Int. driveway	RCU	600	Open cut	NA
24	B6-C4	Int. driveway	RCU	600	Open cut	NA
25	C4-C5	Int. driveway	RCU	800	Open cut	NA
26	C5-C2	Int. driveway	RCU	800	Open cut	NA
27	B5-C1	Int. driveway	RCU	600	Open cut	NA
28	C1-C2	Int. driveway	RCU	800	Open cut	NA
29	D4 end	Future road	RCU	3400	Open cut	NA
30	A1-A3	Road 1	RCU	900	Open cut	NA
31	A1-A2	Road 1	RCU	900	Open cut	NA
32	F1-F2	Kranji Close	RCU	900	Open cut	Demolition and over-pumping
33	Island near B3	Kranji Road	RCU	600	Open cut	NA
34	Island near E2	Kranji Road	RCU	600	Open cut	NA
35	C2-C3	Future road	Trapezoidal	1600	Open cut	NA
36	D1-C3	Future road	Trapezoidal	7000	Open cut	NA
37	C3-D2	Future road	Trapezoidal	7000	Open cut	NA
38	D3-D4	Future road	Trapezoidal	7000	Open cut	NA
39	Overall plot	Overall plot	C7	-	Open cut	NA

Table 2: Drainage excavation method and requirements

The drainage which involve shoring excavation, over-pumping and demolition will be further explained in following sections.

6.1 Construction of 1500 RCU (E2 to E1)

There is a new 1500 RCU along Kranji Road starting from point E1 to E2 as shown in below Figure 10.

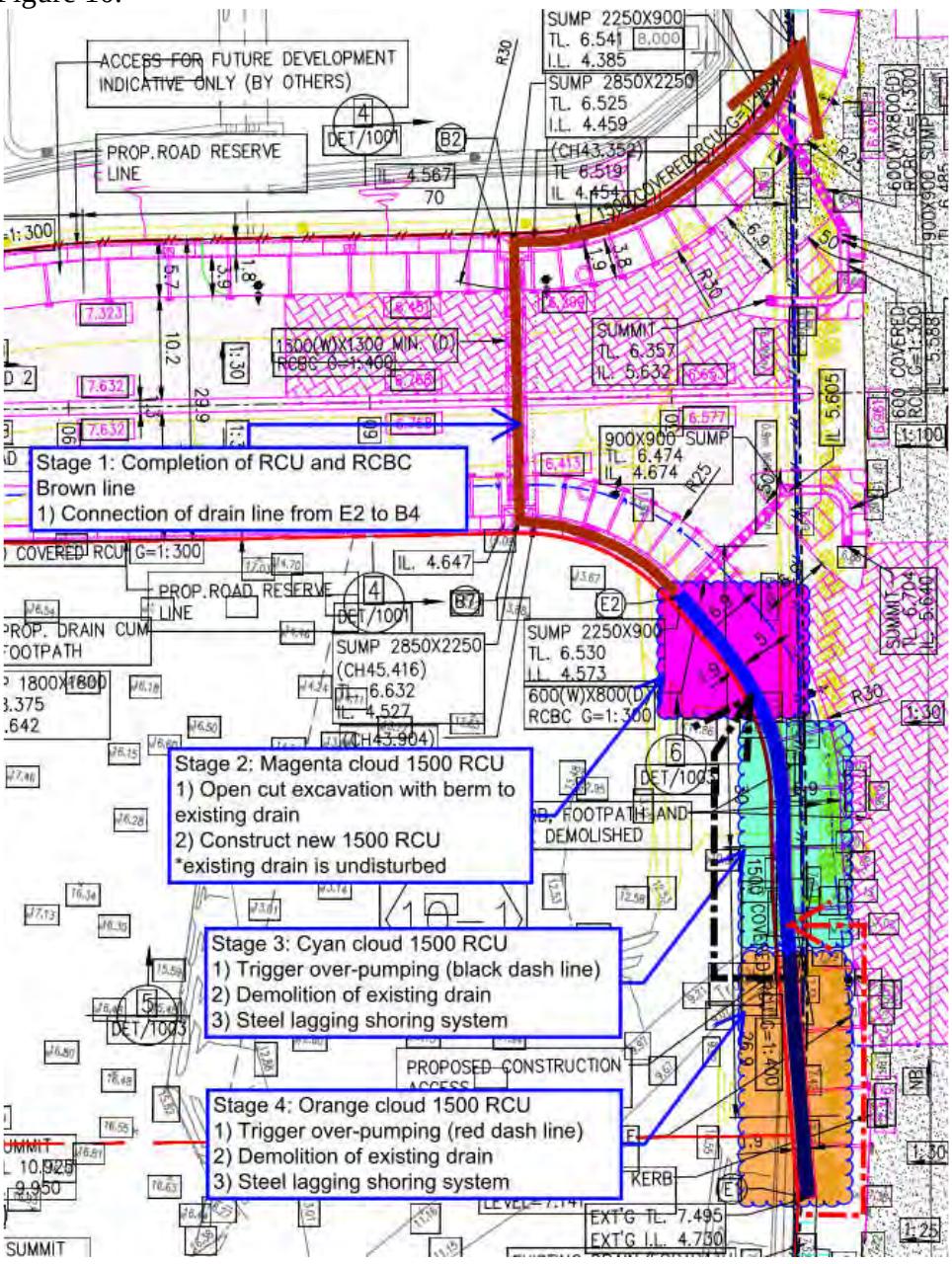


Figure 10: E2 – E1 drain line construction

Drain line E2 to E1 shall be constructed in stages to ensure the flow of existing drain is maintained. The work sequence in stages shall be listed as below:

- Stage 1: completion of RCBC, RCS, RCU as shown in Brown line (Figure 10)
  - 1500 RCU from E2 to RCS shall be completed
  - RCBC B2 to B7 shall be completed
  - 1500 RCU from B2 to connection of existing at B4 shall be completed
- Stage 2: construction of 1500 RCU at E2 (magenta cloud in Figure 10)
  - Existing drain flow is not disturbed, existing drainage to be maintained.
  - Existing drainage shall be utilized as part of the ERSS.
  - Open cut excavation will be used to excavate until the formation level; lean concrete berm will be cast along the existing drain as shown in Figure 11.

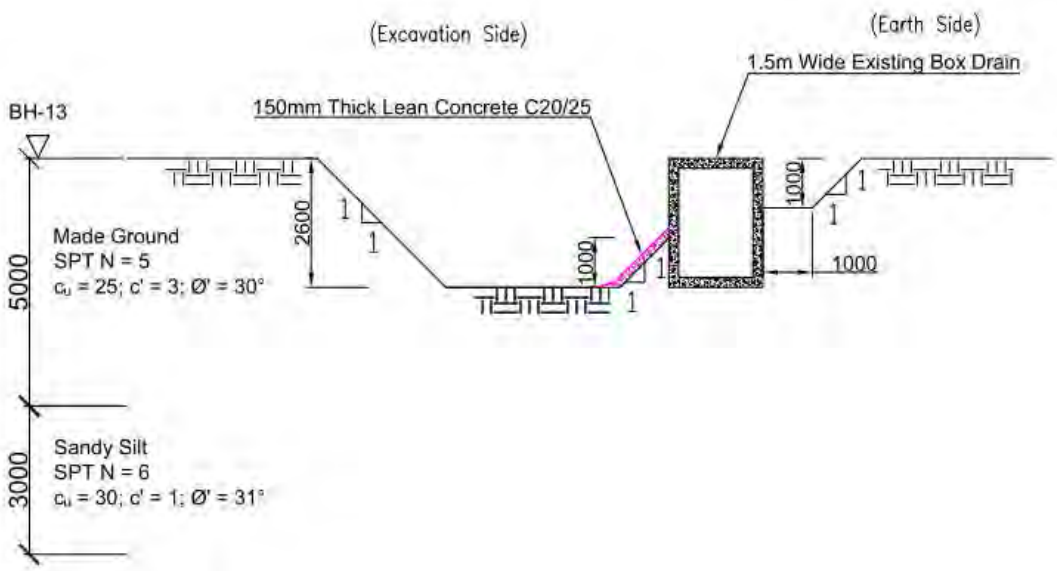


Figure 11: Open cut excavation with lean concrete berm

- Excavation for the drainage to proceed from inner side of the site.
- Construct the 1500 RCU drain as mentioned in previous section.
- Backfilling to the level as shown in approved drainage drawing.

- Stage 3: construction of 1500 RCU towards E1 (cyan cloud in Figure 10)
  - Hoarding to be shifted towards construction site temporary to facilitate the drainage construction.
  - To trigger over-pumping system (black dash line) as shown in Figure 10.
  - Over-pumping system to follow approved ECM scheme as shown in Figure 12)

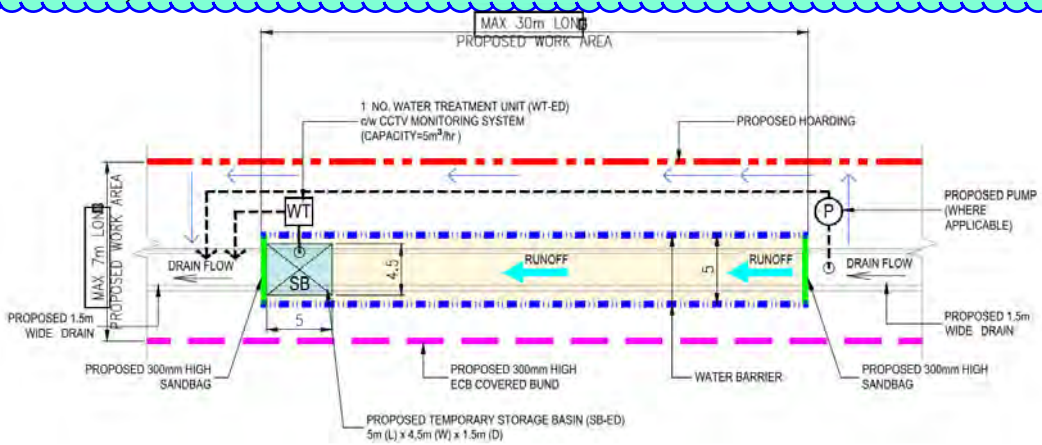


Figure 12: Over-pumping system

- Once the over-pumping is commissioned, 1500 RCU highlighted in cyan cloud in Figure 10 will be started by demolition of existing drain line.
- Existing drain will be demolished by using excavator breaker.
- New drain line will be established.
- Shoring work will be done prior to any excavation works for drainage.
- Steel lagging (consists of steel I-beam and 20mm thick steel plate as of Figure 13) will be installed onsite by using excavator.

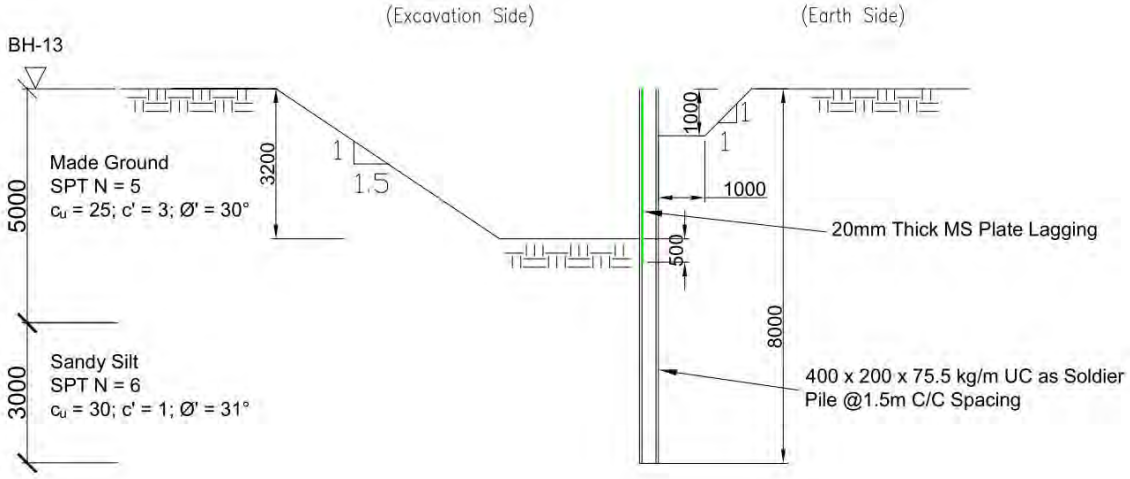


Figure 13: Steel lagging shoring system

- Excavation for the drainage to proceed from inner side of the site.
- Construct the 1500 RCU drain as mentioned in previous section.
- Backfilling to the level as shown in approved drainage drawing.

  - Steel beams, steel plates to be extracted for subsequent stretch of shoring works.
  - Hoarding to be reinstated.

- Stage 4: construction of 1500 RCU towards E1 (orange cloud in Figure 10)
  - Hoarding to be shifted towards construction site temporary to facilitate the drainage construction.
  - To trigger over-pumping system (red dash line) as shown in Figure 10.
  - Once the over-pumping is commissioned, 1500 RCU highlighted in orange cloud in Figure 10 will be started by demolition of existing drain line.
  - Existing drain will be demolished by using excavator breaker.
  - New drain line will be established.
  - Shoring work will be done prior to any excavation works for drainage.
  - Steel lagging (consists of steel I-beam and 20mm thick steel plate as of Figure 13) will be installed onsite by using excavator.
  - Excavation for the drainage to proceed from inner side of the site.
  - Construct the 1500 RCU drain as mentioned in previous section.
  - Backfilling to the level as shown in approved drainage drawing.
  - Steel beams, steel plates to be extracted.
  - Hoarding to be reinstated.

- ERSS for drainage works shall follow the approved ERSS drawing as shown in Appendix 1.
- ECM for drainage works shall follow the approved ECM drawing as shown in Appendix 2

6.2 Construction of 900 RCU (F1 to F2)

There is a new 900 RCU along Kranji Close starting from point F1 to F2 as shown in below Figure 14.

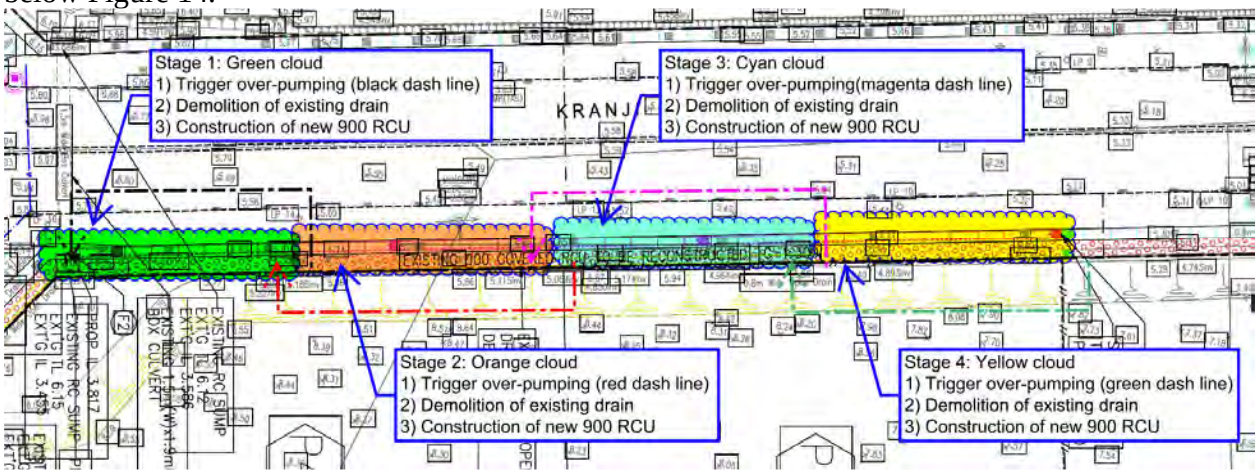


Figure 14: F1 – F2 drain line construction

Drain line F2 to F1 shall be constructed in stages to ensure the flow of existing drain is maintained. The work sequence in stages shall be listed as below:

- Stage 1: Construction of 900 RCU (Green cloud in Figure 14)
  - To trigger over-pumping system (Black dash line as shown in Figure 14)
  - Demolition of existing drain by using excavator breaker.
  - Construction of 900 RCU as mentioned in previous section.
- Stage 2: Construction of 900 RCU (Orange cloud in Figure 14)
  - To trigger over-pumping system (Red dash line as shown in Figure 14)
  - Demolition of existing drain by using excavator breaker.
  - Construction of 900 RCU as mentioned in previous section.
- Stage 3: Construction of 900 RCU (Cyan cloud in Figure 14)
  - To trigger over-pumping system (Magenta dash line as shown in Figure 14)
  - Demolition of existing drain by using excavator breaker.
  - Construction of 900 RCU as mentioned in previous section.
- Stage 4: Construction of 900 RCU (Yellow cloud in Figure 14)
  - To trigger over-pumping system (Green dash line as shown in Figure 14)
  - Demolition of existing drain by using excavator breaker.
  - Construction of 900 RCU as mentioned in previous section.
- ERSS for drainage works shall follow the approved ERSS drawing as shown in Appendix 1.
- ECM for drainage works shall follow the approved ECM drawing as shown in Appendix 2

Appendix 1:
ERSS for drainage works

Design Code and Standard References

1.	SS EN 1990: 2008	Basis of structural design
2.	SS EN 1991-1-1: 2008	General actions - densities, self-weight, imposed loads for buildings
3.	SS EN 1992-1-1: 2008	Design of concrete structures
4.	SS EN 1993-1-1: 2008	Design of steel structures
5.	SS EN 1997-1: 2010	Geotechnical design - General rules
6.	SS EN 1997-2: 2010	Geotechnical design - Ground investigation and testing
7.	SS 557: 2010	Code of Practice for Demolition
8.	BCA BC1: 2012	Design guide on use of alternative structural steel to BS 5950 and Eurocode 3
9.	BS EN 1995	Design of timber structures
10.	BS EN 338 (2016)	Structural Timber – Strength Classes
11.	BS EN 14081-1:2005+A1:2011	Timber structures - Strength graded structural timber with rectangular cross section

General Notes for Building Works

1. It is an offence under the building control act to commence and carry out building works without the approved plans and permit to carry out structural works granted by the commissioner of building control.
2. No building works shall commence and be carried out without approved plans and permit to carry out structural works granted by the Commissioner of Building Control.
3. All building works shall be carried out in accordance to BCA approved drawings.
4. The builder/resident engineer (RE)/resident technical officer (RTO)/supervising qualified person QP(S) shall report to the design qualified person QP(D) any building works deviating from BCA approved drawings and shall not allow such works to commence until the deviation(s) and/or material change(s) are approved by the relevant authorities.
5. The builder shall obtain all necessary approvals from all relevant authorities prior to commencement of the proposed works.
6. The builder shall carry out his due diligence at his own costs to detect any existing services and/or possible underground obstruction on site prior to the commencement of works. Affected existing underground services shall be adequately protected during the construction works to prevent any damages.
7. During construction stage, builder is to ensure that the construction sequence will not result in any instability of the proposed building works or affect the structural stability and integrity of any existing structures.
8. All dimensions shown in the drawings shall be in millimetres unless otherwise stated. Do not scale drawing - Only figured dimensions are to be used.
9. All workmanship and materials shall comply to the requirements of the current editions, including amendments of the relevant SS EN design codes, materials standards, execution standards and Authorities requirements.
10. The builder is to obtain Sewerage Interpretation Plan (SIP), Drainage Interpretation Plan (DIP) and Road Interpretation Plan (RIP) from Architect or Relevant Authorities before commencement of works (i.e. piling, excavation etc).
11. For any alteration and addition works, builder must verify on site for any discrepancy and omission of structural members. The builder is deemed to have included all costs relating to rectifying, provision, amongst others, to comply with Engineer's approval.

Notes for Structural Steel Works

1. All structural steel work to be carried out in accordance with the drawings, the specifications, the latest SS EN 1993 Eurocode 3 or equivalent local code of practices wherever applicable.
2. All structural steel shall comply with the requirements of BS EN 10025, BS EN 10210 and BS EN 10219 grade S275. All steel including bolts and nuts shall be Class 1 Steel complying to BC1:2012. Builder is to submit Factory Production Certificate (FPC) and Manufacturer Test Certificates (MTC) or Mill Certificates for BC1: 2012 requirements.

Notes for Earth Retaining and Stabilising System (ERSS) Works

1. No construction works shall be carried out prior to the approval obtained from all relevant authorities.
3. Builder is to ensure that the existing Gas Transmission Pipes (GTP) and any other services are protected during the construction works.
4. All construction materials used shall comply with the latest authorities' requirements and code of practice.
5. If there are any material changes or deviations from the approved plans, approval must be obtained from the relevant authorities prior to carrying out the proposed construction works on site.
6. Builder and/or Site Supervisor(s) are to report to Design QP should the soil conditions observed on site are different from the soil investigation report.
7. Builder and/or Site Supervisor(s) are to report to Design QP if the ERSS design is unable to achieve the intended depth for his assessment and amendment submission if required.
8. Builder and/or Site Supervisors are to stop the construction works immediately and report to Design QP if any visible ground movements and/or structural deformation is observed on site.
9. Excavation site is to be backfilled immediately shall there be water seepage observed during the construction works.
10. There shall be no additional surcharge within 1x excavation depth from the edge of excavation face at all times.
11. Builder shall ensure proper drainage to be provided in close vicinity of the excavation zone to prevent degradation of the ground conditions.
12. The surcharge of 10kPa was adopted for the design of the ERSS system.

CONTIGENCY PLAN

1.1 Alert Level

The contingency plan to be implemented when the ground movement reaches the alert level as set out in the analysis is;

a. Daily monitoring of instrumentation will be implemented to ensure that any ground movements are being recorded and analysed. All reports will be submitted to the Professional Engineer. A reanalysis may also be carried out based on the site situation and prepared for the necessary remedial action should the ground movement escalates to work suspension level.

b. Visual inspection of the surrounding will be carried out so as to pick up any visible tell tale signs of ground movements. The monitoring frequency may be increased to minimum twice daily or even more during the bulk excavation stage.

c. Inspections to the surrounding buildings, common facilities and existing viaduct will be carried out to check the severity of damages. Buildings / houses will also be inspected to ensure the structure stability. Immediate attention and remedial action, if necessary, will be taken for buildings and common facilities to prevent them from further deterioration.

d. Immediate action as recommended by the Professional Engineer will also be carried out on site depending on the cause of the ground movement. Remedial actions such as backfilling to stabilize the movement of the ERSS, or introduction of recharge well (if ground settlement is generated due to dewatering) will be adopted.

1.2 Work Suspension Level

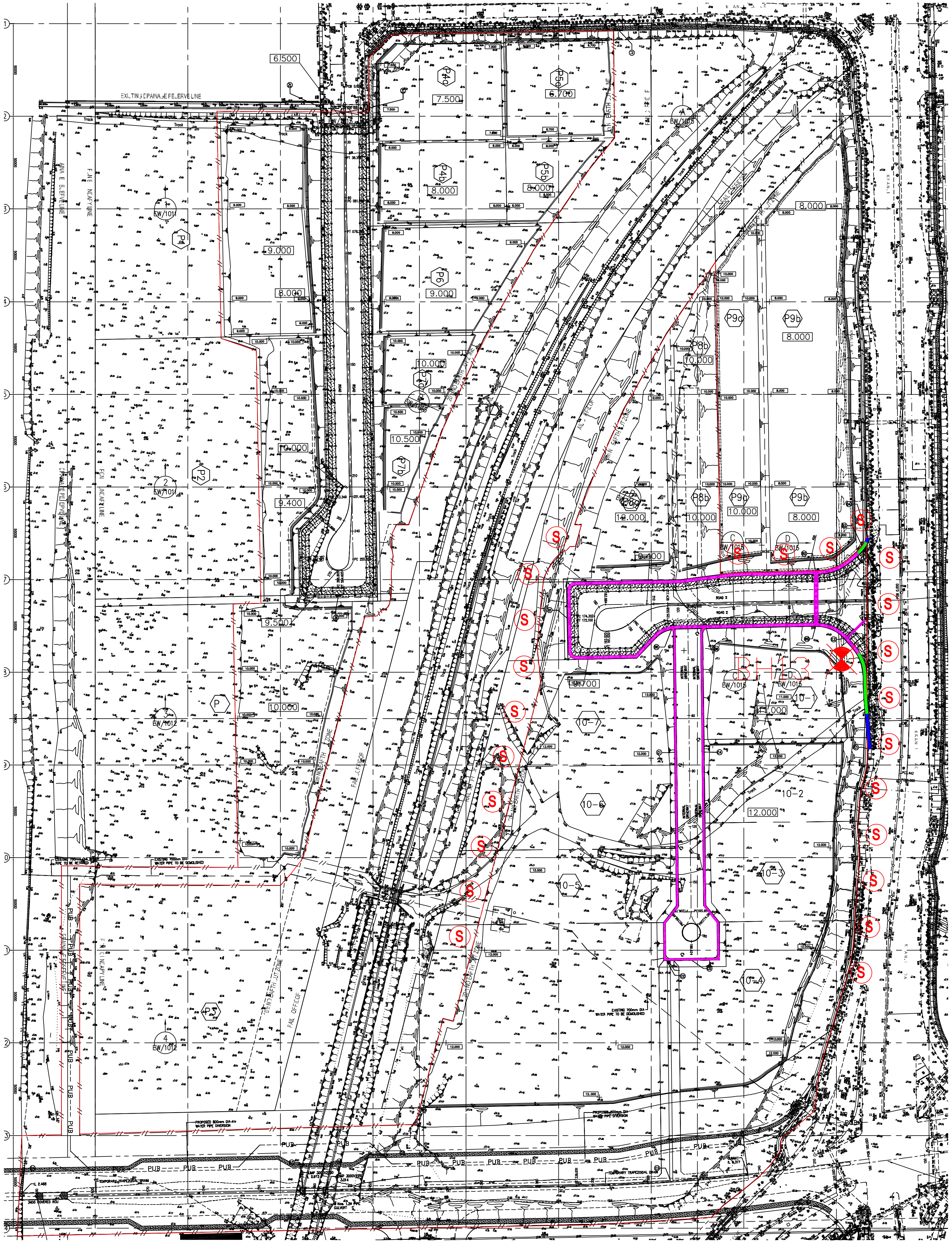
The contingency plan to be implemented when the ground movement reaches the work suspension level as set out in the analysis is;

a. Close monitoring of the ground movement with the aid of instrumentation will be continued daily. Visual inspection will also be carried out.

b. All works affecting the ground stability will be suspended to ensure that the ground condition does not deteriorate. The working area will also be cordoned off to prevent any unauthorized access.

c. The Professional Engineer and Consulting Engineer will be notified immediately of the site condition. A site inspection will then be held immediately to confirm the appropriate remedial action.

d. Additional struts and members will be installed immediately as per the Professional Engineer's design and inspected prior to recommencement of works.



INSTRUMENTATION & LAYOUT PLAN

SCALE: N.T.S

LOCATION PLAN

SCALE: N.T.S

Legend:

- Borehole Location
- Proposed Site Hoarding
- 🟪 Open Cut Excavation Under ST100
- 🟩 Excavation Next to Existing Drain Under ST100
- 🟦 Shoring Excavation Under ST100

Type of Instrumentation	Nos.	Monitoring Frequency	Open Cut Excavation Up to 4m	
			Alert Level	Work Suspension Level
S Ground Settlement Marker (Every 25m C/C Spacing from Each Other)	24	Twice Weekly (During Excavation Works) OR Once Weekly (Where no excavation works)	11mm	15mm

NOTES:

1) Frequency of monitoring should be twice a week during the excavation work and once a week when no excavation work is carried out on site.
2) Readings to be commence when instruments are within 30m radius of the excavation works
3) The contractor shall ensure proper protections are provided for the instrumentations. Any damages on the instrumentation shall be repaired immediately and QP shall be informed immediately.

01 Sheet of 03

BUILDING CONSTRUCTION AUTHORITY
APPROVED UNDER SECTION 5 / SECTION 5A OF THE
BUILDING CONTROL ACT (CHAPTER 29)

Project Ref. No.: E2990-00005-2019-ST100

for Commissioner of Building Control

STANDARD CERTIFICATION BY THE QUALIFIED PERSON FOR STRUCTURAL WORKS

1. In accordance with Regulation 9 of The Building Control Regulations, I, VINCENT LIN WENJUN, the Qualified Person for structural works appointed under section 8(1)(a) or 11(1)(d)(i) of the Building Control Act, hereby submit the detailed structural plans and design calculations prepared by me and certify that they have been prepared in accordance with the provisions of the Building Control Regulations, the Building Control Act and any other written law pertaining to buildings and construction for the time being in force.

2. I further certify that these detailed structural plans and design calculations are in reference to Project Ref. No: E2990-00005-2019-ST100

3. Total number of structural plans submitted : 3
and total number of pages of design calculations in this book: 309

PROFESSIONAL ENGINEER
CIVIL
VINCENT LIN WENJUN
4794
SINGAPORE

(QUALIFIED PERSON FOR STRUCTURAL WORKS' SIGNATURE AND STAMP)

29 MAY 2020
DATE

VEngineers
Disclaimer:
This drawing is produced and issued under specific request of our client in connection with the captioned project. It should not be used for any other purposes by any other party without permission from VEngineers. VEngineers accepts no responsibility for the consequences of this drawing being used by any other party for any other purpose(s), or containing any error(s) and/or omission(s) which is due to error(s) and/or omission(s) in the information given to VEngineers by other parties.

29.05.2020	Note for Structural Steel Works
DATE	DESCRIPTION

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TEL: 6717-8999 EMAIL: admin@vengineers.com.sg

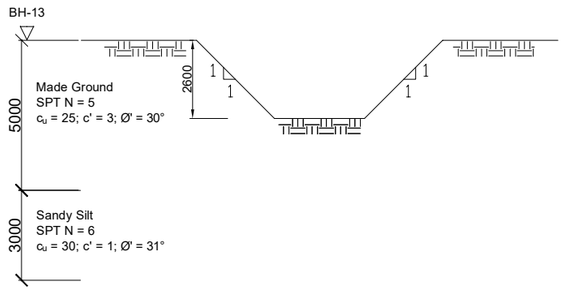
PROJECT TITLE:

EARTHWORKS AND INFRASTRUCTURE AT KRANJI AGRI-FOOD INNOVATION PARK

DRAWING TITLE:

SITE LAYOUT AND INSTRUMENTATION PLAN

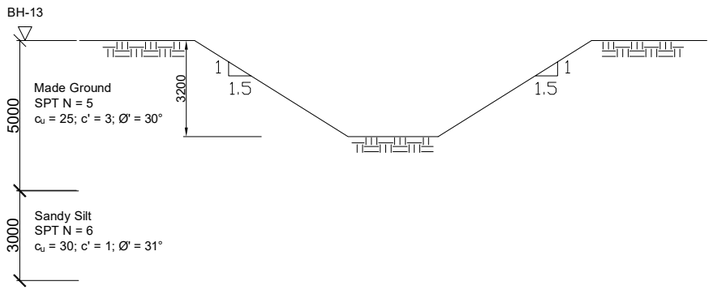
DESIGNED BY: MKN	REVIEWED BY: VL
DRAWN BY: MKN	DATE: 29 MAY 2020
SCALE: AS SHOWN	
DRAWING NO.: 80238_HUATIONG_KRANJI AFIP_ST100_S01	REV: 1



Open Cut Excavation for Construction and Installation of Drainage (Max. Depth =2.6m)
Scale: N.T.S

ERSS Sequence for Construction and Installation of Drainage
(Maximum Depth = 2.6m)

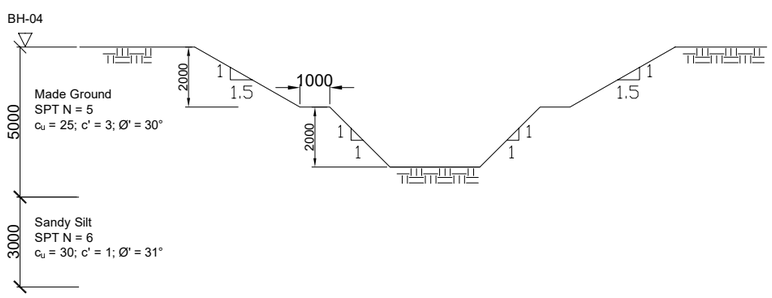
1. Carry out localized open-cut excavation with gradient of 1 : 1 up to maximum depth of 2.6m.
2. Construct and install the drainage.
3. Backfill and compact earth to required platform level.



Open Cut Excavation for Construction and Installation of Drainage (Max. Depth =3.2m)
Scale: N.T.S

ERSS Sequence for Construction and Installation of Drainage
(Maximum Depth = 3.2m)

1. Carry out localized open-cut excavation with gradient of 1 : 1.5 up to maximum depth of 3.2m.
2. Construct and install the drainage.
3. Backfill and compact earth to required platform level.



Open Cut Excavation for Construction and Installation of Drainage (Max. Depth =4.0m)
Scale: N.T.S

ERSS Sequence for Construction and Installation of Drainage
(Maximum Depth = 4m)

1. Carry out localized open-cut excavation with gradient of 1 : 1.5 up to maximum depth of 2m.
2. Set back 1m on each slope and continue to excavate with gradient of 1:1 up to maximum the depth of 4m from ground surface.
3. Construct and install the drainage.
4. Backfill and compact earth to required platform level.

BUILDING CONSTRUCTION AUTHORITY
APPROVED UNDER SECTION 5 / SECTION 5A OF THE
BUILDING CONTROL ACT (CHAPTER 29)

Project Ref. No.: A2990-00006-2019-ST100
for Commissioner of Building Control

202011489

PROFESSIONAL ENGINEER
CIVIL
VINCENT LIN WENJUN
4794
SINGAPORE

(QUALIFIED PERSON FOR STRUCTURAL WORKS' SIGNATURE AND STAMP)

27 APRIL 2020
DATE

DATE	DESCRIPTION

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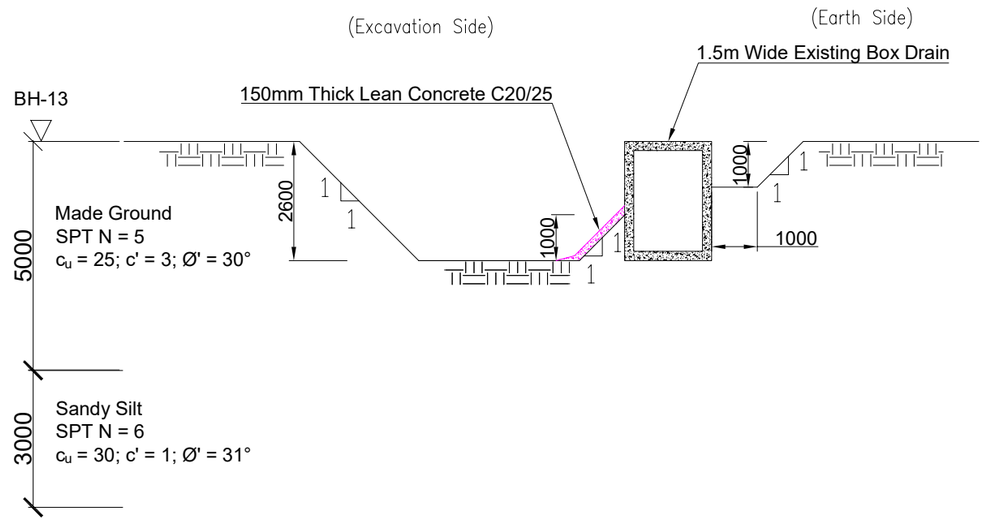
PROJECT TITLE:
EARTHWORKS AND INFRASTRUCTURE AT KRANJI AGRI-FOOD INNOVATION PARK

DRAWING TITLE:
ERSS DETAIL AND CONSTRUCTION SEQUENCE

DESIGNED BY:	REVIEWED BY:
MKN	VL
DRAWN BY:	DATE:
MKN	27 APRIL 2020

SCALE: AS SHOWN

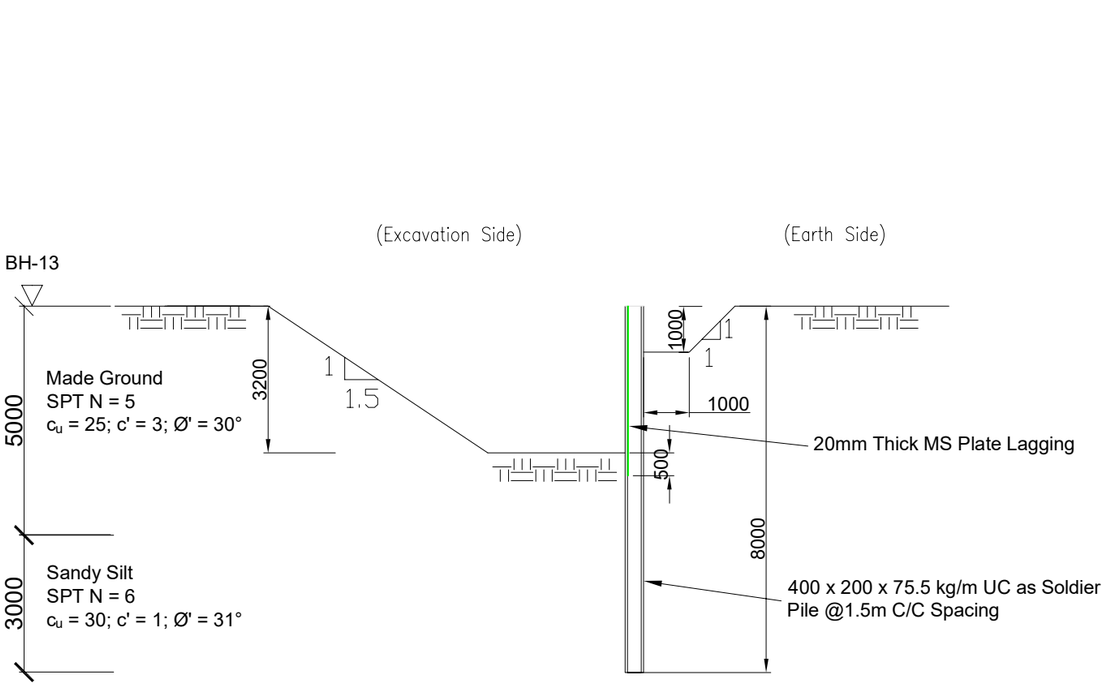
DRAWING NO.: 80238_HUATIONG_KRANJI AFIP_ST100_S02
REV: 0



Excavation for Construction and Installation of Drainage Next to Existing Drain (Max. Depth =2.6m)
Scale: N.T.S

ERSS Sequence for Construction and Installation of Drainage Next to Existing Drain (Maximum Depth = 2.6m)

1. Carry out localized open-cut excavation with gradient of 1 : 1 up to maximum depth of 1.0m on earth side of the existing drain.
2. Carry out localized open-cut excavation with gradient of 1:1 up to maximum depth of 2.6m on the excavation side of the existing drain, maintain a soil berm of 1m height and gradient of 1:1.
3. Cast a layer of 150mm thick lean concrete on the slope of soil berm.
4. Construct and install the drainage.
5. Backfill and compact earth to required platform level.



Shoring Excavation for Construction and Installation of Drainage (Max. Depth =3.2m)
Scale: N.T.S

SOLDIER PILE AND STEEL PLATE LAGGING DETAIL

ERSS Sequence for Construction and Installation of Drainage (Maximum Depth = 3.2m)

1. Install the soldier pile and steel plate lagging.
2. Carry out localized excavation with gradient of 1 : 1 up to maximum depth of 1m on earth side of the soldier pile system.
3. Carry out localized excavation with gradient of 1 : 1.5 up to maximum depth of 3.2m on excavation side of the soldier pile system.
4. Construct and install the drainage.
5. Backfill and compact earth to required platform level.
6. Extract the soldier pile and steel plate lagging.

BUILDING CONSTRUCTION AUTHORITY
APPROVED UNDER SECTION 5 / SECTION 5A OF THE BUILDING CONTROL ACT (CHAPTER 29)

Project Ref. No.: A2990-00005-2019-ST100
for Commissioner of Building Control

202011489

STANDARD CERTIFICATION BY THE QUALIFIED PERSON FOR STRUCTURAL WORKS

1. In accordance with Regulation 9 of The Building Control Regulations, I, VINCENT LIN WENJUN , the Qualified Person for structural works appointed under section 8(1)(a) or 11(1)(d)(i) of the Building Control Act, hereby submit the detailed structural plans and design calculations prepared by me and certify that they have been prepared in accordance with the provisions of the Building Control Regulations, the Building Control Act and any other written law pertaining to buildings and construction for the time being in force.

2. I further certify that these detailed structural plans and design calculations are in reference to Project Ref. No: E2990-00005-2019-ST100

3. Total number of structural plans submitted : 3
and total number of pages of design calculations in this book: 309

PROFESSIONAL ENGINEER
CIVIL
VINCENT LIN WENJUN
4794
SINGAPORE

(QUALIFIED PERSON FOR STRUCTURAL WORKS' SIGNATURE AND STAMP)

27 APRIL 2020
DATE

VEngineers

DATE	DESCRIPTION

OWNER:
JTC CORPORATION
The JTC Summit
8 Jurong Town Hall Road
Singapore 609434

MAIN CONTRACTOR:
HUATIONG CONTRACTOR PTE LTD
(A subsidiary of Huationg Global Limited)
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Singapore 629972
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Fax: (65) 6368 1391

MAIN CONSULTANT:
CPG CONSULTANTS PTE LTD
WESTGATE TOWER, 1 GATEWAY DRIVE
#23-01, SINGAPORE 608531
TEL: 6357-4471 FAX: 6357-4398
EMAIL:gabriel.anthony.vincent@cpgcorp.com.sg

CIVIL AND STRUCTURAL CONSULTANTS :
VEngineers
CIVIL | STRUCTURAL | GEOTECHNICAL
ADD: 18 SIN MING LANE, MIDVIEW CITY, #08-04 SINGAPORE 573960
TEL: 6717-8999 EMAIL: admin@vengineers.com.sg

PROJECT TITLE:
EARTHWORKS AND INFRASTRUCTURE AT KRANJI AGRI-FOOD INNOVATION PARK

DRAWING TITLE:
ERSS DETAIL AND CONSTRUCTION SEQUENCE

DESIGNED BY:	REVIEWED BY:
MKN	VL
DRAWN BY:	DATE:
MKN	27 APRIL 2020

SCALE: AS SHOWN

DRAWING NO.: 80238_HUATIONG_KRANJI AFIP_ST100_S03 REV: 0

Appendix 2:
ECM for drainage works

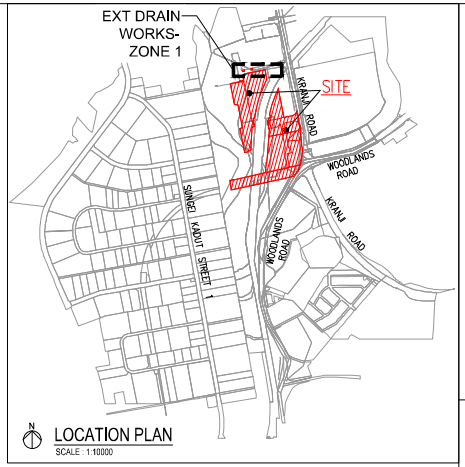
VOLUME OF STORM RUNOFF (Q) AT CONSTRUCTION STAGE = 10.9m³
TEMP STORAGE BASIN = 15.8m³
TOTAL STORAGE VOLUME = 15.8m³ > Q=10.9m³, OK

TEMPORARY STORAGE BASIN DIMENSION (SB-ED)								Storm Runoff (m³)	Water Treatment Tank (WT)
Label	L (m)	W (m)	H (m)	a (m)	b (m)	c (m)	Storage Capacity (m³)		
SB-ED	5	4.5	1.5	2	1.5	1.5	15.8	10.9	WT-ED=1 No. x 5m³/h

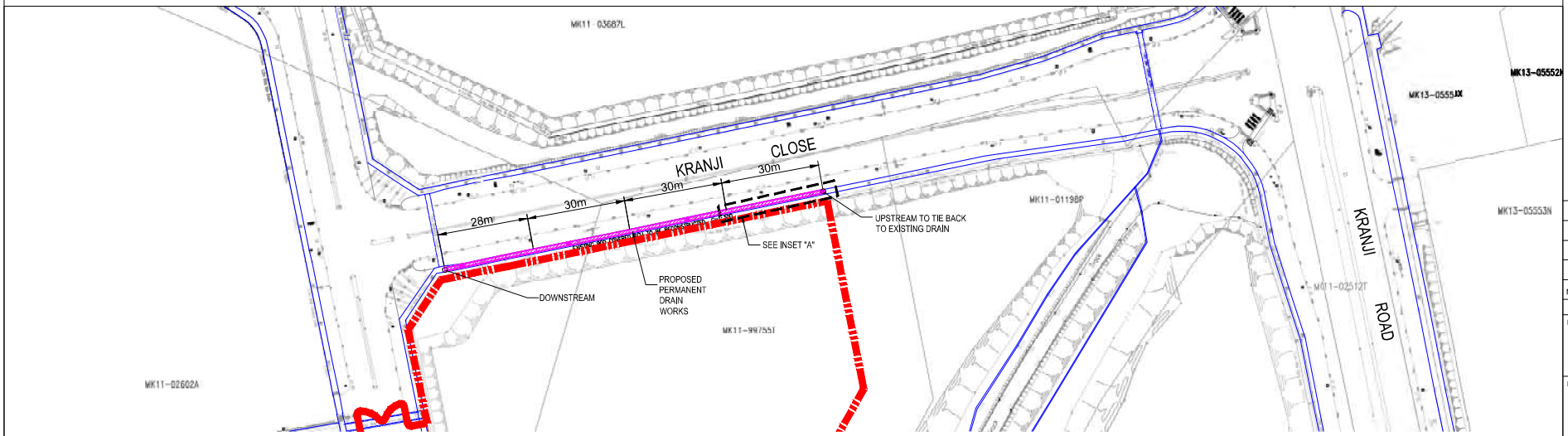
REFER TO DWG NO. DT-01 FOR BASIN DETAILS

NOTES:
1. ALL INACTIVE BARE EARTH AREAS WITHIN THE WORK SITE SHALL BE COVERED ALL TIME
2. AILL ACTIVE BARE EARTH AREAS SHALL BE COVERED UP AFTER AND BEFORE RAIN
3. KERB / SILT FENCE AROUND PERIMETER DRAIN TO BE ERECTED TO PREVENT SURFACE RUNOFF FROM CONTACTING THE BARE EARTH AREAS
4. KEEP TURF AND PAVED AREA WHERE POSSIBLE
5. MAXIMUM WORKING AREA WILL BE 30m(L) x 7m(W) = 210m².
6. ONCE 1ST PORTION COMPLETED WILL GO TO NEXT PORTION. EACH PORTION WILL HAVE A MAX. 210m² EXPOSED AREA.
7. PLACE 1 NO. OF WATER PUMP. TO PUMP BLOCKED CLEAN WATER TO PUBLIC DRAIN.
8. ECM TREATMENT SYSTEM 1 NO. FLEXI-M5, CAPACITY = 5m³/hrs.

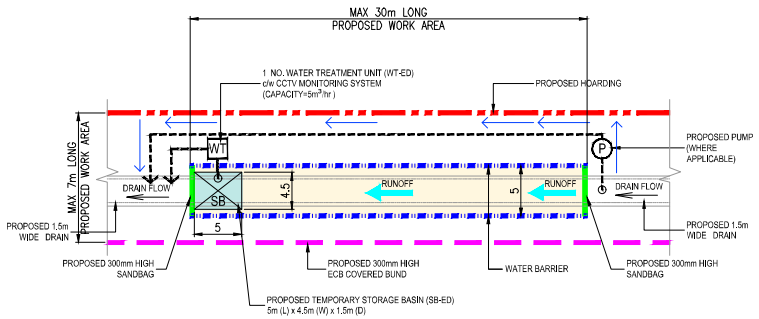
LEGEND
- WT — WATER TREATMENT UNIT c/w CCTV AND TSS MONITORING SYSTEM
- SB (5 x 4.5) — TEMPORARY STORAGE BASIN
- UNTREATED WATER RUNOFF DIRECTION
- CLEAN WATER RUNOFF DISCHARGE TO EXISTING DRAIN/RIVER
- PROPOSED HOARDING WITH SEALED BASE
- PROPOSED 300mm HIGH ECB COVERED BUND
- PROPOSED DRAIN
- PROPOSED 300mm HIGH SANDBAG
- P — PROPOSED PUMP (WHERE APPLICABLE)



N LOCATION PLAN
SCALE : 1:10000



N EARTH CONTROL MEASURE LAYOUT PLAN (EXTERNAL DRAIN WORKS - ZONE 1)
SCALE 1:1250



INSET 'A'
TYPICAL EARTH CONTROL MEASURES PLAN
SCALE 1:200

10 sheet of 14

PUBLIC UTILITIES BOARD
Drainage Department

Project Ref. No. : E2990-00005-2019

PROFESSIONAL ENGINEER CIVIL TAN KEH MUI 3708 SINGAPORE

TAN KEH MUI (Q0153)
QUALIFIED EROSION CONTROL PROFESSIONAL

NO	DESCRIPTION	DATE / SIGN
D		
C		
B		
A		
	REVISION	

DEVELOPER/ LAND OWNER:
JTC Corporation
Engineering Planning Division
The JTC Summit
8 Jurong Town Hall Road
Singapore 609434

PROJECT OWNER:

QUALIFIED EROSION CONTROL CONSULTANT:
PH CONSULTING PTE LTD
28 Sin Ming Lane, #06-135
Midview City, Singapore 573972.
TEL: 6353 3392 FAX: 6354 3639

MAIN CONTRACTOR:
Huationg Contractor Pte Ltd
9 Benoi Crescent Singapore 629972
Contact Person: Chua Ngee Hwee
HP: 9069 1350 Email: ngeehwee.chua@huationg.com.sg

PROJECT:
PROPOSED EARTHWORKS AND CONSTRUCTION OF INFRASTRUCTURE AT KRANJI AGRI-FOOD INNOVATION PARK (AFIP) BOUNDED BY KRANJI ROAD AND KRANJI CLOSE

DRAWING TITLE:
EARTH CONTROL MEASURE LAYOUT PLAN (EXTERNAL DRAIN WORKS - ZONE 1)

DRAWN	SCALE
WL	AS SHOWN
DESIGNED	DATE
CCW	MAY 2020
CHECKED	APPROVED
CA	THM

FILE NAME : PH-ECM-20044-PL-10-

DRAWING NO : PH/ECM/20044/PL/10
REVISION -

A1

APPENDIX B

Glossary of Technical Terms

Term	Definition
Habitat Baseline Study	To establish the types and locations of habitats found on site including waterbodies.
Mangrove Forest	A tidal habitat consisting of flora that normally grows above mean sea level in the intertidal zone of marine environments and estuarine margins
Species of Conservation Interest	Species which have been identified to have high extinction risk and therefore have higher conservation priority.
Keystone Species	Species that have disproportionately large effects on its environment relative to its abundance (Paine, 1995).
Bioindicators	Species which can be used to reveal the health or status of the particular ecosystem they are found in.

Threat status for flora and fauna (also Table 3 in the Fauna Baseline Study)

Global/National Conservation Status	Definition
Vulnerable (VU)	Species facing a high risk of extinction in the wild/in Singapore
Endangered (EN)	Species facing a very high risk of extinction in the wild/in Singapore
Critically Endangered (CR)	Species facing an extremely high risk of extinction in the wild/in Singapore
Presumed Nationally Extinct (NE)	There is no reasonable doubt that the last reproductively capable individual has died or disappeared in the last 50 years
Rediscovered	Species previously presumed to be nationally extinct (NE)

Native Status for Flora (also Table 3-3 in Arboriculture Assessment and Flora Baseline report)

Native Status	Definition
Native	Naturally-occurring species maintaining self-sustaining populations
Exotic	Species existing outside of its natural range
Invasive	Non-native species that bears negative impacts in new environment
Cryptogenic	Species with unknown origin
Exotic Species Categories for flora (adapted from Chong et al., 2009)	
Casual	Non-native species that do not maintain self-sustaining populations
Naturalised	Non-native species that maintain self-sustaining populations
Cultivated	Species not naturally found in the wild that is produced and maintained by horticultural techniques

APPENDIX C

List of Probable and Recorded Faunal Species

Faunal group	No. of probable species		No. of recorded species	
	All species	CS species	All species	CS species
Mollusc	78	1	11	0
Odonate	44	0	22	0
Butterfly	126	3	44	2
Marine Arthropod	39	8	6	0
Fish	56	0	12	0
Amphibian	13	0	10	0
Reptile	34	3	17	2
Bird	164	24	70	10
Non-volant mammal	14	3	6	1
Bat	6	0	5	0
Others (Polychaete, Porifera and Cnidarian)	0	0	3	0
Total	574	42	206	15

No.	Family Name	Scientific Name	Local Status (SRDB)	Global Status (IUCN)	Residence (IUCN, NParks Flora & Fauna Web, Sealifebase, the Biodiversity of Singapore, A Guide To Mangroves of Singapore)	Probable?	Recorded?
1	Achatinidae	*Achatina fulica*	*Not Assessed*	*Not Assessed*	*Non-native*	Yes	
2	Achatinidae	*Limicolaria flammea*	*Not Assessed*	*Not Assessed*	*Non-native*	Yes	
3	Ampullariidae	*Pila scutata*	*Not Assessed*	*Not Assessed*	*Native*	Yes	
4	Ampullariidae	*Pomacea canaliculata*	*Not Assessed*	*Least Concern*	*Non-native*	Yes	Yes
5	Arcidae	*Tegillarca granosa*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
6	Assimineidae	*Assiminea brevicula*	*Not Assessed*	*Least Concern*	*Native*	Yes	Yes
7	Assimineidae	*Cyclotropis scalaris*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
8	Bithyniidae	*Bithynia sp.*	*N/A*	*N/A*	*Indeterminate*	Yes	
9	Cyrenidae	*Geloina expansa*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	Yes
10	Dreissenidae	*Mytilopsis sallei*	*Not Assessed*	*Not Assessed*	*Non-native*	Yes	
11	Ellobiidae	*Auriculastra subula*	*Not Assessed*	*Least Concern*	*Native*	Yes	
12	Ellobiidae	*Cassidula aurisfelis*	*Not Assessed*	*Least Concern*	*Native*	Yes	
13	Ellobiidae	*Cassidula nucleus*	*Not Assessed*	*Not Assessed*	*Native*	Yes	
14	Ellobiidae	*Cassidula vespertilionis*	*Not Assessed*	*Not Assessed*	*Native*	Yes	
15	Ellobiidae	*Ellobium aurisjudae*	*Not Assessed*	*Least Concern*	*Native*	Yes	
16	Ellobiidae	*Ellobium aurismidae*	*Not Assessed*	*Least Concern*	*Native*	Yes	
17	Ellobiidae	*Ellobium scheepmakeri*	*Critically Endangered*	*Not Assessed*	*Native*	Yes	
18	Ellobiidae	*Ellobium tornatelliforme*	*Not Assessed*	*Not Assessed*	*Native*	Yes	
19	Ellobiidae	*Laemodonta punctatostriata*	*Not Assessed*	*Not Assessed*	*Native*	Yes	
20	Ellobiidae	*Laemodonta punctigera*	*Not Assessed*	*Least Concern*	*Native*	Yes	
21	Ellobiidae	*Laemodonta siamensis*	*Not Assessed*	*Not Assessed*	*Native*	Yes	
22	Ellobiidae	*Melampus cf. nucleolus*	*N/A*	*N/A*	*N/A*	Yes	
23	Ellobiidae	*Melampus pulchellus*	*Not Assessed*	*Not Assessed*	*Native*	Yes	
24	Ellobiidae	*Melampus sincaporensis*	*Not Assessed*	*Least Concern*	*Native*	Yes	
25	Ellobiidae	*Pythia plicata*	*Not Assessed*	*Not Assessed*	*Native*	Yes	
26	Ellobiidae	*Pythia trigona*	*Not Assessed*	*Not Assessed*	*Native*	Yes	
27	Iravadiidae	*Iravadia bombayana*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
28	Littorinidae	*Littoraria ardouiniana*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
29	Littorinidae	*Littoraria carinifera*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
30	Littorinidae	*Littoraria conica*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
31	Littorinidae	*Littoraria intermedia*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
32	Littorinidae	*Littoraria lutea*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
33	Littorinidae	*Littoraria melanostoma*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
34	Littorinidae	*Littoraria pallescens*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
35	Littorinidae	*Littoraria vespacea*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
36	Littorinidae	*Mainwaringia leithii*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
37	Lymnaeidae	*Radix auricularia*	*Not Assessed*	*Least Concern*	*Non-native*	Yes	
38	Lymnaeidae	*Radix rubiginosa*	*Not Assessed*	*Not Assessed*	*Non-native*	Yes	
39	Mesodesmatidae	*Coecella horsfieldii*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	Yes
40	Muricidae	*Chicoreus capucinus*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	Yes
41	Mytilidae	*Arcuatula senhousia*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
42	Mytilidae	*Modiolus modulaides*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
43	Mytilidae	*Mytella strigata*	*Not Assessed*	*Not Assessed*	*Non-native*	Yes	Yes

No.	Family Name	Scientific Name	Local Status (SRDB)	Global Status (IUCN)	Residence (IUCN, NParks Flora & Fauna Web, Sealifebase, the Biodiversity of Singapore, A Guide To Mangroves of Singapore)	Probable?	Recorded?
44	Mytilidae	*Perna viridis*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
45	Mytilidae	*Xenostrobus sp.*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
46	Neritidae	*Neripteron cornucopia*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
47	Neritidae	*Neripteron violaceum*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
48	Neritidae	*Nerita balteata*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
49	Onchidiidae	*Melayonchis aileenae*	*N/A*	*N/A*	*N/A*	Yes	
50	Onchidiidae	*Melayonchis annae*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
51	Onchidiidae	*Melayonchis siongkiati*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
52	Onchidiidae	*Onchidium griseum*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
53	Ostreidae	*Crassostrea gigas*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
54	Ostreidae	*Saccostrea cucullata*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
55	Pharidae	*Orbicularia orbiculata*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
56	Pharidae	*Pharella javanica*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
57	Physidae	*Stenophysa spathidophallus*	*Not Assessed*	*Not Assessed*	*Non-native*	Yes	
58	Potamididae	*Cerithidea obtusa*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
59	Potamididae	*Cerithidea quoyii*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
60	Potamididae	*Pirenella cingulata*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
61	Potamididae	*Telescopium telescopium*	*Not Assessed*	*Least Concern*	*Native*	Yes	
62	Potamididae	*Terebralia sulcata*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
63	Psammobiidae	*Gari elongata*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
64	Pteriidae	*Isognomon ephippium*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
65	Pteriidae	*Isognomon legumen*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
66	Tellinidae	*Cyclotellina remies*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
67	Tellinidae	*Serratina capsoides*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
68	Thiaridae	*Melanoides tuberculata*	*Not Assessed*	*Least Concern*	*Native*	Yes	Yes
69	Thiaridae	*Sermyla riqueti*	*Not Assessed*	*Least Concern*	*Native*	Yes	
70	Thiaridae	*Tarebia granifera*	*Not Assessed*	*Least Concern*	*Indeterminate*	Yes	
71	Ungulinidae	*Diplodonta sp.*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
72	Unionidae	*Sinanodonta woodiana*	*Not Assessed*	*Least Concern*	*Non-native*	Yes	
73	Veneridae	*Dosinia cretacea*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
74	Veneridae	*Dosinia exasperata*	*Not Assessed*	*Not Assessed*	*N/A*	Yes	
75	Veneridae	*Pelecyora trigona*	Not Assessed	Not Assessed	*N/A*	Yes	
76	Viviparidae	*Filopaludina sp.*	*N/A*	*N/A*	*N/A*	Yes	
77	Thiaridae	*Thiara sp.*	*N/A*	*N/A*	*N/A*	Yes	Yes
78	Glauconomidae	*Glauconome virens*	Not Assessed	Not Assessed	*N/A*	Yes	Yes
-	Thiaridae	*Sermyla sp.*	*N/A*	*N/A*	*N/A*	N/A	Yes
-	Thiaridae	*Tarebia sp.*	*N/A*	*N/A*	*N/A*	N/A	Yes

No.	Family	Scientific Name	Common Name	Global Status (IUCN/CITES)	National Status (Soh et al., 2019)	Species of Conservation Significance	Distribution/Rarity (Soh et al., 2019)	Probable Species	Recorded Species	Remarks
1	Aeshnidae	*Anax guttatus*	Emperor	Least Concern	Least Concern	No	Widespread but Uncommon	Yes		
2	Aeshnidae	*Gynacantha dohrni*	Spear-tail duskhawker	Not Assessed	Least Concern	No	Widespread but Uncommon	Yes		
3	Aeshnidae	*Gynacantha subinterrupta*	Dingy duskhawker	Least Concern	Least Concern	No	Widespread but Uncommon	Yes		
4	Coenagrionidae	*Agriocnemis femina*	Variable wisp	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
5	Coenagrionidae	*Agriocnemis rubescens*	Variable sprite	Least Concern	Least Concern	No	Widespread but Uncommon	Yes		
6	Coenagrionidae	*Ceriagrion cerinorubellum*	Ornate coraltail	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
7	Coenagrionidae	*Ischnura senegalensis*	Common bluetail	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
8	Coenagrionidae	*Pseudagrion microcephalum*	Blue sprite	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
9	Gomphidae	*Ictinogomphus decoratus*	Common flangetail	Least Concern	Least Concern	No	Widespread and Common	Yes		
10	Libellulidae	*Acisoma panorpoides*	Trumpet tail	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
11	Libellulidae	*Aethriamanta aethra*	Blue adjudant	Least Concern	Least Concern	No	Widespread but Uncommon	Yes		
12	Libellulidae	*Aethriamanta brevipennis*	Scarlet adjudant	Least Concern	Least Concern	No	Widespread but Uncommon	Yes		
13	Libellulidae	*Aethriamanta gracilis*	Pond adjudant	Least Concern	Least Concern	No	Widespread and Common	Yes		
14	Libellulidae	*Agrionoptera insignis*	Grenadier	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
15	Libellulidae	*Brachydiplax chalybea*	Blue dasher	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
16	Libellulidae	*Brachythemis contaminata*	Common amberwing	Least Concern	Least Concern	No	Widespread and Common	Yes		
17	Libellulidae	*Camacinia gigantea*	Sultan	Least Concern	Least Concern	No	Widespread but Uncommon	Yes	Yes	
18	Libellulidae	*Crocothemis servilia*	Common scarlet	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
19	Libellulidae	*Diplacodes nebulosa*	Black-tipped percher	Least Concern	Least Concern	No	Widespread but Uncommon	Yes		
20	Libellulidae	*Diplacodes trivialis*	Blue percher	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
21	Libellulidae	*Hydrobasileus croceus*	Water monarch	Least Concern	Least Concern	No	Widespread and Common	Yes		
22	Libellulidae	*Lathrecista asiatica*	Scarlet grenadier	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
23	Libellulidae	*Macrodiplax cora*	Coastal glider	Least Concern	Least Concern	No	Widespread and Common	Yes		
24	Libellulidae	*Neurothemis fluctuans*	Common parasol	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
25	Libellulidae	*Orthetrum chrysis*	Spine-tufted skimmer	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
26	Libellulidae	*Orthetrum glaucum*	Common blue skimmer	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
27	Libellulidae	*Orthetrum luzonicum*	Slender blue skimmer	Least Concern	Least Concern	No	Widespread and Common	Yes		
28	Libellulidae	*Orthetrum sabina*	Variegated green skimmer	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
29	Libellulidae	*Orthetrum testaceum*	Scarlet skimmer	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
30	Libellulidae	*Pantala flavescens*	Wandering glider	Least Concern	Least Concern	No	Widespread and Common	Yes		
31	Libellulidae	*Pornothemis starrei*	Mangrove marshal	Not Assessed	Near Threatened	No	Widespread but Uncommon	Yes		
32	Libellulidae	*Potamarcha congener*	Common chaser	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
33	Libellulidae	*Pseudothemis jorina*	Banded skimmer	Least Concern	Least Concern	No	Widespread but Uncommon	Yes		
34	Libellulidae	*Raphismia bispina*	Mangrove dwarf	Least Concern	Near Threatened	No	Widespread but Uncommon	Yes		
35	Libellulidae	*Rhodothemis rufa*	Common redbolt	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
36	Libellulidae	*Rhyothemis phyllis*	Yellow-barred flutterer	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
37	Libellulidae	*Rhyothemis triangularis*	Sapphire flutterer	Least Concern	Least Concern	No	Widespread but Uncommon	Yes		
38	Libellulidae	*Tholymis tillarga*	White-barred duskhawk	Least Concern	Least Concern	No	Widespread and Common	Yes	Yes	
39	Libellulidae	*Tramea transmarina*	Saddlebag glider	Least Concern	Least Concern	No	Widespread and Common	Yes		
40	Libellulidae	*Trithemis aurora*	Crimson dropwing	Least Concern	Least Concern	No	Widespread and Common	Yes		
41	Libellulidae	*Trithemis festiva*	Indigo dropwing	Least Concern	Least Concern	No	Widespread and Common	Yes		
42	Libellulidae	*Trithemis pallidinervis*	Dancing dropwing	Least Concern	Least Concern	No	Widespread but Uncommon	Yes		
43	Libellulidae	*Urothemis signata*	Scarlet basker	Not Assessed	Least Concern	No	Widespread and Common	Yes	Yes	
44	Libellulidae	*Zyxomma petiolatum*	Slender duskdarter	Least Concern	Least Concern	No	Widespread and Common	Yes		
-	Aeshnidae	*Gynacantha sp.*	Unidentified duskhawker	N/A	Least Concern	No	Widespread but Uncommon	N/A	Yes	

No.	Family	Scientific Name	Common Name	Global Status (IUCN/CITES)	National Status (Davison et al., 2008; Jain et al, 2018)	Species of Conservation Significance	Distribution/ Abundance /Rarity (Khew, 2015)	Probable Species	Recorded Species
1	Hesperiidae	*Ampittia dioscorides camertes*	Bush hopper	Not Assessed	Not Assessed	No	Moderately common	Yes	Yes
2	Hesperiidae	*Astictopterus jama jama*	Forest hopper	Not Assessed	Nationally Extinct (Rediscovered)	No	Moderately rare	Yes	Yes
3	Hesperiidae	*Baoris farri farri*	Bamboo paintbrush swift	Not Assessed	Not Assessed	No	Moderately rare	Yes	
4	Hesperiidae	*Baoris oceia*	Paintbrush swift	Not Assessed	Not Assessed	No	Moderately rare	Yes	
5	Hesperiidae	*Borbo cinnara*	Formosan swift	Not Assessed	Endangered	Yes	Moderately common	Yes	Yes
6	Hesperiidae	*Caltoris cormasa*	Full stop swift	Not Assessed	Not Assessed	No	Moderately rare	Yes	Yes
7	Hesperiidae	*Cephrenes acalle niasicus*	Plain palm dart	Not Assessed	Nationally Extinct (Rediscovered)	No	Moderately rare	Yes	
8	Hesperiidae	*Cephrenes trichopepla*	Yellow palm dart	Not Assessed	Not assessed	No	Common	Yes	
9	Hesperiidae	*Erionota hiraca apicalis*	White tipped skipper	Not Assessed	Not Assessed	No	Moderately rare	Yes	
10	Hesperiidae	*Erionota thrax thrax*	Banana skipper	Not Assessed	Not Assessed	No	Moderately common	Yes	
11	Hesperiidae	*Erionota torus*	Torus skipper	Not Assessed	Not Assessed	No	Moderately rare	Yes	
12	Hesperiidae	*Hasora badra badra*	Common awl	Not Assessed	Not Assessed	No	Moderately common	Yes	
13	Hesperiidae	*Hidari irava*	Coconut skipper	Not Assessed	Not Assessed	No	Common	Yes	
14	Hesperiidae	*Iambrix salsala salsala*	Chestnut bob	Not Assessed	Not Assessed	No	Common	Yes	Yes
15	Hesperiidae	*Matapa aria*	Common redeye	Not Assessed	Not Assessed	No	Moderately rare	Yes	
16	Hesperiidae	*Oriens gola pseudolus*	Common dartlet	Not Assessed	Not Assessed	No	Moderately common	Yes	Yes
17	Hesperiidae	*Oriens paragola*	Malay dartlet	Not Assessed	Not assessed	No	Rare	Yes	
18	Hesperiidae	*Pelopidas agna agna*	Bengal swift	Not Assessed	Endangered	Yes	Moderately common	Yes	
19	Hesperiidae	*Pelopidas assamensis*	Great swift	Not Assessed	Not Assessed	No	Moderately rare	Yes	
20	Hesperiidae	*Pelopidas conjunctus conjunctus*	Conjoined swift	Not Assessed	Not assessed	No	Moderately rare	Yes	
21	Hesperiidae	*Pelopidas mathias mathias*	Small branded swift	Not Assessed	Not Assessed	No	Common	Yes	
22	Hesperiidae	*Plastingia naga*	Chequered lancer	Not Assessed	Not Assessed	No	Moderately common	Yes	Yes
23	Hesperiidae	*Polytremis lubricans lubricans*	Contiguous swift	Not Assessed	Not Assessed	No	Common	Yes	Yes
24	Hesperiidae	*Potanthus omaha omaha*	Lesser dart	Not Assessed	Not Assessed	No	Common	Yes	Yes
25	Hesperiidae	*Potanthus serina*	Large dart	Not Assessed	Not assessed	No	Moderately common	Yes	
26	Hesperiidae	*Potanthus trachala tytleri*	Detached dart	Not Assessed	Nationally Extinct (Rediscovered)	No	Moderately rare	Yes	
27	Hesperiidae	*Suastus gremius gremius*	Palm bob	Not Assessed	Not Assessed	No	Common	Yes	Yes
28	Hesperiidae	*Taractrocera archias quinta*	Yellow grass dart	Not Assessed	Not Assessed	No	Moderately common	Yes	
29	Hesperiidae	*Taractrocera ardonia lamia*	Spotted grass dart	Not Assessed	Not Assessed	No	Moderately rare	Yes	
30	Hesperiidae	*Telicota augias augias*	Pale palm dart	Not Assessed	Not Assessed	No	Moderately common	Yes	
31	Hesperiidae	*Telicota besta bina*	Besta palm dart	Not Assessed	Not Assessed	No	Moderately common	Yes	
32	Hesperiidae	*Telicota colon stinga*	Common palm dart	Not Assessed	Nationally Extinct (Rediscovered)	No	Moderately common	Yes	Yes
33	Hesperiidae	*Telicota linna*	Linna palm dart	Not Assessed	Not assessed	No	Moderately rare	Yes	
34	Lycaenidae	*Allotinus unicolor unicolor*	Lesser darkwing	Not Assessed	Not Assessed	No	Moderately common	Yes	
35	Lycaenidae	*Anthene emolus goberus*	Ciliate blue	Not Assessed	Not Assessed	No	Common	Yes	
36	Lycaenidae	*Anthene lycaenina miya*	Pointed ciliate blue	Not Assessed	Not Assessed	No	Moderately rare	Yes	
37	Lycaenidae	*Arhopala amphimuta amphimuta*	NA	Not Assessed	Nationally Extinct (Rediscovered)	No	Moderately common	Yes	
38	Lycaenidae	*Arhopala centaurus nakula*	Centaur oakblue	Not Assessed	Not Assessed	No	Moderately common	Yes	
39	Lycaenidae	*Arhopala major major*	NA	Not Assessed	Data Deficient	No	Common	Yes	
40	Lycaenidae	*Catopyrops ancyra*	Ancyra blue	Not Assessed	Vulnerable	Yes	Moderately rare	Yes	Yes
41	Lycaenidae	*Curetis saronis sumatrana*	Sumatran sunbeam	Not Assessed	Not Assessed	No	Moderately common	Yes	Yes
42	Lycaenidae	*Euchrysops cnejus cnejus*	Gram blue	Not Assessed	Not Assessed	No	Moderately common	Yes	Yes
43	Lycaenidae	*Flos apidanus saturatus*	Plain plushblue	Not Assessed	Not Assessed	No	Moderately common	Yes	
44	Lycaenidae	*Hypolycaena erylus teatus*	Common tit	Not Assessed	Not Assessed	No	Common	Yes	
45	Lycaenidae	*Hypolycaena thecloides thecloides*	Dark tit	Not Assessed	Not Assessed	No	Moderately rare	Yes	
46	Lycaenidae	*Ionolyce helicon merguiana*	Pointed line blue	Not Assessed	Not Assessed	No	Common	Yes	
47	Lycaenidae	*Iraota rochana boswelliana*	Scarce silverstreak	Not Assessed	Not Assessed	No	Moderately common	Yes	
48	Lycaenidae	*Jamides bochus nabonassar*	Dark caerulean	Not Assessed	Not Assessed	No	Moderately rare	Yes	
49	Lycaenidae	*Jamides celeno aelianus*	Common caerulean	Not Assessed	Not Assessed	No	Common	Yes	Yes
50	Lycaenidae	*Lampides boeticus*	Pea blue	Not Assessed	Not Assessed	No	Common	Yes	
51	Lycaenidae	*Logania marmorata damis*	Pale mottle	Not Assessed	Not Assessed	No	Moderately common	Yes	Yes
52	Lycaenidae	*Loxura atymnus fuconius*	Yamfly	Not Assessed	Not Assessed	No	Moderately common	Yes	
53	Lycaenidae	*Megisba malaya sikkima*	Malayan	Not Assessed	Not Assessed	No	Moderately rare	Yes	Yes
54	Lycaenidae	*Miletus biggsii biggsii*	Bigg's brownwing	Not Assessed	Not Assessed	No	Moderately common	Yes	
55	Lycaenidae	*Miletus symethus petronius*	Blue brownwing/great brownie	Not Assessed	Not Assessed	No	Moderately common	Yes	
56	Lycaenidae	*Nacaduba berenice icena*	Rounded sixline blue	Not Assessed	Not Assessed	No	Common	Yes	
57	Lycaenidae	*Nacaduba beroe neon*	Opaque sixline blue	Not Assessed	Not Assessed	No	Common	Yes	
58	Lycaenidae	*Nacaduba biocellata*	Two spotted line blue	Not Assessed	Not Assessed	No	Moderately rare	Yes	Yes
59	Lycaenidae	*Nacaduba kurava nemana*	Transparent sixline blue	Not Assessed	Nationally Extinct (Rediscovered)	No	Moderately common	Yes	
60	Lycaenidae	*Prosotas dubiosa lumpura*	Tailless line blue	Not Assessed	Not Assessed	No	Common	Yes	Yes
61	Lycaenidae	*Prosotas nora superdates*	Common line blue	Not Assessed	Not Assessed	No	Moderately common	Yes	
62	Lycaenidae	*Rapala iarbus iarbus*	Common red flash	Not Assessed	Not Assessed	No	Moderately common	Yes	
63	Lycaenidae	*Rapala manea chozeba*	Slate flash	Not Assessed	Not Assessed	No	Moderately rare	Yes	
64	Lycaenidae	*Rapala pheretima sequeira*	Copper flash	Not Assessed	Not Assessed	No	Moderately common	Yes	
65	Lycaenidae	*Rapala suffusa barthema*	Suffused flash	Not Assessed	Not Assessed	No	Moderately common	Yes	
66	Lycaenidae	*Rapala varuna orseis*	Indigo flash	Not Assessed	Not Assessed	No	Moderately rare	Yes	
67	Lycaenidae	*Semanga superba deliciosa*	NA	Not Assessed	Not Assessed	No	Moderately rare	Yes	
68	Lycaenidae	*Spalgis epius epius*	Apefly	Not Assessed	Not Assessed	No	Moderately common	Yes	
69	Lycaenidae	*Spindasis lohita senama*	Long banded silverline	Not Assessed	Not Assessed	No	Moderately common	Yes	
70	Lycaenidae	*Spindasis syama terana*	Club silverline	Not Assessed	Not Assessed	No	Moderately common	Yes	
71	Lycaenidae	*Surendra vivarna amisena*	Acacia blue	Not Assessed	Not Assessed	No	Moderately common	Yes	

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72	Lycaenidae	*Tajuria cippus maxentius*	Peacock royal	Not Assessed	Not Assessed	No	Moderately common	Yes	
73	Lycaenidae	*Zizeeria maha serica*	Pale grass blue	Not Assessed	Not Assessed	No	Common	Yes	
74	Lycaenidae	*Zizina otis lampa*	Lesser grass blue	Not Assessed	Not Assessed	No	Common	Yes	Yes
75	Lycaenidae	*Zizula hylax pygmaea*	Pygmy grass blue	Not Assessed	Not Assessed	No	Common	Yes	Yes
76	Nymphalidae (Brush Foots)	*Acraea terpsicore*	Tawny coster	Not Assessed	Not assessed	No	Common	Yes	Yes
77	Nymphalidae (Brush Foots)	*Amathusia phidippus phidippus*	Palm king	Not Assessed	Not Assessed	No	Moderately rare	Yes	
78	Nymphalidae (Brush Foots)	*Cethosia cyane*	Leopard lacewing	Not Assessed	Not assessed	No	Common	Yes	
79	Nymphalidae (Brush Foots)	*Danaus chrysippus chrysippus*	Plain tiger	Not Assessed	Not Assessed	No	Common	Yes	
80	Nymphalidae (Brush Foots)	*Danaus genutia genutia*	Common tiger	Not Assessed	Not Assessed	No	Moderately common	Yes	Yes
81	Nymphalidae (Brush Foots)	*Danaus melanippus hegesippus*	Black veined tiger	Not Assessed	Not Assessed	No	Moderately common	Yes	
82	Nymphalidae (Brush Foots)	*Doleschallia bisaltide bisaltide*	Autumn leaf	Not Assessed	Not assessed	No	Common	Yes	
83	Nymphalidae (Brush Foots)	*Elymnias hypermnestra agina*	Common palmfly	Not Assessed	Not Assessed	No	Common	Yes	Yes
84	Nymphalidae (Brush Foots)	*Elymnias panthera panthera*	Tawny palmfly	Not Assessed	Not Assessed	No	Moderately common	Yes	Yes
85	Nymphalidae (Brush Foots)	*Euploea mulciber mulciber*	Striped blue crow	Not Assessed	Not Assessed	No	Common	Yes	
86	Nymphalidae (Brush Foots)	*Euthalia aconthea gurda*	Baron	Not Assessed	Not Assessed	No	Common	Yes	
87	Nymphalidae (Brush Foots)	*Euthalia adonia pinwilli*	Green baron	Not Assessed	Not Assessed	No	Moderately common	Yes	
88	Nymphalidae (Brush Foots)	*Euthalia monina monina*	Malay baron	Not Assessed	Not Assessed	No	Common	Yes	
89	Nymphalidae (Brush Foots)	*Hypolimnas anomala anomala*	Malayan eggfly	Not Assessed	Not Assessed	No	Common	Yes	Yes
90	Nymphalidae (Brush Foots)	*Hypolimnas bolina bolina*	Great eggfly	Not Assessed	Not Assessed	No	Moderately common	Yes	
91	Nymphalidae (Brush Foots)	*Hypolimnas bolina jacintha*	Jacintha eggfly	Not Assessed	Not Assessed	No	Common	Yes	
92	Nymphalidae (Brush Foots)	*Ideopsis vulgaris macrina*	Blue glassy tiger	Not Assessed	Not Assessed	No	Common	Yes	
93	Nymphalidae (Brush Foots)	*Junonia almana javana*	Peacock pansy	Least Concern	Not Assessed	No	Common	Yes	Yes
94	Nymphalidae (Brush Foots)	*Junonia atlites atlites*	Grey pansy	Not Assessed	Not Assessed	No	Moderately common	Yes	Yes
95	Nymphalidae (Brush Foots)	*Junonia hedonia ida*	Chocolate pansy	Not Assessed	Not Assessed	No	Common	Yes	Yes
96	Nymphalidae (Brush Foots)	*Junonia orithya wallacei*	Blue pansy	Not Assessed	Not Assessed	No	Common	Yes	
97	Nymphalidae (Brush Foots)	*Melanitis leda leda*	Common evening brown	Not Assessed	Not Assessed	No	Moderately rare	Yes	Yes
98	Nymphalidae (Brush Foots)	*Mycalesis mineus macromalayana*	Dark brand bush brown	Not Assessed	Not Assessed	No	Common	Yes	Yes
99	Nymphalidae (Brush Foots)	*Mycalesis perseoides perseoides*	Burmese bush brown	Not Assessed	Data Deficient	No	Common	Yes	Yes
100	Nymphalidae (Brush Foots)	*Mycalesis perseus cepheus*	Dingy bush brown	Not Assessed	Not Assessed	No	Moderately common	Yes	
101	Nymphalidae (Brush Foots)	*Mycalesis visala phamis*	Long brand bush brown	Not Assessed	Not Assessed	No	Moderately common	Yes	Yes
102	Nymphalidae (Brush Foots)	*Neptis hylas papaja*	Common sailor	Not Assessed	Not Assessed	No	Moderately common	Yes	Yes
103	Nymphalidae (Brush Foots)	*Orsotriaena medus cinerea*	Dark grass brown	Not Assessed	Not Assessed	No	Common	Yes	Yes
104	Nymphalidae (Brush Foots)	*Parantica agleoides agleoides*	Dark glassy tiger	Not Assessed	Not Assessed	No	Common	Yes	Yes
105	Nymphalidae (Brush Foots)	*Phaedyma columella singa*	Short banded sailor	Not Assessed	Not Assessed	No	Common	Yes	Yes
106	Nymphalidae (Brush Foots)	*Polyura hebe plautus*	Plain nawab	Not Assessed	Not Assessed	No	Common	Yes	
107	Nymphalidae (Brush Foots)	*Polyura schreiber tisamenus*	Blue nawab	Not Assessed	Not Assessed	No	Moderately rare	Yes	
108	Nymphalidae (Brush Foots)	*Tanaecia iapis puseda*	Horsfield's baron	Not Assessed	Not Assessed	No	Common	Yes	
109	Nymphalidae (Brush Foots)	*Vindula dejone erotella*	Cruiser	Not Assessed	Not Assessed	No	Common	Yes	
110	Nymphalidae (Brush Foots)	*Ypthima baldus newboldi*	Common five-ring	Not Assessed	Not Assessed	No	Common	Yes	
111	Nymphalidae (Brush Foots)	*Ypthima horsfieldii humei*	Malayan five-ring	Not Assessed	Not Assessed	No	Common	Yes	
112	Papilionidae (Swallowtails & Birdwings)	*Chilasa clytia clytia*	Common mime	Not Assessed	Not Assessed	No	Common	Yes	
113	Papilionidae (Swallowtails & Birdwings)	*Graphium agamemnon agamemnon*	Tailed jay	Not Assessed	Not Assessed	No	Common	Yes	
114	Papilionidae (Swallowtails & Birdwings)	*Graphium sarpedon luctatius*	Common bluebottle	Not Assessed	Not Assessed	No	Common	Yes	
115	Papilionidae (Swallowtails & Birdwings)	*Papilio demoleus malayanus*	Lime butterfly	Not Assessed	Not Assessed	No	Common	Yes	
116	Papilionidae (Swallowtails & Birdwings)	*Papilio polytes romulus*	Common mormon	Not Assessed	Not Assessed	No	Common	Yes	Yes
117	Pieridae (Whites & Sulphurs)	*Appias libythea olferna*	Striped albatross	Not Assessed	Not Assessed	No	Common	Yes	Yes
118	Pieridae (Whites & Sulphurs)	*Catopsilia pomona pomona*	Lemon emigrant	Not Assessed	Not Assessed	No	Common	Yes	
119	Pieridae (Whites & Sulphurs)	*Catopsilia pyranthe pyranthe*	Mottled emigrant	Not Assessed	Not Assessed	No	Common	Yes	
120	Pieridae (Whites & Sulphurs)	*Catopsilia scylla cornelia*	Orange emigrant	Not Assessed	Not Assessed	No	Common	Yes	
121	Pieridae (Whites & Sulphurs)	*Delias hyparete metarete*	Painted jezebel	Not Assessed	Not Assessed	No	Common	Yes	Yes
122	Pieridae (Whites & Sulphurs)	*Eurema andersonii andersonii*	Anderson's grass yellow	Not Assessed	Not Assessed	No	Moderately common	Yes	Yes
123	Pieridae (Whites & Sulphurs)	*Eurema blanda snelleni*	Three spot grass yellow	Not Assessed	Not Assessed	No	Common	Yes	Yes
124	Pieridae (Whites & Sulphurs)	*Eurema hecabe contubernalis*	Common grass yellow	Not Assessed	Not Assessed	No	Common	Yes	Yes
125	Pieridae (Whites & Sulphurs)	*Leptosia nina malayana*	Psyche	Not Assessed	Not Assessed	No	Common	Yes	
126	Riodinidae (Metalmarks)	*Abisara saturata kausambioides*	Malayan plum judy	Not Assessed	Not Assessed	No	Moderately common	Yes	
-	Nymphalidae (Brush Foots)	*Hypolimnas bolina*	Unidentified eggfly	Not Assessed	Not Assessed	No	N/A	N/A	Yes

No.	Family Name	Scientific Name	Common Name	Local Status (SRDB)	Global Status (IUCN)	Residence (IUCN, NParks Flora & Fauna Web, Sealifebase, the Biodiversity of Singapore, A Guide To Mangroves of Singapore)	Probable?	Recorded?
1	Adrianichthyidae	*Oryzias javanicus*	Javanese Ricefish	Not Assessed	Not Assessed	Native	Yes	Yes
2	Ambassidae	*Ambassis kopsii*	Kops' Glass Perchlet	Not Assessed	Not Assessed	Native	Yes	
3	Ambassidae	*Ambassis vachellii*	Vachell's Glassfish	Not Assessed	Least Concern	Native	Yes	
4	Aplocheilidae	*Aplocheilus armatus*	Whitespot	Not Assessed	Least Concern	Native	Yes	
5	Apogonidae	*Yarica hyalosoma*	Mangrove Cardinalfish	Not Assessed	Not Assessed	Native	Yes	
6	Arridae	*Arius venosus*	Yellow Sea Catfish	Not Assessed	Not Assessed	Native	Yes	
7	Belonidae	*Strongylura leiura*	Slender Needlefish	Not Assessed	Not Assessed	Native	Yes	
8	Belonidae	*Strongylura strongylura*	Spot-tail Needlefish	Not Assessed	Not Assessed	N/A	Yes	
9	Centropomidae	*Lates calcarifer*	Barramundi	Not Assessed	Not Assessed	Native	Yes	
10	Gobiidae	*Boleophthalmus boddarti*	Blue-spotted mudskipper	Not Assessed	Least Concern	Native	Yes	
11	Gobiidae	*Brachygobius kabiliensis*	Bumblebee goby	Not Assessed	Not Assessed	Native	Yes	Yes
12	Gobiidae	*Butis butis*	Mangrove flathead gudgeon	Not Assessed	Least Concern	N/A	Yes	
13	Gobiidae	*Calamiana illota*	Dirty-face brackish goby	Not Assessed	Least Concern	N/A	Yes	
14	Gobiidae	*Calamiana variegata*	Stripe-face brackish goby	Not Assessed	Least Concern	N/A	Yes	Yes
15	Gobiidae	*Gobiopetrus birtwistlei*	Glass goby	N/A	N/A	N/A	Yes	
16	Gobiidae	*Hemigobius hoevenii*	Common mullet goby	Not Assessed	Not Assessed	Native	Yes	
17	Gobiidae	*Hemigobius melanurus*	Blue-eyed goby	N/A	N/A	N/A	Yes	
18	Gobiidae	*Mugilogobius fasciatus*	Broad-barred mangrove goby	Not Assessed	Data Deficient	N/A	Yes	
19	Gobiidae	*Mugilogobius mertoni*	Yellow-chequered Mangrove Goby	N/A	N/A	N/A	Yes	
20	Gobiidae	*Mugilogobius tigrinus*	Narrow-barred mangrove goby	Not Assessed	Not Assessed	N/A	Yes	
21	Gobiidae	*Ophiocara porocephala*	Snakehead gudgeon	Not Assessed	Least Concern	N/A	Yes	
22	Gobiidae	*Periophthalmus argentilineatus*	Silver-lined mudskipper	Not Assessed	Not Assessed	N/A	Yes	
23	Gobiidae	*Periophthalmus chrysospilos*	Gold-spotted mudskipper	Not Assessed	Not Assessed	N/A	Yes	
24	Gobiidae	*Periophthalmus gracilis*	Slender mudskipper	Not Assessed	Not Assessed	N/A	Yes	
25	Gobiidae	*Periophthalmus schlosseri*	Giant Mudskipper	Not Assessed	Not Assessed	N/A	Yes	Yes
26	Gobiidae	*Periophthalmus variabilis*	Dusky-gilled mudskipper	Not Assessed	Not Assessed	N/A	Yes	
27	Gobiidae	*Periophthalmus walailakae*	Yellow-spotted mudskipper	Not Assessed	Not Assessed	N/A	Yes	
28	Gobiidae	*Pseudogobius avicennia*	Avicennia fat-nose goby	Not Assessed	Not Assessed	N/A	Yes	
29	Gobiidae	*Pseudogobius javanicus*	Java Fat-nose Goby	Not Assessed	Not Assessed	Native	Yes	
30	Gobiidae	*Pseudogobius melanostictus*	Black-spotted fat-nose goby	Not Assessed	Not Assessed	N/A	Yes	
31	Gobiidae	*Rhinogobius giurinus*	Barcheek Goby	Not Assessed	Least Concern	Non-native	Yes	
32	Gobiidae	*Stigmatogobius sadanundio*	Grey Knight Goby	Not Assessed	Not Assessed	Native	Yes	
33	Heriramphidae	*Hemiramphus far*	Black-bared Halfbeak	Not Assessed	Not Assessed	Native	Yes	
34	Heriramphidae	*Zenarchopterus buffonis*	Striped-nose Halfbeak	Not Assessed	Not Assessed	Native	Yes	
35	Lutjanidae	*Lutjanus argentimaculatus*	Mangrove Red Snapper	Not Assessed	Least Concern	Native	Yes	
36	Mugilidae	*Ellochelon vaigiensis*	Squaretail Mullet	Not Assessed	Least Concern	Native	Yes	
37	Mugilidae	*Planiliza subviridis*	Greenback Mullet	Not Assessed	Not Assessed	Native	Yes	
38	Muraenidae	*Gymnothorax tile*	Estuarine Moray	Not Assessed	Not Assessed	Native	Yes	
39	Phallostethidae	*Neostethus lankesteri*	One-horned Priapus Fish	Not Assessed	Not Assessed	Native	Yes	
40	Platycephalidae	*Platycephalus indicus*	Bartail Flathead	Not Assessed	Data Deficient	Native	Yes	
41	Plotosidae	*Plotosus canius*	Black Eeltail Catfish	Not Assessed	Not Assessed	Native	Yes	
42	Plotosidae	*Plotosus lineatus*	Striped Eeltail Catfish	Not Assessed	Not Assessed	Native	Yes	
43	Poeciliidae	*Gambusia affinis*	Mosquitofish	Not Assessed	Least Concern	Non-native	Yes	
44	Poeciliidae	*Poecilia reticulata*	Guppy	Not Assessed	Not Assessed	Non-native	Yes	Yes
45	Syngnathidae	*Hippichthys cyanospilos*	Blue-speckled Pipefish	Not Assessed	Least Concern	Native	Yes	
46	Syngnathidae	*Ichthyocampus carce*	Freshwater Pipefish	Not Assessed	Least Concern	Native	Yes	
47	Tetraodonitdae	*Tetraodon nigroviridis*	Spotted Green Puffer	Not Assessed	Not Assessed	Native	Yes	
48	Toxotidae	*Toxotes chatareus*	Spotted Archerfish	Not Assessed	Not Assessed	N/A	Yes	
49	Toxotidae	*Toxotes jaculatrix*	Banded Archerfish	Not Assessed	Least Concern	Native	Yes	
50	Channidae	*Channa striata*	Common snakehead/aruan	Least Concern	Not Assessed	Native	Yes	Yes

No.	Family Name	Scientific Name	Common Name	Local Status (SRDB)	Global Status (IUCN)	Residence (IUCN, NParks Flora & Fauna Web, Sealifebase, the Biodiversity of Singapore, A Guide To Mangroves of Singapore)	Probable?	Recorded?
51	Zenarchopteridae	*Dermogenys collettei*	Sunda pygmy halfbeak	Not Assessed	Not Assessed	Native	Yes	Yes
52	Cichlidae	*Oreochromis sp.*	Tilapia sp.	N/A	N/A	Non-native	Yes	Yes
53	Poeciliidae	*Poecilia sphenops*	Green molly	Least Concern	Not Assessed	Non-native	Yes	Yes
54	Gobiidae	*Stigmatogobius sp.*	N/A	N/A	N/A	N/A	Yes	Yes
55	Osphronemidae	*Trichopodus trichopterus*	Threespot gouramy	Least Concern	Not Assessed	Native	Yes	Yes
56	Osphronemidae	*Trichopsis vittata*	Croaking gouramy	Least Concern	Not Assessed	Native	Yes	Yes

No.	Family Name	Scientific Name	Local Status (SRDB)	Global Status (IUCN)	Residence (IUCN, NParks Flora & Fauna Web, Sealifebase, the Biodiversity of Singapore, A Guide To Mangroves of Singapore)	Probable?	Recorded?
1	Alpheidae	*Alpheus euphrosyne*	Not Assessed	Not Assessed	N/A	Yes	
2	Alpheidae	*Alpheus microrhynchus*	Not Assessed	Not Assessed	N/A	Yes	
3	Alpheidae	Potamalpheops johnsoni	Vulnerable	Not Assessed	N/A	Yes	
4	Alpheidae	Potamalpheops tigger	Vulnerable	Not Assessed	N/A	Yes	
5	Atyidae	*Caridina sp.*	Not Listed	Not Assessed	N/A	Yes	
6	Camptandriinae	*Baruna trigranulum*	Not Listed	Not Assessed	N/A	Yes	
7	Camptandriinae	*Ilyogynis microcheirum*	Not Listed	Not Assessed	N/A	Yes	
8	Camptandriinae	*Paracleistostoma depressum*	Not Listed	Not Assessed	Native	Yes	
9	Diogenidae	Clibanarius infraspinatus	Not Listed	Not Assessed	N/A	Yes	
10	Diogenidae	Clibanarius longitarsus	Not Listed	Not Assessed	N/A	Yes	
11	Diogenidae	Clibanarius merguiensis	Not Listed	Not Assessed	N/A	Yes	
12	Diogenidae	Dardanus lagopodes	Not Listed	Not Assessed	N/A	Yes	
13	Diogenidae	*Diogenes sp. (Tidal Hermit Crab)*	Not Listed	Not Assessed	N/A	Yes	
14	Grapsidae	*Metopograpsus frontalis*	Not Listed	Not Assessed	N/A	Yes	
15	Grapsidae	*Metopograpsus gracilipes*	Not Listed	Not Assessed	N/A	Yes	
16	Grapsidae	*Metopograpsus latifrons*	Not Listed	Not Assessed	N/A	Yes	
17	Grapsidae	*Varuna yui*	Not Listed	Not Assessed	N/A	Yes	
18	Limulidae	*Carcinoscorpius rotundicauda*	Vulnerable	Data Deficient	Native	Yes	
19	Limulidae	*Tachypleus gigas*	Endangered	Data Deficient	Native	Yes	
20	Ocypodidae	Uca annulipes	Not Listed	Not Assessed	Native	Yes	
21	Ocypodidae	Uca vocans	Not Listed	Not Assessed	Native	Yes	Yes
22	Palaemonidae	Palaemon sp.	Not Listed	Not Assessed	N/A	Yes	
23	Palamonidae	*Macrobrachium equidens*	Not Listed	Least Concerned	Native	Yes	
24	Penaeidae	*Metapenaeus sp.*	Not Listed	Not Assessed	N/A	Yes	
25	Penaeidae	*Penaeus sp.*	Not Listed	Not Assessed	N/A	Yes	
26	Sesarmidae	*Episesarma chengtongense*	Not Listed	Not Assessed	N/A	Yes	
27	Sesarmidae	*Episesarma singaporense*	Not Listed	Not Assessed	N/A	Yes	
28	Sesarmidae	*Episesarma versicolor*	Not Listed	Not Assessed	N/A	Yes	
29	Sesarmidae	*Perisesarma eumolpe*	Not Listed	Not Assessed	N/A	Yes	
30	Sesarmidae	*Perisesarma fasciatus*	Not Listed	Not Assessed	N/A	Yes	
31	Sesarmidae	*Perisesarma indiarum*	Not Listed	Not Assessed	N/A	Yes	
32	Sesarmidae	*Sarmatium germaini*	Endangered	Not Assessed	N/A	Yes	
33	Sesarmidae	*Selatium brockii*	Not Listed	Not Assessed	Native	Yes	
34	Sesarmidae	*Nanosesarma batavicum*	Not Listed	Not Assessed	N/A	Yes	
35	Thalassinidae	*Thalassina anomala*	Endangered	Not Assessed	Native	Yes	
36	Thalassinidae	*Thalassina gracilis*	Endangered	Not Assessed	Native	Yes	
37	Thalassinidae	*Thalassina kelanang*	Not Listed	Not Assessed	N/A	Yes	
38	Upogebiidae	*Wolffogebia phuketensis*	Endangered	Not Assessed	Native	Yes	
39	Varunidae	*Metaplax elegans*	Not Listed	Not Assessed	N/A	Yes	Yes
-	Thalassinidae	*Thalassina sp.*	N/A	Not Assessed	N/A	Yes	Yes
-	Palamonidae	*Machrobrachium sp.*	N/A	N/A	N/A	N/A	Yes
-	Camptandriinae	*Unidentified Camptandriidae*	N/A	N/A	N/A	N/A	Yes
-	Sesarmidae	*Unidentified Sesarmidae*	N/A	N/A	N/A	N/A	Yes
-	N/A	*Unidentified Brachyura*	N/A	N/A	N/A	N/A	Yes

No.	Family	Scientific Name	Common Name	Global Status (IUCN/CITES)	National Status (Davison et al., 2008)	Species of Conservation Significance	Distribution/Abundance/Rarity (Baker & Lim, 2012)	Native Status (Baker & Lim, 212)	Probable?	Recorded?
1	Bufonidae	*Duttaphrynus melanostictus*	Asian toad	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes
2	Eleutherodactylidae	*Eleutherodactylus planirostris*	Greenhouse frog	Least Concern	Not Assessed	No	Widespread and Common	Non-native	Yes	Yes
3	Dicroglossidae	*Fejervarya cancrivora*	Crab-eating frog	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	
4	Dicroglossidae	*Fejervarya limnocharis*	Field frog	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes
5	Ranidae	*Hylarana erythraea*	Green paddy frog	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes
6	Microhylidae	*Kaloula pulchra*	Banded bull frog	Least Concern	Not Assessed	No	Widespread and Common	Non-native	Yes	Yes
7	Dicroglossidae	*Limnonectes blythii*	Malayan giant frog	Near Threatened	Not Assessed	No	Widespread and Common	Native	Yes	Yes
8	Ranidae	*Lithobates catesbeianus*	American bullfrog	Least Concern	Not Assessed	No	Widespread and Common	Non-native	Yes	
9	Microhylidae	*Microhyla butleri*	Painted chorus frog	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	
10	Microhylidae	*Microhyla heymonsi*	Dark-sided chorus frog	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes
11	Microhylidae	*Microhyla mukhlesuri*	East Asian ornate chorus frog	Least Concern	Not Assessed	No	Restricted and Rare	Non-native	Yes	Yes
12	Rhacophoridae	*Polypedates leucomystax*	Four-lined tree frog	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes
13	Ranidae	*Sylvirana guentheri*	Guenther's frog	Least Concern	Not Assessed	No	Widespread but Uncommon	Non-native	Yes	Yes

No.	Family	Scientific Name	Common Name	Global Status (IUCN/CITES)	National Status (Davison et al., 2008)	Species of Conservation Significance	Distribution/Abundance/Rarity (Baker & Lim, 2012)	Native Status (Baker & Lim, 2012)	Probable Species	Recorded Species	Remarks
1	Colubridae (Ahaetulliinae)	*Ahaetulla prasina*	Oriental whip snake	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes	
2	Trionychidae	*Amyda cartilaginea*	Asian softshell turtle	Vulnerable	Endangered	Yes	Restricted and Uncommon	Native	Yes	Yes	
3	Agamidae	*Bronchocela cristatella*	Green crested lizard	Not Assessed	Not Assessed	No	Widespread but Uncommon	Native	Yes	Yes	
4	Elapidae	*Calliophis intestinalis*	Banded Malayan coral snake	Least Concern	Not Assessed	No	Widespread but Rare	Native	Yes		
5	Agamidae	*Calotes versicolor*	Changeable lizard	Not Assessed	Not Assessed	No	Widespread and Common	Non-native	Yes	Yes	
6	Colubridae (Ahaetulliinae)	*Chrysopelea paradisi*	Paradise gliding snake	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes		
7	Colubridae (Colubrinae)	*Coelognathus flavolineatus*	Common Malayan racer	Least Concern	Endangered	Yes	Widespread but Rare	Native	Yes		
8	Geomydidae	*Cuora amboinensis*	Malayan box terrapin	Vulnerable; CITES protected (Appendix II)	Not Assessed	Yes	Restricted but Common	Native	Yes	Yes	
9	Colubridae (Ahaetulliinae)	*Dendrelaphis caudolineatus*	Striped bronzeback	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes	
10	Colubridae (Ahaetulliinae)	*Dendrelaphis pictus*	Painted bronzeback	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes	
11	Agamidae	*Draco sumatranus*	Sumatran flying dragon	Not Assessed	Not Assessed	No	Widespread and Common	Native	Yes	Yes	
12	Scincidae	*Eutropis multifasciata*	Many-lined sun skink	Not Assessed	Not Assessed	No	Widespread and Common	Native	Yes		
13	Gekkonidae	*Gehyra mutilata*	Four-clawed gecko	Not Assessed	Not Assessed	No	Widespread and Common	Native	Yes		
14	Gekkonidae	*Gekko monarchus*	Spotted house gecko	Not Assessed	Not Assessed	No	Widespread and Common	Native	Yes	Yes	
15	Gekkonidae	*Hemidactylus brookii*	Brooke's house gecko	Not Assessed	Not Assessed	No	Restricted and Rare	Non-native	Yes		
16	Gekkonidae	*Hemidactylus frenatus*	Spiny-tailed house gecko	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes	
17	Gekkonidae	*Hemidactylus platyurus*	Flat-tailed gecko	Not Assessed	Not Assessed	No	Widespread and Common	Native	Yes		
18	Geomydidae	*Heosemys grandis*	Giant asian pond turtle	Vulnerable; CITES protected (Appendix II)	Not Assessed	No	NA	Non-native	Yes		
19	Typhlopidae	*Indotyphlops braminus*	Brahminy blind snake	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes		
20	Gekkonidae	*Lepidodactylus lugubris*	Mourning gecko	Not Assessed	Not Assessed	No	Widespread but Rare	Native	Yes		
21	Colubridae (Colubrinae)	*Lycodon capucinus*	House wolf snake	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes		
22	Scincidae	*Lygosoma bowringii*	Garden supple skink	Not Assessed	Not Assessed	No	Widespread and Common	Native	Yes	Yes	
23	Pythonidae	*Malayopython reticulatus*	Reticulated python	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes		
24	Elapidae	*Naja sumatrana*	Equatorial spitting cobra	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes	
25	Colubridae (Colubrinae)	*Oligodon octolineatus*	Striped kukri snake	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes	
26	Pareidae	*Pareas margaritophorus*	White-spotted slug snake	Least Concern	Not Assessed	No	Widespread and Common	Non-native	Yes		
27	Trionychidae	*Pelodiscus sinensis*	Chinese softshell turtle	Vulnerable	Not Assessed	No	Widespread and Common	Non-native	Yes		
28	Colubridae (Colubrinae)	*Ptyas korros*	Indochinese rat snake	Least Concern	Not Assessed	No	Widespread but Uncommon	Native	Yes		
29	Geomydidae	*Siebenrockiella crassicollis*	Black marsh terrapin	Vulnerable	Not Assessed	No	Widespread and Common	Non-native	Yes	Yes	
30	Emydidae	*Trachemys decussata*	Cuban slider	Not Assessed	Not Assessed	No	NA	NA	Yes		
31	Emydidae	*Trachemys scripta*	Red-eared slider	Least Concern	Not Assessed	No	Widespread and Common	Non-native	Yes	Yes	
32	Varanidae	*Varanus salvator*	Malayan water monitor	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes	
33	Colubridae (Natricinae)	*Xenochrophis vittatus*	Striped keelback	Least Concern	Not Assessed	No	Widespread and Common	Non-native	Yes	Yes	
34	Xenopeltidae	*Xenopeltis unicolor*	Iridescent earth snake	Least Concern	Not Assessed	No	Widespread but Uncommon	Native	Yes		

No.	Family	Scientific Name	Common Name	Global Status (IUCN/CITES)	National Status (Davison et al., 2008)	Species of Conservation Significance	Distribution/ Abundance/ Rarity (NSS, 2020; Singapore Birds Project, 2020)	Primary Native Status (NSS, 2020; Singapre Birds Project, 2020)	Other Native Status (NSS, 2020; Singapre Birds Project, 2020)	Probable Species	Recorded Species
1	Acanthizidae	*Gerygone sulphurea*	Golden-bellied gerygone	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	
2	Accipitridae	*Accipiter gularis*	Japanese sparrowhawk	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	
3	Accipitridae	*Accipiter soloensis*	Chinese sparrowhawk	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
4	Accipitridae	*Accipiter trivirgatus*	Crested goshawk	Least Concern	Critically Endangered	Yes	Uncommon	Resident breeder		Yes	
5	Accipitridae	*Aviceda jerdoni*	Jerdon's baza	Least Concern	Not Assessed	No	Uncommon	Winter visitor		Yes	
6	Accipitridae	*Aviceda leuphotes*	Black baza	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	
7	Accipitridae	*Buteo buteo*	Common buzzard	Least Concern	Not Assessed	No	Uncommon	Winter visitor		Yes	
8	Accipitridae	*Elanus caeruleus*	Black-winged kite	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	
9	Accipitridae	*Haliaeetus ichthyaetus*	Grey-headed fish eagle	Near Threatened	Critically Endangered	Yes	Uncommon	Resident breeder		Yes	
10	Accipitridae	*Haliaeetus leucogaster*	White-bellied sea eagle	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
11	Accipitridae	*Haliastur indus*	Brahminy kite	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
12	Accipitridae	*Nisaetus cirrhatus*	Changeable hawk-eagle	Least Concern	Endangered	Yes	Uncommon	Resident breeder		Yes	Yes
13	Accipitridae	*Pernis ptilorhynchus*	Crested honey-buzzard	Least Concern	Not Assessed	No	Common	Winter visitor	ssage migrant/non-breeding vis	Yes	
14	Accipitridae	*Spilornis cheela*	Crested serpent eagle	Least Concern	Critically Endangered	Yes	Rare	Resident, breeding not proven		Yes	
15	Aegithinidae	*Aegithina tiphia*	Common iora	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
16	Alcedinidae	*Alcedo atthis*	Common kingfisher	Least Concern	Not Assessed	No	Common	Winter visitor		Yes	Yes
17	Alcedinidae	*Alcedo meninting*	Blue-eared kingfisher	Least Concern	Critically Endangered	Yes	Rare	Resident breeder		Yes	
18	Alcedinidae	*Ceyx erithaca*	Oriental dwarf kingfisher	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
19	Alcedinidae	*Halcyon coromanda*	Ruddy kingfisher	Least Concern	Critically Endangered	Yes	Uncommon	Resident breeder	Winter visitor	Yes	
20	Alcedinidae	*Halcyon pileata*	Black-capped kingfisher	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
21	Alcedinidae	*Halcyon smyrnensis*	White-throated kingfisher	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
22	Alcedinidae	*Pelargopsis capensis*	Stork-billed kingfisher	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	Yes
23	Alcedinidae	*Todiramphus chloris*	Collared kingfisher	Least Concern	Not Assessed	No	Abundant	Resident breeder		Yes	Yes
24	Apodidae	*Aerodramus fuciphagus*	Edible-nest swiftlet	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	
25	Apodidae	*Aerodramus maximus*	Black-nest swiftlet	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	
26	Ardeidae	*Ardea alba*	Great egret	Least Concern	Not Assessed	No	Common	Winter visitor		Yes	
27	Ardeidae	*Ardea cinerea*	Grey heron	Least Concern	Vulnerable	Yes	Uncommon	Resident breeder		Yes	Yes
28	Ardeidae	*Ardea intermedia*	Intermediate egret	Least Concern	Not Assessed	No	Uncommon	Winter visitor		Yes	
29	Ardeidae	*Ardea purpurea*	Purple heron	Least Concern	Endangered	Yes	Uncommon	Resident breeder		Yes	Yes
30	Ardeidae	*Ardeola bacchus*	Chinese pond heron	Least Concern	Not Assessed	No	Common	Winter visitor		Yes	
31	Ardeidae	*Ardeola speciosa*	Javan pond heron	Least Concern	Not Assessed	No	Uncommon	Winter visitor		Yes	
32	Ardeidae	*Bubulcus coromandus*	Eastern cattle egret	Least Concern	Not Assessed	No	Common	Winter visitor	duced resident, breeding not p	Yes	
33	Ardeidae	*Butorides striata*	Striated heron	Least Concern	Not Assessed	No	Common	Resident breeder	Winter visitor	Yes	
34	Ardeidae	*Egretta eulophotes*	Chinese egret	Vulnerable	Not Assessed	Yes	Rare	Winter visitor		Yes	
35	Ardeidae	*Egretta garzetta*	Little egret	Least Concern	Not Assessed	No	Common	Winter visitor		Yes	
36	Ardeidae	*Gorsachius melanolophus*	Malayan night heron	Least Concern	Not Assessed	No	Rare	Winter visitor	Passage migrant	Yes	
37	Ardeidae	*Ixobrychus cinnamomeus*	Cinnamon bittern	Least Concern	Not Assessed	No	Uncommon	Resident breeder	Winter visitor	Yes	
38	Ardeidae	*Ixobrychus eurhythmus*	Von Schrenck's bittern	Least Concern	Not Assessed	No	Uncommon	Winter visitor		Yes	
39	Ardeidae	*Ixobrychus flavicollis*	Black bittern	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	Yes
40	Ardeidae	*Ixobrychus sinensis*	Yellow bittern	Least Concern	Not Assessed	No	Common	Resident breeder	Winter visitor	Yes	Yes
41	Ardeidae	*Nycticorax nycticorax*	Black-crowned night heron	Least Concern	Critically Endangered	Yes	Uncommon	Resident breeder		Yes	Yes
42	Bucerotidae	*Anthracoceros albirostris*	Oriental pied hornbill	Least Concern	Critically Endangered	Yes	Uncommon	Resident breeder		Yes	
43	Cacatuidae	*Cacatua goffiniana*	Tanimbar corella	Near Threatened	Not Assessed	No	Common	Introduced resident breeder		Yes	
44	Campephagidae	*Lalage nigra*	Pied triller	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
45	Campephagidae	*Pericrocotus divaricatus*	Ashy minivet	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	Yes
46	Caprimulgidae	*Caprimulgus affinis*	Savanna nightjar	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	
47	Caprimulgidae	*Caprimulgus macrurus*	Large-tailed nightjar	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
48	Charadriidae	*Pluvialis fulva*	Pacific golden plover	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	
49	Charadriidae	*Vanellus indicus*	Red-wattled lapwing	Least Concern	Endangered	Yes	Uncommon	Resident breeder		Yes	
50	Cisticolidae	*Cisticola juncidis*	Zitting cisticola	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	
51	Cisticolidae	*Orthotomus atrogularis*	Dark-necked tailorbird	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
52	Cisticolidae	*Orthotomus ruficeps*	Ashy tailorbird	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	
53	Cisticolidae	*Orthotomus sericeus*	Rufous-tailed tailorbird	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	Yes
54	Cisticolidae	*Orthotomus sutorius*	Common tailorbird	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
55	Cisticolidae	*Prinia flaviventris*	Yellow-bellied prinia	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	
56	Columbidae	*Chalcophaps indica*	Common emerald dove	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	Yes
57	Columbidae	*Columba livia*	Rock dove	Least Concern	Not Assessed	No	Abundant	Introduced resident breeder		Yes	Yes
58	Columbidae	*Ducula bicolor*	Pied imperial pigeon	Least Concern	Not Assessed	No	Uncommon	Resident breeder	Non-breeding visitor/introduced	Yes	
59	Columbidae	*Geopelia striata*	Zebra dove	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
60	Columbidae	*Ptilinopus jambu*	Jambu fruit dove	Near Threatened	Not Assessed	No	Uncommon	Non-breeding visitor		Yes	
61	Columbidae	*Spilopelia chinensis*	Spotted dove	Least Concern	Not Assessed	No	Abundant	Resident breeder		Yes	Yes
62	Columbidae	*Streptopelia tranquebarica*	Red turtle dove	Least Concern	Not Assessed	No	Uncommon	Introduced resident breeder		Yes	
63	Columbidae	*Treron vernans*	Pink-necked green pigeon	Least Concern	Not Assessed	No	Abundant	Resident breeder		Yes	Yes
64	Coraciidae	*Eurystomus orientalis*	Oriental dollarbird	Least Concern	Not Assessed	No	Common	Resident breeder	Winter visitor	Yes	Yes
65	Corvidae	*Corvus macrorhynchos*	Large-billed crow	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	Yes
66	Corvidae	*Corvus splendens*	House crow	Least Concern	Not Assessed	No	Common	Introduced resident breeder		Yes	Yes
67	Cuculidae	*Cacomantis merulinus*	Plaintive cuckoo	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	
68	Cuculidae	*Cacomantis sepulcralis*	Rusty-breasted cuckoo	Least Concern	Vulnerable	Yes	Uncommon	Resident breeder		Yes	
69	Cuculidae	*Cacomantis sonneratii*	Banded bay cuckoo	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	Yes
70	Cuculidae	*Centropus bengalensis*	Lesser coucal	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
71	Cuculidae	*Centropus sinensis*	Greater coucal	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	
72	Cuculidae	*Chrysococcyx minutillus*	Little bronze-cuckoo	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	

No.	Family	Scientific Name	Common Name	Global Status (IUCN/CITES)	National Status (Davison et al., 2008)	Species of Conservation Significance	Distribution/ Abundance/ Rarity (NSS, 2020; Singapore Birds Project, 2020)	Primary Native Status (NSS, 2020; Singapre Birds Project, 2020)	Other Native Status (NSS, 2020; Singapre Birds Project, 2020)	Probable Species	Recorded Species
73	Cuculidae	*Chrysococcyx xanthorhynchus*	Violet cuckoo	Least Concern	Endangered	Yes	Uncommon	Resident breeder	Winter visitor	Yes	
74	Cuculidae	*Clamator coromandus*	Chestnut-winged cuckoo	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
75	Cuculidae	*Cuculus micropterus*	Indian cuckoo	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
76	Cuculidae	*Eudynamys scolopaceus*	Asian koel	Least Concern	Not Assessed	No	Common	Resident breeder	Winter visitor	Yes	
77	Cuculidae	*Hierococcyx fugax*	Malaysian hawk-cuckoo	Least Concern	Not Assessed	No	Uncommon	Non-breeding visitor		Yes	
78	Dicaeidae	*Dicaeum cruentatum*	Scarlet-backed flowerpecker	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
79	Dicruridae	*Dicrurus annectans*	Crow-billed drongo	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
80	Dicruridae	*Dicrurus paradiseus*	Greater racket-tailed drongo	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
81	Estrildidae	*Lonchura atricapilla*	Chestnut munia	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	
82	Estrildidae	*Lonchura leucogastroides*	Javan munia	Least Concern	Not Assessed	No	Uncommon	Introduced resident breeder		Yes	Yes
83	Estrildidae	*Lonchura maja*	White-headed munia	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	
84	Estrildidae	*Lonchura punctulata*	Scaly-breasted munia	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	
85	Glareolidae	*Glareola maldivarum*	Oriental pratincole	Least Concern	Not Assessed	No	Uncommon	Passage migrant		Yes	
86	Hemiprocnidae	*Hemiprocne longipennis*	Grey-rumped treeswift	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	
87	Hirundinidae	*Cecropis daurica*	Red-rumped swallow	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
88	Hirundinidae	*Hirundo rustica*	Barn swallow	Least Concern	Not Assessed	No	Abundant	Winter visitor	Passage migrant	Yes	
89	Hirundinidae	*Hirundo tahitica*	Pacific swallow	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
90	Hirundinidae	*Riparia riparia*	Sand martin	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
91	Laniidae	*Lanius cristatus*	Brown shrike	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	Yes
92	Laniidae	*Lanius schach*	Long-tailed shrike	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	
93	Laniidae	*Lanius tigrinus*	Tiger shrike	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	Yes
94	Laridae	*Chlidonias hybrida*	Whiskered tern	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
95	Laridae	*Chlidonias leucopterus*	White-winged tern	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	
96	Laridae	*Sternula albifrons*	Little tern	Least Concern	Endangered	Yes	Common	Resident breeder	Winter visitor	Yes	
97	Leiothrichidae	*Garrulax leucolophus*	White-crested laughingthrush	Least Concern	Not Assessed	No	Common	Introduced resident breeder		Yes	
98	Megalaimidae	*Psilopogon haemacephalus*	Coppersmith barbet	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
99	Megalaimidae	*Psilopogon lineatus*	Lineated barbet	Least Concern	Not Assessed	No	Uncommon	Introduced resident breeder		Yes	Yes
100	Meropidae	*Merops philippinus*	Blue-tailed bee-eater	Least Concern	Not Assessed	No	Common	Winter visitor		Yes	Yes
101	Meropidae	*Merops viridis*	Blue-throated bee-eater	Least Concern	Not Assessed	No	Common	Migrant breeder		Yes	Yes
102	Monarchidae	*Terpsiphone incei*	Amur paradise flycatcher	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	
103	Motacillidae	*Anthus rufulus*	Paddyfield pipit	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	
104	Motacillidae	*Dendronanthus indicus*	Forest wagtail	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
105	Motacillidae	*Motacilla cinerea*	Grey wagtail	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
106	Motacillidae	*Motacilla tschutschensis*	Eastern yellow wagtail	Least Concern	Not Assessed	No	Common	Winter visitor		Yes	
107	Muscicapidae	*Copsychus saularis*	Oriental magpie-robin	Least Concern	Endangered	Yes	Uncommon	Resident breeder		Yes	Yes
108	Muscicapidae	*Ficedula mugimaki*	Mugimaki flycatcher	Least Concern	Not Assessed	No	Uncommon	Passage migrant		Yes	
109	Muscicapidae	*Ficedula zanthopygia*	Yellow-rumped flycatcher	Least Concern	Not Assessed	No	Uncommon	Passage migrant		Yes	Yes
110	Muscicapidae	*Larvivora cyane*	Siberian blue robin	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	
111	Muscicapidae	*Muscicapa dauurica*	Asian brown flycatcher	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	Yes
112	Muscicapidae	*Muscicapa ferruginea*	Ferruginous flycatcher	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
113	Muscicapidae	*Muscicapa sibirica*	Dark-sided flycatcher	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
114	Nectariniidae	*Aethopyga siparaja*	Crimson sunbird	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
115	Nectariniidae	*Anthreptes malacensis*	Brown-throated sunbird	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
116	Nectariniidae	*Cinnyris jugularis*	Olive-backed sunbird	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
117	Nectariniidae	*Leptocoma calcostetha*	Copper-throated sunbird	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	
118	Oriolidae	*Oriolus chinensis*	Black-naped oriole	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
119	Pandionidae	*Pandion haliaetus*	Western osprey	Least Concern	Not Assessed	No	Common	Non-breeding visitor		Yes	
120	Passeridae	*Passer montanus*	Eurasian tree sparrow	Least Concern	Not Assessed	No	Common	Resident breeder	Introduced?	Yes	
121	Phasianidae	*Excalfactoria chinensis*	King quail	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	
122	Phasianidae	*Gallus gallus*	Red junglefowl	Least Concern	Endangered	Yes	Uncommon	Resident breeder		Yes	Yes
123	Phasianidae	*Gallus gallus (domestic)*	Domestic chicken	Not Assessed	Not Assessed	No	NA	Introduced		Yes	
124	Phylloscopidae	*Phylloscopus borealis*	Arctic warbler	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	
125	Phylloscopidae	*Phylloscopus coronatus*	Eastern crowned warbler	Least Concern	Not Assessed	No	Uncommon	Winter visitor		Yes	
126	Phylloscopidae	*Phylloscopus inornatus*	Yellow-browed warbler	Least Concern	Not Assessed	No	Rare	Winter visitor	Passage migrant	Yes	Yes
127	Picidae	*Chrysophlegma miniaceum*	Banded woodpecker	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
128	Picidae	*Dinopium javanense*	Common flameback	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
129	Picidae	*Micropternus brachyurus*	Rufous woodpecker	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	Yes
130	Picidae	*Picus vittatus*	Laced woodpecker	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
131	Picidae	*Yungipicus moluccensis*	Sunda pygmy woodpecker	Least Concern	Not Assessed	No	Abundant	Resident breeder		Yes	Yes
132	Pittidae	*Pitta moluccensis*	Blue-winged pitta	Least Concern	Not Assessed	No	Uncommon	Migrant breeder	Winter visitor/passage migrant	Yes	
133	Pittidae	*Pitta sordida*	Hooded pitta	Least Concern	Not Assessed	No	Uncommon	Winter visitor	Passage migrant	Yes	
134	Ploceidae	*Ploceus philippinus*	Baya weaver	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	
135	Psittaculidae	*Loriculus galgulus*	Blue-crowned hanging-parrot	Least Concern	Endangered	Yes	Uncommon	Resident breeder		Yes	Yes
136	Psittaculidae	*Psittacula alexandri*	Red-breasted parakeet	Near Threatened	Not Assessed	No	Common	Introduced resident breeder		Yes	Yes
137	Psittaculidae	*Psittacula krameri*	Rose-ringed parakeet	Least Concern	Not Assessed	No	Uncommon	Introduced resident breeder		Yes	
138	Psittaculidae	*Psittacula longicauda*	Long-tailed parakeet	Vulnerable	Not Assessed	Yes	Common	Resident breeder		Yes	Yes
139	Psittaculidae	*Trichoglossus haematodus*	Coconut lorikeet	Least Concern	Not Assessed	No	Uncommon	Introduced resident breeder		Yes	
140	Pycnonotidae	*Pycnonotus aurigaster*	Sooty-headed bulbul	Least Concern	Not Assessed	No	Uncommon	Introduced resident breeder		Yes	
141	Pycnonotidae	*Pycnonotus goiavier*	Yellow-vented bulbul	Least Concern	Not Assessed	No	Abundant	Resident breeder		Yes	Yes
142	Pycnonotidae	*Pycnonotus jocosus*	Red-whiskered bulbul	Least Concern	Not Assessed	No	Uncommon	Introduced resident breeder		Yes	
143	Pycnonotidae	*Pycnonotus plumosus*	Olive-winged bulbul	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
144	Pycnonotidae	*Pycnonotus zeylanicus*	Straw-headed bulbul	Critically Endangered	Endangered	Yes	Uncommon	Resident breeder		Yes	Yes

No.	Family	Scientific Name	Common Name	Global Status (IUCN/CITES)	National Status (Davison et al., 2008)	Species of Conservation Significance	Distribution/ Abundance/ Rarity (NSS, 2020; Singapore Birds Project, 2020)	Primary Native Status (NSS, 2020; Singapre Birds Project, 2020)	Other Native Status (NSS, 2020; Singapre Birds Project, 2020)	Probable Species	Recorded Species
145	Rallidae	*Amaurornis phoenicurus*	White-breasted waterhen	Least Concern	Not Assessed	No	Common	Resident breeder	Winter visitor	Yes	Yes
146	Rallidae	*Rallina fasciata*	Red-legged crake	Least Concern	Vulnerable	Yes	Uncommon	Resident breeder	Winter visitor	Yes	Yes
147	Rhipiduridae	*Rhipidura javanica*	Malaysian pied fantail	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
148	Rostratulidae	*Rostratula benghalensis*	Greater painted-snipe	Least Concern	Critically Endangered	Yes	Rare	Resident breeder		Yes	
149	Scolopacidae	*Actitis hypoleucos*	Common sandpiper	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	Yes
150	Scolopacidae	*Gallinago gallinago*	Common snipe	Least Concern	Not Assessed	No	Common	Winter visitor		Yes	
151	Scolopacidae	*Gallinago stenura*	Pin-tailed snipe	Least Concern	Not Assessed	No	Common	Winter visitor		Yes	
152	Scolopacidae	*Numenius phaeopus*	Eurasian whimbrel	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	
153	Strigidae	*Ketupa ketupu*	Buffy fish owl	Least Concern	Critically Endangered	Yes	Uncommon	Resident breeder		Yes	
154	Strigidae	*Otus lempiji*	Sunda scops owl	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
155	Strigidae	*Strix seloputo*	Spotted wood owl	Least Concern	Critically Endangered	Yes	Uncommon	Resident breeder		Yes	
156	Sturnidae	*Acridotheres javanicus*	Javan myna	Least Concern	Not Assessed	No	Abundant	Introduced resident breeder		Yes	Yes
157	Sturnidae	*Acridotheres tristis*	Common myna	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	
158	Sturnidae	*Agropsar sturninus*	Daurian starling	Least Concern	Not Assessed	No	Common	Winter visitor	Passage migrant	Yes	
159	Sturnidae	*Aplonis panayensis*	Asian glossy starling	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
160	Sturnidae	*Gracula religiosa*	Common hill myna	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	Yes
161	Timaliidae	*Mixornis gularis*	Pin-striped tit-babbler	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
162	Turnicidae	*Turnix suscitator*	Barred buttonquail	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	
163	Tytonidae	*Tyto javanica*	Eastern barn owl	Least Concern	Not Assessed	No	Uncommon	Resident breeder		Yes	
164	Zosteropidae	*Zosterops simplex*	Swinhoe's white-eye	Least Concern	Not Assessed	No	Common	Resident breeder		Yes	Yes
-	Apodidae	*Aerodramus sp.*	Unidentified swiftlet	Least Concern	Not Assessed	No	Common	Resident breeder		N/A	Yes

No.	Family	Scientific Name	Common Name	Global Status (IUCN, 2012)	National Status (Davison et al. 2008)	Species of Conservation Significance	Distribution/Rarity (Baker & Lim, 2012)	Native Status (Baker & Lim, 2012)	Probable Species	Recorded Species
1	Canidae	*Canis lupus familiaris*	Feral dog	Not Assessed	Not Assessed	No	NA	Non-native	Yes	
2	Cercopithecidae	*Macaca fascicularis*	Long-tailed macaque	Vulnerable	Not Assessed	Yes	Widespread and Common	Native	Yes	
3	Felidae	*Felis catus*	Feral cat	Not Assessed	Not Assessed	No	NA	Non-native	Yes	
4	Manidae	*Manis javanica*	Sunda pangolin	Critically Endangered	Critically Endangered	Yes	Widespread but Rare	Native	Yes	
5	Muridae	*Mus castaneus*	House mouse	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	
6	Muridae	*Rattus norvegicus*	Brown rat	Least Concern	Not Assessed	No	Widespread and Common	Non-native	Yes	
7	Muridae	*Rattus tanezumi*	Oriental house rat	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes
8	Muridae	*Rattus tiomanicus*	Malaysian wood rat	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	
9	Mustelidae	*Lutrogale perspicillata*	Smooth-coated otter	Vulnerable	Critically Endangered	Yes	Widespread but Rare	Native	Yes	Yes
10	Sciuridae	*Callosciurus notatus*	Plantain squirrel	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes
11	Soricidae	*Suncus murinus*	House shrew	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	
12	Suidae	*Sus scrofa*	Eurasian wild boar	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes
13	Tupaiidae	*Tupaia glis*	Common treeshrew	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes
14	Viverridae	*Paradoxurus musangus*	Common palm civet	Least Concern	Not Assessed	No	Widespread but Uncommon	Native	Yes	Yes

No.	Family	Scientific Name	Common Name	Global Status (IUCN/CITES)	National Status (Davison et al., 2008)	Species of Conservation Significance	Distribution/Abundance/Rarity (Baker & Lim, 2012)	Native Status (Baker & Lim, 2012)	Probable Species	Recorded Species
1	Pteropodidae	*Cynopterus brachyotis*	Lesser dog-faced fruit bat	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	No
2	Pteropodidae	*Eonycteris spelaea*	Cave nectar bat	Least Concern	Not Assessed	No	Widespread but Uncommon	Native	Yes	No
3	Emballonuridae	*Saccolaimus saccolaimus*	Pouch-bearing bat	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes
4	Vespertilionidae	*Myotis muricola*	Whiskered myotis	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes
5	Vespertilionidae	*Pipistrellus javanicus*	Javan pipistrelle	Least Concern	Not Assessed	No	Widespread but Uncommon	Native	Yes	Yes
6	Vespertilionidae	*Scotophilus kuhlii*	Asiatic lesser yellow house bat	Least Concern	Not Assessed	No	Widespread and Common	Native	Yes	Yes
-	Pteropodidae	*Unidentified Pteropodidae*	Unidentified fruit bat	N/A	N/A	N/A	N/A	N/A	N/A	Yes

No.	Taxon	Family Name	Scientific Name	Local Status (SRDB)	Global Status (IUCN)	Residence (IUCN, NParks Flora & Fauna Web, Sealifebase, the Biodiversity of Singapore, A Guide To Mangroves of Singapore)	Probable?	Recorded?
1	Cnidarian	N/A	*Unidentified Actiniaria*	N/A	N/A	N/A	N/A	Yes
2	Polychaete	N/A	*Unidentified Polychaeta*	N/A	N/A	N/A	N/A	Yes
3	Porifera	N/A	*Unidentified Archaeobalanidae*	N/A	N/A	N/A	N/A	Yes

APPENDIX D

Camera Trap Data

Station	Sampling_date	Date	Time	DateTimeOriginal	File	Taxon	Common Name	*Scientific name*	Global Status	Local Status	Threatened	Abundance	Remarks
CT03	10 Feb 2021	5 Feb 2021	11:17:48	2/05/21 11:17:48	IMG_0008.AVI	Bird	Red-legged crake	*Rallina fasciata*	Least Concern	Vulnerable	Yes	2	1 adult 1 chick
CT03	10 Feb 2021	6 Feb 2021	10:35:44	2/06/21 10:35:44	IMG_0010.AVI	Bird	Red-legged crake	*Rallina fasciata*	Least Concern	Vulnerable	Yes	7	2 adults 5 chicks
CT03	10 Feb 2021	4 Feb 2021	21:19:40	2/04/21 21:19:40	IMG_0007.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	10 Feb 2021	9 Feb 2021	18:35:42	2/09/21 18:35:42	IMG_0011.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	10 Feb 2021	9 Feb 2021	18:39:28	2/09/21 18:39:28	IMG_0012.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	10 Feb 2021	9 Feb 2021	18:42:21	2/09/21 18:42:21	IMG_0013.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	10 Feb 2021	9 Feb 2021	18:43:42	2/09/21 18:43:42	IMG_0014.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	10 Feb 2021	9 Feb 2021	18:45:06	2/09/21 18:45:06	IMG_0015.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	8 Feb 2021	5 Feb 2021	23:41:16	2/05/21 23:41:16	IMG_0024.AVI	Mammal	Common palm civet	*Paradoxurus musangus*	Least Concern	Not Assessed	No	1	
CT04	8 Feb 2021	4 Feb 2021	22:02:08	2/04/21 22:02:08	IMG_0008.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	8 Feb 2021	5 Feb 2021	19:38:34	2/05/21 19:38:34	IMG_0021.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	8 Feb 2021	5 Feb 2021	19:38:56	2/05/21 19:38:56	IMG_0022.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	8 Feb 2021	5 Feb 2021	21:43:52	2/05/21 21:43:52	IMG_0023.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	8 Feb 2021	7 Feb 2021	19:44:54	2/07/21 19:44:54	IMG_0129.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT05	8 Feb 2021	5 Feb 2021	21:34:10	2/05/21 21:34:10	IMG_0015.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT02	8 Feb 2021	7 Feb 2021	15:33:28	2/07/21 15:33:28	IMG_0007.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	8 Feb 2021	7 Feb 2021	17:16:58	2/07/21 17:16:58	IMG_0008.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	8 Feb 2021	7 Feb 2021	17:18:38	2/07/21 17:18:38	IMG_0009.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT01	8 Feb 2021	6 Feb 2021	20:25:58	2/06/21 20:25:58	IMG_0009.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT05	18 Feb 2021	10 Feb 2021	1:02:06	2/10/21 01:02:06	IMG_0027.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT05	18 Feb 2021	14 Feb 2021	21:25:00	2/14/21 21:25:00	IMG_0202.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT05	18 Feb 2021	12 Feb 2021	11:07:02	2/12/21 11:07:02	IMG_0067.AVI	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	2	
CT04	18 Feb 2021	8 Feb 2021	22:36:40	2/08/21 22:36:40	IMG_0020.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	18 Feb 2021	11 Feb 2021	1:12:23	2/11/21 01:12:23	IMG_0050.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	18 Feb 2021	12 Feb 2021	23:09:52	2/12/21 23:09:52	IMG_0110.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	18 Feb 2021	13 Feb 2021	10:08:58	2/13/21 10:08:58	IMG_0129.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	18 Feb 2021	15 Feb 2021	6:06:42	2/15/21 06:06:42	IMG_0208.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	18 Feb 2021	15 Feb 2021	6:07:44	2/15/21 06:07:44	IMG_0209.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	18 Feb 2021	15 Feb 2021	6:09:02	2/15/21 06:09:02	IMG_0210.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	18 Feb 2021	18 Feb 2021	9:59:30	2/18/21 09:59:30	IMG_0304.AVI	#N/A	#N/A	*Unidentified sp.*	#N/A	#N/A	#N/A	1	
CT04	18 Feb 2021	17 Feb 2021	14:10:30	2/17/21 14:10:30	IMG_0282.AVI	Bird	White-throated kingfisher	*Halcyon smyrnensis*	Least Concern	Not Assessed	No	1	
CT04	18 Feb 2021	17 Feb 2021	14:11:28	2/17/21 14:11:28	IMG_0283.AVI	Bird	White-throated kingfisher	*Halcyon smyrnensis*	Least Concern	Not Assessed	No	1	
CT05	25 Feb 2021	23 Feb 2021	22:07:14	2/23/21 22:07:14	IMG_0225.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT05	25 Feb 2021	23 Feb 2021	22:07:34	2/23/21 22:07:34	IMG_0226.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT05	25 Feb 2021	23 Feb 2021	22:08:02	2/23/21 22:08:02	IMG_0227.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT05	25 Feb 2021	23 Feb 2021	22:08:40	2/23/21 22:08:40	IMG_0228.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT05	25 Feb 2021	23 Feb 2021	22:09:48	2/23/21 22:09:48	IMG_0229.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT05	25 Feb 2021	19 Feb 2021	21:54:36	2/19/21 21:54:36	IMG_0030.AVI	Bird	Black-crowned night heron	*Nycticorax nycticorax*	Least Concern	Critically Endangered	Yes	1	
CT05	25 Feb 2021	19 Feb 2021	21:56:35	2/19/21 21:56:35	IMG_0031.AVI	Bird	Black-crowned night heron	*Nycticorax nycticorax*	Least Concern	Critically Endangered	Yes	1	
CT04	25 Feb 2021	22 Feb 2021	20:34:40	2/22/21 20:34:40	IMG_0257.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	25 Feb 2021	22 Feb 2021	20:35:04	2/22/21 20:35:04	IMG_0258.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	25 Feb 2021	22 Feb 2021	20:39:44	2/22/21 20:39:44	IMG_0259.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	25 Feb 2021	25 Feb 2021	6:59:26	2/25/21 06:59:26	IMG_0325.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	25 Feb 2021	25 Feb 2021	6:59:54	2/25/21 06:59:54	IMG_0326.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	25 Feb 2021	25 Feb 2021	7:00:16	2/25/21 07:00:16	IMG_0327.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	25 Feb 2021	25 Feb 2021	7:01:00	2/25/21 07:01:00	IMG_0328.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	25 Feb 2021	19 Feb 2021	20:42:40	2/19/21 20:42:40	IMG_0040.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	3	
CT04	25 Feb 2021	19 Feb 2021	14:05:26	2/19/21 14:05:26	IMG_0032.AVI	Bird	White-throated kingfisher	*Halcyon smyrnensis*	Least Concern	Not Assessed	No	1	
CT04	1 Mar 2021	25 Feb 2021	10:57:34	2/25/21 10:57:34	IMG_0007.AVI	Bird	White-throated kingfisher	*Halcyon smyrnensis*	Least Concern	Not Assessed	No	1	
CT04	1 Mar 2021	27 Feb 2021	13:24:14	2/27/21 13:24:14	IMG_0160.AVI	Bird	White-throated kingfisher	*Halcyon smyrnensis*	Least Concern	Not Assessed	No	1	
CT04	1 Mar 2021	25 Feb 2021	22:26:58	2/25/21 22:26:58	IMG_0033.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	1 Mar 2021	28 Feb 2021	3:46:22	2/28/21 03:46:22	IMG_0204.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	1 Mar 2021	28 Feb 2021	23:15:12	2/28/21 23:15:12	IMG_0293.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	1 Mar 2021	1 Mar 2021	0:48:06	3/01/21 00:48:06	IMG_0294.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	1 Mar 2021	1 Mar 2021	5:55:34	3/01/21 05:55:34	IMG_0295.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	1 Mar 2021	1 Mar 2021	5:56:00	3/01/21 05:56:00	IMG_0296.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	1 Mar 2021	1 Mar 2021	5:56:26	3/01/21 05:56:26	IMG_0297.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	1 Mar 2021	1 Mar 2021	5:56:50	3/01/21 05:56:50	IMG_0298.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	1 Mar 2021	1 Mar 2021	5:57:12	3/01/21 05:57:12	IMG_0299.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	1 Mar 2021	28 Feb 2021	3:46:42	2/28/21 03:46:42	IMG_0205.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT04	1 Mar 2021	28 Feb 2021	3:47:04	2/28/21 03:47:04	IMG_0206.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT04	10 Mar 2021	4 Mar 2021	13:04:02	3/04/21 13:04:02	IMG_0103.AVI	Bird	White-throated kingfisher	*Halcyon smyrnensis*	Least Concern	Not Assessed	No	1	
CT04	10 Mar 2021	1 Mar 2021	19:05:54	3/01/21 19:05:54	IMG_0006.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	10 Mar 2021	1 Mar 2021	19:06:16	3/01/21 19:06:16	IMG_0007.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	

Station	Sampling_date	Date	Time	DateTimeOriginal	File	Taxon	Common Name	*Scientific name*	Global Status	Local Status	Threatened	Abundance	Remarks
CT04	10 Mar 2021	1 Mar 2021	19:06:42	3/01/21 19:06:42	IMG_0008.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	10 Mar 2021	1 Mar 2021	19:07:04	3/01/21 19:07:04	IMG_0009.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	10 Mar 2021	2 Mar 2021	21:21:24	3/02/21 21:21:24	IMG_0046.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	10 Mar 2021	4 Mar 2021	22:51:56	3/04/21 22:51:56	IMG_0116.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	10 Mar 2021	4 Mar 2021	22:52:18	3/04/21 22:52:18	IMG_0117.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	10 Mar 2021	5 Mar 2021	21:45:14	3/05/21 21:45:14	IMG_0153.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	10 Mar 2021	5 Mar 2021	23:42:52	3/05/21 23:42:52	IMG_0154.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	10 Mar 2021	7 Mar 2021	22:21:12	3/07/21 22:21:12	IMG_0385.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	10 Mar 2021	9 Mar 2021	13:53:42	3/09/21 13:53:42	IMG_0426.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	10 Mar 2021	4 Mar 2021	12:36:00	3/04/21 12:36:00	IMG_0101.AVI	#N/A	#N/A	*Unidentified sp.*	#N/A	#N/A	#N/A	1	
CT04	10 Mar 2021	4 Mar 2021	13:02:32	3/04/21 13:02:32	IMG_0102.AVI	#N/A	#N/A	*Unidentified sp.*	#N/A	#N/A	#N/A	1	
CT05	10 Mar 2021	3 Mar 2021	8:58:22	3/03/21 08:58:22	IMG_0036.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT05	10 Mar 2021	10 Mar 2021	8:13:56	3/10/21 08:13:56	IMG_0409.AVI	Butterfly	#N/A	*Unidentified Lepidoptera*	#N/A	#N/A	#N/A	1	
CT01	16 Mar 2021	24 Feb 2021	14:41:49	2/24/21 14:41:49	IMG_0021.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	25 Feb 2021	8:51:12	2/25/21 08:51:12	IMG_0023.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	2 Mar 2021	7:32:32	3/02/21 07:32:32	IMG_0046.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	2 Mar 2021	12:45:06	3/02/21 12:45:06	IMG_0047.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	3 Mar 2021	11:34:32	3/03/21 11:34:32	IMG_0049.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	4 Mar 2021	12:46:02	3/04/21 12:46:02	IMG_0053.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	16 Mar 2021	9:36:20	3/16/21 09:36:20	IMG_0107.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	19 Feb 2021	7:15:06	2/19/21 07:15:06	IMG_0018.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	18 Mar 2021	16:21:55	3/18/21 16:21:55	IMG_0070.AVI	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	10 Mar 2021	18:21:08	3/10/21 18:21:08	IMG_0077.AVI	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	15 Mar 2021	17:21:18	3/15/21 17:21:18	IMG_0101.AVI	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	18 Mar 2021	16:21:08	3/18/21 16:21:08	IMG_0068.AVI	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	2	
CT01	16 Mar 2021	13 Mar 2021	7:56:48	3/13/21 07:56:48	IMG_0088.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	5	
CT01	16 Mar 2021	13 Mar 2021	7:57:18	3/13/21 07:57:18	IMG_0089.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	5	
CT01	16 Mar 2021	18 Feb 2021	10:13:26	2/18/21 10:13:26	IMG_0017.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	26 Feb 2021	8:59:20	2/26/21 08:59:20	IMG_0025.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	1 Mar 2021	10:34:30	3/01/21 10:34:30	IMG_0045.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	6 Mar 2021	18:34:10	3/06/21 18:34:10	IMG_0059.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	7 Mar 2021	10:20:12	3/07/21 10:20:12	IMG_0062.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	7 Mar 2021	10:51:08	3/07/21 10:51:08	IMG_0063.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	8 Mar 2021	7:19:36	3/08/21 07:19:36	IMG_0065.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	13 Mar 2021	10:49:02	3/13/21 10:49:02	IMG_0091.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	14 Mar 2021	10:54:00	3/14/21 10:54:00	IMG_0096.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	8 Mar 2021	10:57:26	3/08/21 10:57:26	IMG_0066.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	2	
CT01	16 Mar 2021	12 Feb 2021	19:00:06	2/12/21 19:00:06	IMG_0001.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	12 Feb 2021	21:10:22	2/12/21 21:10:22	IMG_0002.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	12 Feb 2021	21:10:46	2/12/21 21:10:46	IMG_0003.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	14 Feb 2021	6:54:38	2/14/21 06:54:38	IMG_0005.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	14 Feb 2021	6:55:00	2/14/21 06:55:00	IMG_0006.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	14 Feb 2021	6:55:20	2/14/21 06:55:20	IMG_0007.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	14 Feb 2021	6:55:44	2/14/21 06:55:44	IMG_0008.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	14 Feb 2021	10:13:20	2/14/21 10:13:20	IMG_0009.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	15 Feb 2021	21:32:14	2/15/21 21:32:14	IMG_0010.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	15 Feb 2021	21:32:38	2/15/21 21:32:38	IMG_0011.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	15 Feb 2021	21:32:58	2/15/21 21:32:58	IMG_0012.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	15 Feb 2021	21:33:20	2/15/21 21:33:20	IMG_0013.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	16 Feb 2021	10:53:56	2/16/21 10:53:56	IMG_0014.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	17 Feb 2021	5:02:56	2/17/21 05:02:56	IMG_0015.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	17 Feb 2021	5:03:16	2/17/21 05:03:16	IMG_0016.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	22 Feb 2021	10:11:26	2/22/21 10:11:26	IMG_0019.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	22 Feb 2021	10:12:02	2/22/21 10:12:02	IMG_0020.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	26 Feb 2021	6:54:05	2/26/21 06:54:05	IMG_0024.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	26 Feb 2021	22:06:06	2/26/21 22:06:06	IMG_0027.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	26 Feb 2021	22:06:28	2/26/21 22:06:28	IMG_0028.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	27 Feb 2021	18:34:36	2/27/21 18:34:36	IMG_0030.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	28 Feb 2021	7:52:24	2/28/21 07:52:24	IMG_0031.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	28 Feb 2021	7:52:46	2/28/21 07:52:46	IMG_0032.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	28 Feb 2021	7:53:10	2/28/21 07:53:10	IMG_0033.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	28 Feb 2021	7:53:32	2/28/21 07:53:32	IMG_0034.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	28 Feb 2021	7:53:52	2/28/21 07:53:52	IMG_0035.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	28 Feb 2021	18:20:10	2/28/21 18:20:10	IMG_0036.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	

Station	Sampling_date	Date	Time	DateTimeOriginal	File	Taxon	Common Name	*Scientific name*	Global Status	Local Status	Threatened	Abundance	Remarks
CT01	16 Mar 2021	28 Feb 2021	18:20:32	2/28/21 18:20:32	IMG_0037.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	28 Feb 2021	18:20:52	2/28/21 18:20:52	IMG_0038.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	28 Feb 2021	18:21:16	2/28/21 18:21:16	IMG_0039.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	28 Feb 2021	18:21:40	2/28/21 18:21:40	IMG_0040.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	28 Feb 2021	18:22:00	2/28/21 18:22:00	IMG_0041.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	28 Feb 2021	22:24:42	2/28/21 22:24:42	IMG_0042.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	28 Feb 2021	22:25:02	2/28/21 22:25:02	IMG_0043.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	3 Mar 2021	21:16:10	3/03/21 21:16:10	IMG_0050.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	3 Mar 2021	21:48:54	3/03/21 21:48:54	IMG_0051.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	3 Mar 2021	21:49:15	3/03/21 21:49:15	IMG_0052.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	7 Mar 2021	8:48:14	3/07/21 08:48:14	IMG_0060.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	7 Mar 2021	8:48:36	3/07/21 08:48:36	IMG_0061.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	7 Mar 2021	19:18:14	3/07/21 19:18:14	IMG_0064.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	8 Mar 2021	13:36:40	3/08/21 13:36:40	IMG_0068.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	8 Mar 2021	13:38:02	3/08/21 13:38:02	IMG_0069.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	8 Mar 2021	13:38:22	3/08/21 13:38:22	IMG_0070.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	8 Mar 2021	13:39:16	3/08/21 13:39:16	IMG_0071.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	8 Mar 2021	13:39:44	3/08/21 13:39:44	IMG_0072.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	8 Mar 2021	13:40:16	3/08/21 13:40:16	IMG_0073.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	8 Mar 2021	13:40:38	3/08/21 13:40:38	IMG_0074.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	9 Mar 2021	0:49:10	3/09/21 00:49:10	IMG_0076.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	12 Mar 2021	20:49:38	3/12/21 20:49:38	IMG_0083.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	13 Mar 2021	0:39:58	3/13/21 00:39:58	IMG_0084.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	13 Mar 2021	0:56:16	3/13/21 00:56:16	IMG_0085.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	13 Mar 2021	1:09:49	3/13/21 01:09:49	IMG_0086.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	13 Mar 2021	1:12:51	3/13/21 01:12:51	IMG_0087.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	13 Mar 2021	18:57:56	3/13/21 18:57:56	IMG_0093.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	13 Mar 2021	18:58:18	3/13/21 18:58:18	IMG_0094.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	14 Mar 2021	20:33:08	3/14/21 20:33:08	IMG_0097.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	14 Mar 2021	20:33:36	3/14/21 20:33:36	IMG_0098.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	14 Mar 2021	20:33:56	3/14/21 20:33:56	IMG_0099.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	16 Mar 2021	6:49:12	3/16/21 06:49:12	IMG_0103.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	16 Mar 2021	6:49:40	3/16/21 06:49:40	IMG_0104.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	16 Mar 2021	6:50:22	3/16/21 06:50:22	IMG_0106.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT01	16 Mar 2021	12 Mar 2021	19:05:54	3/12/21 19:05:54	IMG_0082.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT01	16 Mar 2021	16 Mar 2021	6:50:00	3/16/21 06:50:00	IMG_0105.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	28 Feb 2021	12:45:12	2/28/21 12:45:12	IMG_0065.AVI	Bird	Laced woodpecker	*Picus vittatus*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	28 Feb 2021	12:46:06	2/28/21 12:46:06	IMG_0066.AVI	Bird	Laced woodpecker	*Picus vittatus*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	28 Feb 2021	12:50:24	2/28/21 12:50:24	IMG_0067.AVI	Bird	Laced woodpecker	*Picus vittatus*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	28 Feb 2021	14:48:14	2/28/21 14:48:14	IMG_0068.AVI	Bird	Laced woodpecker	*Picus vittatus*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	13 Feb 2021	18:43:38	2/13/21 18:43:38	IMG_0019.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	23 Feb 2021	9:41:46	2/23/21 09:41:46	IMG_0040.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	23 Feb 2021	9:42:58	2/23/21 09:42:58	IMG_0041.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	27 Feb 2021	7:25:40	2/27/21 07:25:40	IMG_0062.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	10 Mar 2021	9:20:50	3/10/21 09:20:50	IMG_0099.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	10 Mar 2021	15:13:54	3/10/21 15:13:54	IMG_0102.AVI	Mammal	Plantain squirrel	*Callosciurus notatus*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	12 Mar 2021	18:40:44	3/12/21 18:40:44	IMG_0109.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	13 Mar 2021	19:26:22	3/13/21 19:26:22	IMG_0112.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	11 Feb 2021	13:00:20	2/11/21 13:00:20	IMG_0009.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	4 Mar 2021	8:09:52	3/04/21 08:09:52	IMG_0080.AVI	Bird	White-breasted waterhen	*Amaurornis phoenicurus*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	13 Mar 2021	8:36:50	3/13/21 08:36:50	IMG_0110.AVI	Bird	White-breasted waterhen	*Amaurornis phoenicurus*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	14 Feb 2021	9:04:40	2/14/21 09:04:40	IMG_0022.AVI	Mammal	Plantain squirrel	*Callosciurus notatus*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	24 Feb 2021	14:55:32	2/24/21 14:55:32	IMG_0044.AVI	Mammal	Plantain squirrel	*Callosciurus notatus*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	11 Feb 2021	14:40:30	2/11/21 14:40:30	IMG_0010.AVI	Bird	Common emerald dove	*Chalcophaps indica*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	25 Feb 2021	18:01:28	2/25/21 18:01:28	IMG_0049.AVI	Bird	Common emerald dove	*Chalcophaps indica*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	1 Mar 2021	15:48:18	3/01/21 15:48:18	IMG_0075.AVI	Bird	Common emerald dove	*Chalcophaps indica*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	26 Feb 2021	13:22:34	2/26/21 13:22:34	IMG_0059.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT02	16 Mar 2021	4 Mar 2021	8:41:10	3/04/21 08:41:10	IMG_0081.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT02	16 Mar 2021	4 Mar 2021	8:42:56	3/04/21 08:42:56	IMG_0082.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT02	16 Mar 2021	4 Mar 2021	18:24:42	3/04/21 18:24:42	IMG_0085.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT02	16 Mar 2021	5 Mar 2021	7:08:20	3/05/21 07:08:20	IMG_0088.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT02	16 Mar 2021	10 Mar 2021	11:30:08	3/10/21 11:30:08	IMG_0100.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT02	16 Mar 2021	10 Feb 2021	21:12:12	2/10/21 21:12:12	IMG_0008.AVI	Mammal	Common palm civet	*Paradoxurus musangus*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	13 Feb 2021	4:41:48	2/13/21 04:41:48	IMG_0014.AVI	Mammal	Oriental house rat	*Rattus tanezumi*	Least Concern	Not Assessed	No	1	

Station	Sampling_date	Date	Time	DateTimeOriginal	File	Taxon	Common Name	*Scientific name*	Global Status	Local Status	Threatened	Abundance	Remarks
CT02	16 Mar 2021	20 Feb 2021	22:06:04	2/20/21 22:06:04	IMG_0033.AVI	Mammal	Oriental house rat	*Rattus tanezumi*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	22 Feb 2021	1:03:36	2/22/21 01:03:36	IMG_0034.AVI	Mammal	Rat sp.	*Rattus sp.*	#N/A	#N/A	#N/A	1	
CT02	16 Mar 2021	26 Feb 2021	1:14:22	2/26/21 01:14:22	IMG_0055.AVI	Mammal	Oriental house rat	*Rattus tanezumi*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	3 Mar 2021	21:44:10	3/03/21 21:44:10	IMG_0079.AVI	Mammal	Oriental house rat	*Rattus tanezumi*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	5 Mar 2021	4:53:14	3/05/21 04:53:14	IMG_0087.AVI	Mammal	Oriental house rat	*Rattus tanezumi*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	10 Mar 2021	3:31:42	3/10/21 03:31:42	IMG_0097.AVI	Mammal	Oriental house rat	*Rattus tanezumi*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	10 Mar 2021	5:44:16	3/10/21 05:44:16	IMG_0098.AVI	Mammal	Oriental house rat	*Rattus tanezumi*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	14 Feb 2021	8:49:20	2/14/21 08:49:20	IMG_0021.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	18 Feb 2021	13:40:00	2/18/21 13:40:00	IMG_0027.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	23 Feb 2021	12:37:14	2/23/21 12:37:14	IMG_0042.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	26 Feb 2021	9:25:48	2/26/21 09:25:48	IMG_0056.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	26 Feb 2021	9:26:14	2/26/21 09:26:14	IMG_0057.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	26 Feb 2021	11:54:30	2/26/21 11:54:30	IMG_0058.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	27 Feb 2021	10:12:56	2/27/21 10:12:56	IMG_0063.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	17 Feb 2021	11:19:48	2/17/21 11:19:48	IMG_0026.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	18 Feb 2021	13:48:06	2/18/21 13:48:06	IMG_0029.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	19 Feb 2021	13:11:44	2/19/21 13:11:44	IMG_0031.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	22 Feb 2021	10:16:54	2/22/21 10:16:54	IMG_0035.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	22 Feb 2021	10:49:10	2/22/21 10:49:10	IMG_0036.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	22 Feb 2021	11:38:02	2/22/21 11:38:02	IMG_0037.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	24 Feb 2021	11:39:24	2/24/21 11:39:24	IMG_0043.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	19 Jul 2020	16:52:54	7/19/20 16:52:54	IMG_0059.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	26 Feb 2021	13:22:54	2/26/21 13:22:54	IMG_0060.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	13 Feb 2021	13:16:56	2/13/21 13:16:56	IMG_0017.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	3	
CT02	16 Mar 2021	13 Feb 2021	13:15:56	2/13/21 13:15:56	IMG_0016.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	4	
CT02	16 Mar 2021	13 Feb 2021	13:15:32	2/13/21 13:15:32	IMG_0015.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	5	
CT02	16 Mar 2021	10 Feb 2021	19:31:54	2/10/21 19:31:54	IMG_0007.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	24 Feb 2021	19:26:16	2/24/21 19:26:16	IMG_0046.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	24 Feb 2021	19:27:06	2/24/21 19:27:06	IMG_0047.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	25 Feb 2021	17:03:56	2/25/21 17:03:56	IMG_0048.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	2 Mar 2021	14:43:42	3/02/21 14:43:42	IMG_0070.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	2 Mar 2021	14:44:08	3/02/21 14:44:08	IMG_0071.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	3 Mar 2021	19:40:12	3/03/21 19:40:12	IMG_0072.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	4 Mar 2021	22:45:34	3/04/21 22:45:34	IMG_0086.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	9 Mar 2021	17:12:06	3/09/21 17:12:06	IMG_0095.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	10 Mar 2021	1:22:48	3/10/21 01:22:48	IMG_0096.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	24 Feb 2021	19:25:56	2/24/21 19:25:56	IMG_0045.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	27 Feb 2021	10:29:32	2/27/21 10:29:32	IMG_0064.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	10 Mar 2021	11:36:10	3/10/21 11:36:10	IMG_0101.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT02	16 Mar 2021	9 Mar 2021	16:58:18	3/09/21 16:58:18	IMG_0094.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	3	
CT02	16 Mar 2021	13 Feb 2021	18:33:12	2/13/21 18:33:12	IMG_0018.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	13 Feb 2021	18:53:08	2/13/21 18:53:08	IMG_0020.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	16 Feb 2021	19:29:40	2/16/21 19:29:40	IMG_0023.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	16 Feb 2021	19:32:50	2/16/21 19:32:50	IMG_0024.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	17 Feb 2021	7:51:46	2/17/21 07:51:46	IMG_0025.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	23 Feb 2021	9:31:22	2/23/21 09:31:22	IMG_0038.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	23 Feb 2021	9:32:02	2/23/21 09:32:02	IMG_0039.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	2 Mar 2021	8:02:06	3/02/21 08:02:06	IMG_0069.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	1 Mar 2021	17:45:48	3/01/21 17:45:48	IMG_0076.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	3 Mar 2021	7:32:12	3/03/21 07:32:12	IMG_0077.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	5 Mar 2021	7:43:56	3/05/21 07:43:56	IMG_0089.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	6 Mar 2021	15:04:30	3/06/21 15:04:30	IMG_0091.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	11 Mar 2021	8:42:18	3/11/21 08:42:18	IMG_0103.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	12 Mar 2021	12:58:46	3/12/21 12:58:46	IMG_0107.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	12 Mar 2021	18:40:22	3/12/21 18:40:22	IMG_0108.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT02	16 Mar 2021	13 Mar 2021	9:06:22	3/13/21 09:06:22	IMG_0111.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	12 Feb 2021	11:49:40	2/12/21 11:49:40	IMG_0003.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	15 Feb 2021	19:06:32	2/15/21 19:06:32	IMG_0007.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	23 Feb 2021	13:25:14	2/23/21 13:25:14	IMG_0018.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	25 Feb 2021	9:57:14	2/25/21 09:57:14	IMG_0023.AVI	Mammal	Plantain squirrel	*Callosciurus notatus*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	13 Feb 2021	18:34:26	2/13/21 18:34:26	IMG_0004.AVI	Bird	White-breasted waterhen	*Amaurornis phoenicurus*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	22 Feb 2021	13:40:28	2/22/21 13:40:28	IMG_0016.AVI	Bird	White-breasted waterhen	*Amaurornis phoenicurus*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	1 Mar 2021	18:35:30	3/01/21 18:35:30	IMG_0034.AVI	Bird	White-breasted waterhen	*Amaurornis phoenicurus*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	27 Feb 2021	7:18:56	2/27/21 07:18:56	IMG_0030.AVI	Bird	White-breasted waterhen	*Amaurornis phoenicurus*	Least Concern	Not Assessed	No	2	

Station	Sampling_date	Date	Time	DateTimeOriginal	File	Taxon	Common Name	*Scientific name*	Global Status	Local Status	Threatened	Abundance	Remarks
CT03	16 Mar 2021	23 Feb 2021	16:46:04	2/23/21 16:46:04	IMG_0019.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	24 Feb 2021	18:30:42	2/24/21 18:30:42	IMG_0020.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	25 Feb 2021	7:22:26	2/25/21 07:22:26	IMG_0022.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	26 Feb 2021	10:10:58	2/26/21 10:10:58	IMG_0026.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	27 Feb 2021	16:46:36	2/27/21 16:46:36	IMG_0031.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	3 Mar 2021	9:53:10	3/03/21 09:53:10	IMG_0037.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	4 Mar 2021	11:12:14	3/04/21 11:12:14	IMG_0042.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	4 Mar 2021	11:13:36	3/04/21 11:13:36	IMG_0043.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	4 Mar 2021	11:19:24	3/04/21 11:19:24	IMG_0044.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	9 Mar 2021	7:41:36	3/09/21 07:41:36	IMG_0046.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	13 Mar 2021	7:53:52	3/13/21 07:53:52	IMG_0052.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	14 Mar 2021	7:22:44	3/14/21 07:22:44	IMG_0053.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	14 Mar 2021	8:14:42	3/14/21 08:14:42	IMG_0054.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	15 Mar 2021	7:24:36	3/15/21 07:24:36	IMG_0055.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	1	
CT03	16 Mar 2021	17 Feb 2021	10:13:50	2/17/21 10:13:50	IMG_0009.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	2	
CT03	16 Mar 2021	11 Mar 2021	15:50:52	3/11/21 15:50:52	IMG_0051.AVI	Bird	Red junglefowl	*Gallus gallus*	Least Concern	Endangered	Yes	2	
CT03	16 Mar 2021	16 Feb 2021	8:00:30	2/16/21 08:00:30	IMG_0008.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	19 Feb 2021	18:14:46	2/19/21 18:14:46	IMG_0010.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	19 Feb 2021	18:15:06	2/19/21 18:15:06	IMG_0011.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	20 Feb 2021	16:35:24	2/20/21 16:35:24	IMG_0013.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	20 Feb 2021	18:11:18	2/20/21 18:11:18	IMG_0015.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	24 Feb 2021	18:39:32	2/24/21 18:39:32	IMG_0021.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	25 Feb 2021	18:43:12	2/25/21 18:43:12	IMG_0025.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	28 Feb 2021	17:50:00	2/28/21 17:50:00	IMG_0032.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	1 Mar 2021	23:07:50	3/01/21 23:07:50	IMG_0035.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	19 Mar 2021	14:41:05	3/19/21 14:41:05	IMG_0037.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	3 Mar 2021	10:07:38	3/03/21 10:07:38	IMG_0038.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	4 Mar 2021	9:19:04	3/04/21 09:19:04	IMG_0040.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	4 Mar 2021	9:36:40	3/04/21 09:36:40	IMG_0041.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	7 Mar 2021	19:44:32	3/07/21 19:44:32	IMG_0045.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	10 Mar 2021	16:45:18	3/10/21 16:45:18	IMG_0050.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	20 Feb 2021	7:31:54	2/20/21 07:31:54	IMG_0012.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT03	16 Mar 2021	20 Feb 2021	18:10:28	2/20/21 18:10:28	IMG_0014.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT03	16 Mar 2021	26 Feb 2021	22:55:14	2/26/21 22:55:14	IMG_0028.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT03	16 Mar 2021	26 Feb 2021	22:55:36	2/26/21 22:55:36	IMG_0029.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT03	16 Mar 2021	2 Mar 2021	18:33:58	3/02/21 18:33:58	IMG_0036.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT03	16 Mar 2021	16 Mar 2021	17:15:30	3/16/21 17:15:30	IMG_0056.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT03	16 Mar 2021	14 Feb 2021	14:02:18	2/14/21 14:02:18	IMG_0005.AVI	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	3 Mar 2021	19:15:50	3/03/21 19:15:50	IMG_0039.AVI	Mammal	Common treeshrew	*Tupaia glis*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	1 Mar 2021	7:38:30	3/01/21 07:38:30	IMG_0033.AVI	Bird	Common emerald dove	*Chalcophaps indica*	Least Concern	Not Assessed	No	1	
CT03	16 Mar 2021	15 Feb 2021	10:59:24	2/15/21 10:59:24	IMG_0006.AVI	Reptile	Monitor Lizard	*Varanus sp.*	#N/A	Not Assessed	No	1	
CT04	16 Mar 2021	19 Mar 2021	17:27:50	3/19/21 17:27:50	IMG_0061.AVI	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	
CT04	16 Mar 2021	11 Mar 2021	11:21:56	3/11/21 11:21:56	IMG_0061.AVI	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	2	
CT04	16 Mar 2021	10 Mar 2021	15:08:22	3/10/21 15:08:22	IMG_0017.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	16 Mar 2021	10 Mar 2021	15:09:26	3/10/21 15:09:26	IMG_0018.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	16 Mar 2021	10 Mar 2021	15:09:52	3/10/21 15:09:52	IMG_0019.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	16 Mar 2021	10 Mar 2021	15:10:16	3/10/21 15:10:16	IMG_0020.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	16 Mar 2021	10 Mar 2021	15:54:46	3/10/21 15:54:46	IMG_0025.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	16 Mar 2021	16 Mar 2021	15:35:40	3/16/21 15:35:40	IMG_0346.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	
CT04	16 Mar 2021	10 Mar 2021	15:11:08	3/10/21 15:11:08	IMG_0021.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	2	
CT04	16 Mar 2021	10 Mar 2021	15:04:48	3/10/21 15:04:48	IMG_0010.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	3	
CT04	16 Mar 2021	10 Mar 2021	15:05:12	3/10/21 15:05:12	IMG_0011.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	3	
CT04	16 Mar 2021	10 Mar 2021	15:05:40	3/10/21 15:05:40	IMG_0012.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	3	
CT04	16 Mar 2021	10 Mar 2021	15:06:02	3/10/21 15:06:02	IMG_0013.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	3	
CT04	16 Mar 2021	10 Mar 2021	15:06:48	3/10/21 15:06:48	IMG_0014.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	3	
CT04	16 Mar 2021	10 Mar 2021	15:07:24	3/10/21 15:07:24	IMG_0015.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	3	
CT04	16 Mar 2021	10 Mar 2021	15:07:52	3/10/21 15:07:52	IMG_0016.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	3	
CT04	16 Mar 2021	10 Mar 2021	15:11:38	3/10/21 15:11:38	IMG_0022.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	3	
CT04	16 Mar 2021	10 Mar 2021	15:12:08	3/10/21 15:12:08	IMG_0023.AVI	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	3	
CT05	16 Mar 2021	15 Mar 2021	10:58:46	3/15/21 10:58:46	IMG_0149.AVI	#N/A	#N/A	*Unidentified sp.*	#N/A	#N/A	#N/A	1	
CT05	16 Mar 2021	15 Mar 2021	12:00:18	3/15/21 12:00:18	IMG_0167.AVI	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	1	

APPENDIX E

Faunal Survey Data

Date	Cycle	Route	Waypoint	Latitude	Longitude	Sampling Pt	SP_Lat	SP_long	Time (24h)	Taxon	Common Name	Scientific name	Global Status	Local Status	Threatened	Quantity	Observation type (seen/heard/caught/scat/other signs)	Survey method (targeted/incidental)	Photo no.	Remarks
10 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	1507-1512	Bird	Large-billed crow	*Corvus macrorhynchos*	Least Concern	Not Assessed	No	1	Seen	Incidental		
1 Mar 2021	-	-	A1_02	1.42259	103.75398	-	-	-	1542	Bird	Sunda pygmy woodpecker	*Yungipicus moluccensis*	Least Concern	Not Assessed	No	1	Heard	Incidental		
10 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	1523-1528	Bird	Common emerald dove	*Chalcophaps indica*	Least Concern	Not Assessed	No	1	Heard	Incidental		
10 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	1523-1528	Bird	Pin-striped tit-babbler	*Mixornis gularis*	Least Concern	Not Assessed	No	1	Heard	Incidental		
10 Feb 2021	-	-	A1_05	1.428421978	103.755538	-	-	-	1422-1427	Odonate	Blue sprite	*Pseudagrion microcephalum*	Least Concern	Least Concern	No	1	Seen	Incidental		
18 Feb 2021	-	-	CH4148	1.427754024	103.752136	-	-	-	808	Bird	Grey heron	*Ardea cinerea*	Least Concern	Vulnerable	Yes	1	Seen	Incidental		
18 Feb 2021	-	-	CH4148	1.427754024	103.752136	-	-	-	808	Bird	Purple heron	*Ardea purpurea*	Least Concern	Endangered	Yes	1	Seen	Incidental		
18 Feb 2021	-	-	CH4149	1.427624021	103.753232	-	-	-	850	Bird	Common kingfisher	*Alcedo atthis*	Least Concern	Not Assessed	No	1	Seen	Incidental		
18 Feb 2021	-	-	CH4157	1.422195984	103.753105	-	-	-	-	Mammal	Smooth-coated otter	*Lutrogale perspicillata*	Vulnerable	Critically Endangered	Yes		Scat	Incidental	6760	
18 Feb 2021	-	-	CH4158	1.425311035	103.754518	-	-	-	1018	Butterfly	Common tiger	*Danaus genutia genutia*	Not Assessed	Not Assessed	No	1	Seen	Incidental	6763	
18 Feb 2021	-	-	CH4159	1.428171024	103.755334	-	-	-	1030	Bird	Common kingfisher	*Alcedo atthis*	Least Concern	Not Assessed	No	1	Seen	Incidental		
19 Mar 2021	-	-	CH4255	1.422697976	103.754615	-	-	-	-	Reptile	Striped kukri snake	*Oligodon octolineatus*	Least Concern	Not Assessed	No	1	Seen	Incidental		Trapped and dead in ECB
19 Mar 2021	-	-	CH4256	1.422721026	103.754553	-	-	-		Reptile	Striped keelback	*Xenochrophis vittatus*	Least Concern	Not Assessed	No	1	Seen	Incidental		Trapped and dead in ECB
6 Feb 2021	-	-	CT01	1.426405041	103.752633	-	-	-	20:25:58	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	Recorded	Targeted	IMG_0009.AVI	
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600	Mammal	Smooth-coated otter	*Lutrogale perspicillata*	Vulnerable	Critically Endangered	Yes	-	Scat	Incidental		Scat
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1716	Butterfly	Sumatran sunbeam	*Curetis saronis sumatrana*	Not Assessed	Not Assessed	No	1	Seen	Incidental		
1 Mar 2021	-	-	XT1137	1.427885033	103.752594	-	-	-	1708	Reptile	Malayan box terrapin	*Cuora amboinensis*	Vulnerable; CITES protected (Appendix II)	Not Assessed	Yes	1	Seen	Incidental		
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	79	Seen	Quadrat	JT2197	Quadrat 1 (5m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	52	Seen	Quadrat		Quadrat 2 (8m); excluded 8 halves
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	109	Seen	Quadrat	JT2188	Quadrat 3 (11m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	Mangrove murex	*Chicoreus capucinus*	Not Assessed	Not Assessed	No	1	Seen	Quadrat	JT2193, 2192	Quadrat 2 (8m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Polychaete	#N/A	*Unidentified Polychaeta*	#N/A	#N/A	#N/A	3	Seen	Quadrat		Quadrat 1 (5m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	NA	*Glauconome virens*	Not Assessed	Not Assessed	No	3	Seen	Quadrat	JT2197	Quadrat 1 (5m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	NA	*Mytella strigata*	Not Assessed	Not Assessed	No	1	Seen	Quadrat	JT2197	Quadrat 1 (5m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Polychaete	#N/A	*Unidentified Polychaeta*	#N/A	#N/A	#N/A	23	Seen	Quadrat		Quadrat 2 (8m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	NA	*Glauconome virens*	Not Assessed	Not Assessed	No	4	Seen	Quadrat	JT2193, 2192	Quadrat 2 (8m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Polychaete	#N/A	*Unidentified Polychaeta*	#N/A	#N/A	#N/A	10	Seen	Quadrat		Quadrat 3 (11m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	NA	*Coecella horsfieldii*	Not Assessed	Not Assessed	No	1	Seen	Quadrat	JT2188	Quadrat 3 (11m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	Red berry snail	*Assiminea brevicula*	Least Concern	Not Assessed	No	1	Seen	Quadrat		Quadrat 1 (5m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	Red berry snail	*Assiminea brevicula*	Least Concern	Not Assessed	No	4	Seen	Quadrat		Quadrat 2 (8m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	Red berry snail	*Assiminea brevicula*	Least Concern	Not Assessed	No	3	Seen	Quadrat		Quadrat 3 (11m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	36	Seen	Quadrat		Quadrat 1 (2m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	18	Seen	Quadrat		Quadrat 2 (6m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	25	Seen	Quadrat		Quadrat 3 (10m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	Mangrove murex	*Chicoreus capucinus*	Not Assessed	Not Assessed	No	2	Seen	Quadrat	IMG20210210172622 to IMG20210210172747	Quadrat 1 (2m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	NA	*Coecella horsfieldii*	Not Assessed	Not Assessed	No	1	Seen	Quadrat	IMG20210210174012; IMG20210210174019	Quadrat 3 (10m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	NA	*Mytella strigata*	Not Assessed	Not Assessed	No	200	Seen	Quadrat		Quadrat 1 (2m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	NA	*Coecella horsfieldii*	Not Assessed	Not Assessed	No	9	Seen	Quadrat	IMG20210210173211	Quadrat 1 (2m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	NA	*Melanoides tuberculata*	Least Concern	Not Assessed	No	1	Seen	Quadrat		Quadrat 1 (2m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	NA	*Mytella strigata*	Not Assessed	Not Assessed	No	24	Seen	Quadrat		Quadrat 2 (6m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	NA	*Pomacea canaliculata*	Least Concern	Not Assessed	No	1	Seen	Quadrat		Quadrat 2 (6m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	NA	*Coecella horsfieldii*	Not Assessed	Not Assessed	No	4	Seen	Quadrat	IMG20210210173811	Quadrat 2 (6m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	NA	*Mytella strigata*	Not Assessed	Not Assessed	No	14	Seen	Quadrat		Quadrat 3 (10m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	NA	*Glauconome virens*	Not Assessed	Not Assessed	No	4	Seen	Quadrat	IMG20210210173958; IMG20210210174019	Quadrat 3 (10m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Decapod	Orange fiddler crab	*Metaplax elegans*	Not Assessed	Not Assessed	No	1	Seen	Quadrat		Quadrat 1 (2m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	#N/A	*Sermyla sp.*	#N/A	#N/A	#N/A	3	Seen	Quadrat		Quadrat 1 (2m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	#N/A	*Tarebia sp.*	#N/A	#N/A	#N/A	7	Seen	Quadrat		Quadrat 1 (2m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	#N/A	*Tarebia sp.*	#N/A	#N/A	#N/A	3	Seen	Quadrat		Quadrat 2 (6m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	#N/A	*Tarebia sp.*	#N/A	#N/A	#N/A	11	Seen	Quadrat		Quadrat 3 (10m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Mollusc	#N/A	*Thiara sp.*	#N/A	#N/A	#N/A	3	Seen	Quadrat		Quadrat 1 (2m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Porifera	#N/A	*Unidentified Archaeobalanidae*	#N/A	#N/A	#N/A	5	Seen	Quadrat		Quadrat 3 (10m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Decapod	#N/A	*Unidentified Camptandriidae*	#N/A	#N/A	#N/A	1	Seen	Quadrat		Quadrat 1 (2m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Polychaete	#N/A	*Unidentified Polychaeta*	#N/A	#N/A	#N/A	17	Seen	Quadrat		Quadrat 1 (2m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Polychaete	#N/A	*Unidentified Polychaeta*	#N/A	#N/A	#N/A	3	Seen	Quadrat		Quadrat 2 (6m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Polychaete	#N/A	*Unidentified Polychaeta*	#N/A	#N/A	#N/A	2	Seen	Quadrat		Quadrat 3 (10m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Decapod	#N/A	*Unidentified Sesarmidae*	#N/A	#N/A	#N/A	1	Seen	Quadrat		Quadrat 1 (2m)
4 Feb 2021	-	-	A1_01	1.42246	103.75431	-	-	-	2154-2159	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	5	Seen	Targeted		
8 Feb 2021	-	-	A1_01	1.42246	103.75431	-	-	-	859-904	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	-	-	A1_01	1.42246	103.75431	-	-	-	919-924	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
24 Feb 2021	-	-	A1_01	1.42246	103.75431	-	-	-	2117-2122	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
24 Feb 2021	-	-	A1_01	1.42246	103.75431	-	-	-	2117-2122	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	-	-	A1_01	1.42246	103.75431	-	-	-	2154-2159	Fish	Guppy	*Poecilia reticulata*	Not Assessed	Not Assessed	No	40	Seen	Targeted	JT2052	
10 Feb 2021	-	-	A1_01	1.42246	103.75431	-	-	-	1453-1458	Fish	Guppy	*Poecilia reticulata*	Not Assessed	Not Assessed	No	TMC	Seen	Targeted		
25 Feb 2021	-	-	A1_01	1.42246	103.75431	-	-	-	917	Fish	Guppy	*Poecilia reticulata*	Not Assessed	Not Assessed	No	1	Caught	Targeted	CT6942-CT6943	
1 Mar 2021	-	-	A1_01	1.42246	103.75431	-	-	-	1523-1528	Fish	Guppy	*Poecilia reticulata*	Not Assessed	Not Assessed	No	40	Seen	Targeted		
24 Feb 2021	-	-	A1_01	1.42246	103.75431	-	-	-	2117-2122	Fish	Guppy	*Poecilia reticulata*	Not Assessed	Not Assessed	No	150	Seen	Targeted		
4 Feb 2021	-	-	A1_01	1.42246	103.75431	-	-	-	2154-2159	Amphibian	Malayan giant frog	*Limnonectes blythii*	Near Threatened	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	-	-	A1_01	1.42246	103.75431	-	-	-	2154-2159	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	7	Seen	Targeted	JT2053	
10 Feb 2021	-	-	A1_01	1.42246	103.75431	-	-	-	1453-1458	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	10	Seen	Targeted		
1 Mar 2021	-	-	A1_01	1.42246	103.75431	-	-	-	1523-1528	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	30	Seen	Targeted		
24 Feb 2021	-	-	A1_01	1.42246	103.75431	-	-	-	2117-2122	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	100	Seen	Targeted		
24 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	2130-2135	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
10 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	1507-1512	Fish	Giant mudskipper	*Periophthalmodon schlosseri*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	2202-2207	Fish	Green molly	*Poecilia sphenops*	Least Concern	Not Assessed	No	10	Seen	Targeted	JT2058-2060	
10 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	1507-1512	Fish	Green molly	*Poecilia sphenops*	Least Concern	Not Assessed	No	10	Seen	Targeted		
1 Mar 2021	-	-	A1_02	1.42259	103.75398	-	-	-	1535-1540	Fish	Green molly	*Poecilia sphenops*	Least Concern	Not Assessed	No	3	Seen	Targeted		
24 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	2130-2135	Fish	Green molly	*Poecilia sphenops*	Least Concern	Not Assessed	No	20	Seen	Targeted		
4 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	2202-2207	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	2	Seen	Targeted		
4 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	2202-2207	Fish	Guppy	*Poecilia reticulata*	Not Assessed	Not Assessed	No	20	Seen	Targeted	JT2061-2063	1 colourful
10 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	1507-1512	Fish	Guppy	*Poecilia reticulata*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
1 Mar 2021	-	-	A1_02	1.42259	103.75398	-	-	-	1535-1540	Fish	Guppy	*Poecilia reticulata*	Not Assessed	Not Assessed	No	50	Seen	Targeted		
24 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	2130-2135	Fish	Guppy	*Poecilia reticulata*	Not Assessed	Not Assessed	No	50	Seen	Targeted		
10 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	1507-1512	Fish	Javanese ricefish	*Oryzias javanicus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
1 Mar 2021	-	-	A1_02	1.42259	103.75398	-	-	-	1535-1540	Fish	Javanese ricefish	*Oryzias javanicus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	2202-2207	Amphibian	Malayan giant frog	*Limnonectes blythii*	Near Threatened	Not Assessed	No	4	Seen	Targeted	JT2055	
24 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	2130-2135	Amphibian	Malayan giant frog	*Limnonectes blythii*	Near Threatened	Not Assessed	No	3	Seen	Targeted		
24 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	2130-2135	Reptile	Malayan water monitor	*Varanus salvator*	Least Concern	Not Assessed	No	1	Seen	Targeted		
10 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	1507-1512	Reptile	Red-eared slider	*Trachemys scripta*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	929-934	Odonate	Scarlet skimmer	*Orthetrum testaceum*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	-	-	A1_02	1.42259	103.75398	-	-	-	911-916	Odonate	Scarlet skimmer	*Orthetrum testaceum*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	907-912	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	-	-	A1_02	1.42259	103.75398	-	-	-	911-916	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	1	Seen	Targeted		
4 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	2202-2207	Fish	Stripe-face brackish goby	*Calamiana variegata*	Least Concern	Not Assessed	No	3	Seen	Targeted	JT2057; 2064	
4 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	2202-2207	Fish	Stripe-face brackish goby	*Calamiana variegata*	Least Concern	Not Assessed	No	1	Seen	Targeted	JT2056	
4 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	2202-2207	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	100	Seen	Targeted		
10 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	1507-1512	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	82	Seen	Targeted		
1 Mar 2021	-	-	A1_02	1.42259	103.75398	-	-	-	1535-1540	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	20	Seen	Targeted		
24 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	2130-2135	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	50	Seen	Targeted		
25 Feb 2021	-	-	A1_02	1.42259	103.75398	-	-	-	929-934	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	2	Seen	Targeted		
24 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2144-2149	Fish	Bumblebee goby	*Brachygobius kabiliensis*	Not Assessed	Not Assessed	No	2	Seen	Targeted		
4 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2215-2221	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	2	Seen	Targeted		
24 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2144-2149	Fish	Green molly	*Poecilia sphenops*	Least Concern	Not Assessed	No	5	Seen	Targeted		
4 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2215-2221	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	2	Heard	Targeted		
24 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2144-2149	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	3	Heard	Targeted		
10 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	1523-1528	Fish	Javanese ricefish	*Oryzias javanicus*	Not Assessed	Not Assessed	No	10	Seen	Targeted		
4 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2215-2221	Fish	Javanese ricefish	*Oryzias javanicus*	Not Assessed	Not Assessed	No	20	Seen	Targeted	JT2069	
24 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2144-2149	Fish	Javanese ricefish	*Oryzias javanicus*	Not Assessed	Not Assessed	No	40	Seen	Targeted		
4 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2215-2221	Bird	Red-legged crake	*Rallina fasciata*	Least Concern	Vulnerable	Yes	1	Seen	Targeted	JT2068	
25 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	944-949	Odonate	Scarlet skimmer	*Orthetrum testaceum*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	-	-	A1_03	1.42272	103.75354	-	-	-	921-926	Odonate	Scarlet skimmer	*Orthetrum testaceum*	Least Concern	Least Concern	No	2	Seen	Targeted		
4 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2215-2221	Fish	Stripe-face brackish goby	*Calamiana variegata*	Least Concern	Not Assessed	No	1	Seen	Targeted	JT2073	
4 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2215-2221	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	60	Seen	Targeted		
10 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	1523-1528	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	50	Seen	Targeted		
1 Mar 2021	-	-	A1_03	1.42272	103.75354	-	-	-	1547-1552	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	30	Seen	Targeted		
24 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2144-2149	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	50	Seen	Targeted		
24 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2144-2149	Decapod	#N/A	*Macrobrachium sp.*	#N/A	#N/A	#N/A	1	Seen	Targeted	JT2324-2327	
24 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2144-2149	Fish	#N/A	*Stigmatogobius sp.*	#N/A	#N/A	#N/A	1	Seen	Targeted	JL7775	
24 Feb 2021	-	-	A1_03	1.42272	103.75354	-	-	-	2144-2149	Fish	#N/A	*Unidenified Gobiidae*	#N/A	#N/A	#N/A	5	Seen	Targeted	JL7772	
10 Feb 2021	-	-	A1_04	1.428050995	103.755315	-	-	-	1433-1438	Fish	Croaking gouramy	*Trichopsis vittata*	Least Concern	Not Assessed	No	3	Seen	Targeted		
25 Feb 2021	-	-	A1_04	1.428050995	103.755315	-	-	-	824	Fish	Croaking gouramy	*Trichopsis vittata*	Least Concern	Not Assessed	No	1	Caught	Targeted	CT6931	
1 Mar 2021	-	-	A1_04	1.428050995	103.755315	-	-	-	1609-1614	Fish	Croaking gouramy	*Trichopsis vittata*	Least Concern	Not Assessed	No	2	Seen	Targeted		
24 Feb 2021	-	-	A1_04	1.428050995	103.755315	-	-	-	2023-2026	Fish	Croaking gouramy	*Trichopsis vittata*	Least Concern	Not Assessed	No	2	Seen	Targeted		
24 Feb 2021	-	-	A1_04	1.428050995	103.755315	-	-	-	2023-2026	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
24 Feb 2021	-	-	A1_04	1.428050995	103.755315	-	-	-	2023-2026	Amphibian	Green paddy frog	*Hylarana erythraea*	Least Concern	Not Assessed	No	2	Heard	Targeted		
24 Feb 2021	-	-	A1_04	1.428050995	103.755315	-	-	-	2023-2026	Fish	Guppy	*Poecilia reticulata*	Not Assessed	Not Assessed	No	100	Seen	Targeted		
10 Feb 2021	-	-	A1_04	1.428050995	103.755315	-	-	-	1433-1438	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	20	Seen	Targeted		
1 Mar 2021	-	-	A1_04	1.428050995	103.755315	-	-	-	1609-1614	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	10	Seen	Targeted		
24 Feb 2021	-	-	A1_04	1.428050995	103.755315	-	-	-	2023-2026	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	100	Seen	Targeted		
10 Feb 2021	-	-	A1_05	1.428421978	103.755538	-	-	-	1422-1427	Fish	Common snakehead/aruan	*Channa striata*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	-	-	A1_05	1.428421978	103.755538	-	-	-	2008-2013	Fish	Common snakehead/aruan	*Channa striata*	Least Concern	Not Assessed	No	1	Seen	Targeted	JT2313	
10 Feb 2021	-	-	A1_05	1.428421978	103.755538	-	-	-	1422-1427	Fish	Croaking gouramy	*Trichopsis vittata*	Least Concern	Not Assessed	No	5	Seen	Targeted		

Date	Cycle	Route	Waypoint	Latitude	Longitude	Sampling Pt	SP_Lat	SP_long	Time (24h)	Taxon	Common Name	Scientific name	Global Status	Local Status	Threatened	Quantity	Observation type (seen/heard/caught/scat/other signs)	Survey method (targeted/incidental)	Photo no.	Remarks
1 Mar 2021	-	-	A1_05	1.428421978	103.755538	-	-	-	1616-1621	Fish	Croaking gouramy	*Trichopsis vittata*	Least Concern	Not Assessed	No	20	Seen	Targeted		
10 Feb 2021	-	-	A1_05	1.428421978	103.755538	-	-	-	1422-1427	Fish	Guppy	*Poecilia reticulata*	Not Assessed	Not Assessed	No	TMTC	Seen	Targeted		
1 Mar 2021	-	-	A1_05	1.428421978	103.755538	-	-	-	1616-1621	Fish	Guppy	*Poecilia reticulata*	Not Assessed	Not Assessed	No	70	Seen	Targeted		
24 Feb 2021	-	-	A1_05	1.428421978	103.755538	-	-	-	2008-2013	Fish	Guppy	*Poecilia reticulata*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Feb 2021	-	-	A1_05	1.428421978	103.755538	-	-	-	1422-1427	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	TMTC	Seen	Targeted		
1 Mar 2021	-	-	A1_05	1.428421978	103.755538	-	-	-	1616-1621	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	TMTC	Seen	Targeted		
24 Feb 2021	-	-	A1_05	1.428421978	103.755538	-	-	-	2008-2013	Fish	Sunda pygmy halfbeak	*Dermogenys collettei*	Not Assessed	Not Assessed	No	200	Seen	Targeted		
24 Feb 2021	-	-	A1_05	1.428421978	103.755538	-	-	-	2008-2013	Fish	#N/A	*Oreochromis sp.*	#N/A	Not Assessed	#N/A	3	Seen	Targeted		No breeding adults around so cannot ID this
10 Feb 2021	-	-	A1_05	1.428421978	103.755538	-	-	-	1422-1427	Fish	#N/A	*Unidentified Cichlidae*	#N/A	#N/A	#N/A	6	Seen	Targeted		Tilapia
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1555-1600	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Seen	Targeted		
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1555-1600	Bird	Common kingfisher	*Alcedo atthis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1555-1600	Bird	White-breasted waterhen	*Amaurornis phoenicurus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1615-1620	Bird	Common sandpiper	*Actitis hypoleucos*	Least Concern	Not Assessed	No	1	Seen	Targeted		
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1722-1727	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Seen	Targeted		
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	65	Seen	Targeted		1m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	36	Seen	Targeted		6m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Mollusc	Mangrove murex	*Chicoreus capucinus*	Not Assessed	Not Assessed	No	6	Seen	Targeted		1m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Mollusc	Mangrove murex	*Chicoreus capucinus*	Not Assessed	Not Assessed	No	2	Seen	Targeted		11m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Mollusc	NA	*Mytella strigata*	Not Assessed	Not Assessed	No	56	Seen	Targeted		1m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Mollusc	NA	*Mytella strigata*	Not Assessed	Not Assessed	No	20	Seen	Targeted		6m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Mollusc	NA	*Mytella strigata*	Not Assessed	Not Assessed	No	4	Seen	Targeted		11m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Mollusc	NA	*Coecella horsfieldii*	Not Assessed	Not Assessed	No	10	Seen	Targeted		11m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Decapod	Orange fiddler crab	*Metaplax elegans*	Not Assessed	Not Assessed	No	1	Seen	Targeted		1m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Decapod	Orange fiddler crab	*Uca vocans*	Not Assessed	Not Assessed	No	20	Seen	Targeted		VES
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Decapod	Orange fiddler crab	*Metaplax elegans*	Not Assessed	Not Assessed	No	2	Seen	Targeted		6m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Decapod	Orange fiddler crab	*Metaplax elegans*	Not Assessed	Not Assessed	No	18	Seen	Targeted		11m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Cnidarian	#N/A	*Unidentified Actiniaria*	#N/A	#N/A	#N/A	1	Seen	Targeted		VES
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Decapod	#N/A	*Unidentified Camptandriidae*	#N/A	#N/A	#N/A	5	Seen	Targeted		1m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Decapod	#N/A	*Unidentified Camptandriidae*	#N/A	#N/A	#N/A	4	Seen	Targeted		VES
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Decapod	#N/A	*Unidentified Camptandriidae*	#N/A	#N/A	#N/A	1	Seen	Targeted		11m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Polychaete	#N/A	*Unidentified Polychaeta*	#N/A	#N/A	#N/A	6	Seen	Targeted		1m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Polychaete	#N/A	*Unidentified Polychaeta*	#N/A	#N/A	#N/A	8	Seen	Targeted		6m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Polychaete	#N/A	*Unidentified Polychaeta*	#N/A	#N/A	#N/A	2	Seen	Targeted		11m
1 Mar 2021	-	-	I1_03	1.425794	103.752477	-	-	-	1730-1830	Decapod	#N/A	*Unidentified Sesarmidae*	#N/A	#N/A	#N/A	1	Seen	Targeted		11m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	4	Seen	Targeted		
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	25	Seen	Targeted		2m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	17	Seen	Targeted		8m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	8	Seen	Targeted		13m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Mollusc	Mangrove murex	*Chicoreus capucinus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		2m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Mollusc	Mangrove murex	*Chicoreus capucinus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		13m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Mollusc	Mangrove murex	*Chicoreus capucinus*	Not Assessed	Not Assessed	No	9	Seen	Targeted		13m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Mollusc	NA	*Coecella horsfieldii*	Not Assessed	Not Assessed	No	5	Seen	Targeted		2m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Mollusc	NA	*Coecella horsfieldii*	Not Assessed	Not Assessed	No	3	Seen	Targeted		8m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Mollusc	NA	*Coecella horsfieldii*	Not Assessed	Not Assessed	No	2	Seen	Targeted		13m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Mollusc	NA	*Mytella strigata*	Not Assessed	Not Assessed	No	2	Seen	Targeted		13m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Decapod	Orange fiddler crab	*Uca vocans*	Not Assessed	Not Assessed	No	1	Seen	Targeted		8m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Bird	White-breasted waterhen	*Amaurornis phoenicurus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Decapod	#N/A	*Unidentified Camptandriidae*	#N/A	#N/A	#N/A	5	Seen	Targeted		2m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Decapod	#N/A	*Unidentified Camptandriidae*	#N/A	#N/A	#N/A	TMTC	Seen	Targeted		8m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Decapod	#N/A	*Unidentified Camptandriidae*	#N/A	#N/A	#N/A	TMTC	Seen	Targeted		13m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Polychaete	#N/A	*Unidentified Polychaeta*	#N/A	#N/A	#N/A	7	Seen	Targeted		2m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Polychaete	#N/A	*Unidentified Polychaeta*	#N/A	#N/A	#N/A	22	Seen	Targeted		8m
1 Mar 2021	-	-	I1_04	1.427784031	103.752164	-	-	-	1710-1715	Polychaete	#N/A	*Unidentified Polychaeta*	#N/A	#N/A	#N/A	17	Seen	Targeted		13m
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	20	Seen	VES		Quadrat 1 (5m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	10	Seen	VES		Quadrat 2 (8m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	Giant mud clam, lokan	*Geloina expansa*	Not Assessed	Not Assessed	No	10	Seen	VES		Quadrat 3 (11m); excluded 14 halves
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	Red berry snail	*Assiminea brevicula*	Least Concern	Not Assessed	No	3	Seen	VES		Quadrat 2 (8m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Mollusc	Red berry snail	*Assiminea brevicula*	Least Concern	Not Assessed	No	1	Seen	VES		Quadrat 3 (11m)
10 Feb 2021	-	-	I1_01	1.422217023	103.753156	-	-	-	1600-1730	Decapod	#N/A	*Unidentified Brachyura*	#N/A	#N/A	#N/A	1	Seen	VES		Quadrat 2 (8m)
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Decapod	Orange fiddler crab	*Metaplax elegans*	Not Assessed	Not Assessed	No	30	Seen	VES		
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Fish	#N/A	*Unidentified Cichlidae*	#N/A	#N/A	#N/A	10	Seen	VES		One school of tilapia
10 Feb 2021	-	-	I1_02	1.423933972	103.752891	-	-	-	1600-1730	Fish	#N/A	*Unidentified Gobiidae*	#N/A	#N/A	#N/A	1	Seen	VES		
24 Feb 2021	2	T1	JL1868	1.426974	103.752647	-	-	-	2250	Butterfly	Hawkmoth sp.	*Unidentified Sphingidae*	Not Assessed	Not Assessed	No	1	Seen	Incidental	JL2780	Caterpillar
8 Feb 2021	1	T1	XT1024	1.425985023	103.752902	-	-	-	755	Odonate	Duskhawker sp.	*Gynacantha sp.*	#N/A	#N/A	#N/A	1	Seen	Incidental		
8 Feb 2021	1	T1	XT1026	1.425985023	103.752902	-	-	-	811	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Least Concern	Endangered	Yes	1	Seen	Incidental		Nest
8 Feb 2021	1	T1	XT1029	1.425437015	103.753409	-	-	-	820	Aculeate hymenopteran	Bee sp.	*Unidentified Anthophila*	#N/A	#N/A	#N/A	1	Seen	Incidental	HB174	Beehive
8 Feb 2021	1	T1	XT1034	1.42429498	103.753607	-	-	-	841	Bird	#N/A	*Unidentified Accipitridae*	#N/A	#N/A	#N/A	1	Seen	Incidental	HB178	Raptor nest
10 Feb 2021	1	T1	XT1091	1.42328999	103.754371	-	-	-	1337	Bird	Yellow-rumped flycatcher	*Ficedula zanthopygia*	Least Concern	Not Assessed	No	1	Seen	Incidental	HB260	
4 Feb 2021	1	T1	J826	1.427638019	103.752613	1	1.427763	103.752679	2047	Reptile	Oriental whip snake	*Ahaetulla prasina*	Least Concern	Not Assessed	No	2	Seen	Targeted	JT2047	
4 Feb 2021	1	T1	J827	1.427570963	103.752581	1	1.427763	103.752679	2055	Reptile	#N/A	*Unidentified Gekkonidae*	#N/A	#N/A	#N/A	1	Heard	Targeted		
4 Feb 2021	1	T1	J828	1.426824974	103.752665	2	1.42687225	103.752594	2102	Mammal (Bat)	#N/A	*Unidentified Pteropodidae*	#N/A	#N/A	#N/A	1	Seen	Targeted		
4 Feb 2021	1	T1	J829	1.42673797	103.752651	2	1.42687225	103.752594	2103	Amphibian	Banded bull frog	*Kaloula pulchra*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J829	1.42673797	103.752651	2	1.42687225	103.752594	2103	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J829	1.42673797	103.752651	2	1.42687225	103.752594	2103	Reptile	Malayan water monitor	*Varanus salvator*	Least Concern	Not Assessed	No	1	Other signs	Incidental		Tail carcass
4 Feb 2021	1	T1	J829	1.42673797	103.752651	2	1.42687225	103.752594	2103	Amphibian	#N/A	*Fejervarya sp.*	Least Concern	Not Assessed	No	2	Seen	Targeted		
4 Feb 2021	1	T1	J830	1.426572008	103.752662	2	1.42687225	103.752594	2108	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J831	1.426429013	103.752714	3	1.42611181	103.752952	2111	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J831	1.426429013	103.752714	3	1.42611181	103.752952	2111	Reptile	#N/A	*Unidentified Gekkonidae*	#N/A	#N/A	#N/A	1	Heard	Targeted		
4 Feb 2021	1	T1	J832	1.426261039	103.752918	3	1.42611181	103.752952	2114	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J833	1.426070016	103.752991	3	1.42611181	103.752952	2116	Reptile	Spiny-tailed house gecko	*Hemidactylus frenatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J834	1.42574002	103.753128	4	1.42553646	103.753396	2112	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J834	1.42574002	103.753128	4	1.42553646	103.753396	2112	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J834	1.42574002	103.753128	4	1.42553646	103.753396	2112	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J835	1.425676988	103.753386	4	1.42553646	103.753396	2127	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J836	1.425581016	103.753491	4	1.42553646	103.753396	2128	Reptile	#N/A	*Unidentified Gekkonidae*	#N/A	#N/A	#N/A	1	Heard	Targeted		
4 Feb 2021	1	T1	J837	1.425293013	103.753556	4	1.42553646	103.753396	2129	Amphibian	Four-lined tree frog	*Polypedates leucomystax*	Least Concern	Not Assessed	No	1	Heard	Targeted		
4 Feb 2021	1	T1	J838	1.425140966	103.753615	5	1.42471984	103.753638	2132	Amphibian	#N/A	*Fejervarya sp.*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J838	1.425140966	103.753615	5	1.42471984	103.753638	2132	Reptile	#N/A	*Unidentified Gekkonidae*	#N/A	#N/A	#N/A	1	Heard	Targeted		
4 Feb 2021	1	T1	J839	1.424690019	103.753706	5	1.42471984	103.753638	2135	Amphibian	Greenhouse frog	*Eleutherodactylus planirostris*	Least Concern	Not Assessed	No	6	Seen	Targeted		
4 Feb 2021	1	T1	J840	1.424220968	103.753625	6	1.4239017	103.753747	2140	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J841	1.424060035	103.753684	6	1.4239017	103.753747	2142	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	2	Seen	Targeted		
4 Feb 2021	1	T1	J841	1.424060035	103.753684	6	1.4239017	103.753747	2142	Reptile	Painted bronzeback	*Dendrelaphis pictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J841	1.424060035	103.753684	6	1.4239017	103.753747	2142	Reptile	#N/A	*Unidentified Gekkonidae*	#N/A	#N/A	#N/A	1	Heard	Targeted		
4 Feb 2021	1	T1	J842	1.423657034	103.754127	7	1.4233353	103.754233	2146	Amphibian	Asian toad	*Duttaphrynus melanostictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J843	1.423303988	103.754412	7	1.4233353	103.754233	2150	Reptile	Striped bronzeback	*Dendrelaphis caudolineatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J844	1.423230981	103.754414	7	1.4233353	103.754233	2151	Reptile	Green crested lizard	*Bronchocela cristatella*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1850	1.423179	103.754325	7	1.4233353	103.754233	2210	Reptile	Oriental whip snake	*Ahaetulla prasina*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1851	1.423337	103.754238	7	1.4233353	103.754233	2211	Bird	Large-tailed nightjar	*Caprimulgus macrurus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
24 Feb 2021	2	T1	JL1852	1.423502	103.754174	7	1.4233353	103.754233	2213	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	5	Seen	Targeted	JL7777	
24 Feb 2021	2	T1	JL1853	1.423825	103.75389	6	1.4239017	103.753747	2216	Bird	Sunda scops owl	*Otus lempiji*	Least Concern	Not Assessed	No	1	Heard	Targeted		
24 Feb 2021	2	T1	JL1854	1.423978	103.753711	6	1.4239017	103.753747	2217	Reptile	Green crested lizard	*Bronchocela cristatella*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1855	1.424559	103.75362	5	1.42471984	103.753638	2221	Amphibian	Banded bull frog	*Kaloula pulchra*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1856	1.424578	103.753642	5	1.42471984	103.753638	2222	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	3	Seen	Targeted		
24 Feb 2021	2	T1	JL1856	1.424578	103.753642	5	1.42471984	103.753638	2222	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1856	1.424578	103.753642	5	1.42471984	103.753638	2222	Amphibian	Green paddy frog	*Hylarana erythraea*	Least Concern	Not Assessed	No	3	Seen	Targeted		
24 Feb 2021	2	T1	JL1856	1.424578	103.753642	5	1.42471984	103.753638	2222	Reptile	Painted bronzeback	*Dendrelaphis pictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1857	1.424761	103.753607	5	1.42471984	103.753638	2222	Amphibian	Four-lined tree frog	*Polypedates leucomystax*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1858	1.424822	103.753563	5	1.42471984	103.753638	2226	Amphibian	Banded bull frog	*Kaloula pulchra*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1858	1.424822	103.753563	5	1.42471984	103.753638	2226	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1858	1.424822	103.753563	5	1.42471984	103.753638	2226	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1858	1.424822	103.753563	5	1.42471984	103.753638	2226	Amphibian	Greenhouse frog	*Eleutherodactylus planirostris*	Least Concern	Not Assessed	No	4	Seen	Targeted		
24 Feb 2021	2	T1	JL1859	1.424983	103.753629	5	1.42471984	103.753638	2230	Amphibian	Asian toad	*Duttaphrynus melanostictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1859	1.424983	103.753629	5	1.42471984	103.753638	2230	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1859	1.424983	103.753629	5	1.42471984	103.753638	2230	Amphibian	Greenhouse frog	*Eleutherodactylus planirostris*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1860	1.42537	103.753497	4	1.42553646	103.753396	2232	Amphibian	Asian toad	*Duttaphrynus melanostictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1860	1.42537	103.753497	4	1.42553646	103.753396	2232	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	3	Seen	Targeted		
24 Feb 2021	2	T1	JL1860	1.42537	103.753497	4	1.42553646	103.753396	2232	Amphibian	Greenhouse frog	*Eleutherodactylus planirostris*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1861	1.425578	103.7534	4	1.42553646	103.753396	2233	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	5	Heard	Targeted		
24 Feb 2021	2	T1	JL1862	1.425632	103.753354	4	1.42553646	103.753396	2233	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1862	1.425632	103.753354	4	1.42553646	103.753396	2233	Reptile	Striped bronzeback	*Dendrelaphis caudolineatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1863	1.42567	103.753107	4	1.42553646	103.753396	2238	Amphibian	Asian toad	*Duttaphrynus melanostictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1863	1.42567	103.753107	4	1.42553646	103.753396	2238	Amphibian	Greenhouse frog	*Eleutherodactylus planirostris*	Least Concern	Not Assessed	No	2	Seen	Targeted		
24 Feb 2021	2	T1	JL1864	1.425771	103.752981	3	1.42611181	103.752952	2240	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1865	1.426102	103.752982	3	1.42611181	103.752952	2244	Bird	White-throated kingfisher	*Halcyon smyrnensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1866	1.426367	103.752759	3	1.42611181	103.752952	2246	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	2	Seen	Targeted		
24 Feb 2021	2	T1	JL1866	1.426367	103.752759	3	1.42611181	103.752952	2246	Reptile	#N/A	*Unidentified Gekkonidae*	#N/A	#N/A	#N/A	1	Heard	Targeted		
24 Feb 2021	2	T1	JL1867	1.426527	103.752638	2	1.42687225	103.752594	2248	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
24 Feb 2021	2	T1	JL1869	1.427291	103.752615	2	1.42687225	103.752594	2253	Amphibian	Dark-sided chorus frog	*Microhyla heymonsi*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1869	1.427291	103.752615	2	1.42687225	103.752594	2253	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1869	1.427291	103.752615	2	1.42687225	103.752594	2253	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	3	Seen	Targeted		
24 Feb 2021	2	T1	JL1871	1.427367	103.752613	1	1.427763	103.752679	2253	Reptile	Garden supple skink	*Lygosoma bowringii*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1872	1.427819	103.752692	1	1.427763	103.752679	2256	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1873	1.427875	103.752737	1	1.427763	103.752679	2257	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1873	1.427875	103.752737	1	1.427763	103.752679	2257	Reptile	Oriental whip snake	*Ahaetulla prasina*	Least Concern	Not Assessed	No	1	Seen	Targeted	JT2334	

Date	Cycle	Route	Waypoint	Latitude	Longitude	Sampling Pt	SP_Lat	SP_long	Time (24h)	Taxon	Common Name	Scientific name	Global Status	Local Status	Threatened	Quantity	Observation type (seen/heard/caught/scat/other signs)	Survey method (targeted/incidental)	Photo no.	Remarks
24 Feb 2021	2	T1	RS62	1.423357967	103.754304	7	1.4233353	103.754233	1812	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T1	RS63	1.423438014	103.754219	7	1.4233353	103.754233	1812	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T1	RS64	1.424120972	103.753641	6	1.4239017	103.753747	1817	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T1	RS65	1.427695015	103.752746	1	1.427763	103.752679	1841	Odonate	Common chaser	*Potamarcha congener*	Least Concern	Least Concern	No	4	Seen	Targeted		
4 Feb 2021	1	T1	XT1002	1.426679967	103.752654	2	1.42687225	103.752594	1752	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
4 Feb 2021	1	T1	XT1003	1.426362963	103.752803	3	1.42611181	103.752952	1755	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
4 Feb 2021	1	T1	XT1004	1.425700961	103.753349	4	1.42553646	103.753396	1800	Odonate	Scarlet grenadier	*Lathrecista asiatica*	Least Concern	Least Concern	No	1	Seen	Targeted		
4 Feb 2021	1	T1	XT1004	1.425700961	103.753349	4	1.42553646	103.753396	1800	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
4 Feb 2021	1	T1	XT1005	1.425538016	103.753531	4	1.42553646	103.753396	1802	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
4 Feb 2021	1	T1	XT1006	1.424388019	103.753669	5	1.42471984	103.753638	1806	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1014	1.427909005	103.753003	1	1.427763	103.752679	711	Bird	White-breasted waterhen	*Amaurornis phoenicurus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1015	1.427670959	103.752631	1	1.427763	103.752679	714	Reptile	Painted bronzeback	*Dendrelaphis pictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1015	1.427670959	103.752631	1	1.427763	103.752679	714	Bird	Yellow-rumped flycatcher	*Ficedula zanthopygia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1016	1.42746401	103.75255	1	1.427763	103.752679	716	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	7	Seen	Targeted		
8 Feb 2021	1	T1	XT1016	1.42746401	103.75255	1	1.427763	103.752679	716	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T1	XT1016	1.42746401	103.75255	1	1.427763	103.752679	716	Bird	Blue-throated bee-eater	*Merops viridis*	Least Concern	Not Assessed	No	15	Seen	Targeted	HB169	
8 Feb 2021	1	T1	XT1016	1.42746401	103.75255	1	1.427763	103.752679	716	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1016	1.42746401	103.75255	1	1.427763	103.752679	716	Bird	Olive-backed sunbird	*Cinnyris jugularis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1017	1.427257983	103.752626	2	1.42687225	103.752594	722	Bird	Ashy minivet	*Pericrocotus divaricatus*	Least Concern	Not Assessed	No	2	Heard	Targeted		
8 Feb 2021	1	T1	XT1017	1.427257983	103.752626	2	1.42687225	103.752594	722	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1017	1.427257983	103.752626	2	1.42687225	103.752594	722	Bird	Laced woodpecker	*Picus vittatus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1017	1.427257983	103.752626	2	1.42687225	103.752594	722	Bird	Long-tailed parakeet	*Psittacula longicauda*	Vulnerable	Not Assessed	Yes	2	Heard	Targeted		
8 Feb 2021	1	T1	XT1017	1.427257983	103.752626	2	1.42687225	103.752594	722	Bird	Malaysian pied fantail	*Rhipidura javanica*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1017	1.427257983	103.752626	2	1.42687225	103.752594	722	Bird	Oriental dollarbird	*Eurystomus orientalis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1017	1.427257983	103.752626	2	1.42687225	103.752594	722	Bird	Oriental magpie-robin	*Copsychus saularis*	Least Concern	Endangered	Yes	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1017	1.427257983	103.752626	2	1.42687225	103.752594	722	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1017	1.427257983	103.752626	2	1.42687225	103.752594	722	Reptile	#N/A	*Unidentified Gekkonidae*	#N/A	#N/A	#N/A	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1018	1.426794967	103.752622	2	1.42687225	103.752594	728	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1018	1.426794967	103.752622	2	1.42687225	103.752594	728	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T1	XT1018	1.426794967	103.752622	2	1.42687225	103.752594	728	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	4	Heard	Targeted		
8 Feb 2021	1	T1	XT1018	1.426794967	103.752622	2	1.42687225	103.752594	728	Bird	Oriental dollarbird	*Eurystomus orientalis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1018	1.426794967	103.752622	2	1.42687225	103.752594	728	Reptile	Painted bronzeback	*Dendrelaphis pictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1019	1.426681979	103.752589	2	1.42687225	103.752594	732	Bird	Straw-headed bulbul	*Pycnonotus zeylanicus*	Critically Endangered	Endangered	Yes	2	Heard	Targeted		
8 Feb 2021	1	T1	XT1019	1.426681979	103.752589	2	1.42687225	103.752594	732	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1020	1.426457008	103.752672	2	1.42687225	103.752594	734	Bird	Common tailorbird	*Orthotomus sutorius*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1020	1.426457008	103.752672	2	1.42687225	103.752594	734	Bird	Large-tailed nightjar	*Caprimulgus macrurus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1020	1.426457008	103.752672	2	1.42687225	103.752594	734	Bird	Long-tailed parakeet	*Psittacula longicauda*	Vulnerable	Not Assessed	Yes	3	Seen	Targeted		
8 Feb 2021	1	T1	XT1020	1.426457008	103.752672	2	1.42687225	103.752594	734	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1020	1.426457008	103.752672	2	1.42687225	103.752594	734	Mammal	Plantain squirrel	*Callosciurus notatus*	Least Concern	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T1	XT1021	1.426361036	103.752796	3	1.42611181	103.752952	745	Bird	Olive-winged bulbul	*Pycnonotus plumosus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1021	1.426361036	103.752796	3	1.42611181	103.752952	745	Bird	Scarlet-backed flowerpecker	*Dicaeum cruentatum*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1021	1.426361036	103.752796	3	1.42611181	103.752952	745	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1022	1.426234972	103.752955	3	1.42611181	103.752952	748	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1022	1.426234972	103.752955	3	1.42611181	103.752952	748	Bird	Common flameback	*Dinopium javanense*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1022	1.426234972	103.752955	3	1.42611181	103.752952	748	Bird	Common tailorbird	*Orthotomus sutorius*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1022	1.426234972	103.752955	3	1.42611181	103.752952	748	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1022	1.426234972	103.752955	3	1.42611181	103.752952	748	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	3	Seen	Targeted		
8 Feb 2021	1	T1	XT1023	1.426088959	103.753028	3	1.42611181	103.752952	751	Bird	Rufous-tailed tailorbird	*Orthotomus sericeus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1023	1.426088959	103.753028	3	1.42611181	103.752952	751	Bird	#N/A	*Unidentified Accipitridae*	#N/A	#N/A	#N/A	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1024	1.425985023	103.752902	3	1.42611181	103.752952	755	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1024	1.425985023	103.752902	3	1.42611181	103.752952	755	Bird	Brown-throated sunbird	*Anthreptes malacensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1024	1.425985023	103.752902	3	1.42611181	103.752952	755	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	3	Heard	Targeted		
8 Feb 2021	1	T1	XT1024	1.425985023	103.752902	3	1.42611181	103.752952	755	Bird	Lineated barbet	*Psilopogon lineatus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1025	1.425885027	103.752936	3	1.42611181	103.752952	757	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1025	1.425885027	103.752936	3	1.42611181	103.752952	757	Bird	Long-tailed parakeet	*Psittacula longicauda*	Vulnerable	Not Assessed	Yes	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1025	1.425885027	103.752936	3	1.42611181	103.752952	757	Bird	Yellow-rumped flycatcher	*Ficedula zanthopygia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1025	1.425885027	103.752936	3	1.42611181	103.752952	757	Reptile	#N/A	*Unidentified Gekkonidae*	#N/A	#N/A	#N/A	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1026	1.425589984	103.753113	4	1.42553646	103.753396	811	Bird	Ashy minivet	*Pericrocotus divaricatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1026	1.425589984	103.753113	4	1.42553646	103.753396	811	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	5	Heard	Targeted		
8 Feb 2021	1	T1	XT1026	1.425589984	103.753113	4	1.42553646	103.753396	811	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Least Concern	Endangered	Yes	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1027	1.425194023	103.753069	4	1.42553646	103.753396	815	Bird	Banded bay cuckoo	*Cacomantis sonneratii*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1027	1.425194023	103.753069	4	1.42553646	103.753396	815	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	11	Seen	Targeted		
8 Feb 2021	1	T1	XT1027	1.425194023	103.753069	4	1.42553646	103.753396	815	Bird	White-throated kingfisher	*Halcyon smyrnensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1028	1.42551396	103.753486	4	1.42553646	103.753396	818	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1028	1.42551396	103.753486	4	1.42553646	103.753396	818	Bird	Rufous-tailed tailorbird	*Orthotomus sericeus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1029	1.425437015	103.753409	4	1.42553646	103.753396	820	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	10	Seen	Targeted		
8 Feb 2021	1	T1	XT1029	1.425437015	103.753409	4	1.42553646	103.753396	820	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1029	1.425437015	103.753409	4	1.42553646	103.753396	820	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1029	1.425437015	103.753409	4	1.42553646	103.753396	820	Reptile	Equatorial spitting cobra	*Naja sumatrana*	Least Concern	Not Assessed	No	1	Seen	Targeted	HB173	
8 Feb 2021	1	T1	XT1030	1.425358979	103.753536	4	1.42553646	103.753396	827	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1030	1.425358979	103.753536	4	1.42553646	103.753396	827	Bird	Common tailorbird	*Orthotomus sutorius*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1030	1.425358979	103.753536	4	1.42553646	103.753396	827	Bird	Greater racket-tailed drongo	*Dicrurus paradiseus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1030	1.425358979	103.753536	4	1.42553646	103.753396	827	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1031	1.425115988	103.753554	5	1.42471984	103.753638	831	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	2	Heard	Targeted		
8 Feb 2021	1	T1	XT1031	1.425115988	103.753554	5	1.42471984	103.753638	831	Bird	Long-tailed parakeet	*Psittacula longicauda*	Vulnerable	Not Assessed	Yes	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1031	1.425115988	103.753554	5	1.42471984	103.753638	831	Bird	Rufous woodpecker	*Micropternus brachyurus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1032	1.424886994	103.753597	5	1.42471984	103.753638	832	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Least Concern	Endangered	Yes	2	Seen	Targeted	HB175 & HB176 - dark morph ind in nest	near nest - 1 dark, one pale morph
8 Feb 2021	1	T1	XT1032	1.424886994	103.753597	5	1.42471984	103.753638	832	Bird	Common tailorbird	*Orthotomus sutorius*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1032	1.424886994	103.753597	5	1.42471984	103.753638	832	Bird	Olive-backed sunbird	*Cinnyris jugularis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1032	1.424886994	103.753597	5	1.42471984	103.753638	832	Bird	White-bellied sea eagle	*Haliaeetus leucogaster*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1033	1.424588012	103.753649	5	1.42471984	103.753638	839	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Least Concern	Endangered	Yes	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1033	1.424588012	103.753649	5	1.42471984	103.753638	839	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	4	Seen	Targeted		
8 Feb 2021	1	T1	XT1033	1.424588012	103.753649	5	1.42471984	103.753638	839	Bird	Olive-backed sunbird	*Cinnyris jugularis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1033	1.424588012	103.753649	5	1.42471984	103.753638	839	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T1	XT1033	1.424588012	103.753649	5	1.42471984	103.753638	839	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1034	1.42429498	103.753607	6	1.4239017	103.753747	841	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		with nesting materials in mouth
8 Feb 2021	1	T1	XT1034	1.42429498	103.753607	6	1.4239017	103.753747	841	Bird	Long-tailed parakeet	*Psittacula longicauda*	Vulnerable	Not Assessed	Yes	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1034	1.42429498	103.753607	6	1.4239017	103.753747	841	Bird	Swiftlet sp.	*Aerodramus sp.*	Least Concern	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T1	XT1035	1.424148967	103.753659	6	1.4239017	103.753747	845	Bird	Common tailorbird	*Orthotomus sutorius*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1035	1.424148967	103.753659	6	1.4239017	103.753747	845	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1036	1.423815032	103.753871	6	1.4239017	103.753747	849	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Least Concern	Endangered	Yes	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1036	1.423815032	103.753871	6	1.4239017	103.753747	849	Reptile	Striped bronzeback	*Dendrelaphis caudolineatus*	Least Concern	Not Assessed	No	1	Seen	Targeted	HB181	
8 Feb 2021	1	T1	XT1036	1.423815032	103.753871	6	1.4239017	103.753747	849	Bird	Yellow-rumped flycatcher	*Ficedula zanthopygia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1037	1.423322009	103.754334	7	1.4233353	103.754233	854	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1037	1.423322009	103.754334	7	1.4233353	103.754233	854	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	2	Heard	Targeted		
8 Feb 2021	1	T1	XT1037	1.423322009	103.754334	7	1.4233353	103.754233	854	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1037	1.423322009	103.754334	7	1.4233353	103.754233	854	Bird	Common tailorbird	*Orthotomus sutorius*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1037	1.423322009	103.754334	7	1.4233353	103.754233	854	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1037	1.423322009	103.754334	7	1.4233353	103.754233	854	Reptile	Painted bronzeback	*Dendrelaphis pictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1074	1.427802974	103.752704	1	1.427763	103.752679	1220	Odonate	Common chaser	*Potamarcha congener*	Least Concern	Least Concern	No	1	Seen	Targeted	HB237	
10 Feb 2021	1	T1	XT1074	1.427802974	103.752704	1	1.427763	103.752679	1220	Odonate	Common chaser	*Potamarcha congener*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1074	1.427802974	103.752704	1	1.427763	103.752679	1220	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	3	Seen	Targeted		
10 Feb 2021	1	T1	XT1074	1.427802974	103.752704	1	1.427763	103.752679	1220	Butterfly	Tawny coster	*Acraea terpsicore*	Not Assessed	Not assessed	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1074	1.427802974	103.752704	1	1.427763	103.752679	1220	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1075	1.427418999	103.752556	1	1.427763	103.752679	1228	Butterfly	Common mormon	*Papilio polytes romulus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1075	1.427418999	103.752556	1	1.427763	103.752679	1228	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1075	1.427418999	103.752556	1	1.427763	103.752679	1228	Butterfly	Palm bob	*Suastus gremius gremius*	Not Assessed	Not Assessed	No	1	Seen	Targeted	HB239	
10 Feb 2021	1	T1	XT1075	1.427418999	103.752556	1	1.427763	103.752679	1228	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted	HB238	
10 Feb 2021	1	T1	XT1076	1.427229987	103.752625	2	1.42687225	103.752594	1231	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1077	1.426959001	103.752668	2	1.42687225	103.752594	1234	Odonate	Common chaser	*Potamarcha congener*	Least Concern	Least Concern	No	1	Seen	Targeted	HB240	
10 Feb 2021	1	T1	XT1077	1.426959001	103.752668	2	1.42687225	103.752594	1234	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1078	1.426736042	103.752673	2	1.42687225	103.752594	1238	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1078	1.426736042	103.752673	2	1.42687225	103.752594	1238	Butterfly	Long brand bush brown	*Mycalesis visala phamis*	Not Assessed	Not Assessed	No	1	Seen	Targeted	HB241	
10 Feb 2021	1	T1	XT1078	1.426736042	103.752673	2	1.42687225	103.752594	1238	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	2	Seen	Targeted		
10 Feb 2021	1	T1	XT1079	1.426401017	103.752794	3	1.42611181	103.752952	1243	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1079	1.426401017	103.752794	3	1.42611181	103.752952	1243	Butterfly	#N/A	*Unidentified Hesperiidae*	#N/A	#N/A	#N/A	1	Seen	Targeted	HB242	
10 Feb 2021	1	T1	XT1080	1.426192978	103.752961	3	1.42611181	103.752952	1246	Butterfly	Common mormon	*Papilio polytes romulus*	Not Assessed	Not Assessed	No	4	Seen	Targeted		Caterpillars
10 Feb 2021	1	T1	XT1081	1.426121984	103.752957	3	1.42611181	103.752952	1250	Butterfly	Dark glassy tiger	*Parantica agleoides agleoides*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1081	1.426121984	103.752957	3	1.42611181	103.752952	1250	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1082	1.425718982	103.753251	4	1.42553646	103.753396	1258	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	2	Seen	Targeted		
10 Feb 2021	1	T1	XT1082	1.425718982	103.753251	4	1.42553646	103.753396	1258	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1082	1.425718982	103.753251	4	1.42553646	103.753396	1258	Odonate	Scarlet grenadier	*Lathrecista asiatica*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1083	1.425585039	103.75346	4	1.42553646	103.753396	1301	Odonate	Scarlet grenadier	*Lathrecista asiatica*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1083	1.425585039	103.75346	4	1.42553646	103.753396	1301	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	1	Seen	Targeted	HB244	
10 Feb 2021	1	T1	XT1084	1.425228976	103.753586	4	1.42553646	103.753396	1303	Butterfly	Burmese bush brown	*Mycalesis perseoides perseoides*	Not Assessed	Data Deficient	No	1	Seen	Targeted	HB245	
10 Feb 2021	1	T1	XT1085	1.425029989	103.753605	5	1.42471984	103.753638	1305	Odonate	Common chaser	*Potamarcha congener*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1085	1.425029989	103.753605	5	1.42471984	103.753638	1305	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1085	1.425029989	103.753605	5	1.42471984	103.753638	1305	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1086	1.424703011	103.753645	5	1.42471984	103.753638	1308	Odonate	Common redbolt	*Rhodothemis rufa*

Date	Cycle	Route	Waypoint	Latitude	Longitude	Sampling Pt	SP_Lat	SP_long	Time (24h)	Taxon	Common Name	Scientific name	Global Status	Local Status	Threatened	Quantity	Observation type (seen/heard/caught/scat/other signs)	Survey method (targeted/incidental)	Photo no.	Remarks
10 Feb 2021	1	T1	XT1087	1.42446002	103.75358	5	1.42471984	103.753638	1312	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	4	Seen	Targeted		
10 Feb 2021	1	T1	XT1087	1.42446002	103.75358	5	1.42471984	103.753638	1312	Butterfly	Malayan	*Megisba malaya sikkima*	Not Assessed	Not Assessed	No	1	Seen	Targeted	HB251	
10 Feb 2021	1	T1	XT1087	1.42446002	103.75358	5	1.42471984	103.753638	1312	Odonate	Scarlet grenadier	*Lathrecista asiatica*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1088	1.424149973	103.753629	6	1.4239017	103.753747	1318	Butterfly	Bush brown sp.	*Mycalesis sp.*	Not Assessed	#N/A	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1088	1.424149973	103.753629	6	1.4239017	103.753747	1318	Butterfly	Common caerulean	*Jamides celeno aelianus*	Not Assessed	Not Assessed	No	10	Seen	Targeted		
10 Feb 2021	1	T1	XT1088	1.424149973	103.753629	6	1.4239017	103.753747	1318	Butterfly	Common sailor	*Neptis hylas papaja*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1088	1.424149973	103.753629	6	1.4239017	103.753747	1318	Butterfly	Formosan swift	*Borbo cinnara*	Not Assessed	Endangered	Yes	1	Seen	Targeted	HB252	
10 Feb 2021	1	T1	XT1088	1.424149973	103.753629	6	1.4239017	103.753747	1325	Butterfly	Formosan swift	*Borbo cinnara*	Not Assessed	Endangered	Yes	1	Seen	Targeted	HB253	egg
10 Feb 2021	1	T1	XT1088	1.424149973	103.753629	6	1.4239017	103.753747	1325	Butterfly	Gram blue	*Euchrysops cnejus cnejus*	Not Assessed	Not Assessed	No	1	Seen	Targeted	HB254	
10 Feb 2021	1	T1	XT1088	1.424149973	103.753629	6	1.4239017	103.753747	1318	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	2	Seen	Targeted		
10 Feb 2021	1	T1	XT1088	1.424149973	103.753629	6	1.4239017	103.753747	1325	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1088	1.424149973	103.753629	6	1.4239017	103.753747	1325	Butterfly	Palmfly sp.	*Elymnias sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted	HB255	
10 Feb 2021	1	T1	XT1089	1.423932966	103.753839	6	1.4239017	103.753747	1331	Butterfly	Bush brown sp.	*Mycalesis sp.*	Not Assessed	#N/A	No	2	Seen	Targeted		
10 Feb 2021	1	T1	XT1089	1.423932966	103.753839	6	1.4239017	103.753747	1331	Butterfly	Chequered lancer	*Plastingia naga*	Not Assessed	Not Assessed	No	1	Seen	Targeted	HB256,257	
10 Feb 2021	1	T1	XT1089	1.423932966	103.753839	6	1.4239017	103.753747	1331	Butterfly	Chestnut bob	*Iambrix salsala salsala*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1089	1.423932966	103.753839	6	1.4239017	103.753747	1331	Butterfly	Lesser dart	*Potanthus omaha omaha*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1089	1.423932966	103.753839	6	1.4239017	103.753747	1331	Butterfly	#N/A	*Unidentified Hesperiidae*	#N/A	#N/A	#N/A	2	Seen	Targeted		
10 Feb 2021	1	T1	XT1090	1.423385963	103.754293	7	1.4233353	103.754233	1336	Butterfly	Bush brown sp.	*Mycalesis sp.*	Not Assessed	#N/A	No	1	Seen	Targeted		
10 Feb 2021	1	T1	XT1090	1.423385963	103.754293	7	1.4233353	103.754233	1336	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	4	Seen	Targeted		
10 Feb 2021	1	T1	XT1091	1.42328999	103.754371	7	1.4233353	103.754233	1337	Butterfly	Bush brown sp.	*Mycalesis sp.*	Not Assessed	#N/A	No	3	Seen	Targeted		
10 Feb 2021	1	T1	XT1091	1.42328999	103.754371	7	1.4233353	103.754233	1337	Butterfly	Full stop swift	*Caltoris cormasa*	Not Assessed	Not Assessed	No	1	Seen	Targeted	HB258	
10 Feb 2021	1	T1	XT1091	1.42328999	103.754371	7	1.4233353	103.754233	1337	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	10	Seen	Targeted		
10 Feb 2021	1	T1	XT1091	1.42328999	103.754371	7	1.4233353	103.754233	1337	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted	HB259	
4 Feb 2021	1	T2	J862	1.428097012	103.755321				2258	Fish	Croaking gouramy	*Trichopsis vittata*	Least Concern	Not Assessed	No	10	Seen	Incidental		
4 Feb 2021	1	T2	J862	1.428097012	103.755321				2258	Fish	Snakehead sp.	*Channa sp.*	Least Concern	#N/A	#N/A	1	Seen	Incidental		
25 Feb 2021	2	T2	RS118	1.422442999	103.753912				956	Bird	Pacific swallow	*Hirundo tahitica*	Least Concern	Not Assessed	No	1	Seen	Incidental		
25 Feb 2021	2	T2	RS118	1.422442999	103.753912				956	Bird	Stork-billed kingfisher	*Pelargopsis capensis*	Least Concern	Not Assessed	No	1	Heard	Incidental		
25 Feb 2021	2	T2	RS119	1.422579959	103.754283				957	Butterfly	Common palm dart	*Telicota colon stinga*	Not Assessed	Nationally Extinct (Rediscovered)	No	1	Seen	Incidental	6945	
4 Feb 2021	1	T2	XT1007	1.422781041	103.753638				1841	Decapod	#N/A	*Thalassina sp.*	#N/A	#N/A	#N/A	1	Seen	Incidental	JT2043	Mound
4 Feb 2021	1	T2	XT1011	1.427959967	103.755264				1905	Butterfly	Common evening brown	*Melanitis leda leda*	Not Assessed	Not Assessed	No	1	Seen	Incidental		
10 Mar 2021	2	T2	XT1238	1.428214023	103.755351				1109	Bird	Yellow-browed warbler	*Phylloscopus inornatus*	Least Concern	Not Assessed	No	1	Seen	Incidental	CT7316	
4 Feb 2021	1	T2	J845	1.422606027	103.754313	9	1.42249714	103.753978	2154	Amphibian	Four-lined tree frog	*Polypedates leucomystax*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J845	1.422606027	103.754313	9	1.42249714	103.753978	2154	Reptile	Oriental whip snake	*Ahaetulla prasina*	Least Concern	Not Assessed	No	1	Seen	Targeted		Brown juvenile
4 Feb 2021	1	T2	J846	1.422479041	103.753853	9	1.42249714	103.753978	2213	Amphibian	Four-lined tree frog	*Polypedates leucomystax*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J847	1.422490021	103.754348	9	1.42249714	103.753978	2230	Bird	Nightjar sp.	*Caprimulgus sp.*	Least Concern	Not Assessed	No	2	Seen	Targeted		
4 Feb 2021	1	T2	J848	1.422965024	103.754377	10	1.42299324	103.754396	2232	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
4 Feb 2021	1	T1	J849	1.423238022	103.754375	7	1.4233353	103.754233	2233	Bird	Brown shrike	*Lanius cristatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T1	J850	1.423294013	103.754387	7	1.4233353	103.754233	2235	Reptile	Striped bronzeback	*Dendrelaphis caudolineatus*	Least Concern	Not Assessed	No	1	Seen	Targeted	JT2079	
4 Feb 2021	1	T2	J851	1.423719982	103.75434	11	1.42388932	103.754456	2236	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	2	Heard	Targeted		
4 Feb 2021	1	T2	J851	1.423719982	103.75434	11	1.42388932	103.754456	2236	Bird	Sunda scops owl	*Otus lempiji*	Least Concern	Not Assessed	No	1	Heard	Targeted		
4 Feb 2021	1	T2	J852	1.423859037	103.754359	11	1.42388932	103.754456	2237	Amphibian	Asian toad	*Duttaphrynus melanostictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J852	1.423859037	103.754359	11	1.42388932	103.754456	2237	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
4 Feb 2021	1	T2	J853	1.424001027	103.754357	11	1.42388932	103.754456	2237	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J853	1.424001027	103.754357	11	1.42388932	103.754456	2237	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
4 Feb 2021	1	T2	J853	1.424001027	103.754357	11	1.42388932	103.754456	2237	Amphibian	Malayan giant frog	*Limnonectes blythii*	Near Threatened	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J853	1.424001027	103.754357	11	1.42388932	103.754456	2237	Bird	White-throated kingfisher	*Halcyon smyrnensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J854	1.424357006	103.7545	12	1.42478368	103.754539	2242	Amphibian	Asian toad	*Duttaphrynus melanostictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J854	1.424357006	103.7545	12	1.42478368	103.754539	2242	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J854	1.424357006	103.7545	12	1.42478368	103.754539	2242	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	2	Heard	Targeted		
4 Feb 2021	1	T2	J854	1.424357006	103.7545	12	1.42478368	103.754539	2242	Amphibian	Malayan giant frog	*Limnonectes blythii*	Near Threatened	Not Assessed	No	1	Seen	Targeted		Large
4 Feb 2021	1	T2	J854	1.424357006	103.7545	12	1.42478368	103.754539	2242	Reptile	Spotted house gecko	*Gekko monarchus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J854	1.424357006	103.7545	12	1.42478368	103.754539	2242	Reptile	#N/A	*Unidentified Gekkonidae*	#N/A	#N/A	#N/A	1	Heard	Targeted		
4 Feb 2021	1	T2	J854	1.424357006	103.7545	12	1.42478368	103.754539	2242	Mammal (Bat)	#N/A	*Unidentified Pteropodidae*	#N/A	#N/A	#N/A	1	Seen	Targeted		
4 Feb 2021	1	T2	J855	1.424550964	103.754473	12	1.42478368	103.754539	2243	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
4 Feb 2021	1	T2	J855	1.424550964	103.754473	12	1.42478368	103.754539	2243	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J855	1.424550964	103.754473	12	1.42478368	103.754539	2243	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
4 Feb 2021	1	T2	J856	1.425282033	103.754549	13	1.42567869	103.754614	2246	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	2	Seen	Targeted		
4 Feb 2021	1	T2	J856	1.425282033	103.754549	13	1.42567869	103.754614	2246	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	3	Seen	Targeted		
4 Feb 2021	1	T2	J857	1.425938001	103.754584	13	1.42567869	103.754614	2247	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	2	Seen	Targeted		
4 Feb 2021	1	T2	J857	1.425938001	103.754584	13	1.42567869	103.754614	2247	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	3	Seen	Targeted		
4 Feb 2021	1	T2	J858	1.426310996	103.754651	14	1.42656309	103.754763	2249	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J858	1.426310996	103.754651	14	1.42656309	103.754763	2249	Mammal (Bat)	#N/A	*Unidentified Pteropodidae*	#N/A	#N/A	#N/A	1	Seen	Targeted		
4 Feb 2021	1	T2	J859	1.426927987	103.754768	14	1.42656309	103.754763	2251	Amphibian	Asian toad	*Duttaphrynus melanostictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J859	1.426927987	103.754768	14	1.42656309	103.754763	2251	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J859	1.426927987	103.754768	14	1.42656309	103.754763	2251	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
4 Feb 2021	1	T2	J859	1.426927987	103.754768	14	1.42656309	103.754763	2251	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
4 Feb 2021	1	T2	J859	1.426927987	103.754768	14	1.42656309	103.754763	2251	Bird	Sunda scops owl	*Otus lempiji*	Least Concern	Not Assessed	No	1	Heard	Targeted		
4 Feb 2021	1	T2	J860	1.427316992	103.754919	15	1.42742462	103.755014	2253	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	6	Seen	Targeted		
4 Feb 2021	1	T2	J860	1.427316992	103.754919	15	1.42742462	103.755014	2253	Amphibian	Green paddy frog	*Hylarana erythraea*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J860	1.427316992	103.754919	15	1.42742462	103.755014	2253	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	2	Heard	Targeted		
4 Feb 2021	1	T2	J860	1.427316992	103.754919	15	1.42742462	103.755014	2253	Amphibian	Malayan giant frog	*Limnonectes blythii*	Near Threatened	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J861	1.427915962	103.755163	16	1.42822099	103.755424	2247	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
4 Feb 2021	1	T2	J861	1.427915962	103.755163	16	1.42822099	103.755424	2247	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	3	Heard	Targeted		
4 Feb 2021	1	T2	J863	1.428182004	103.755332	16	1.42822099	103.755424	2300	Reptile	Black marsh terrapin	*Siebenrockiella crassicollis*	Vulnerable	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J863	1.428182004	103.755332	16	1.42822099	103.755424	2300	Amphibian	Green paddy frog	*Hylarana erythraea*	Least Concern	Not Assessed	No	5	Heard	Targeted		
4 Feb 2021	1	T2	J863	1.428182004	103.755332	16	1.42822099	103.755424	2300	Amphibian	Malayan giant frog	*Limnonectes blythii*	Near Threatened	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J863	1.428182004	103.755332	16	1.42822099	103.755424	2300	Reptile	#N/A	*Unidentified Gekkonidae*	#N/A	#N/A	#N/A	1	Heard	Targeted		
4 Feb 2021	1	T2	J864	1.428265991	103.755388	16	1.42822099	103.755424	2302	Reptile	Asian softshell turtle	*Amyda cartilaginea*	Vulnerable	Endangered	Yes	1	Seen	Targeted		
4 Feb 2021	1	T2	J864	1.428265991	103.755388	16	1.42822099	103.755424	2302	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	5	Heard	Targeted		
4 Feb 2021	1	T2	J864	1.428265991	103.755388	16	1.42822099	103.755424	2302	Reptile	Painted bronzeback	*Dendrelaphis pictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J864	1.428265991	103.755388	16	1.42822099	103.755424	2302	Mammal (Bat)	#N/A	*Unidentified Pteropodidae*	#N/A	#N/A	#N/A		Seen	Targeted		
4 Feb 2021	1	T2	J865	1.428534966	103.755554	17	1.4287837	103.75574	2306	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
4 Feb 2021	1	T2	J865	1.428534966	103.755554	17	1.4287837	103.75574	2306	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	3	Heard	Targeted		
4 Feb 2021	1	T2	J865	1.428534966	103.755554	17	1.4287837	103.75574	2306	Amphibian	Malayan giant frog	*Limnonectes blythii*	Near Threatened	Not Assessed	No	1	Seen	Targeted		
4 Feb 2021	1	T2	J866	1.428753985	103.755702	17	1.4287837	103.75574	2308	Amphibian	Malayan giant frog	*Limnonectes blythii*	Near Threatened	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1824	1.428597	103.755673	17	1.4287837	103.75574	2004	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1824	1.428597	103.755673	17	1.4287837	103.75574	2004	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1824	1.428597	103.755673	17	1.4287837	103.75574	2004	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
24 Feb 2021	2	T2	JL1825	1.428672	103.755618	17	1.4287837	103.75574	2006	Amphibian	Asian toad	*Duttaphrynus melanostictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1825	1.428672	103.755618	17	1.4287837	103.75574	2006	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	3	Seen	Targeted		
24 Feb 2021	2	T2	JL1825	1.428672	103.755618	17	1.4287837	103.75574	2006	Amphibian	#N/A	*Fejervarya sp.*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1826	1.428549	103.755588	17	1.4287837	103.75574	2008	Reptile	Black marsh terrapin	*Siebenrockiella crassicollis*	Vulnerable	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1826	1.428549	103.755588	17	1.4287837	103.75574	2008	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1826	1.428549	103.755588	17	1.4287837	103.75574	2008	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1826	1.428549	103.755588	17	1.4287837	103.75574	2008	Fish	Threespot gouramy	*Trichopodus trichopterus*	Least Concern	Not Assessed	No	2	Seen	Targeted		
24 Feb 2021	2	T2	JL1826	1.428549	103.755588	17	1.4287837	103.75574	2008	Bird	White-breasted waterhen	*Amaurornis phoenicurus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1828	1.427966	103.755349	16	1.42822099	103.755424	2035	Amphibian	Field frog	*Fejervarya limnocharis*	Least Concern	Not Assessed	No	4	Seen	Targeted		
24 Feb 2021	2	T2	JL1828	1.427966	103.755349	16	1.42822099	103.755424	2035	Amphibian	Green paddy frog	*Hylarana erythraea*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1828	1.427966	103.755349	16	1.42822099	103.755424	2035	Reptile	Painted bronzeback	*Dendrelaphis pictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1830	1.427446	103.754987	15	1.42742462	103.755014	2040	Amphibian	Malayan giant frog	*Limnonectes blythii*	Near Threatened	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1830	1.427446	103.754987	15	1.42742462	103.755014	2040	Amphibian	#N/A	*Fejervarya sp.*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1831	1.427278	103.754902	15	1.42742462	103.755014	2043	Amphibian	Four-lined tree frog	*Polypedates leucomystax*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1831	1.427278	103.754902	15	1.42742462	103.755014	2040	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
24 Feb 2021	2	T2	JL1832	1.427042	103.754838	15	1.42742462	103.755014	2043	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1833	1.426624	103.754764	14	1.42656309	103.754763	2048	Amphibian	Dark-sided chorus frog	*Microhyla heymonsi*	Least Concern	Not Assessed	No	1	Heard	Targeted		
24 Feb 2021	2	T2	JL1833	1.426624	103.754764	14	1.42656309	103.754763	2044	Reptile	Oriental whip snake	*Ahaetulla prasina*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1834	1.426118	103.754666	13	1.42567869	103.754614	2052	Reptile	Oriental whip snake	*Ahaetulla prasina*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1835	1.425175	103.754572	12	1.42478368	103.754539	2057	Amphibian	Malayan giant frog	*Limnonectes blythii*	Near Threatened	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1836	1.425084	103.754537	12	1.42478368	103.754539	2058	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
24 Feb 2021	2	T2	JL1836	1.425084	103.754537	12	1.42478368	103.754539	2058	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1836	1.425084	103.754537	12	1.42478368	103.754539	2058	Reptile	Oriental whip snake	*Ahaetulla prasina*	Least Concern	Not Assessed	No	1	Seen	Targeted	JL2316	
24 Feb 2021	2	T2	JL1836	1.425084	103.754537	12	1.42478368	103.754539	2058	Reptile	Painted bronzeback	*Dendrelaphis pictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1837	1.424589	103.754461	12	1.42478368	103.754539	2102	Amphibian	Asian toad	*Duttaphrynus melanostictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1838	1.424374	103.754527	12	1.42478368	103.754539	2103	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1839	1.42431	103.754609	11	1.42388932	103.754456	2105	Reptile	Spotted house gecko	*Gekko monarchus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1840	1.424164	103.754483	11	1.42388932	103.754456	2106	Amphibian	East Asian ornate chorus frog	*Microhyla mukhlesuri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1841	1.424127	103.754518	11	1.42388932	103.754456	2107	Amphibian	Malayan giant frog	*Limnonectes blythii*	Near Threatened	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1841	1.424127	103.754518	11	1.42388932	103.754456	2107	Amphibian	Malayan giant frog	*Limnonectes blythii*	Near Threatened	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1842	1.423793	103.754464	11	1.42388932	103.754456	2109	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T1	JL1843	1.423493	103.754437	7	1.4233353	103.754233	2110	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
24 Feb 2021	2	T2	JL1845	1.422531	103.754368	9	1.42249714	103.753978	2115	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
24 Feb 2021	2	T2	JL1846	1.422492	103.753958	9	1.42249714	103.753978	2126	Mammal (Bat)	Javan pipistrelle	*Pipistrellus javanicus*	Least Concern	Not Assessed	No	1	Seen	Targeted	JT2319-2320	
25 Feb 2021	2	T2	RS100	1.423447989	103.754757	11	1.42388932	103.754456	910	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS100	1.423447989	103.754757	11	1.42388932	103.754456	910	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS100	1.423447989	103.754757	11	1.42388932	103.754456	910	Bird	Common tailorbird	*Orthotomus sutorius*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS101	1.423447989	103.754757	11	1.42388932	103.754456	911	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	2	Heard	Targeted		
25 Feb 2021	2	T2	RS101	1.423447989	103.754757	11	1.42388932	103.754456	911	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	2	Heard	Targeted		
25 Feb 2021	2	T2	RS101	1.423447989	103.754757	11	1.42388932	103.754456	911	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS102	1.423447989	103.754757	11	1.42388932	103.754456	912	Bird	Red-breasted parakeet	*Psittacula alexandri*	Near Threatened	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS102	1.423447989	103.754757	11	1.42388932	103.754456	912	Bird	Swiftlet sp.	*Aerodramus sp.*	Least Concern	Not Assessed	No

Date	Cycle	Route	Waypoint	Latitude	Longitude	Sampling Pt	SP_Lat	SP_long	Time (24h)	Taxon	Common Name	Scientific name	Global Status	Local Status	Threatened	Quantity	Observation type (seen/heard/caught/scat/other signs)	Survey method (targeted/incidental)	Photo no.	Remarks
25 Feb 2021	2	T2	RS105	1.423447989	103.754757	11	1.42388932	103.754456	914	Bird	Rock dove	*Columba livia*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS106	1.423447989	103.754757	11	1.42388932	103.754456	916	Bird	Asian brown flycatcher	*Muscicapa dauurica*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS106	1.423447989	103.754757	11	1.42388932	103.754456	915	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	4	Seen	Targeted		
25 Feb 2021	2	T2	RS106	1.423447989	103.754757	11	1.42388932	103.754456	914	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Least Concern	Endangered	Yes	1	Seen	Targeted		
25 Feb 2021	2	T2	RS106	1.423447989	103.754757	11	1.42388932	103.754456	915	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS106	1.423447989	103.754757	11	1.42388932	103.754456	915	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	4	Seen	Targeted		
25 Feb 2021	2	T2	RS106	1.423447989	103.754757	11	1.42388932	103.754456	916	Bird	Shrike sp.	*Lanius sp.*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS107	1.423447989	103.754757	11	1.42388932	103.754456	921	Bird	Ashy minivet	*Pericrocotus divaricatus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS107	1.423447989	103.754757	11	1.42388932	103.754456	921	Bird	Dark-necked tailorbird	*Orthotomus atrogularis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS107	1.423447989	103.754757	11	1.42388932	103.754456	921	Bird	Red-breasted parakeet	*Psittacula alexandri*	Near Threatened	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS107	1.423447989	103.754757	11	1.42388932	103.754456	921	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS108	1.422643997	103.753963	9	1.42249714	103.753978	932	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS108	1.422643997	103.753963	9	1.42249714	103.753978	933	Bird	Oriental magpie-robin	*Copsychus saularis*	Least Concern	Endangered	Yes	1	Heard	Targeted		
25 Feb 2021	2	T2	RS108	1.422643997	103.753963	9	1.42249714	103.753978	932	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS109	1.422566967	103.753881	9	1.42249714	103.753978	936	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	4	Seen	Targeted		
25 Feb 2021	2	T2	RS109	1.422566967	103.753881	9	1.42249714	103.753978	936	Bird	Blue-tailed bee-eater	*Merops philippinus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS109	1.422566967	103.753881	9	1.42249714	103.753978	936	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS109	1.422566967	103.753881	9	1.42249714	103.753978	936	Bird	Long-tailed parakeet	*Psittacula longicauda*	Vulnerable	Not Assessed	Yes	1	Seen	Targeted		
25 Feb 2021	2	T2	RS109	1.422566967	103.753881	9	1.42249714	103.753978	936	Reptile	Spiny-tailed house gecko	*Hemidactylus frenatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS109	1.422566967	103.753881	9	1.42249714	103.753978	936	Bird	Swiftlet sp.	*Aerodramus sp.*	Least Concern	Not Assessed	No	13	Seen	Targeted		
25 Feb 2021	2	T2	RS110	1.422524974	103.753845	9	1.42249714	103.753978	938	Bird	Banded woodpecker	*Chrysophlegma miniaceum*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS110	1.422524974	103.753845	9	1.42249714	103.753978	938	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS110	1.422524974	103.753845	9	1.42249714	103.753978	939	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS110	1.422524974	103.753845	9	1.42249714	103.753978	939	Bird	Common tailorbird	*Orthotomus sutorius*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS110	1.422524974	103.753845	9	1.42249714	103.753978	938	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS110	1.422524974	103.753845	9	1.42249714	103.753978	938	Bird	Rock dove	*Columba livia*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS111	1.422452973	103.753787	9	1.42249714	103.753978	940	Bird	Pied triller	*Lalage nigra*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS111	1.422452973	103.753787	9	1.42249714	103.753978	940	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS112	1.422671992	103.753582	9	1.42249714	103.753978	941	Bird	Pin-striped tit-babbler	*Mixornis gularis*	Least Concern	Not Assessed	No	2	Heard	Targeted		
25 Feb 2021	2	T2	RS113	1.422723038	103.753616	9	1.42249714	103.753978	945	Bird	Common tailorbird	*Orthotomus sutorius*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS113	1.422723038	103.753616	9	1.42249714	103.753978	945	Bird	Coppersmith barbet	*Psilopogon haemacephalus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS113	1.422723038	103.753616	9	1.42249714	103.753978	945	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS113	1.422723038	103.753616	9	1.42249714	103.753978	947	Bird	Long-tailed parakeet	*Psittacula longicauda*	Vulnerable	Not Assessed	Yes	1	Heard	Targeted		
25 Feb 2021	2	T2	RS113	1.422723038	103.753616	9	1.42249714	103.753978	945	Bird	Malaysian pied fantail	*Rhipidura javanica*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS113	1.422723038	103.753616	9	1.42249714	103.753978	942	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	2	Heard	Targeted		
25 Feb 2021	2	T2	RS114	1.422694959	103.75359	9	1.42249714	103.753978	950	Bird	Rufous-tailed tailorbird	*Orthotomus sericeus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS115	1.422389019	103.753411	8	1.422589	103.753085	951	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Least Concern	Endangered	Yes	2	Seen	Targeted		
25 Feb 2021	2	T2	RS115	1.422389019	103.753411	8	1.422589	103.753085	951	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS115	1.422389019	103.753411	8	1.422589	103.753085	951	Bird	Rock dove	*Columba livia*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS116	1.422307966	103.753168	8	1.422589	103.753085	952	Bird	Brown shrike	*Lanius cristatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS116	1.422307966	103.753168	8	1.422589	103.753085	952	Bird	Laced woodpecker	*Picus vittatus*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS116	1.422307966	103.753168	8	1.422589	103.753085	952	Bird	Lesser coucal	*Centropus bengalensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS117	1.422240995	103.753154	8	1.422589	103.753085	954	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS117	1.422240995	103.753154	8	1.422589	103.753085	954	Mammal	Smooth-coated otter	*Lutrogale perspicillata*	Vulnerable	Critically Endangered	Yes	1	Scat	Targeted		
25 Feb 2021	2	T2	RS120	1.423155041	103.754324	10	1.42299324	103.754396	1000	Butterfly	Chocolate pansy	*Junonia hedonia ida*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS120	1.423155041	103.754324	10	1.42299324	103.754396	1000	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS120	1.423155041	103.754324	10	1.42299324	103.754396	1000	Butterfly	Pale mottle	*Logania marmorata damis*	Not Assessed	Not Assessed	No	1	Seen	Targeted	6947	
25 Feb 2021	2	T2	RS120	1.423155041	103.754324	10	1.42299324	103.754396	1000	Butterfly	Three spot grass yellow	*Eurema blanda snelleni*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS120	1.423155041	103.754324	10	1.42299324	103.754396	1002	Bird	White-bellied sea eagle	*Haliaeetus leucogaster*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS121	1.423218995	103.75433	7	1.4233353	103.754233	1002	Butterfly	Bush brown sp.	*Mycalesis sp.*	Not Assessed	#N/A	No	2	Seen	Targeted		
25 Feb 2021	2	T1	RS121	1.423218995	103.75433	7	1.4233353	103.754233	1002	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	2	Heard	Targeted		
25 Feb 2021	2	T1	RS121	1.423218995	103.75433	7	1.4233353	103.754233	1002	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
25 Feb 2021	2	T1	RS122	1.423270963	103.754346	7	1.4233353	103.754233	1003	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	4	Seen	Targeted		
25 Feb 2021	2	T1	RS123	1.423314968	103.75436	7	1.4233353	103.754233	1004	Butterfly	Anderson's grass yellow	*Eurema andersonii andersonii*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS123	1.423314968	103.75436	7	1.4233353	103.754233	1004	Bird	Banded woodpecker	*Chrysophlegma miniaceum*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS124	1.423336007	103.754338	7	1.4233353	103.754233	1005	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS124	1.423336007	103.754338	7	1.4233353	103.754233	1005	Butterfly	Burmese bush brown	*Mycalesis perseoides perseoides*	Not Assessed	Data Deficient	No	1	Seen	Targeted	6950	
25 Feb 2021	2	T1	RS124	1.423336007	103.754338	7	1.4233353	103.754233	1006	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	2	Seen	Targeted		
25 Feb 2021	2	T1	RS124	1.423336007	103.754338	7	1.4233353	103.754233	1005	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	2	Seen	Targeted		
25 Feb 2021	2	T1	RS125	1.423474979	103.754265	7	1.4233353	103.754233	1007	Butterfly	Common grass yellow	*Eurema hecabe contubernalis*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS126	1.423512027	103.754246	7	1.4233353	103.754233	1007	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
25 Feb 2021	2	T1	RS126	1.423512027	103.754246	7	1.4233353	103.754233	1007	Butterfly	Painted jezebel	*Delias hyparete metarete*	Not Assessed	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T1	RS127	1.423559971	103.754173	7	1.4233353	103.754233	1008	Butterfly	Burmese bush brown	*Mycalesis perseoides perseoides*	Not Assessed	Data Deficient	No	1	Seen	Targeted	6952	
25 Feb 2021	2	T1	RS127	1.423559971	103.754173	7	1.4233353	103.754233	1008	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
25 Feb 2021	2	T1	RS128	1.42364203	103.754116	7	1.4233353	103.754233	1009	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	2	Seen	Targeted		
25 Feb 2021	2	T1	RS129	1.423725011	103.754076	6	1.4239017	103.753747	1010	Bird	Ashy minivet	*Pericrocotus divaricatus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS129	1.423725011	103.754076	6	1.4239017	103.753747	1010	Butterfly	Burmese bush brown	*Mycalesis perseoides perseoides*	Not Assessed	Data Deficient	No	1	Seen	Targeted	6953	
25 Feb 2021	2	T1	RS129	1.423725011	103.754076	6	1.4239017	103.753747	1010	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS129	1.423725011	103.754076	6	1.4239017	103.753747	1010	Butterfly	Tawny palmfly	*Elymnias panthera panthera*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS130	1.423868006	103.753926	6	1.4239017	103.753747	1012	Butterfly	Common dartlet	*Oriens gola pseudolus*	Not Assessed	Not Assessed	No	1	Seen	Targeted	6955	
25 Feb 2021	2	T1	RS130	1.423868006	103.753926	6	1.4239017	103.753747	1011	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS130	1.423868006	103.753926	6	1.4239017	103.753747	1012	Bird	Long-tailed parakeet	*Psittacula longicauda*	Vulnerable	Not Assessed	Yes	1	Heard	Targeted		
25 Feb 2021	2	T1	RS130	1.423868006	103.753926	6	1.4239017	103.753747	1011	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS131	1.423922991	103.753814	6	1.4239017	103.753747	1013	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS131	1.423922991	103.753814	6	1.4239017	103.753747	1013	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS131	1.423922991	103.753814	6	1.4239017	103.753747	1013	Bird	Lineated barbet	*Psilopogon lineatus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS131	1.423922991	103.753814	6	1.4239017	103.753747	1013	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS131	1.423922991	103.753814	6	1.4239017	103.753747	1013	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS132	1.423963979	103.753731	6	1.4239017	103.753747	1016	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	6	Seen	Targeted		
25 Feb 2021	2	T1	RS132	1.423963979	103.753731	6	1.4239017	103.753747	1016	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Least Concern	Endangered	Yes	1	Heard	Targeted		
25 Feb 2021	2	T1	RS132	1.423963979	103.753731	6	1.4239017	103.753747	1014	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	2	Seen	Targeted		
25 Feb 2021	2	T1	RS132	1.423963979	103.753731	6	1.4239017	103.753747	1015	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS132	1.423963979	103.753731	6	1.4239017	103.753747	1014	Bird	Laced woodpecker	*Picus vittatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS132	1.423963979	103.753731	6	1.4239017	103.753747	1014	Bird	Swiftlet sp.	*Aerodramus sp.*	Least Concern	Not Assessed	No	8	Seen	Targeted		
25 Feb 2021	2	T1	RS132	1.423963979	103.753731	6	1.4239017	103.753747	1014	Bird	White-bellied sea eagle	*Haliaeetus leucogaster*	Least Concern	Not Assessed	No	1	Seen	Targeted	6956	Flew out from nest
25 Feb 2021	2	T1	RS133	1.424033968	103.75364	6	1.4239017	103.753747	1019	Bird	Blue-throated bee-eater	*Merops viridis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS133	1.424033968	103.75364	6	1.4239017	103.753747	1017	Butterfly	Common caerulean	*Jamides celeno aelianus*	Not Assessed	Not Assessed	No	2	Seen	Targeted	6959	
25 Feb 2021	2	T1	RS133	1.424033968	103.75364	6	1.4239017	103.753747	1017	Reptile	Painted bronzeback	*Dendrelaphis pictus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS133	1.424033968	103.75364	6	1.4239017	103.753747	1019	Bird	Pied triller	*Lalage nigra*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS133	1.424033968	103.75364	6	1.4239017	103.753747	1019	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T1	RS134	1.424120972	103.753607	6	1.4239017	103.753747	1022	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS134	1.424120972	103.753607	6	1.4239017	103.753747	1024	Butterfly	Common caerulean	*Jamides celeno aelianus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS134	1.424120972	103.753607	6	1.4239017	103.753747	1020	Butterfly	Gram blue	*Euchrysops cnejus cnejus*	Not Assessed	Not Assessed	No	8	Seen	Targeted	6962	
25 Feb 2021	2	T1	RS134	1.424120972	103.753607	6	1.4239017	103.753747	1022	Butterfly	Short banded sailor	*Phaedyma columella singa*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS134	1.424120972	103.753607	6	1.4239017	103.753747	1020	Butterfly	Three spot grass yellow	*Eurema blanda snelleni*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS135	1.424217029	103.753599	6	1.4239017	103.753747	1025	Butterfly	Chocolate pansy	*Junonia hedonia ida*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS135	1.424217029	103.753599	6	1.4239017	103.753747	1025	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS135	1.424217029	103.753599	6	1.4239017	103.753747	1025	Odonate	Common redbolt	*Rhodothemis rufa*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS135	1.424217029	103.753599	6	1.4239017	103.753747	1025	Bird	Olive-backed sunbird	*Cinnyris jugularis*	Least Concern	Not Assessed	No	2	Heard	Targeted		
25 Feb 2021	2	T1	RS135	1.424217029	103.753599	6	1.4239017	103.753747	1025	Butterfly	Short banded sailor	*Phaedyma columella singa*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS135	1.424217029	103.753599	6	1.4239017	103.753747	1025	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T1	RS136	1.424215017	103.753579	6	1.4239017	103.753747	1026	Butterfly	Common dartlet	*Oriens gola pseudolus*	Not Assessed	Not Assessed	No	1	Seen	Targeted	6964	
25 Feb 2021	2	T1	RS136	1.424215017	103.753579	6	1.4239017	103.753747	1026	Bird	Lineated barbet	*Psilopogon lineatus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS136	1.424215017	103.753579	6	1.4239017	103.753747	1027	Bird	Pied triller	*Lalage nigra*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS136	1.424215017	103.753579	6	1.4239017	103.753747	1026	Odonate	Scarlet skimmer	*Orthetrum testaceum*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS136	1.424215017	103.753579	6	1.4239017	103.753747	1026	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS136	1.424215017	103.753579	6	1.4239017	103.753747	1026	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS137	1.424288023	103.753585	6	1.4239017	103.753747	1028	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS137	1.424288023	103.753585	6	1.4239017	103.753747	1028	Butterfly	Pygmy grass blue	*Zizula hylax pygmaea*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS137	1.424288023	103.753585	6	1.4239017	103.753747	1028	Butterfly	Short banded sailor	*Phaedyma columella singa*	Not Assessed	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T1	RS137	1.424288023	103.753585	6	1.4239017	103.753747	1028	Butterfly	Three spot grass yellow	*Eurema blanda snelleni*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS138	1.423438038	103.753615	5	1.42471984	103.753638	1029	Butterfly	Bush brown sp.	*Mycalesis sp.*	Not Assessed	#N/A	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS138	1.423438038	103.753615	5	1.42471984	103.753638	1029	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
25 Feb 2021	2	T1	RS139	1.424429007	103.753626	5	1.42471984	103.753638	1030	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	3	Seen	Targeted		
25 Feb 2021	2	T1	RS139	1.424429007	103.753626	5	1.42471984	103.753638	1030	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS140	1.424518023	103.753637	5	1.42471984	103.753638	1030	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS140	1.424518023	103.753637	5	1.42471984	103.753638	1030	Butterfly	Common sailor	*Neptis hylas papaja*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS141	1.424648026	103.753659	5	1.42471984	103.753638	1031	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS141	1.424648026	103.753659	5	1.42471984	103.753638	1031	Bird	Zebra dove	*Geopelia striata*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS142	1.424863022	103.753628	5	1.42471984	103.753638	1033	Bird	Banded bay cuckoo	*Cacomantis sonneratii*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS142	1.424863022	103.753628	5	1.42471984	103.753638	1035	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Least Concern	Endangered	Yes	1	Heard	Targeted		
25 Feb 2021	2	T1	RS142	1.424863022	103.753628	5	1.42471984	103.753638	1035	Bird	Blue-throated bee-eater	*Merops viridis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS142	1.424863022	103.753628	5	1.42471984	103.753638	1035	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
25 Feb 2021	2	T1	RS142	1.424863022	103.753628	5	1.42471984	103.753638	1033	Bird	Sunda pygmy woodpecker	*Yungipicus moluccensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS142	1.424863022	103.753628	5	1.42471984	103.753638	1034	Bird	Swinhoe's white-eye	*Zosterops simplex*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T1	RS143	1.42503703	103.753564	5	1.42471984	103.753638	1036	Butterfly	Common grass yellow	*Eurema hecabe contubernalis*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS143	1.42503703	103.753564	5	1.42471984	103.753638	1036	Bird	Lineated barbet	*Psilopogon lineatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS144	1.425260995	103.753545	4	1.42553646	103.753396	1037	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS144	1.425260995	103.753545	4	1.42553646	103.753396	1037	Bird	Olive-backed sunbird	*Cinnyris jugularis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS145	1.425516978	103.753459	4	1.42553646	103.753396	1039	Bird	Common iora	*Aeg

Date	Cycle	Route	Waypoint	Latitude	Longitude	Sampling Pt	SP_Lat	SP_long	Time (24h)	Taxon	Common Name	Scientific name	Global Status	Local Status	Threatened	Quantity	Observation type (seen/heard/caught/scat/other signs)	Survey method (targeted/incidental)	Photo no.	Remarks
25 Feb 2021	2	T1	RS146	1.425566012	103.753411	4	1.42553646	103.753396	1040	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS147	1.425639018	103.75338	4	1.42553646	103.753396	1041	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS147	1.425639018	103.75338	4	1.42553646	103.753396	1042	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS147	1.425639018	103.75338	4	1.42553646	103.753396	1041	Bird	Zebra dove	*Geopelia striata*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS148	1.425741026	103.753216	4	1.42553646	103.753396	1043	Bird	Straw-headed bulbul	*Pycnonotus zeylanicus*	Critically Endangered	Endangered	Yes	1	Heard	Targeted		
25 Feb 2021	2	T1	RS149	1.425692998	103.753121	4	1.42553646	103.753396	1043	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS149	1.425692998	103.753121	4	1.42553646	103.753396	1044	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS149	1.425692998	103.753121	4	1.42553646	103.753396	1043	Bird	Brown-throated sunbird	*Anthreptes malacensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS149	1.425692998	103.753121	4	1.42553646	103.753396	1044	Butterfly	Grass yellow sp.	*Eurema* sp.	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
25 Feb 2021	2	T1	RS150	1.425791988	103.752958	3	1.42611181	103.752952	1045	Butterfly	Painted jezebel	*Delias hyparete metarete*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS150	1.425791988	103.752958	3	1.42611181	103.752952	1045	Reptile	Sumatran flying dragon	*Draco sumatranus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS150	1.425791988	103.752958	3	1.42611181	103.752952	1046	Butterfly	Tailless line blue	*Prosotas dubiosa lumpura*	Not Assessed	Not Assessed	No	3	Seen	Targeted		
25 Feb 2021	2	T1	RS151	1.425935989	103.752936	3	1.42611181	103.752952	1047	Bird	Rufous-tailed tailorbird	*Orthotomus sericeus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS152	1.425962979	103.752909	3	1.42611181	103.752952	1048	Butterfly	Grass yellow sp.	*Eurema* sp.	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
25 Feb 2021	2	T1	RS152	1.425962979	103.752909	3	1.42611181	103.752952	1048	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS153	1.426005978	103.752974	3	1.42611181	103.752952	1049	Butterfly	Tailless line blue	*Prosotas dubiosa lumpura*	Not Assessed	Not Assessed	No	4	Seen	Targeted		
25 Feb 2021	2	T1	RS154	1.426028023	103.752976	3	1.42611181	103.752952	1049	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS155	1.42612299	103.752944	3	1.42611181	103.752952	1050	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS156	1.42620597	103.752876	3	1.42611181	103.752952	1050	Bird	Blue-throated bee-eater	*Merops viridis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS156	1.42620597	103.752876	3	1.42611181	103.752952	1050	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS157	1.426298004	103.752883	3	1.42611181	103.752952	1051	Bird	Brown-throated sunbird	*Anthreptes malacensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS157	1.426298004	103.752883	3	1.42611181	103.752952	1052	Butterfly	Bush brown sp.	*Mycalesis sp.*	Not Assessed	#N/A	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS157	1.426298004	103.752883	3	1.42611181	103.752952	1051	Bird	Olive-backed sunbird	*Cinnyris jugularis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS157	1.426298004	103.752883	3	1.42611181	103.752952	1051	Bird	Pied triller	*Lalage nigra*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS158	1.426395988	103.752672	3	1.42611181	103.752952	1053	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS159	1.426413003	103.752643	3	1.42611181	103.752952	1053	Butterfly	Grass yellow sp.	*Eurema* sp.	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
25 Feb 2021	2	T1	RS159	1.426413003	103.752643	3	1.42611181	103.752952	1054	Bird	Olive-backed sunbird	*Cinnyris jugularis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T1	RS159	1.426413003	103.752643	3	1.42611181	103.752952	1053	Butterfly	Tailless line blue	*Prosotas dubiosa lumpura*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS159	1.426413003	103.752643	3	1.42611181	103.752952	1053	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS159	1.426413003	103.752643	3	1.42611181	103.752952	1054	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T1	RS160	1.426921031	103.752628	2	1.42687225	103.752594	1056	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	2	Heard	Targeted		
25 Feb 2021	2	T1	RS160	1.426921031	103.752628	2	1.42687225	103.752594	1056	Butterfly	Painted jezebel	*Delias hyparete metarete*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS161	1.427037036	103.752631	2	1.42687225	103.752594	1057	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS162	1.42709001	103.75262	2	1.42687225	103.752594	1057	Butterfly	#N/A	*Hypolimnas bolina*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS163	1.427177014	103.752543	2	1.42687225	103.752594	1058	Butterfly	Painted jezebel	*Delias hyparete metarete*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS163	1.427177014	103.752543	2	1.42687225	103.752594	1058	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS163	1.427177014	103.752543	2	1.42687225	103.752594	1058	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T1	RS164	1.427334007	103.752598	1	1.427763	103.752679	1059	Butterfly	Malayan eggfly	*Hypolimnas anomala anomala*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS165	1.427514972	103.752574	1	1.427763	103.752679	1102	Butterfly	Two spotted line blue	*Nacaduba biocellata*	Not Assessed	Not Assessed	No	4	Seen	Targeted		
25 Feb 2021	2	T1	RS166	1.427672971	103.752637	1	1.427763	103.752679	1103	Butterfly	Striped albatross	*Appias libythea olferna*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS167	1.427699961	103.752642	1	1.427763	103.752679	1104	Butterfly	Common grass yellow	*Eurema hecabe contubernalis*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS167	1.427699961	103.752642	1	1.427763	103.752679	1106	Odonate	Scarlet basker	*Urothemis signata*	Not Assessed	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T1	RS167	1.427699961	103.752642	1	1.427763	103.752679	1104	Odonate	Scarlet skimmer	*Orthetrum testaceum*	Least Concern	Least Concern	No	1	Seen	Targeted	6970	
24 Feb 2021	2	T2	RS33	1.428685002	103.755703	17	1.4287837	103.75574	1701	Odonate	Common scarlet	*Crocothemis servilia*	Least Concern	Least Concern	No	4	Seen	Targeted		
24 Feb 2021	2	T2	RS34	1.428630017	103.755666	17	1.4287837	103.75574	1702	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	3	Seen	Targeted		
24 Feb 2021	2	T2	RS35	1.428605961	103.755656	17	1.4287837	103.75574	1703	Odonate	Trumpet tail	*Acisoma panorpoides*	Least Concern	Least Concern	No	2	Seen	Targeted		
24 Feb 2021	2	T2	RS35	1.428605961	103.755656	17	1.4287837	103.75574	1703	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	10	Seen	Targeted		
24 Feb 2021	2	T2	RS36	1.428556005	103.755613	17	1.4287837	103.75574	1705	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	2	Seen	Targeted		
24 Feb 2021	2	T2	RS36	1.428556005	103.755613	17	1.4287837	103.75574	1705	Odonate	Common scarlet	*Crocothemis servilia*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS36	1.428556005	103.755613	17	1.4287837	103.75574	1705	Odonate	Trumpet tail	*Acisoma panorpoides*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS37	1.42853396	103.755582	17	1.4287837	103.75574	1706	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	2	Seen	Targeted		
24 Feb 2021	2	T2	RS38	1.428470006	103.755573	16	1.42822099	103.755424	1706	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS39	1.428422984	103.755554	16	1.42822099	103.755424	1707	Odonate	Common bluetail	*Ischnura senegalensis*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS40	1.428377973	103.755547	16	1.42822099	103.755424	1708	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS41	1.428329023	103.755481	16	1.42822099	103.755424	1709	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS41	1.428329023	103.755481	16	1.42822099	103.755424	1711	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS41	1.428329023	103.755481	16	1.42822099	103.755424	1709	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS41	1.428329023	103.755481	16	1.42822099	103.755424	1710	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	4	Seen	Targeted		
24 Feb 2021	2	T2	RS42	1.428225003	103.755359	16	1.42822099	103.755424	1711	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS42	1.428225003	103.755359	16	1.42822099	103.755424	1711	Odonate	Trumpet tail	*Acisoma panorpoides*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS42	1.428225003	103.755359	16	1.42822099	103.755424	1711	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS43	1.428171024	103.755324	16	1.42822099	103.755424	1712	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS43	1.428171024	103.755324	16	1.42822099	103.755424	1712	Odonate	Ornate coraltail	*Ceriagrion cerinorubellum*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS44	1.427987963	103.755248	16	1.42822099	103.755424	1715	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS44	1.427987963	103.755248	16	1.42822099	103.755424	1715	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	2	Seen	Targeted		
24 Feb 2021	2	T2	RS45	1.42781496	103.755191	15	1.42742462	103.755014	1716	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	3	Seen	Targeted		
24 Feb 2021	2	T2	RS45	1.42781496	103.755191	15	1.42742462	103.755014	1716	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS46	1.427672971	103.755057	15	1.42742462	103.755014	1718	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS47	1.427633995	103.755063	15	1.42742462	103.755014	1719	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS47	1.427633995	103.755063	15	1.42742462	103.755014	1719	Odonate	Scarlet grenadier	*Lathrecista asiatica*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS48	1.42754104	103.755025	15	1.42742462	103.755014	1720	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS48	1.42754104	103.755025	15	1.42742462	103.755014	1720	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS49	1.427334007	103.75494	15	1.42742462	103.755014	1721	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS49	1.427334007	103.75494	15	1.42742462	103.755014	1722	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS50	1.427234011	103.754895	15	1.42742462	103.755014	1722	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	2	Seen	Targeted		
24 Feb 2021	2	T2	RS51	1.427058997	103.754855	15	1.42742462	103.755014	1723	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS51	1.427058997	103.754855	15	1.42742462	103.755014	1724	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS51	1.427058997	103.754855	15	1.42742462	103.755014	1723	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS52	1.42689798	103.754811	14	1.42656309	103.754763	1725	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS53	1.426806031	103.754794	14	1.42656309	103.754763	1726	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS53	1.426806031	103.754794	14	1.42656309	103.754763	1726	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS54	1.426433958	103.754701	14	1.42656309	103.754763	1729	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	2	Seen	Targeted		
24 Feb 2021	2	T2	RS54	1.426433958	103.754701	14	1.42656309	103.754763	1729	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS55	1.426215023	103.754664	14	1.42656309	103.754763	1730	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS56	1.425677994	103.754623	13	1.42567869	103.754614	1732	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS57	1.42501398	103.754596	12	1.42478368	103.754539	1733	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS58	1.424876014	103.754588	12	1.42478368	103.754539	1734	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS59	1.424673004	103.754524	12	1.42478368	103.754539	1735	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS60	1.423844034	103.754447	11	1.42388932	103.754456	1737	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS60	1.423844034	103.754447	11	1.42388932	103.754456	1737	Odonate	Scarlet skimmer	*Orthetrum testaceum*	Least Concern	Least Concern	No	1	Seen	Targeted		
24 Feb 2021	2	T2	RS61	1.422559004	103.753509	8	1.422589	103.753085	1805	Odonate	Common scarlet	*Crocothemis servilia*	Least Concern	Least Concern	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS66	1.429076018	103.755682	17	1.4287837	103.75574	813	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS66	1.429076018	103.755682	17	1.4287837	103.75574	812	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	3	Seen	Targeted		
25 Feb 2021	2	T2	RS66	1.429076018	103.755682	17	1.4287837	103.75574	813	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS66	1.429076018	103.755682	17	1.4287837	103.75574	812	Reptile	Garden supple skink	*Lygosoma bowringii*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS66	1.429076018	103.755682	17	1.4287837	103.75574	812	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS66	1.429076018	103.755682	17	1.4287837	103.75574	812	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS66	1.429076018	103.755682	17	1.4287837	103.75574	812	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS67	1.42864502	103.755583	17	1.4287837	103.75574	814	Bird	Brown-throated sunbird	*Anthreptes malacensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS67	1.42864502	103.755583	17	1.4287837	103.75574	814	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS67	1.42864502	103.755583	17	1.4287837	103.75574	814	Mammal	Plantain squirrel	*Callosciurus notatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS67	1.42864502	103.755583	17	1.4287837	103.75574	814	Bird	Yellow bittern	*Ixobrychus sinensis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS67	1.42864502	103.755583	17	1.4287837	103.75574	814	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS68	1.428462965	103.755578	16	1.42822099	103.755424	814	Bird	Asian brown flycatcher	*Muscicapa dauurica*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS68	1.428462965	103.755578	16	1.42822099	103.755424	814	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS68	1.428462965	103.755578	16	1.42822099	103.755424	815	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS69	1.428174041	103.755311	16	1.42822099	103.755424	823	Bird	Ashy minivet	*Pericrocotus divaricatus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS69	1.428174041	103.755311	16	1.42822099	103.755424	820	Bird	Bittern sp.	*Ixobrychus sp.*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS69	1.428174041	103.755311	16	1.42822099	103.755424	815	Bird	Olive-backed sunbird	*Cinnyris jugularis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS69	1.428174041	103.755311	16	1.42822099	103.755424	822	Mammal	Plantain squirrel	*Callosciurus notatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS69	1.428174041	103.755311	16	1.42822099	103.755424	820	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS70	1.428119978	103.755301	16	1.42822099	103.755424	823	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS70	1.428119978	103.755301	16	1.42822099	103.755424	823	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	2	Heard	Targeted		
25 Feb 2021	2	T2	RS70	1.428119978	103.755301	16	1.42822099	103.755424	823	Bird	Red-breasted parakeet	*Psittacula alexandri*	Near Threatened	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS70	1.428119978	103.755301	16	1.42822099	103.755424	823	Bird	Swiftlet sp.	*Aerodramus sp.*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS71	1.42798	103.755147	16	1.42822099	103.755424	824	Mammal	Plantain squirrel	*Callosciurus notatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS72	1.42792996	103.755157	16	1.42822099	103.755424	828	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS72	1.42792996	103.755157	16	1.42822099	103.755424	828	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS72	1.42792996	103.755157	16	1.42822099	103.755424	828	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS73	1.427759975	103.755123	15	1.42742462	103.755014	829	Bird	Pied triller	*Lalage nigra*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS73	1.427759975	103.755123	15	1.42742462	103.755014	829	Bird	White-breasted waterhen	*Amaurornis phoenicurus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS74	1.427660985	103.755097	15	1.42742462	103.755014	830	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS74	1.427660985	103.755097	15	1.42742462	103.755014	830	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS75	1.427513966	103.755026	15	1.42742462	103.755014	831	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	2	Heard	Targeted		
25 Feb 2021	2	T2	RS75	1.427513966	103.755026	15	1.42742462	103.755014	831	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS76	1.42742998	103.754978	15	1.42742462	103.755014	834	Bird	Laced woodpecker	*Picus vittatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS76	1.42742998	103.754978	15	1.42742462	103.755014	834	Bird	Tiger shrike	*Lanius tigrinus*	Least Concern	Not Assessed	No	1	Seen	Targeted	6933	
25 Feb 2021	2	T2	RS76	1.42742998	103.754978	15	1.42742462	103.755014	834	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS77	1.427273992	103.75492	15	1.42742462	103.755014	835	Bird	Common flameback	*Dinopium javanense*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS77	1.427273992	103.75492	15	1.42742462	103.755014	835	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS77	1.427273992	103.75492	15	1.42742462	103.755014	835	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed

Date	Cycle	Route	Waypoint	Latitude	Longitude	Sampling Pt	SP_Lat	SP_long	Time (24h)	Taxon	Common Name	Scientific name	Global Status	Local Status	Threatened	Quantity	Observation type (seen/heard/caught/scat/other signs)	Survey method (targeted/incidental)	Photo no.	Remarks
25 Feb 2021	2	T2	RS78	1.427259995	103.754909	15	1.42742462	103.755014	836	Bird	Pied triller	*Lalage nigra*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS78	1.427259995	103.754909	15	1.42742462	103.755014	838	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS78	1.427259995	103.754909	15	1.42742462	103.755014	838	Bird	Zebra dove	*Geopelia striata*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS79	1.427168967	103.75486	15	1.42742462	103.755014	838	Mammal	Plantain squirrel	*Callosciurus notatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS80	1.426940979	103.75483	14	1.42656309	103.754763	839	Bird	White-bellied sea eagle	*Haliaeetus leucogaster*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS81	1.426682984	103.754745	14	1.42656309	103.754763	840	Bird	Ashy minivet	*Pericrocotus divaricatus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS81	1.426682984	103.754745	14	1.42656309	103.754763	841	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS81	1.426682984	103.754745	14	1.42656309	103.754763	840	Bird	House crow	*Corvus splendens*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS81	1.426682984	103.754745	14	1.42656309	103.754763	840	Bird	Javan munia	*Lonchura leucogastroides*	Least Concern	Not Assessed	No	11	Seen	Targeted		
25 Feb 2021	2	T2	RS81	1.426682984	103.754745	14	1.42656309	103.754763	840	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	3	Seen	Targeted		
25 Feb 2021	2	T2	RS81	1.426682984	103.754745	14	1.42656309	103.754763	842	Bird	Red-breasted parakeet	*Psittacula alexandri*	Near Threatened	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS82	1.426549042	103.754749	14	1.42656309	103.754763	842	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	3	Seen	Targeted		
25 Feb 2021	2	T2	RS83	1.426443011	103.754707	14	1.42656309	103.754763	843	Bird	White-throated kingfisher	*Halcyon smyrnensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS84	1.426278977	103.754668	14	1.42656309	103.754763	844	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS84	1.426278977	103.754668	14	1.42656309	103.754763	844	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS84	1.426278977	103.754668	14	1.42656309	103.754763	844	Bird	Long-tailed parakeet	*Psittacula longicauda*	Vulnerable	Not Assessed	Yes	1	Seen	Targeted		
25 Feb 2021	2	T2	RS84	1.426278977	103.754668	14	1.42656309	103.754763	844	Bird	Olive-backed sunbird	*Cinnyris jugularis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS84	1.426278977	103.754668	14	1.42656309	103.754763	844	Bird	Oriental dollarbird	*Eurystomus orientalis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS84	1.426278977	103.754668	14	1.42656309	103.754763	843	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS84	1.426278977	103.754668	14	1.42656309	103.754763	843	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS85	1.426011007	103.754629	13	1.42567869	103.754614	848	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	3	Seen	Targeted		
25 Feb 2021	2	T2	RS85	1.426011007	103.754629	13	1.42567869	103.754614	846	Bird	Lineated barbet	*Psilopogon lineatus*	Least Concern	Not Assessed	No	1	Seen	Targeted	6934	Nesting
25 Feb 2021	2	T2	RS85	1.426011007	103.754629	13	1.42567869	103.754614	847	Bird	Long-tailed parakeet	*Psittacula longicauda*	Vulnerable	Not Assessed	Yes	1	Seen	Targeted		
25 Feb 2021	2	T2	RS85	1.426011007	103.754629	13	1.42567869	103.754614	849	Bird	Long-tailed parakeet	*Cinnyris jugularis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS85	1.426011007	103.754629	13	1.42567869	103.754614	847	Bird	Pied triller	*Lalage nigra*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS85	1.426011007	103.754629	13	1.42567869	103.754614	849	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS86	1.425746977	103.754585	13	1.42567869	103.754614	850	Bird	Zebra dove	*Geopelia striata*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS87	1.425546985	103.754606	13	1.42567869	103.754614	851	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS87	1.425546985	103.754606	13	1.42567869	103.754614	851	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS87	1.425546985	103.754606	13	1.42567869	103.754614	851	Bird	Oriental dollarbird	*Eurystomus orientalis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS87	1.425546985	103.754606	13	1.42567869	103.754614	851	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS87	1.425546985	103.754606	13	1.42567869	103.754614	851	Bird	Red-breasted parakeet	*Psittacula alexandri*	Near Threatened	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS87	1.425546985	103.754606	13	1.42567869	103.754614	851	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS88	1.425450006	103.75457	13	1.42567869	103.754614	852	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS89	1.42543802	103.754579	13	1.42567869	103.754614	853	Reptile	Spiny-tailed house gecko	*Hemidactylus frenatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		Behind CT
25 Feb 2021	2	T2	RS90	1.425334001	103.754589	13	1.42567869	103.754614	856	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS90	1.425334001	103.754589	13	1.42567869	103.754614	856	Bird	Brahminy kite	*Haliastur indus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS90	1.425334001	103.754589	13	1.42567869	103.754614	856	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS91	1.425124034	103.754588	12	1.42478368	103.754539	857	Bird	Red-breasted parakeet	*Psittacula alexandri*	Near Threatened	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS91	1.425124034	103.754588	12	1.42478368	103.754539	857	Bird	Red-breasted parakeet	*Psittacula alexandri*	Near Threatened	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS91	1.425124034	103.754588	12	1.42478368	103.754539	858	Bird	Swiftlet sp.	*Aerodramus sp.*	Least Concern	Not Assessed	No	15	Seen	Targeted		
25 Feb 2021	2	T2	RS92	1.425062008	103.7545	12	1.42478368	103.754539	858	Bird	Banded woodpecker	*Chrysophlegma miniaceum*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS92	1.425062008	103.7545	12	1.42478368	103.754539	858	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS92	1.425062008	103.7545	12	1.42478368	103.754539	858	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS93	1.424899986	103.754549	12	1.42478368	103.754539	900	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS93	1.424899986	103.754549	12	1.42478368	103.754539	900	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Least Concern	Endangered	Yes	1	Seen	Targeted		
25 Feb 2021	2	T2	RS93	1.424899986	103.754549	12	1.42478368	103.754539	859	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS93	1.424899986	103.754549	12	1.42478368	103.754539	900	Bird	Lineated barbet	*Psilopogon lineatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS93	1.424899986	103.754549	12	1.42478368	103.754539	859	Bird	Rufous woodpecker	*Micropternus brachyurus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS94	1.424814994	103.754549	12	1.42478368	103.754539	901	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	3	Seen	Targeted		
25 Feb 2021	2	T2	RS95	1.424613995	103.754527	12	1.42478368	103.754539	902	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS96	1.424088031	103.754488	11	1.42388932	103.754456	906	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
25 Feb 2021	2	T2	RS96	1.424088031	103.754488	11	1.42388932	103.754456	906	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	3	Seen	Targeted		
25 Feb 2021	2	T2	RS96	1.424088031	103.754488	11	1.42388932	103.754456	906	Bird	Rufous woodpecker	*Micropternus brachyurus*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS96	1.424088031	103.754488	11	1.42388932	103.754456	906	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	2	Seen	Targeted		
25 Feb 2021	2	T2	RS97	1.423888039	103.754402	11	1.42388932	103.754456	907	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	6	Seen	Targeted		
25 Feb 2021	2	T2	RS98	1.423792988	103.754426	11	1.42388932	103.754456	908	Bird	Yellow-rumped flycatcher	*Ficedula zanthopygia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
25 Feb 2021	2	T2	RS99	1.423447989	103.754757	11	1.42388932	103.754456	908	Bird	Ashy minivet	*Pericrocotus divaricatus*	Least Concern	Not Assessed	No	2	Heard	Targeted		
4 Feb 2021	1	T2	XT1008	1.42495296	103.754575	12	1.42478368	103.754539	1853	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
4 Feb 2021	1	T2	XT1009	1.426797984	103.754753	14	1.42656309	103.754763	1859	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
4 Feb 2021	1	T2	XT1009	1.426797984	103.754753	14	1.42656309	103.754763	1859	Odonate	Scarlet grenadier	*Lathrecista asiatica*	Least Concern	Least Concern	No	1	Seen	Targeted		
4 Feb 2021	1	T2	XT1010	1.427557971	103.755024	15	1.42742462	103.755014	1903	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted		
4 Feb 2021	1	T2	XT1010	1.427557971	103.755024	15	1.42742462	103.755014	1903	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	1	Seen	Targeted		
4 Feb 2021	1	T2	XT1010	1.427557971	103.755024	15	1.42742462	103.755014	1903	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	2	Seen	Targeted		
4 Feb 2021	1	T2	XT1011	1.427959967	103.755264	16	1.42822099	103.755424	1905	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	1	Seen	Targeted		
4 Feb 2021	1	T2	XT1011	1.427959967	103.755264	16	1.42822099	103.755424	1905	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	3	Seen	Targeted		
4 Feb 2021	1	T2	XT1012	1.428229026	103.755462	16	1.42822099	103.755424	1907	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	3	Seen	Targeted		
4 Feb 2021	1	T2	XT1013	1.428377973	103.755503	16	1.42822099	103.755424	1910	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted		
4 Feb 2021	1	T2	XT1013	1.428377973	103.755503	16	1.42822099	103.755424	1910	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	6	Seen	Targeted		
8 Feb 2021	1	T2	XT1038	1.422537966	103.75385	9	1.42249714	103.753978	914	Bird	Common hill myna	*Gracula religiosa*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1038	1.422537966	103.75385	9	1.42249714	103.753978	914	Bird	Crimson sunbird	*Aethopyga siparaja*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1038	1.422537966	103.75385	9	1.42249714	103.753978	914	Bird	Lineated barbet	*Psilopogon lineatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1039	1.422724966	103.753662	9	1.42249714	103.753978	918	Mammal	Eurasian wild boar	*Sus scrofa*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1040	1.422172012	103.753172	8	1.422589	103.753085	926	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1041	1.422276031	103.753108	8	1.422589	103.753085	928	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1041	1.422276031	103.753108	8	1.422589	103.753085	928	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1041	1.422276031	103.753108	8	1.422589	103.753085	928	Bird	Blue-throated bee-eater	*Merops viridis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1041	1.422276031	103.753108	8	1.422589	103.753085	928	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1041	1.422276031	103.753108	8	1.422589	103.753085	928	Bird	Olive-backed sunbird	*Cinnyris jugularis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1041	1.422276031	103.753108	8	1.422589	103.753085	928	Bird	Oriental magpie-robin	*Copsychus saularis*	Least Concern	Endangered	Yes	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1041	1.422276031	103.753108	8	1.422589	103.753085	928	Bird	Swiftlet sp.	*Aerodramus sp.*	Least Concern	Not Assessed	No	8	Seen	Targeted		
8 Feb 2021	1	T2	XT1041	1.422276031	103.753108	8	1.422589	103.753085	928	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1042	1.422336968	103.753394	8	1.422589	103.753085	930	Bird	Blue-throated bee-eater	*Merops viridis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1042	1.422336968	103.753394	8	1.422589	103.753085	930	Bird	Common hill myna	*Gracula religiosa*	Least Concern	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1042	1.422336968	103.753394	8	1.422589	103.753085	930	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1042	1.422336968	103.753394	8	1.422589	103.753085	930	Bird	Laced woodpecker	*Picus vittatus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1042	1.422336968	103.753394	8	1.422589	103.753085	930	Bird	Lesser coucal	*Centropus bengalensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1043	1.422376027	103.753547	9	1.42249714	103.753978	933	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Least Concern	Endangered	Yes	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1043	1.422376027	103.753547	9	1.42249714	103.753978	933	Bird	Long-tailed parakeet	*Psittacula longicauda*	Vulnerable	Not Assessed	Yes	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1043	1.422376027	103.753547	9	1.42249714	103.753978	933	Bird	Scarlet-backed flowerpecker	*Dicaeum cruentatum*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1044	1.422493039	103.754196	9	1.42249714	103.753978	935	Butterfly	#N/A	*Unidentified Hesperiidae*	#N/A	#N/A	#N/A	1	Seen	Targeted	HB183	
8 Feb 2021	1	T2	XT1045	1.422523968	103.754377	9	1.42249714	103.753978	936	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1045	1.422523968	103.754377	9	1.42249714	103.753978	936	Odonate	Common blue skimmer	*Orthetrum glaucum*	Least Concern	Least Concern	No	1	Seen	Targeted	HB184-186	
8 Feb 2021	1	T2	XT1045	1.422523968	103.754377	9	1.42249714	103.753978	936	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	2	Heard	Targeted		
8 Feb 2021	1	T2	XT1045	1.422523968	103.754377	9	1.42249714	103.753978	936	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	10	Seen	Targeted		
8 Feb 2021	1	T2	XT1045	1.422523968	103.754377	9	1.42249714	103.753978	936	Bird	Rufous woodpecker	*Micropternus brachyurus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1046	1.423029983	103.754381	10	1.42299324	103.754396	939	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1046	1.423029983	103.754381	10	1.42299324	103.754396	939	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	2	Heard	Targeted		
8 Feb 2021	1	T2	XT1046	1.423029983	103.754381	10	1.42299324	103.754396	939	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1047	1.423106007	103.754399	10	1.42299324	103.754396	940	Butterfly	Burmese bush brown	*Mycalesis perseoides perseoides*	Not Assessed	Data Deficient	No	1	Seen	Targeted	HB188	
8 Feb 2021	1	T2	XT1047	1.423106007	103.754399	10	1.42299324	103.754396	940	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted	HB189	
8 Feb 2021	1	T2	XT1047	1.423106007	103.754399	10	1.42299324	103.754396	940	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	3	Seen	Targeted		
8 Feb 2021	1	T2	XT1047	1.423106007	103.754399	10	1.42299324	103.754396	940	Bird	Oriental dollarbird	*Eurystomus orientalis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1047	1.423106007	103.754399	10	1.42299324	103.754396	940	Reptile	Striped bronzeback	*Dendrelaphis caudolineatus*	Least Concern	Not Assessed	No	1	Seen	Targeted	HB187	
8 Feb 2021	1	T1	XT1048	1.423244979	103.754383	7	1.4233353	103.754233	943	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	3	Heard	Targeted		
8 Feb 2021	1	T1	XT1048	1.423244979	103.754383	7	1.4233353	103.754233	943	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T1	XT1048	1.423244979	103.754383	7	1.4233353	103.754233	943	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	5	Seen	Targeted		
8 Feb 2021	1	T1	XT1048	1.423244979	103.754383	7	1.4233353	103.754233	943	Butterfly	#N/A	*Unidentified Hesperiidae*	#N/A	#N/A	#N/A	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1049	1.423557959	103.754396	7	1.4233353	103.754233	944	Butterfly	Common palmfly	*Elymnias hypermnestra agina*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1049	1.423557959	103.754396	7	1.4233353	103.754233	944	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	8	Seen	Targeted		
8 Feb 2021	1	T1	XT1049	1.423557959	103.754396	7	1.4233353	103.754233	944	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
8 Feb 2021	1	T1	XT1049	1.423557959	103.754396	7	1.4233353	103.754233	944	Bird	Lineated barbet	*Psilopogon lineatus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1050	1.423977977	103.754425	11	1.42388932	103.754456	946	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	4	Seen	Targeted		
8 Feb 2021	1	T2	XT1050	1.423977977	103.754425	11	1.42388932	103.754456	946	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1051	1.424247036	103.754484	11	1.42388932	103.754456	950	Bird	Ashy minivet	*Pericrocotus divaricatus*	Least Concern	Not Assessed	No	2	Heard	Targeted		
8 Feb 2021	1	T2	XT1051	1.424247036	103.754484	11	1.42388932	103.754456	950	Odonate	Ornate coraltail	*Ceriagrion cerinorubellum*	Least Concern	Least Concern	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1051	1.424247036	103.754484	11	1.42388932	103.754456	950	Amphibian	#N/A	*Unidentified Anura*	#N/A	#N/A	#N/A	5	Seen	Targeted		Too small to ID
8 Feb 2021	1	T2	XT1052	1.424378967	103.75444	12	1.42478368	103.754539	953	Butterfly	Full stop swift	*Caltoris cormasa*	Not Assessed	Not Assessed	No	1	Seen	Targeted	HB193	
8 Feb 2021	1	T2	XT1052	1.424378967	103.75444	12	1.42478368	103.754539	953	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	7	Seen	Targeted		
8 Feb 2021	1	T2	XT1052	1.424378967	103.75444	12	1.42478368	103.754539	953	Odonate	Scarlet grenadier	*Lathrecista asiatica*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1053	1.424519029	103.754461	12	1.42478368	103.754539	955	Bird	Asian glossy starling	*Aplonis panayensis*	Least Concern	Not Assessed	No	2	Heard	Targeted		
8 Feb 2021	1	T2	XT1053	1.424519029	103.754461	12	1.42478368	103.754539	955	Butterfly	Chestnut bob	*Iambrix salsala salsala*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1053	1.424519029	103.754461	12	1.42478368	103.754539	955	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1053	1.424519029	103.754461	12	1.42478368	103.754539	955	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1053	1.424519029	103.754461	12	1.42478368	103.754539	955	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1053	1.424519029	103.754461	12	1.42478368	103.754539	955	Bird	Lineated barbet	*Psilopogon lineatus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1053	1.424519029	103.754461	12	1.42478368	103.754539	955	Odonate	Ornate coraltail	*Ceriagrion cerinorubellum*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1054	1.424703011	103.754485	12	1.42478368	103.754539	958	Butterfly	Chestnut bob	*Iambrix salsala salsala*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1054	1.424703011	103.754485	12	1.42478368	103.754539	958	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1054	1.424703011	103.754485	12	1.42478368	103.754539	958	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1054	1.424703011	103.754485

Date	Cycle	Route	Waypoint	Latitude	Longitude	Sampling Pt	SP_Lat	SP_long	Time (24h)	Taxon	Common Name	Scientific name	Global Status	Local Status	Threatened	Quantity	Observation type (seen/heard/caught/scat/other signs)	Survey method (targeted/incidental)	Photo no.	Remarks
8 Feb 2021	1	T2	XT1057	1.425253032	103.754533	13	1.42567869	103.754614	1001	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1057	1.425253032	103.754533	13	1.42567869	103.754614	1001	Bird	Swiftlet sp.	*Aerodramus sp.*	Least Concern	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1058	1.425375994	103.75455	13	1.42567869	103.754614	1002	Butterfly	Chestnut bob	*Iambrix salsala salsala*	Not Assessed	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1058	1.425375994	103.75455	13	1.42567869	103.754614	1002	Bird	Common flameback	*Dinopium javanense*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1058	1.425375994	103.75455	13	1.42567869	103.754614	1002	Butterfly	Full stop swift	*Caltoris cormasa*	Not Assessed	Not Assessed	No	1	Seen	Targeted	HB194,195	
8 Feb 2021	1	T2	XT1058	1.425375994	103.75455	13	1.42567869	103.754614	1002	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	5	Seen	Targeted		
8 Feb 2021	1	T2	XT1058	1.425375994	103.75455	13	1.42567869	103.754614	1002	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	1	Seen	Targeted	HB196	
8 Feb 2021	1	T2	XT1059	1.425614962	103.754567	13	1.42567869	103.754614	1007	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1059	1.425614962	103.754567	13	1.42567869	103.754614	1007	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1059	1.425614962	103.754567	13	1.42567869	103.754614	1007	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	9	Seen	Targeted		
8 Feb 2021	1	T2	XT1059	1.425614962	103.754567	13	1.42567869	103.754614	1007	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1059	1.425614962	103.754567	13	1.42567869	103.754614	1007	Butterfly	Lesser dart	*Potanthus omaha omaha*	Not Assessed	Not Assessed	No	1	Seen	Targeted	HB197	
8 Feb 2021	1	T2	XT1059	1.425614962	103.754567	13	1.42567869	103.754614	1007	Bird	Olive-backed sunbird	*Cinnyris jugularis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1060	1.426107986	103.754569	13	1.42567869	103.754614	1011	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Least Concern	Endangered	Yes	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1060	1.426107986	103.754569	13	1.42567869	103.754614	1011	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1060	1.426107986	103.754569	13	1.42567869	103.754614	1011	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1060	1.426107986	103.754569	13	1.42567869	103.754614	1011	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1060	1.426107986	103.754569	13	1.42567869	103.754614	1011	Butterfly	Lesser dart	*Potanthus omaha omaha*	Not Assessed	Not Assessed	No	1	Seen	Targeted	HB198	
8 Feb 2021	1	T2	XT1060	1.426107986	103.754569	13	1.42567869	103.754614	1011	Butterfly	Lesser dart	*Potanthus omaha omaha*	Not Assessed	Not Assessed	No	1	Seen	Targeted	HB199	
8 Feb 2021	1	T2	XT1061	1.426603021	103.75466	14	1.42656309	103.754763	1015	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Least Concern	Endangered	Yes	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1061	1.426603021	103.75466	14	1.42656309	103.754763	1015	Butterfly	Chestnut bob	*Iambrix salsala salsala*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1061	1.426603021	103.75466	14	1.42656309	103.754763	1015	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1061	1.426603021	103.75466	14	1.42656309	103.754763	1015	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1061	1.426603021	103.75466	14	1.42656309	103.754763	1015	Bird	Lineated barbet	*Psilopogon lineatus*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1061	1.426603021	103.75466	14	1.42656309	103.754763	1015	Butterfly	Striped albatross	*Appias libythea olferna*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1061	1.426603021	103.75466	14	1.42656309	103.754763	1015	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1062	1.426724978	103.754759	14	1.42656309	103.754763	1020	Bird	Blue-throated bee-eater	*Merops viridis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1062	1.426724978	103.754759	14	1.42656309	103.754763	1020	Bird	Brown-throated sunbird	*Anthreptes malacensis*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1062	1.426724978	103.754759	14	1.42656309	103.754763	1020	Butterfly	Common caerulean	*Jamides celeno aelianus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1062	1.426724978	103.754759	14	1.42656309	103.754763	1020	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1062	1.426724978	103.754759	14	1.42656309	103.754763	1020	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1062	1.426724978	103.754759	14	1.42656309	103.754763	1020	Butterfly	Formosan swift	*Borbo cinnara*	Not Assessed	Endangered	Yes	1	Seen	Targeted	HB205	
8 Feb 2021	1	T2	XT1062	1.426724978	103.754759	14	1.42656309	103.754763	1020	Bird	Javan munia	*Lonchura leucogastroides*	Least Concern	Not Assessed	No	2	Seen	Targeted	HB200-204	
8 Feb 2021	1	T2	XT1062	1.426724978	103.754759	14	1.42656309	103.754763	1020	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1062	1.426724978	103.754759	14	1.42656309	103.754763	1020	Butterfly	Painted jezebel	*Delias hyparete metarete*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1062	1.426724978	103.754759	14	1.42656309	103.754763	1020	Bird	Pink-necked green pigeon	*Treron vernans*	Least Concern	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1062	1.426724978	103.754759	14	1.42656309	103.754763	1020	Bird	Swinhoe's white-eye	*Zosterops simplex*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1063	1.426939974	103.754772	14	1.42656309	103.754763	1023	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1063	1.426939974	103.754772	14	1.42656309	103.754763	1023	Bird	Crimson sunbird	*Aethopyga siparaja*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1063	1.426939974	103.754772	14	1.42656309	103.754763	1023	Butterfly	Dark grass brown	*Orsotriaena medus cinerea*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1063	1.426939974	103.754772	14	1.42656309	103.754763	1023	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1063	1.426939974	103.754772	14	1.42656309	103.754763	1023	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1063	1.426939974	103.754772	14	1.42656309	103.754763	1023	Odonate	Scarlet grenadier	*Lathrecista asiatica*	Least Concern	Least Concern	No	4	Seen	Targeted		
8 Feb 2021	1	T2	XT1063	1.426939974	103.754772	14	1.42656309	103.754763	1023	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	3	Seen	Targeted		
8 Feb 2021	1	T2	XT1063	1.426939974	103.754772	14	1.42656309	103.754763	1023	Bird	Spotted dove	*Spilopelia chinensis*	Least Concern	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1064	1.427259995	103.754811	15	1.42742462	103.755014	1027	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted	HB206	
8 Feb 2021	1	T2	XT1064	1.427259995	103.754811	15	1.42742462	103.755014	1027	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	5	Seen	Targeted	HB209-212	
8 Feb 2021	1	T2	XT1064	1.427259995	103.754811	15	1.42742462	103.755014	1027	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1064	1.427259995	103.754811	15	1.42742462	103.755014	1027	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted	HB208	
8 Feb 2021	1	T2	XT1064	1.427259995	103.754811	15	1.42742462	103.755014	1027	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	3	Seen	Targeted		
8 Feb 2021	1	T2	XT1064	1.427259995	103.754811	15	1.42742462	103.755014	1027	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1064	1.427259995	103.754811	15	1.42742462	103.755014	1027	Odonate	Trumpet tail	*Acisoma panorpoides*	Least Concern	Least Concern	No	1	Seen	Targeted	HB207	
8 Feb 2021	1	T2	XT1064	1.427259995	103.754811	15	1.42742462	103.755014	1027	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1065	1.427518995	103.754915	15	1.42742462	103.755014	1032	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	6	Seen	Targeted		
8 Feb 2021	1	T2	XT1065	1.427518995	103.754915	15	1.42742462	103.755014	1032	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted	HB213	
8 Feb 2021	1	T2	XT1065	1.427518995	103.754915	15	1.42742462	103.755014	1032	Butterfly	Common caerulean	*Jamides celeno aelianus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1065	1.427518995	103.754915	15	1.42742462	103.755014	1032	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1065	1.427518995	103.754915	15	1.42742462	103.755014	1032	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1065	1.427518995	103.754915	15	1.42742462	103.755014	1032	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1065	1.427518995	103.754915	15	1.42742462	103.755014	1032	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1067	1.427674983	103.755037	15	1.42742462	103.755014	1038	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted	HB214	
8 Feb 2021	1	T2	XT1067	1.427674983	103.755037	15	1.42742462	103.755014	1038	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	1	Seen	Targeted	HB215	
8 Feb 2021	1	T2	XT1067	1.427674983	103.755037	15	1.42742462	103.755014	1038	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	8	Seen	Targeted		
8 Feb 2021	1	T2	XT1067	1.427674983	103.755037	15	1.42742462	103.755014	1038	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1067	1.427674983	103.755037	15	1.42742462	103.755014	1038	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1067	1.427674983	103.755037	15	1.42742462	103.755014	1038	Bird	Olive-backed sunbird	*Cinnyris jugularis*	Least Concern	Not Assessed	No	2	Heard	Targeted		
8 Feb 2021	1	T2	XT1067	1.427674983	103.755037	15	1.42742462	103.755014	1038	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1067	1.427674983	103.755037	15	1.42742462	103.755014	1038	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1068	1.427726028	103.755081	15	1.42742462	103.755014	1039	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	4	Seen	Targeted		
8 Feb 2021	1	T2	XT1068	1.427726028	103.755081	15	1.42742462	103.755014	1039	Odonate	Common redbolt	*Rhodothemis rufa*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1068	1.427726028	103.755081	15	1.42742462	103.755014	1039	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1068	1.427726028	103.755081	15	1.42742462	103.755014	1039	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1069	1.427865	103.755113	15	1.42742462	103.755014	1042	Bird	Ashy minivet	*Pericrocotus divaricatus*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1069	1.427865	103.755113	15	1.42742462	103.755014	1042	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1069	1.427865	103.755113	15	1.42742462	103.755014	1042	Bird	Brown-throated sunbird	*Anthreptes malacensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1069	1.427865	103.755113	15	1.42742462	103.755014	1042	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1069	1.427865	103.755113	15	1.42742462	103.755014	1042	Odonate	Common redbolt	*Rhodothemis rufa*	Least Concern	Least Concern	No	1	Seen	Targeted	HB217	
8 Feb 2021	1	T2	XT1069	1.427865	103.755113	15	1.42742462	103.755014	1042	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	8	Seen	Targeted		
8 Feb 2021	1	T2	XT1069	1.427865	103.755113	15	1.42742462	103.755014	1042	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1069	1.427865	103.755113	15	1.42742462	103.755014	1042	Bird	Yellow-vented bulbul	*Pycnonotus goiavier*	Least Concern	Not Assessed	No	2	Heard	Targeted		
8 Feb 2021	1	T2	XT1069	1.427865	103.755113	15	1.42742462	103.755014	1042	Butterfly	#N/A	*Unidentified Lepidoptera*	#N/A	#N/A	#N/A	1	Seen	Targeted	HB218	Caterpillar
8 Feb 2021	1	T2	XT1070	1.428125007	103.755273	16	1.42822099	103.755424	1048	Bird	Black-naped oriole	*Oriolus chinensis*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1070	1.428125007	103.755273	16	1.42822099	103.755424	1048	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1070	1.428125007	103.755273	16	1.42822099	103.755424	1048	Odonate	Blue percher	*Diplacodes trivialis*	Least Concern	Least Concern	No	1	Seen	Targeted	HB221	
8 Feb 2021	1	T2	XT1070	1.428125007	103.755273	16	1.42822099	103.755424	1048	Bird	Collared kingfisher	*Todiramphus chloris*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1070	1.428125007	103.755273	16	1.42822099	103.755424	1048	Bird	Common iora	*Aegithina tiphia*	Least Concern	Not Assessed	No	1	Heard	Targeted		
8 Feb 2021	1	T2	XT1070	1.428125007	103.755273	16	1.42822099	103.755424	1048	Odonate	Common redbolt	*Rhodothemis rufa*	Least Concern	Least Concern	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1070	1.428125007	103.755273	16	1.42822099	103.755424	1048	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	4	Seen	Targeted		
8 Feb 2021	1	T2	XT1070	1.428125007	103.755273	16	1.42822099	103.755424	1048	Bird	Javan myna	*Acridotheres javanicus*	Least Concern	Not Assessed	No	2	Heard	Targeted		
8 Feb 2021	1	T2	XT1070	1.428125007	103.755273	16	1.42822099	103.755424	1048	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1071	1.428338997	103.755392	16	1.42822099	103.755424	1055	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	11	Seen	Targeted		
8 Feb 2021	1	T2	XT1071	1.428338997	103.755392	16	1.42822099	103.755424	1055	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	5	Seen	Targeted		
8 Feb 2021	1	T2	XT1071	1.428338997	103.755392	16	1.42822099	103.755424	1055	Odonate	Scarlet skimmer	*Orthetrum testaceum*	Least Concern	Least Concern	No	1	Seen	Targeted	HB224	
8 Feb 2021	1	T2	XT1071	1.428338997	103.755392	16	1.42822099	103.755424	1055	Odonate	Suitan	*Camacinia gigantea*	Least Concern	Least Concern	No	1	Seen	Targeted	HB223	
8 Feb 2021	1	T2	XT1071	1.428338997	103.755392	16	1.42822099	103.755424	1055	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1071	1.428338997	103.755392	16	1.42822099	103.755424	1055	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	4	Seen	Targeted		
8 Feb 2021	1	T2	XT1072	1.428330028	103.755389	16	1.42822099	103.755424	1057	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	5	Seen	Targeted		
8 Feb 2021	1	T2	XT1072	1.428330028	103.755389	16	1.42822099	103.755424	1057	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1072	1.428330028	103.755389	16	1.42822099	103.755424	1057	Amphibian	Guenther's frog	*Sylvirana guentheri*	Least Concern	Not Assessed	No	2	Heard	Targeted		
8 Feb 2021	1	T2	XT1072	1.428330028	103.755389	16	1.42822099	103.755424	1057	Odonate	Trumpet tail	*Acisoma panorpoides*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1072	1.428330028	103.755389	16	1.42822099	103.755424	1057	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	3	Seen	Targeted		
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Odonate	Blue percher	*Diplacodes trivialis*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Reptile	Changeable lizard	*Calotes versicolor*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Odonate	Common scarlet	*Crocothemis servilia*	Least Concern	Least Concern	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Butterfly	Gram blue	*Euchrysops cnejus cnejus*	Not Assessed	Not Assessed	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Butterfly	Gram blue	*Euchrysops cnejus cnejus*	Not Assessed	Not Assessed	No	1	Seen	Targeted	HB226	
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Butterfly	Lesser grass blue	*Zizina otis lampa*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Butterfly	Peacock pansy	*Junonia almana javana*	Least Concern	Not Assessed	No	1	Seen	Targeted		
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Odonate	Trumpet tail	*Acisoma panorpoides*	Least Concern	Least Concern	No	2	Seen	Targeted		
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	32	Seen	Targeted		
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	1	Seen	Targeted	HB225	
8 Feb 2021	1	T2	XT1073	1.428584	103.755563	17	1.4287837	103.75574	1100	Odonate	Variegated green skimmer	*Orthetrum sabina*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1207	1.42222398	103.753145	8	1.422589	103.753085	935	Mammal	Smooth-coated otter	*Lutrogale perspicillata*	Vulnerable	Critically Endangered	Yes	8	Seen	Targeted		
10 Mar 2021	2	T2	XT1208	1.422465965	103.753989	9	1.42249714	103.753978	942	Butterfly	Common sailor	*Neptis hylas papaja*	Not Assessed	Not Assessed	No	1	Seen	Targeted	CT7294	
10 Mar 2021	2	T2	XT1208	1.422465965	103.753989	9	1.42249714	103.753978	942	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1209	1.422459008	103.754202	9	1.42249714	103.753978	944	Butterfly	Dark brand bush brown	*Mycalesis mineus macromalayana*	Not Assessed	Not Assessed	No	1	Seen	Targeted	CT7302	
10 Mar 2021	2	T2	XT1209	1.422459008	103.754202	9	1.42249714	103.753978	944	Butterfly	Dark grass brown	*Orsotriaena medus cinerea*	Not Assessed	Not Assessed	No	1	Seen	Targeted	CT7303	
10 Mar 2021	2	T2	XT1209	1.422459008	103.754202	9	1.42249714	103.753978	944	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1210	1.422502007	103.754269	9	1.42249714	103.753978	945	Butterfly	Chestnut bob	*Iambrix salsala salsala*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1211	1.422499996	103.754312	9	1.42249714	103.753978	946	Butterfly	Short banded sailor	*Phaedyma columella singa*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1212	1.422455991	103.754277	9	1.42249714	103.753978	947	Odonate	Ornate coraltail	*Ceriagrion cerinorubellum*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1213	1.422695965	103.754355	10	1.42299324	103.754396	950	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1214	1.422798978	103.754372	10	1.42299324	103.754396	951	Butterfly	Chestnut bob	*Iambrix salsala salsala*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1214	1.422798978	103.754372	10	1.42299324	103.754396	951	Butterfly	Chocolate pansy	*Junonia hedonia ida*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1214	1.422798978	103.754372	10	1.42299324	103.754396	951	Butterfly	Common mormon	*Papilio polytes romulus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1215	1.422828985	103.754436

Date	Cycle	Route	Waypoint	Latitude	Longitude	Sampling Pt	SP_Lat	SP_long	Time (24h)	Taxon	Common Name	Scientific name	Global Status	Local Status	Threatened	Quantity	Observation type (seen/heard/caught/scat/other signs)	Survey method (targeted/incidental)	Photo no.	Remarks
10 Mar 2021	2	T2	XT1219	1.423597019	103.754388	11	1.42388932	103.754456	959	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1219	1.423597019	103.754388	11	1.42388932	103.754456	959	Butterfly	Painted jezebel	*Delias hyparete metarete*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1220	1.423959034	103.754438	11	1.42388932	103.754456	1001	Butterfly	Common dartlet	*Oriens gola pseudolus*	Not Assessed	Not Assessed	No	1	Seen	Targeted	CT7310	
10 Mar 2021	2	T2	XT1221	1.424160032	103.754447	11	1.42388932	103.754456	1004	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1221	1.424160032	103.754447	11	1.42388932	103.754456	1004	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1221	1.424160032	103.754447	11	1.42388932	103.754456	1004	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1221	1.424160032	103.754447	11	1.42388932	103.754456	1004	Butterfly	Three spot grass yellow	*Eurema blanda snelleni*	Not Assessed	Not Assessed	No	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1222	1.424393971	103.754509	12	1.42478368	103.754539	1008	Butterfly	Chestnut bob	*Iambrix salsala salsala*	Not Assessed	Not Assessed	No	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1222	1.424393971	103.754509	12	1.42478368	103.754539	1008	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	7	Seen	Targeted		
10 Mar 2021	2	T2	XT1222	1.424393971	103.754509	12	1.42478368	103.754539	1008	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	3	Seen	Targeted		
10 Mar 2021	2	T2	XT1222	1.424393971	103.754509	12	1.42478368	103.754539	1008	Butterfly	Three spot grass yellow	*Eurema blanda snelleni*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1223	1.424689014	103.754521	12	1.42478368	103.754539	1010	Butterfly	Chocolate pansy	*Junonia hedonia ida*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1223	1.424689014	103.754521	12	1.42478368	103.754539	1010	Butterfly	Common grass yellow	*Eurema hecabe contubernalis*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1223	1.424689014	103.754521	12	1.42478368	103.754539	1010	Butterfly	Common palmfly	*Elymnias hypermnestra agina*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1224	1.425098972	103.754527	12	1.42478368	103.754539	1014	Butterfly	Pygmy grass blue	*Zizula hylax pygmaea*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1224	1.425098972	103.754527	12	1.42478368	103.754539	1014	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1225	1.425551008	103.754557	13	1.42567869	103.754614	1017	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1225	1.425551008	103.754557	13	1.42567869	103.754614	1017	Butterfly	Pygmy grass blue	*Zizula hylax pygmaea*	Not Assessed	Not Assessed	No	3	Seen	Targeted		
10 Mar 2021	2	T2	XT1226	1.425713031	103.754593	13	1.42567869	103.754614	1021	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1226	1.425713031	103.754593	13	1.42567869	103.754614	1021	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1226	1.425713031	103.754593	13	1.42567869	103.754614	1021	Odonate	Scarlet skimmer	*Orthetrum testaceum*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1226	1.425713031	103.754593	13	1.42567869	103.754614	1021	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1226	1.425713031	103.754593	13	1.42567869	103.754614	1021	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1227	1.426428007	103.754651	14	1.42656309	103.754763	1023	Butterfly	Chestnut bob	*Iambrix salsala salsala*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1227	1.426428007	103.754651	14	1.42656309	103.754763	1023	Butterfly	Common mormon	*Papilio polytes romulus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1228	1.426436976	103.754649	14	1.42656309	103.754763	1025	Odonate	Common redbolt	*Rhodothemis rufa*	Least Concern	Least Concern	No	1	Seen	Targeted	CT7313	
10 Mar 2021	2	T2	XT1228	1.426436976	103.754649	14	1.42656309	103.754763	1025	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1229	1.42652004	103.754683	14	1.42656309	103.754763	1027	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1229	1.42652004	103.754683	14	1.42656309	103.754763	1027	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1229	1.42652004	103.754683	14	1.42656309	103.754763	1027	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1229	1.42652004	103.754683	14	1.42656309	103.754763	1027	Butterfly	Tailless line blue	*Prosotas dubiosa lumpura*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1229	1.42652004	103.754683	14	1.42656309	103.754763	1027	Butterfly	Three spot grass yellow	*Eurema blanda snelleni*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1230	1.426846012	103.754753	14	1.42656309	103.754763	1030	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1230	1.426846012	103.754753	14	1.42656309	103.754763	1030	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1230	1.426846012	103.754753	14	1.42656309	103.754763	1030	Odonate	Scarlet grenadier	*Lathrecista asiatica*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1230	1.426846012	103.754753	14	1.42656309	103.754763	1030	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1231	1.427051034	103.754822	15	1.42742462	103.755014	1033	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1231	1.427051034	103.754822	15	1.42742462	103.755014	1033	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	3	Seen	Targeted	CT7321	
10 Mar 2021	2	T2	XT1231	1.427051034	103.754822	15	1.42742462	103.755014	1033	Odonate	Grenadier	*Agrionoptera insignis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1231	1.427051034	103.754822	15	1.42742462	103.755014	1033	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	4	Seen	Targeted		
10 Mar 2021	2	T2	XT1232	1.427369965	103.754882	15	1.42742462	103.755014	1039	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	6	Seen	Targeted		
10 Mar 2021	2	T2	XT1232	1.427369965	103.754882	15	1.42742462	103.755014	1039	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1232	1.427369965	103.754882	15	1.42742462	103.755014	1039	Butterfly	Forest hopper	*Astictopterus jama jama*	Not Assessed	Nationally Extinct (Rediscovered)	No	1	Seen	Targeted	CT7324	
10 Mar 2021	2	T2	XT1232	1.427369965	103.754882	15	1.42742462	103.755014	1039	Butterfly	Grass yellow sp.	*Eurema sp.*	#N/A	#N/A	#N/A	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1232	1.427369965	103.754882	15	1.42742462	103.755014	1039	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1233	1.427540034	103.754983	15	1.42742462	103.755014	1044	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	10	Seen	Targeted		
10 Mar 2021	2	T2	XT1233	1.427540034	103.754983	15	1.42742462	103.755014	1044	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1233	1.427540034	103.754983	15	1.42742462	103.755014	1044	Odonate	Common redbolt	*Rhodothemis rufa*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1233	1.427540034	103.754983	15	1.42742462	103.755014	1044	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1233	1.427540034	103.754983	15	1.42742462	103.755014	1044	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1234	1.427523019	103.75499	15	1.42742462	103.755014	1050	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	5	Seen	Targeted		
10 Mar 2021	2	T2	XT1234	1.427523019	103.75499	15	1.42742462	103.755014	1050	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1234	1.427523019	103.75499	15	1.42742462	103.755014	1050	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1234	1.427523019	103.75499	15	1.42742462	103.755014	1050	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1234	1.427523019	103.75499	15	1.42742462	103.755014	1050	Butterfly	Three spot grass yellow	*Eurema blanda snelleni*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1234	1.427523019	103.75499	15	1.42742462	103.755014	1050	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	3	Seen	Targeted		
10 Mar 2021	2	T2	XT1234	1.427523019	103.75499	15	1.42742462	103.755014	1050	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	3	Seen	Targeted	CT7327	
10 Mar 2021	2	T2	XT1234	1.427523019	103.75499	15	1.42742462	103.755014	1050	Odonate	White-barred duskhawk	*Tholymis tillarga*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1235	1.427700967	103.755031	15	1.42742462	103.755014	1055	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1235	1.427700967	103.755031	15	1.42742462	103.755014	1055	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	5	Seen	Targeted		
10 Mar 2021	2	T2	XT1236	1.427989975	103.755141	16	1.42822099	103.755424	1057	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	6	Seen	Targeted		
10 Mar 2021	2	T2	XT1236	1.427989975	103.755141	16	1.42822099	103.755424	1057	Odonate	Common redbolt	*Rhodothemis rufa*	Least Concern	Least Concern	No	3	Seen	Targeted		
10 Mar 2021	2	T2	XT1236	1.427989975	103.755141	16	1.42822099	103.755424	1057	Odonate	Common scarlet	*Crocothemis servilia*	Least Concern	Least Concern	No	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1236	1.427989975	103.755141	16	1.42822099	103.755424	1057	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1236	1.427989975	103.755141	16	1.42822099	103.755424	1057	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1237	1.428043032	103.755189	16	1.42822099	103.755424	1100	Odonate	Common parasol	*Neurothemis fluctuans*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1237	1.428043032	103.755189	16	1.42822099	103.755424	1100	Odonate	Common redbolt	*Rhodothemis rufa*	Least Concern	Least Concern	No	3	Seen	Targeted		
10 Mar 2021	2	T2	XT1237	1.428043032	103.755189	16	1.42822099	103.755424	1100	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1237	1.428043032	103.755189	16	1.42822099	103.755424	1100	Odonate	Trumpet tail	*Acisoma panorpoides*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1237	1.428043032	103.755189	16	1.42822099	103.755424	1100	Odonate	Variegated green skimmer	*Orthetrum sabina*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1238	1.428214023	103.755351	16	1.42822099	103.755424	1109	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	3	Seen	Targeted		
10 Mar 2021	2	T2	XT1238	1.428214023	103.755351	16	1.42822099	103.755424	1109	Odonate	Blue dasher	*Brachydiplax chalybea*	Least Concern	Least Concern	No	20	Seen	Targeted		
10 Mar 2021	2	T2	XT1238	1.428214023	103.755351	16	1.42822099	103.755424	1109	Odonate	Common redbolt	*Rhodothemis rufa*	Least Concern	Least Concern	No	4	Seen	Targeted		
10 Mar 2021	2	T2	XT1238	1.428214023	103.755351	16	1.42822099	103.755424	1109	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	3	Seen	Targeted		
10 Mar 2021	2	T2	XT1238	1.428214023	103.755351	16	1.42822099	103.755424	1109	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	4	Seen	Targeted		
10 Mar 2021	2	T2	XT1238	1.428214023	103.755351	16	1.42822099	103.755424	1109	Odonate	Trumpet tail	*Acisoma panorpoides*	Least Concern	Least Concern	No	4	Seen	Targeted		
10 Mar 2021	2	T2	XT1238	1.428214023	103.755351	16	1.42822099	103.755424	1109	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	6	Seen	Targeted		
10 Mar 2021	2	T2	XT1239	1.428453997	103.755498	16	1.42822099	103.755424	1111	Odonate	Common scarlet	*Crocothemis servilia*	Least Concern	Least Concern	No	2	Seen	Targeted		
10 Mar 2021	2	T2	XT1239	1.428453997	103.755498	16	1.42822099	103.755424	1111	Butterfly	Painted jezebel	*Delias hyparete metarete*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1240	1.428490961	103.755568	16	1.42822099	103.755424	1112	Butterfly	Ancyra blue	*Catopyrops ancyra*	Not Assessed	Vulnerable	Yes	1	Seen	Targeted	CT7349	
10 Mar 2021	2	T2	XT1240	1.428490961	103.755568	16	1.42822099	103.755424	1112	Butterfly	Bush hopper	*Ampittia dioscorides camertes*	Not Assessed	Not Assessed	No	4	Seen	Targeted	CT7343	
10 Mar 2021	2	T2	XT1240	1.428490961	103.755568	16	1.42822099	103.755424	1112	Odonate	Common bluetail	*Ischnura senegalensis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1240	1.428490961	103.755568	16	1.42822099	103.755424	1112	Butterfly	Grass yellow sp.	*Eurema sp.*	Not Assessed	#N/A	#N/A	3	Seen	Targeted		
10 Mar 2021	2	T2	XT1240	1.428490961	103.755568	16	1.42822099	103.755424	1112	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	3	Seen	Targeted		
10 Mar 2021	2	T2	XT1240	1.428490961	103.755568	16	1.42822099	103.755424	1112	Butterfly	Lesser grass blue	*Zizina otis lampa*	Not Assessed	Not Assessed	No	3	Seen	Targeted		
10 Mar 2021	2	T2	XT1240	1.428490961	103.755568	16	1.42822099	103.755424	1112	Butterfly	Three spot grass yellow	*Eurema blanda snelleni*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1240	1.428490961	103.755568	16	1.42822099	103.755424	1112	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	30	Seen	Targeted		
10 Mar 2021	2	T2	XT1240	1.428453997	103.755498	16	1.42822099	103.755424	1111	Odonate	Yellow-barred flutterer	*Rhyothemis phyllis*	Least Concern	Least Concern	No	3	Seen	Targeted		
10 Mar 2021	2	T2	XT1241	1.428453997	103.755498	16	1.42822099	103.755424	1111	Odonate	Common redbolt	*Rhodothemis rufa*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1241	1.428644015	103.755667	17	1.4287837	103.75574	1121	Butterfly	Gram blue	*Euchrysops cnejus cnejus*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1241	1.428644015	103.755667	17	1.4287837	103.75574	1121	Butterfly	Painted jezebel	*Delias hyparete metarete*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1241	1.428644015	103.755667	17	1.4287837	103.75574	1121	Butterfly	Peacock pansy	*Junonia almana javana*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1241	1.428644015	103.755667	17	1.4287837	103.75574	1121	Odonate	Spine-tufted skimmer	*Orthetrum chrysis*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1241	1.428644015	103.755667	17	1.4287837	103.75574	1121	Butterfly	Striped albatross	*Appias libythea olferna*	Not Assessed	Not Assessed	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1241	1.428644015	103.755667	17	1.4287837	103.75574	1121	Odonate	Variable wisp	*Agriocnemis femina*	Least Concern	Least Concern	No	10	Seen	Targeted		
10 Mar 2021	2	T2	XT1241	1.428644015	103.755667	17	1.4287837	103.75574	1121	Odonate	Variegated green skimmer	*Orthetrum sabina*	Least Concern	Least Concern	No	1	Seen	Targeted		
10 Mar 2021	2	T2	XT1242	1.428453997	103.755498	16	1.42822099	103.755424	1111	Butterfly	Grey pansy	*Junonia atlites atlites*	Not Assessed	Not Assessed	No	2	Seen	Targeted		
16 Mar 2021	2	-		1.428814167	103.7557317	17	1.4287837	103.75574	19:56:57	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195657.wav	
16 Mar 2021	2	-		1.428615013	103.7556425	17	1.4287837	103.75574	19:57:43	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195743.wav	
16 Mar 2021	2	-		1.428548461	103.7555954	17	1.4287837	103.75574	19:57:53	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195753.wav	
16 Mar 2021	2	-		1.428548461	103.7555954	17	1.4287837	103.75574	19:58:01	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195801.wav	
16 Mar 2021	2	-		1.428428683	103.7555011	16	1.42822099	103.755424	19:58:16	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195816.wav	
16 Mar 2021	2	-		1.428428683	103.7555011	16	1.42822099	103.755424	19:58:16	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195816.wav	
16 Mar 2021	2	-		1.428300608	103.7554225	16	1.42822099	103.755424	19:58:34	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195834.wav	
16 Mar 2021	2	-		1.428300608	103.7554225	16	1.42822099	103.755424	19:58:34	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195834.wav	
16 Mar 2021	2	-		1.42822165	103.7553348	16	1.42822099	103.755424	19:58:50	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195850.wav	
16 Mar 2021	2	-		1.42822165	103.7553348	16	1.42822099	103.755424	19:58:50	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195850.wav	
16 Mar 2021	2	-		1.428220812	103.7553266	16	1.42822099	103.755424	19:59:05	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195905.wav	
16 Mar 2021	2	-		1.428220812	103.7553266	16	1.42822099	103.755424	19:59:05	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195905.wav	
16 Mar 2021	2	-		1.428220812	103.7553266	16	1.42822099	103.755424	19:59:20	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195920.wav	
16 Mar 2021	2	-		1.428220812	103.7553266	16	1.42822099	103.755424	19:59:20	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195920.wav	
16 Mar 2021	2	-		1.428226093	103.7553304	16	1.42822099	103.755424	19:59:35	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195935.wav	
16 Mar 2021	2	-		1.428226093	103.7553304	16	1.42822099	103.755424	19:59:35	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195935.wav	
16 Mar 2021	2	-		1.428210922	103.7553351	16	1.42822099	103.755424	19:59:50	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195950.wav	
16 Mar 2021	2	-		1.428210922	103.7553351	16	1.42822099	103.755424	19:59:50	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_195950.wav	
16 Mar 2021	2	-		1.428210922	103.7553351	16	1.42822099	103.755424	20:00:06	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200006.wav	
16 Mar 2021	2	-		1.428210922	103.7553351	16	1.42822099	103.755424	20:00:06	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200006.wav	
16 Mar 2021	2	-		1.428206228	103.7553199	16	1.42822099	103.755424	20:00:21	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200021.wav	
16 Mar 2021	2	-		1.428206228	103.7553199	16	1.42822099	103.755424	20:00:21	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200021.wav	
16 Mar 2021	2	-		1.428206228	103.7553199	16	1.42822099	103.755424	20:00:36	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200036.wav	
16 Mar 2021	2	-		1.428206228	103.7553199	16	1.42822099	103.755424	20:00:36	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200036.wav	
16 Mar 2021	2	-		1.428206814	103.7553205	16	1.42822099	103.755424	20:00:51	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200051.wav	
16 Mar 2021	2	-		1.428206814	103.7553205	16	1.42822099	103.755424	20:00:51	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200051.wav	
16 Mar 2021	2	-		1.428206814	103.7553205	16	1.42822099	103.755424	20:01:07	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200107.wav	
16 Mar 2021	2	-		1.428206814	103.7553205	16	1.42822099	103.755424	20:01:07	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted

Date	Cycle	Route	Waypoint	Latitude	Longitude	Sampling Pt	SP_Lat	SP_long	Time (24h)	Taxon	Common Name	Scientific name	Global Status	Local Status	Threatened	Quantity	Observation type (seen/heard/caught/scat/other signs)	Survey method (targeted/incidental)	Photo no.	Remarks
16 Mar 2021	2		-	1.428028448	103.755239	16	1.42822099	103.755424	20:02:37	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200237.wav	
16 Mar 2021	2		-	1.428028448	103.755239	16	1.42822099	103.755424	20:02:43	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200243.wav	
16 Mar 2021	2		-	1.428006655	103.7552041	16	1.42822099	103.755424	20:02:54	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200254.wav	
16 Mar 2021	2		-	1.428006655	103.7552041	16	1.42822099	103.755424	20:03:06	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200306.wav	
16 Mar 2021	2		-	1.428006655	103.7552041	16	1.42822099	103.755424	20:03:06	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200306.wav	
16 Mar 2021	2		-	1.427977737	103.7552066	16	1.42822099	103.755424	20:03:21	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200321.wav	
16 Mar 2021	2		-	1.427977737	103.7552066	16	1.42822099	103.755424	20:03:36	Mammal (Bat)	Javan pipistrelle	*Pipistrellus javanicus*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200336.wav	
16 Mar 2021	2		-	1.427977737	103.7552066	16	1.42822099	103.755424	20:03:36	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200336.wav	
16 Mar 2021	2		-	1.427893908	103.7551538	16	1.42822099	103.755424	20:03:51	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200351.wav	
16 Mar 2021	2		-	1.427809345	103.755104	15	1.42742462	103.755014	20:03:59	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200359.wav	
16 Mar 2021	2		-	1.427809345	103.755104	15	1.42742462	103.755014	20:03:59	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200359.wav	
16 Mar 2021	2		-	1.427809345	103.755104	15	1.42742462	103.755014	20:04:10	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200410.wav	
16 Mar 2021	2		-	1.427809345	103.755104	15	1.42742462	103.755014	20:04:10	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200410.wav	
16 Mar 2021	2		-	1.427749079	103.755055	15	1.42742462	103.755014	20:04:25	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200425.wav	
16 Mar 2021	2		-	1.427606503	103.7550178	15	1.42742462	103.755014	20:04:40	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200440.wav	
16 Mar 2021	2		-	1.427606503	103.7550178	15	1.42742462	103.755014	20:04:55	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200455.wav	
16 Mar 2021	2		-	1.427399637	103.7549245	15	1.42742462	103.755014	20:05:13	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200513.wav	
16 Mar 2021	2		-	1.427399637	103.7549245	15	1.42742462	103.755014	20:05:25	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200525.wav	
16 Mar 2021	2		-	1.427206518	103.7548491	15	1.42742462	103.755014	20:05:40	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200540.wav	
16 Mar 2021	2		-	1.427077604	103.7548134	15	1.42742462	103.755014	20:05:50	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200550.wav	
16 Mar 2021	2		-	1.42675926	103.7547194	14	1.42656309	103.754763	20:06:42	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200642.wav	
16 Mar 2021	2		-	1.426596902	103.7546995	14	1.42656309	103.754763	20:06:59	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200659.wav	
16 Mar 2021	2		-	1.426596902	103.7546995	14	1.42656309	103.754763	20:06:59	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200659.wav	
16 Mar 2021	2		-	1.426596902	103.7546995	14	1.42656309	103.754763	20:07:15	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200715.wav	
16 Mar 2021	2		-	1.426393306	103.7546438	14	1.42656309	103.754763	20:07:30	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_200730.wav	
16 Mar 2021	2		-	1.425491832	103.7545993	13	1.42567869	103.754614	20:10:28	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201028.wav	
16 Mar 2021	2		-	1.425440451	103.7546024	13	1.42567869	103.754614	20:10:59	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201059.wav	
16 Mar 2021	2		-	1.425440451	103.7546024	13	1.42567869	103.754614	20:11:14	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201114.wav	
16 Mar 2021	2		-	1.425444139	103.7545793	13	1.42567869	103.754614	20:11:29	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201129.wav	
16 Mar 2021	2		-	1.425470542	103.7546147	13	1.42567869	103.754614	20:12:12	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201212.wav	
16 Mar 2021	2		-	1.425470542	103.7546147	13	1.42567869	103.754614	20:12:28	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201228.wav	
16 Mar 2021	2		-	1.425497616	103.7546291	13	1.42567869	103.754614	20:12:35	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201235.wav	
16 Mar 2021	2		-	1.425497616	103.7546291	13	1.42567869	103.754614	20:12:48	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201248.wav	
16 Mar 2021	2		-	1.42509738	103.754532	12	1.42478368	103.754539	20:13:47	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201347.wav	
16 Mar 2021	2		-	1.424628496	103.7544764	12	1.42478368	103.754539	20:15:02	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201502.wav	
16 Mar 2021	2		-	1.424428253	103.7544625	12	1.42478368	103.754539	20:15:14	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201514.wav	
16 Mar 2021	2		-	1.423907652	103.7544142	11	1.42388932	103.754456	20:16:53	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201653.wav	
16 Mar 2021	2		-	1.422981871	103.7543543	10	1.42299324	103.754396	20:19:27	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201927.wav	
16 Mar 2021	2		-	1.422856646	103.7543512	10	1.42299324	103.754396	20:19:47	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_201947.wav	
16 Mar 2021	2		-	1.422504103	103.7543185	9	1.42249714	103.753978	20:20:22	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202022.wav	
16 Mar 2021	2		-	1.422504103	103.7543185	9	1.42249714	103.753978	20:20:37	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202037.wav	
16 Mar 2021	2		-	1.422485663	103.7542872	9	1.42249714	103.753978	20:20:55	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202055.wav	
16 Mar 2021	2		-	1.42248122	103.7541997	9	1.42249714	103.753978	20:21:44	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202144.wav	
16 Mar 2021	2		-	1.422393462	103.7537294	9	1.42249714	103.753978	20:26:40	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202640.wav	
16 Mar 2021	2		-	1.422417182	103.7539146	9	1.42249714	103.753978	20:27:01	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202701.wav	
16 Mar 2021	2		-	1.422444256	103.7540589	9	1.42249714	103.753978	20:27:13	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202713.wav	
16 Mar 2021	2		-	1.422543246	103.7542612	9	1.42249714	103.753978	20:28:03	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202803.wav	
16 Mar 2021	2		-	1.422535283	103.754289	9	1.42249714	103.753978	20:28:27	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202827.wav	
16 Mar 2021	2		-	1.422544504	103.7542712	9	1.42249714	103.753978	20:28:38	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202838.wav	
16 Mar 2021	2		-	1.422544504	103.7542712	9	1.42249714	103.753978	20:28:54	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202854.wav	
16 Mar 2021	2		-	1.422651038	103.754298	9	1.42249714	103.753978	20:29:14	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202914.wav	
16 Mar 2021	2		-	1.422757823	103.7542931	10	1.42299324	103.754396	20:29:32	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202932.wav	
16 Mar 2021	2		-	1.422877265	103.7543118	10	1.42299324	103.754396	20:29:47	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202947.wav	
16 Mar 2021	2		-	1.422877265	103.7543118	10	1.42299324	103.754396	20:29:55	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_202955.wav	
16 Mar 2021	2		-	1.423155041	103.7543947	10	1.42299324	103.754396	20:30:42	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_203042.wav	
16 Mar 2021	2		-	1.423267946	103.7543609	7	1.4233353	103.754233	20:31:07	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_203107.wav	
16 Mar 2021	2		-	1.423353357	103.7542973	7	1.4233353	103.754233	20:31:22	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_203122.wav	
16 Mar 2021	2		-	1.423354363	103.7542116	7	1.4233353	103.754233	20:31:41	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_203141.wav	
16 Mar 2021	2		-	1.423312034	103.7541332	7	1.4233353	103.754233	20:32:07	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_203207.wav	
16 Mar 2021	2		-	1.423285129	103.7539996	7	1.4233353	103.754233	20:33:22	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_203322.wav	
16 Mar 2021	2		-	1.423310358	103.7539526	7	1.4233353	103.754233	20:33:38	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_203338.wav	
16 Mar 2021	2		-	1.423350926	103.7539497	7	1.4233353	103.754233	20:34:01	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_203401.wav	
16 Mar 2021	2		-	1.423334163	103.753814	7	1.4233353	103.754233	20:39:20	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_203920.wav	
16 Mar 2021	2		-	1.423346316	103.7537953	7	1.4233353	103.754233	20:40:00	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_204000.wav	
16 Mar 2021	2		-	1.423420329	103.7542315	7	1.4233353	103.754233	20:43:25	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_204325.wav	
16 Mar 2021	2		-	1.423440194	103.7542219	7	1.4233353	103.754233	20:43:41	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_204341.wav	
16 Mar 2021	2		-	1.423966158	103.7536951	6	1.4239017	103.753747	20:48:47	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_204847.wav	
16 Mar 2021	2		-	1.424030866	103.7536877	6	1.4239017	103.753747	20:49:02	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_204902.wav	
16 Mar 2021	2		-	1.424073027	103.7536631	6	1.4239017	103.753747	20:49:38	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_204938.wav	
16 Mar 2021	2		-	1.424127845	103.7536623	6	1.4239017	103.753747	20:50:08	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205008.wav	
16 Mar 2021	2		-	1.424127845	103.7536623	6	1.4239017	103.753747	20:50:21	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205021.wav	
16 Mar 2021	2		-	1.424137652	103.7536163	6	1.4239017	103.753747	20:50:36	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205036.wav	
16 Mar 2021	2		-	1.424156344	103.7535855	6	1.4239017	103.753747	20:50:48	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205048.wav	
16 Mar 2021	2		-	1.42418962	103.7536044	6	1.4239017	103.753747	20:51:01	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205101.wav	
16 Mar 2021	2		-	1.42418962	103.7536044	6	1.4239017	103.753747	20:51:07	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205107.wav	
16 Mar 2021	2		-	1.424239157	103.7536126	6	1.4239017	103.753747	20:51:22	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205122.wav	
16 Mar 2021	2		-	1.424239157	103.7536126	6	1.4239017	103.753747	20:51:22	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205122.wav	
16 Mar 2021	2		-	1.424239157	103.7536126	6	1.4239017	103.753747	20:51:32	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205132.wav	
16 Mar 2021	2		-	1.424276624	103.7535736	6	1.4239017	103.753747	20:51:57	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205157.wav	
16 Mar 2021	2		-	1.424276624	103.7535736	6	1.4239017	103.753747	20:52:12	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205212.wav	
16 Mar 2021	2		-	1.424300261	103.7535917	5	1.42471984	103.753638	20:52:31	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205231.wav	
16 Mar 2021	2		-	1.424319874	103.7536005	5	1.42471984	103.753638	20:52:46	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205246.wav	
16 Mar 2021	2		-	1.424319874	103.7536005	5	1.42471984	103.753638	20:52:46	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205246.wav	
16 Mar 2021	2		-	1.424319874	103.7536005	5	1.42471984	103.753638	20:52:52	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205252.wav	
16 Mar 2021	2		-	1.424319874	103.7536005	5	1.42471984	103.753638	20:52:52	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205252.wav	
16 Mar 2021	2		-	1.424360108	103.7536263	5	1.42471984	103.753638	20:53:00	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205300.wav	
16 Mar 2021	2		-	1.424360108	103.7536263	5	1.42471984	103.753638	20:53:00	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205300.wav	
16 Mar 2021	2		-	1.424360108	103.7536263	5	1.42471984	103.753638	20:53:09	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205309.wav	
16 Mar 2021	2		-	1.424360108	103.7536263	5	1.42471984	103.753638	20:53:09	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205309.wav	
16 Mar 2021	2		-	1.424364634	103.7536223	5	1.42471984	103.753638	20:53:17	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205317.wav	
16 Mar 2021	2		-	1.424364634	103.7536223	5	1.42471984	103.753638	20:53:28	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205328.wav	
16 Mar 2021	2		-	1.424425403	103.75361	5	1.42471984	103.753638	20:53:46	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205346.wav	
16 Mar 2021	2		-	1.42453596	103.7536424	5	1.42471984	103.753638	20:54:33	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205433.wav	
16 Mar 2021	2		-	1.424566386	103.7536576	5	1.42471984	103.753638	20:54:42	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205442.wav	
16 Mar 2021	2		-	1.424566386	103.7536576	5	1.42471984	103.753638	20:54:47	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205447.wav	
16 Mar 2021	2		-	1.424566386	103.7536576	5	1.42471984	103.753638	20:54:57	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205457.wav	
16 Mar 2021	2		-	1.424566386	103.7536576	5	1.42471984	103.753638	20:54:57	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205457.wav	
16 Mar 2021	2		-	1.424683398	103.7536871	5	1.42471984	103.753638	20:55:05	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205505.wav	
16 Mar 2021	2		-	1.424683398	103.7536871	5	1.42471984	103.753638	20:55:11	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205511.wav	
16 Mar 2021	2		-	1.424683398	103.7536871	5	1.42471984	103.753638	20:55:15	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205515.wav	
16 Mar 2021	2		-	1.42472514	103.7536579	5	1.42471984	103.753638	20:55:20	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205520.wav	
16 Mar 2021	2		-	1.42472514	103.7536579	5	1.42471984	103.753638	20:55:30	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205530.wav	
16 Mar 2021	2		-	1.424853466	103.7536	5	1.42471984	103.753638	20:55:50	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205550.wav	
16 Mar 2021	2		-	1.424995875	103.7536052	5	1.42471984	103.753638	20:56:15	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205615.wav	
16 Mar 2021	2		-	1.424995875	103.7536052	5	1.42471984	103.753638	20:56:15	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205615.wav	
16 Mar 2021	2		-	1.424995875	103.7536052	5	1.42471984	103.753638	20:56:21	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205621.wav	
16 Mar 2021	2		-	1.424995875	103.7536052	5	1.42471984	103.753638	20:56:29	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205629.wav	
16 Mar 2021	2		-	1.425080197	103.7535813	5	1.42471984	103.753638	20:56:51	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205651.wav	
16 Mar 2021	2		-	1.425080197	103.7535813	5	1.42471984	103.753638	20:56:51	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205651.wav	
16 Mar 2021	2		-	1.425080197	103.7535813	5	1.42471984	103.753638	20:57:02	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205702.wav	
16 Mar 2021	2		-	1.425045747	103.7536168	5	1.42471984	103.753638	20:57:17	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205717.wav	
16 Mar 2021	2		-	1.425070306	103.753594	5	1.42471984	103.753638	20:57:31	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205731.wav	
16 Mar 2021	2		-	1.425070306	103.753594	5	1.42471984	103.753638	20:57:31	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205731.wav	
16 Mar 2021	2		-	1.425070306	103.753594	5	1.42471984	103.753638	20:57:38	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210316_205738.wav	
16 Mar

Date	Cycle	Route	Waypoint	Latitude	Longitude	Sampling Pt	SP_Lat	SP_long	Time (24h)	Taxon	Common Name	Scientific name	Global Status	Local Status	Threatened	Quantity	Observation type (seen/heard/caught/scat/other signs)	Survey method (targeted/incidental)	Photo no.	Remarks
4 Feb 2021	1		-	1.426829332	103.752665	2	1.42687225	103.752594	21:01:13	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_210113.wav	
4 Feb 2021	1		-	1.426829332	103.752665	2	1.42687225	103.752594	21:01:25	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_210125.wav	
4 Feb 2021	1		-	1.426663538	103.7526555	2	1.42687225	103.752594	21:06:09	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_210609.wav	
4 Feb 2021	1		-	1.426650546	103.7526604	2	1.42687225	103.752594	21:06:32	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_210632.wav	
4 Feb 2021	1		-	1.426430773	103.7527522	3	1.42611181	103.752952	21:10:45	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_211045.wav	
4 Feb 2021	1		-	1.426430773	103.7527522	3	1.42611181	103.752952	21:10:45	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_211045.wav	
4 Feb 2021	1		-	1.426430773	103.7527522	3	1.42611181	103.752952	21:10:57	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_211057.wav	
4 Feb 2021	1		-	1.426159283	103.7529932	3	1.42611181	103.752952	21:14:57	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_211457.wav	
4 Feb 2021	1		-	1.426094575	103.7529686	3	1.42611181	103.752952	21:15:05	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_211505.wav	
4 Feb 2021	1		-	1.426094575	103.7529686	3	1.42611181	103.752952	21:15:21	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_211521.wav	
4 Feb 2021	1		-	1.43008	103.75379	17	1.4287837	103.75574	21:15:32	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_211532.wav	
4 Feb 2021	1		-	1.426069848	103.7529907	3	1.42611181	103.752952	21:15:37	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_211537.wav	
4 Feb 2021	1		-	1.426069848	103.7529907	3	1.42611181	103.752952	21:15:43	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_211543.wav	
4 Feb 2021	1		-	1.425690232	103.7531421	4	1.42553646	103.753396	21:21:40	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212140.wav	
4 Feb 2021	1		-	1.42576064	103.7533153	4	1.42553646	103.753396	21:25:00	Mammal (Bat)	Pouch-bearing bat	*Saccolaimus saccolaimus*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212500.wav	
4 Feb 2021	1		-	1.42576064	103.7533153	4	1.42553646	103.753396	21:25:00	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212500.wav	
4 Feb 2021	1		-	1.42576064	103.7533153	4	1.42553646	103.753396	21:25:00	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212500.wav	
4 Feb 2021	1		-	1.425624099	103.753425	4	1.42553646	103.753396	21:26:37	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212637.wav	
4 Feb 2021	1		-	1.42551966	103.7535385	4	1.42553646	103.753396	21:27:27	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212727.wav	
4 Feb 2021	1		-	1.42551966	103.7535385	4	1.42553646	103.753396	21:27:34	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212734.wav	
4 Feb 2021	1		-	1.425410612	103.7535399	4	1.42553646	103.753396	21:27:39	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212739.wav	
4 Feb 2021	1		-	1.425410612	103.7535399	4	1.42553646	103.753396	21:27:45	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212745.wav	
4 Feb 2021	1		-	1.425328804	103.7535591	4	1.42553646	103.753396	21:28:02	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212802.wav	
4 Feb 2021	1		-	1.425328804	103.7535591	4	1.42553646	103.753396	21:28:02	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212802.wav	
4 Feb 2021	1		-	1.425328804	103.7535591	4	1.42553646	103.753396	21:28:14	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212814.wav	
4 Feb 2021	1		-	1.425297204	103.735575	4	1.42553646	103.753396	21:28:23	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212823.wav	
4 Feb 2021	1		-	1.425274657	103.7535623	4	1.42553646	103.753396	21:28:44	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212844.wav	
4 Feb 2021	1		-	1.425274657	103.7535623	4	1.42553646	103.753396	21:28:58	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212858.wav	
4 Feb 2021	1		-	1.425234005	103.7535897	4	1.42553646	103.753396	21:29:18	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212918.wav	
4 Feb 2021	1		-	1.425234005	103.7535897	4	1.42553646	103.753396	21:29:18	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_212918.wav	
4 Feb 2021	1		-	1.425190168	103.7536057	4	1.42553646	103.753396	21:30:08	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213008.wav	
4 Feb 2021	1		-	1.425151359	103.7536045	5	1.42471984	103.753638	21:30:40	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213040.wav	
4 Feb 2021	1		-	1.425151359	103.7536045	5	1.42471984	103.753638	21:30:55	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213055.wav	
4 Feb 2021	1		-	1.425151359	103.7536045	5	1.42471984	103.753638	21:30:55	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213055.wav	
4 Feb 2021	1		-	1.425144989	103.7536132	5	1.42471984	103.753638	21:31:10	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213110.wav	
4 Feb 2021	1		-	1.425121855	103.7536241	5	1.42471984	103.753638	21:31:25	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213125.wav	
4 Feb 2021	1		-	1.425121855	103.7536241	5	1.42471984	103.753638	21:31:25	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213125.wav	
4 Feb 2021	1		-	1.425071228	103.7536222	5	1.42471984	103.753638	21:31:40	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213140.wav	
4 Feb 2021	1		-	1.425071228	103.7536222	5	1.42471984	103.753638	21:31:40	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213140.wav	
4 Feb 2021	1		-	1.425071228	103.7536222	5	1.42471984	103.753638	21:31:55	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213155.wav	
4 Feb 2021	1		-	1.424996546	103.7536496	5	1.42471984	103.753638	21:32:10	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213210.wav	
4 Feb 2021	1		-	1.424903255	103.7536641	5	1.42471984	103.753638	21:32:25	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213225.wav	
4 Feb 2021	1		-	1.424854388	103.7536798	5	1.42471984	103.753638	21:32:46	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213246.wav	
4 Feb 2021	1		-	1.424819184	103.7536893	5	1.42471984	103.753638	21:33:01	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213301.wav	
4 Feb 2021	1		-	1.424819184	103.7536893	5	1.42471984	103.753638	21:33:07	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213307.wav	
4 Feb 2021	1		-	1.42475917	103.7536969	5	1.42471984	103.753638	21:33:18	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213318.wav	
4 Feb 2021	1		-	1.424713153	103.7537272	5	1.42471984	103.753638	21:33:47	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213347.wav	
4 Feb 2021	1		-	1.424695887	103.7537091	5	1.42471984	103.753638	21:33:52	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213352.wav	
4 Feb 2021	1		-	1.424695887	103.7537091	5	1.42471984	103.753638	21:33:57	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213357.wav	
4 Feb 2021	1		-	1.424665293	103.7537159	5	1.42471984	103.753638	21:34:18	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213418.wav	
4 Feb 2021	1		-	1.424651043	103.7537135	5	1.42471984	103.753638	21:34:54	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213454.wav	
4 Feb 2021	1		-	1.424659174	103.7537008	5	1.42471984	103.753638	21:35:24	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213524.wav	
4 Feb 2021	1		-	1.424654312	103.7536924	5	1.42471984	103.753638	21:35:44	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213544.wav	
4 Feb 2021	1		-	1.424643835	103.7537068	5	1.42471984	103.753638	21:36:06	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213606.wav	
4 Feb 2021	1		-	1.4246062	103.7536997	5	1.42471984	103.753638	21:36:20	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213620.wav	
4 Feb 2021	1		-	1.4246062	103.7536997	5	1.42471984	103.753638	21:36:25	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213625.wav	
4 Feb 2021	1		-	1.4246062	103.7536997	5	1.42471984	103.753638	21:36:25	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213625.wav	
4 Feb 2021	1		-	1.424573846	103.7537246	5	1.42471984	103.753638	21:36:42	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213642.wav	
4 Feb 2021	1		-	1.4245544	103.7537361	5	1.42471984	103.753638	21:36:56	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213656.wav	
4 Feb 2021	1		-	1.424477203	103.75371	5	1.42471984	103.753638	21:37:34	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213734.wav	
4 Feb 2021	1		-	1.424477203	103.75371	5	1.42471984	103.753638	21:37:34	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213734.wav	
4 Feb 2021	1		-	1.42445717	103.7536908	5	1.42471984	103.753638	21:37:49	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213749.wav	
4 Feb 2021	1		-	1.42445717	103.7536908	5	1.42471984	103.753638	21:37:56	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213756.wav	
4 Feb 2021	1		-	1.424378129	103.7536771	5	1.42471984	103.753638	21:38:09	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213809.wav	
4 Feb 2021	1		-	1.424378129	103.7536771	5	1.42471984	103.753638	21:38:14	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213814.wav	
4 Feb 2021	1		-	1.424323479	103.7536593	5	1.42471984	103.753638	21:38:22	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213822.wav	
4 Feb 2021	1		-	1.424323479	103.7536593	5	1.42471984	103.753638	21:38:34	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213834.wav	
4 Feb 2021	1		-	1.424258016	103.7536415	6	1.4239017	103.753747	21:39:03	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213903.wav	
4 Feb 2021	1		-	1.424258016	103.7536415	6	1.4239017	103.753747	21:39:09	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213909.wav	
4 Feb 2021	1		-	1.424258016	103.7536415	6	1.4239017	103.753747	21:39:18	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213918.wav	
4 Feb 2021	1		-	1.424213089	103.7536327	6	1.4239017	103.753747	21:39:31	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213931.wav	
4 Feb 2021	1		-	1.424197918	103.7536425	6	1.4239017	103.753747	21:39:52	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_213952.wav	
4 Feb 2021	1		-	1.424197918	103.7536425	6	1.4239017	103.753747	21:40:09	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214009.wav	
4 Feb 2021	1		-	1.424167156	103.7536399	6	1.4239017	103.753747	21:40:30	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214030.wav	
4 Feb 2021	1		-	1.43008	103.75379	17	1.4287837	103.75574	21:41:27	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214127.wav	
4 Feb 2021	1		-	1.424058024	103.75368	6	1.4239017	103.753747	21:41:27	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214127.wav	
4 Feb 2021	1		-	1.423888961	103.7539519	6	1.4239017	103.753747	21:44:19	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214419.wav	
4 Feb 2021	1		-	1.423791312	103.754063	6	1.4239017	103.753747	21:45:15	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214515.wav	
4 Feb 2021	1		-	1.423678743	103.7541223	7	1.4233353	103.754233	21:45:46	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214546.wav	
4 Feb 2021	1		-	1.423678743	103.7541223	7	1.4233353	103.754233	21:45:57	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214557.wav	
4 Feb 2021	1		-	1.42360867	103.7541315	7	1.4233353	103.754233	21:46:02	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214602.wav	
4 Feb 2021	1		-	1.42360867	103.7541315	7	1.4233353	103.754233	21:46:10	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214610.wav	
4 Feb 2021	1		-	1.42360867	103.7541315	7	1.4233353	103.754233	21:46:14	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214614.wav	
4 Feb 2021	1		-	1.42360867	103.7541315	7	1.4233353	103.754233	21:46:18	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214618.wav	
4 Feb 2021	1		-	1.423572628	103.7541802	7	1.4233353	103.754233	21:46:44	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214644.wav	
4 Feb 2021	1		-	1.42352879	103.7542161	7	1.4233353	103.754233	21:46:53	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214653.wav	
4 Feb 2021	1		-	1.423469447	103.7542494	7	1.4233353	103.754233	21:47:10	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214710.wav	
4 Feb 2021	1		-	1.423469447	103.7542494	7	1.4233353	103.754233	21:47:13	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214713.wav	
4 Feb 2021	1		-	1.423420412	103.7542626	7	1.4233353	103.754233	21:47:38	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214738.wav	
4 Feb 2021	1		-	1.423420412	103.7542626	7	1.4233353	103.754233	21:47:49	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214749.wav	
4 Feb 2021	1		-	1.423389148	103.7542771	7	1.4233353	103.754233	21:48:10	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214810.wav	
4 Feb 2021	1		-	1.423360063	103.7543268	7	1.4233353	103.754233	21:48:25	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214825.wav	
4 Feb 2021	1		-	1.423360063	103.7543268	7	1.4233353	103.754233	21:48:29	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214829.wav	
4 Feb 2021	1		-	1.423360063	103.7543268	7	1.4233353	103.754233	21:48:29	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214829.wav	
4 Feb 2021	1		-	1.423311029	103.7543978	7	1.4233353	103.754233	21:48:47	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214847.wav	
4 Feb 2021	1		-	1.42326585	103.7544251	7	1.4233353	103.754233	21:49:05	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214905.wav	
4 Feb 2021	1		-	1.42326585	103.7544251	7	1.4233353	103.754233	21:49:18	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214918.wav	
4 Feb 2021	1		-	1.423243135	103.7544207	7	1.4233353	103.754233	21:49:31	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_214931.wav	
4 Feb 2021	1		-	1.423216648	103.7543776	7	1.4233353	103.754233	21:50:29	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215029.wav	
4 Feb 2021	1		-	1.423242381	103.7544049	7	1.4233353	103.754233	21:50:34	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215034.wav	
4 Feb 2021	1		-	1.423242381	103.7544049	7	1.4233353	103.754233	21:50:43	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215043.wav	
4 Feb 2021	1		-	1.423208853	103.7543989	7	1.4233353	103.754233	21:51:08	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215108.wav	
4 Feb 2021	1		-	1.423208853	103.7543989	7	1.4233353	103.754233	21:51:14	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215114.wav	
4 Feb 2021	1		-	1.423208853	103.7543989	7	1.4233353	103.754233	21:51:14	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215114.wav	
4 Feb 2021	1		-	1.422951696	103.7543647	10	1.42299324	103.754396	21:52:30	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215230.wav	
4 Feb 2021	1		-	1.42273494	103.7543049	10	1.42299324	103.754396	21:52:56	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215256.wav	
4 Feb 2021	1		-	1.422640141	103.7543	9	1.42249714	103.753978	21:53:03	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215303.wav	
4 Feb 2021	1		-	1.422640141	103.7543	9	1.42249714	103.753978	21:53:13	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215313.wav	
4 Feb 2021	1		-	1.422591945	103.7543186	9	1.42249714	103.753978	21:53:20	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215320.wav	
4 Feb 2021	1		-	1.422591945	103.7543186	9	1.42249714	103.753978	21:53:20	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215320.wav	
4 Feb 2021	1		-	1.422591945	103.7543186	9	1.42249714	103.753978	21:53:37	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215337.wav	
4 Feb 2021	1		-	1.422531009	103.7542945	9	1.42249714	103.753978	21:53:51	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215351.wav	
4 Feb 2021	1		-	1.422478203	103.7542347	9	1.42249714	103.753978	21:55:03	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215503.wav	
4 Feb 2021	1		-	1.422494631	103.7542419	9	1.42249714	103.753978	21:56:39	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215639.wav	
4 Feb 2021	1		-	1.422513323	103.7542527	9	1.42249714	103.753978	21:57:15	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_215715.wav	
4 Feb 2021	1		-	1.422631508	103.7539321	9	1.42249714	103.753978	22:03:12	Mammal (Bat)	Asiatic lesser yell

Date	Cycle	Route	Waypoint	Latitude	Longitude	Sampling Pt	SP_Lat	SP_long	Time (24h)	Taxon	Common Name	Scientific name	Global Status	Local Status	Threatened	Quantity	Observation type (seen/heard/caught/scat/other signs)	Survey method (targeted/incidental)	Photo no.	Remarks
4 Feb 2021	1		-	1.424208395	103.7546006	11	1.42388932	103.754456	22:40:31	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224031.wav	
4 Feb 2021	1		-	1.424314426	103.7544858	11	1.42388932	103.754456	22:40:54	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224054.wav	
4 Feb 2021	1		-	1.42443412	103.7545548	12	1.42478368	103.754539	22:41:53	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224153.wav	
4 Feb 2021	1		-	1.424455578	103.7544993	12	1.42478368	103.754539	22:42:14	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224214.wav	
4 Feb 2021	1		-	1.424483489	103.7544939	12	1.42478368	103.754539	22:42:28	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224228.wav	
4 Feb 2021	1		-	1.424483489	103.7544939	12	1.42478368	103.754539	22:42:31	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224231.wav	
4 Feb 2021	1		-	1.424570242	103.7544779	12	1.42478368	103.754539	22:42:46	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224246.wav	
4 Feb 2021	1		-	1.424570242	103.7544779	12	1.42478368	103.754539	22:42:52	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224252.wav	
4 Feb 2021	1		-	1.424572002	103.7544744	12	1.42478368	103.754539	22:42:59	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224259.wav	
4 Feb 2021	1		-	1.424572002	103.7544744	12	1.42478368	103.754539	22:43:06	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224306.wav	
4 Feb 2021	1		-	1.424572002	103.7544744	12	1.42478368	103.754539	22:43:11	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224311.wav	
4 Feb 2021	1		-	1.425922075	103.7545763	13	1.42567869	103.754614	22:47:02	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224702.wav	
4 Feb 2021	1		-	1.42602182	103.7546003	13	1.42567869	103.754614	22:47:24	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224724.wav	
4 Feb 2021	1		-	1.426134808	103.754607	14	1.42656309	103.754763	22:47:39	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224739.wav	
4 Feb 2021	1		-	1.426134808	103.754607	14	1.42656309	103.754763	22:47:50	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224750.wav	
4 Feb 2021	1		-	1.426205384	103.7546273	14	1.42656309	103.754763	22:48:05	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224805.wav	
4 Feb 2021	1		-	1.426306637	103.7546418	14	1.42656309	103.754763	22:48:27	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224827.wav	
4 Feb 2021	1		-	1.426445777	103.754635	14	1.42656309	103.754763	22:49:07	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224907.wav	
4 Feb 2021	1		-	1.426543426	103.7546469	14	1.42656309	103.754763	22:49:22	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224922.wav	
4 Feb 2021	1		-	1.426661443	103.7546703	14	1.42656309	103.754763	22:49:54	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_224954.wav	
4 Feb 2021	1		-	1.426661443	103.7546703	14	1.42656309	103.754763	22:50:01	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225001.wav	
4 Feb 2021	1		-	1.426780466	103.7546911	14	1.42656309	103.754763	22:50:07	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225007.wav	
4 Feb 2021	1		-	1.426780466	103.7546911	14	1.42656309	103.754763	22:50:12	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225012.wav	
4 Feb 2021	1		-	1.426895047	103.7547217	14	1.42656309	103.754763	22:50:32	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225032.wav	
4 Feb 2021	1		-	1.426895047	103.7547217	14	1.42656309	103.754763	22:50:47	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225047.wav	
4 Feb 2021	1		-	1.426928239	103.7547681	14	1.42656309	103.754763	22:51:06	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225106.wav	
4 Feb 2021	1		-	1.426980291	103.754777	14	1.42656309	103.754763	22:51:15	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225115.wav	
4 Feb 2021	1		-	1.427085819	103.7548199	15	1.42742462	103.755014	22:51:41	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225141.wav	
4 Feb 2021	1		-	1.427332582	103.7549012	15	1.42742462	103.755014	22:52:45	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225245.wav	
4 Feb 2021	1		-	1.427665092	103.7550454	15	1.42742462	103.755014	22:54:49	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225449.wav	
4 Feb 2021	1		-	1.427734997	103.7550637	15	1.42742462	103.755014	22:54:54	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225454.wav	
4 Feb 2021	1		-	1.427804651	103.7551108	15	1.42742462	103.755014	22:55:24	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225524.wav	
4 Feb 2021	1		-	1.427882854	103.7551497	16	1.42822099	103.755424	22:55:41	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225541.wav	
4 Feb 2021	1		-	1.427917471	103.7551637	16	1.42822099	103.755424	22:55:59	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225559.wav	
4 Feb 2021	1		-	1.427917471	103.7551637	16	1.42822099	103.755424	22:56:08	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225608.wav	
4 Feb 2021	1		-	1.428000201	103.7551955	16	1.42822099	103.755424	22:56:24	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225624.wav	
4 Feb 2021	1		-	1.428097934	103.7553215	16	1.42822099	103.755424	22:57:27	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225727.wav	
4 Feb 2021	1		-	1.428121319	103.7553206	16	1.42822099	103.755424	22:58:02	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_225802.wav	
4 Feb 2021	1		-	1.428254005	103.7553852	16	1.42822099	103.755424	23:00:54	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230054.wav	
4 Feb 2021	1		-	1.428336818	103.7554281	16	1.42822099	103.755424	23:03:22	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230322.wav	
4 Feb 2021	1		-	1.428336818	103.7554281	16	1.42822099	103.755424	23:03:37	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230337.wav	
4 Feb 2021	1		-	1.428343439	103.7554242	16	1.42822099	103.755424	23:03:58	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230358.wav	
4 Feb 2021	1		-	1.428343439	103.7554242	16	1.42822099	103.755424	23:03:58	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230358.wav	
4 Feb 2021	1		-	1.428378057	103.7554533	16	1.42822099	103.755424	23:04:13	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230413.wav	
4 Feb 2021	1		-	1.428378057	103.7554533	16	1.42822099	103.755424	23:04:13	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230413.wav	
4 Feb 2021	1		-	1.428378057	103.7554533	16	1.42822099	103.755424	23:04:27	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230427.wav	
4 Feb 2021	1		-	1.428445196	103.755485	16	1.42822099	103.755424	23:04:34	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230434.wav	
4 Feb 2021	1		-	1.428445196	103.755485	16	1.42822099	103.755424	23:04:34	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230434.wav	
4 Feb 2021	1		-	1.428480567	103.7555125	16	1.42822099	103.755424	23:04:51	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230451.wav	
4 Feb 2021	1		-	1.428480567	103.7555125	16	1.42822099	103.755424	23:05:00	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230500.wav	
4 Feb 2021	1		-	1.428480567	103.7555125	16	1.42822099	103.755424	23:05:00	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230500.wav	
4 Feb 2021	1		-	1.428525578	103.7555472	17	1.4287837	103.75574	23:05:12	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230512.wav	
4 Feb 2021	1		-	1.428525578	103.7555472	17	1.4287837	103.75574	23:05:12	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230512.wav	
4 Feb 2021	1		-	1.428525578	103.7555472	17	1.4287837	103.75574	23:05:17	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230517.wav	
4 Feb 2021	1		-	1.428525578	103.7555472	17	1.4287837	103.75574	23:05:17	Mammal (Bat)	Whiskered myotis	*Myotis muricola*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230517.wav	
4 Feb 2021	1		-	1.428544521	103.7555545	17	1.4287837	103.75574	23:05:32	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230532.wav	
4 Feb 2021	1		-	1.428595986	103.7555831	17	1.4287837	103.75574	23:05:47	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230547.wav	
4 Feb 2021	1		-	1.428659689	103.7556301	17	1.4287837	103.75574	23:06:02	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230602.wav	
4 Feb 2021	1		-	1.428693132	103.7556617	17	1.4287837	103.75574	23:06:17	Mammal (Bat)	Asiatic lesser yellow house bat	*Scotophilus kuhlii*	Least Concern	Not Assessed	No	-	Heard	Targeted	20210204_230617.wav	
22 Jan 2021	-	-	XT956	1.427623015	103.755033	-	-	-	948	Bird	Black bittern	*Ixobrychus flavicollis*	Least Concern	Not Assessed	No	1	Seen	Incidental		
7 Jan 2021	-	-	XT948	1.424029022	103.753763	-	-	-	1200	Reptile	Malayan box terrapin	*Cuora amboinensis*	Vulnerable; CITES protected (Appendix II)	Not Assessed	Yes	1	Seen	Incidental		

APPENDIX F

Impact Assessment for Habitats and Fauna

Phase	Habitat	Impact type	Sensitivity (S)	Impact intensity (I)	Consequence (C = S × I)	Likelihood (L)	Impact significance (C × L)	Mitigation measures	Residual impact intensity	Residual consequence	Residual likelihood	Residual impact significance
Construction	Kranji Cross	Loss of vegetation	Medium	Negligible	Very low	Unlikely	Negligible	Retention of areas of high conservation value	Negligible	Very low	Unlikely	Negligible
		Habitat degradation	Medium	High	High	Less likely	Minor	Infill planting Monitoring of habitat quality	High	High	Less likely	Minor
		Changes in species composition	Medium	High	High	Possible	**Moderate**	**Infill planting**	High	High	Less likely	Minor
	Mangrove	Loss of vegetation	High	Negligible	Very low	Unlikely	Negligible	Retention of areas of high conservation value	Negligible	Very low	Unlikely	Negligible
		Habitat degradation	High	Negligible	Very low	Less likely	Negligible	Retention of buffer zone Ensure hydrology unaffected Monitoring of habitat quality Ensure integrity of ECM	Negligible	Very low	Less likely	Negligible
		Changes in species composition	High	Negligible	Very low	Unlikely	Negligible		Negligible	Very low	Unlikely	Negligible
	Exotic-dominated woodland	Loss of vegetation	High	High	High	Almost certain	**Major**	**Retention of buffer zone**	High	High	Almost certain	**Major**
		Habitat degradation	High	High	High	Less likely	Minor	Infill planting	High	High	Less likely	Minor
		Changes in species composition	High	High	High	Likely	**Major**	**Infill planting**	High	High	Less likely	Minor
	Herbaceous and Scrubland Vegetation	Loss of vegetation	Medium	High	High	Almost certain	**Major**	**Retention of buffer zone**	High	High	Almost certain	**Major**
		Habitat degradation	Medium	Medium	Medium	Less likely	Minor	Infill planting	Medium	Medium	Less likely	Minor
		Changes in species composition	Medium	Medium	Medium	Less likely	Minor	Infill planting	Medium	Medium	Less likely	Minor
	Unlined earth drain	Loss of vegetation	High	High	High	Almost certain	**Major**	Retention of areas of high conservation value; diversion of plans for the trapezoidal drain, vehicle flyover and watermain to avoid the unlined earth drain	High	High	Unlikely	Negligible
		Habitat degradation	High	Medium	Medium	Less likely	Minor	Retention of buffer zone Ensure hydrology unaffected Monitoring of habitat quality Monitoring of aquatic faunal community Ensure integrity of ECM	Medium	Medium	Less likely	Minor
		Changes in species composition	High	Medium	Medium	Possible	**Moderate**	Infill planting; diversion of plans for the trapezoidal drain, vehicle flyover and watermain to avoid the unlined earth drain	Medium	Medium	Less likely	Minor
	Ponds	Loss of vegetation	Low	High	Low	Almost certain	**Moderate**	**Retention of areas of high conservation value**	High	Low	Almost certain	**Moderate**
		Habitat degradation	Low	Medium	Very low	Less likely	Negligible	Monitoring of habitat quality Ensure integrity of ECM	Medium	Very low	Less likely	Negligible
		Changes in species composition	Low	Medium	Very low	Unlikely	Negligible		Medium	Very low	Unlikely	Negligible
Operational	Kranji Cross	Habitat degradation	Medium	High	High	Unlikely	Negligible	Judicious maintenance	High	High	Unlikely	Negligible
		Changes in species composition	Medium	Medium	Medium	Possible	**Moderate**	**Judicious maintenance**	Medium	Medium	Less likely	Minor
	Mangrove	Habitat degradation	High	Negligible	Very low	Unlikely	Negligible		Negligible	Very low	Unlikely	Negligible
		Changes in species composition	High	Negligible	Very low	Unlikely	Negligible		Negligible	Very low	Unlikely	Negligible
	Exotic-dominated woodland	Habitat degradation	High	Medium	Medium	Unlikely	Negligible	Judicious maintenance	Medium	Medium	Unlikely	Negligible
		Changes in species composition	High	Medium	Medium	Possible	**Moderate**	**Judicious maintenance**	Medium	Medium	Less likely	Minor
	Herbaceous and Scrubland Vegetation	Habitat degradation	Medium	Medium	Medium	Unlikely	Negligible	Judicious maintenance	Medium	Medium	Unlikely	Negligible
		Changes in species composition	Medium	Medium	Medium	Possible	**Moderate**	**Judicious maintenance**	Medium	Medium	Less likely	Minor
	Unlined earth drain	Habitat degradation	High	Negligible	Very low	Unlikely	Negligible	Judicious maintenance	Negligible	Very low	Unlikely	Negligible
		Changes in species composition	High	Negligible	Very low	Unlikely	Negligible	Judicious maintenance	Negligible	Very low	Unlikely	Negligible
	Ponds	Habitat degradation	Low	Medium	Very low	Unlikely	Negligible	Judicious maintenance	Medium	Very low	Unlikely	Negligible
		Changes in species composition	Low	Medium	Very low	Possible	Minor	Judicious maintenance	Medium	Very low	Possible	Minor

Phase	Taxon	Common Name	Scientific Name	Impact Type	Sensitivity (S)	Impact intensity (I)	Consequence (C = S × I)	Likelihood (L)	Impact significance (C × L)	Mitigation measures	Residual impact intensity	Residual consequence	Residual likelihood	Residual impact significance
Construction	Reptile	Asian softshell turtle	*Amyda cartilaginea*	Loss of/ reduction in	High	Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Reptile	Asian softshell turtle	*Amyda cartilaginea*	Injury or mortality		High	High	Possible/Occasional	**Moderate**	Road calming measures; reduce vehicle speed	High	High	Less likely/Rare	Minor
Construction	Reptile	Asian softshell turtle	*Amyda cartilaginea*	Loss of ecological		High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Reptile	Asian softshell turtle	*Amyda cartilaginea*	Light disturbances		Medium	Medium	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Medium	Medium	Unlikely/Remote	Negligible
Construction	Reptile	Asian softshell turtle	*Amyda cartilaginea*	Human presence		High	High	Possible/Occasional	**Moderate**	Restrict personnel access to areas of high conservation	High	High	Less likely/Rare	Minor
Construction	Reptile	Malayan box terrapin	*Cuora amboinensis*	Loss of/ reduction in	High	Low	Low	Possible/Occasional	Minor		Low	Low	Possible/Occasional	Minor
Construction	Reptile	Malayan box terrapin	*Cuora amboinensis*	Injury or mortality		High	High	Possible/Occasional	**Moderate**	Road calming measures; reduce vehicle speed	High	High	Less likely/Rare	Minor
Construction	Reptile	Malayan box terrapin	*Cuora amboinensis*	Loss of ecological		High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Reptile	Malayan box terrapin	*Cuora amboinensis*	Light disturbances		Medium	Medium	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Medium	Medium	Unlikely/Remote	Negligible
Construction	Reptile	Malayan box terrapin	*Cuora amboinensis*	Human presence		High	High	Possible/Occasional	**Moderate**	Restrict personnel access to areas of high conservation	High	High	Less likely/Rare	Minor
Construction	Reptile	Common Malayan racer	*Coelognathus flavolineatus*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Reptile	Common Malayan racer	*Coelognathus flavolineatus*	Injury or mortality		High	High	Possible/Occasional	**Moderate**	Pre-felling fauna inspection	High	High	Less likely/Rare	Minor
Construction	Reptile	Common Malayan racer	*Coelognathus flavolineatus*	Loss of ecological		High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Less likely/Rare	**Major**
Construction	Reptile	Common Malayan racer	*Coelognathus flavolineatus*	Light disturbances		Medium	Medium	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Medium	Medium	Unlikely/Remote	Negligible
Construction	Reptile	Common Malayan racer	*Coelognathus flavolineatus*	Human presence		High	High	Possible/Occasional	**Moderate**	Restrict personnel access to areas of high conservation	High	High	Less likely/Rare	Minor
Construction	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Injury or mortality		Low	Low	Unlikely/Remote	Negligible	Avoid site clearance during peak bird breeding season	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Loss of ecological		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Human presence		Medium	Medium	Almost	**Major**	Restrict personnel access to areas of high conservation	Medium	Medium	Likely/Regular	**Moderate**
Construction	Bird	Grey heron	*Ardea cinerea*	Loss of/ reduction in	High	High	High	Unlikely/Remote	Negligible		High	High	Unlikely/Remote	Negligible
Construction	Bird	Grey heron	*Ardea cinerea*	Injury or mortality		Low	Low	Unlikely/Remote	Negligible	Avoid site clearance during peak bird breeding season	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Grey heron	*Ardea cinerea*	Loss of ecological		Negligible	Very low	Unlikely/Remote	Negligible		Negligible	Very low	Unlikely/Remote	Negligible
Construction	Bird	Grey heron	*Ardea cinerea*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Grey heron	*Ardea cinerea*	Human presence		Medium	Medium	Unlikely/Remote	Negligible		Medium	Medium	Unlikely/Remote	Negligible
Construction	Bird	Purple heron	*Ardea purpurea*	Loss of/ reduction in	High	High	High	Unlikely/Remote	Negligible		High	High	Unlikely/Remote	Negligible
Construction	Bird	Purple heron	*Ardea purpurea*	Injury or mortality		Low	Low	Unlikely/Remote	Negligible	Avoid site clearance during peak bird breeding season	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Purple heron	*Ardea purpurea*	Loss of ecological		Negligible	Very low	Unlikely/Remote	Negligible		Negligible	Very low	Unlikely/Remote	Negligible
Construction	Bird	Purple heron	*Ardea purpurea*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Purple heron	*Ardea purpurea*	Human presence		Medium	Medium	Unlikely/Remote	Negligible		Medium	Medium	Unlikely/Remote	Negligible
Construction	Bird	Black-crowned night heron	*Nycticorax nycticorax*	Loss of/ reduction in	High	High	High	Unlikely/Remote	Negligible		High	High	Unlikely/Remote	Negligible
Construction	Bird	Black-crowned night heron	*Nycticorax nycticorax*	Injury or mortality		Low	Low	Unlikely/Remote	Negligible	Avoid site clearance during peak bird breeding season	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Black-crowned night heron	*Nycticorax nycticorax*	Loss of ecological		High	High	Possible/Occasional	**Moderate**	Retention of areas of high conservation value and	High	High	Less likely/Rare	Minor
Construction	Bird	Black-crowned night heron	*Nycticorax nycticorax*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Black-crowned night heron	*Nycticorax nycticorax*	Human presence		High	High	Possible/Occasional	**Moderate**	Restrict personnel access to areas of high conservation	High	High	Less likely/Rare	Minor
Construction	Bird	Oriental magpie-robin	*Copsychus saularis*	Loss of/ reduction in	High	Medium	Medium	Almost	**Major**	Retention of areas of high conservation value and	Medium	Medium	Likely/Regular	**Moderate**
Construction	Bird	Oriental magpie-robin	*Copsychus saularis*	Injury or mortality		Low	Low	Possible/Occasional	Minor	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Oriental magpie-robin	*Copsychus saularis*	Loss of ecological		Low	Low	Almost	**Moderate**	Retention of areas of high conservation value and	Low	Low	Likely/Regular	**Moderate**
Construction	Bird	Oriental magpie-robin	*Copsychus saularis*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Oriental magpie-robin	*Copsychus saularis*	Human presence		Low	Low	Almost	**Moderate**	Restrict personnel access to areas of high conservation	Low	Low	Likely/Regular	**Moderate**
Construction	Bird	Red junglefowl	*Gallus gallus*	Loss of/ reduction in	High	Medium	Medium	Almost	**Major**	Retention of areas of high conservation value and	Medium	Medium	Likely/Regular	**Moderate**
Construction	Bird	Red junglefowl	*Gallus gallus*	Injury or mortality		Low	Low	Possible/Occasional	Minor	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Red junglefowl	*Gallus gallus*	Loss of ecological		Low	Low	Almost	**Moderate**	Retention of areas of high conservation value and	Low	Low	Likely/Regular	**Moderate**
Construction	Bird	Red junglefowl	*Gallus gallus*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Red junglefowl	*Gallus gallus*	Human presence		Negligible	Very low	Almost	Minor		Negligible	Very low	Almost certain/continuous	Minor
Construction	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Injury or mortality		Low	Low	Possible/Occasional	Minor	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Loss of ecological		Low	Low	Possible/Occasional	Minor		Low	Low	Possible/Occasional	Minor
Construction	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Human presence		Low	Low	Almost	**Moderate**	Restrict personnel access to areas of high conservation	Low	Low	Likely/Regular	**Moderate**
Construction	Bird	Long-tailed parakeet	*Psittacula longicauda*	Loss of/ reduction in	High	Low	Low	Almost	**Moderate**	Retention of areas of high conservation value and	Low	Low	Likely/Regular	**Moderate**
Construction	Bird	Long-tailed parakeet	*Psittacula longicauda*	Injury or mortality		Low	Low	Possible/Occasional	Minor	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Long-tailed parakeet	*Psittacula longicauda*	Loss of ecological		Low	Low	Possible/Occasional	Minor		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Long-tailed parakeet	*Psittacula longicauda*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Long-tailed parakeet	*Psittacula longicauda*	Human presence		Negligible	Very low	Almost	Minor		Negligible	Very low	Almost certain/continuous	**Minor**
Construction	Bird	Straw-headed bulbul	*Pycnonotus zeylanicus*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Bird	Straw-headed bulbul	*Pycnonotus zeylanicus*	Injury or mortality		High	High	Possible/Occasional	**Moderate**	Avoid site clearance during peak bird breeding season	High	High	Less likely/Rare	Minor
Construction	Bird	Straw-headed bulbul	*Pycnonotus zeylanicus*	Loss of ecological		High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Bird	Straw-headed bulbul	*Pycnonotus zeylanicus*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Straw-headed bulbul	*Pycnonotus zeylanicus*	Human presence		High	High	Almost	**Major**	Conduct monthly targeted surveys	High	High	Likely/Regular	**Major**
Construction	Bird	Red-legged crake	*Rallina fasciata*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Moderate**
Construction	Bird	Red-legged crake	*Rallina fasciata*	Injury or mortality		Medium	Medium	Possible/Occasional	**Moderate**	Avoid site clearance during peak bird breeding season	Medium	Medium	Less likely/Rare	Minor
Construction	Bird	Red-legged crake	*Rallina fasciata*	Loss of ecological		High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Bird	Red-legged crake	*Rallina fasciata*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Red-legged crake	*Rallina fasciata*	Human presence		High	High	Almost	**Major**	Restrict personnel access to areas of high conservation	High	High	Likely/Regular	**Major**
Construction	Bird	Changeable hawk-eagle (nest)	*Nisaetus cirrhatus (nest)*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of tree with nest with buffer zone	High	High	Likely/Regular	**Major**
Construction	Bird	Changeable hawk-eagle (nest)	*Nisaetus cirrhatus (nest)*	Injury or mortality		Medium	Medium	Possible/Occasional	**Moderate**	Avoid site clearance during peak bird breeding season	Medium	Medium	Less likely/Rare	Minor
Construction	Bird	Changeable hawk-eagle (nest)	*Nisaetus cirrhatus (nest)*	Loss of ecological		Medium	Medium	Almost	**Major**	Retention of areas of high conservation value and	Medium	Medium	Likely/Regular	**Moderate**
Construction	Bird	Changeable hawk-eagle (nest)	*Nisaetus cirrhatus (nest)*	Light disturbances		High	High	Unlikely/Remote	Negligible	Retention of tree with nest with buffer zone	High	High	Unlikely/Remote	Negligible
Construction	Bird	Changeable hawk-eagle (nest)	*Nisaetus cirrhatus (nest)*	Human presence		High	High	Almost	**Major**	Retention of tree with nest with buffer zone	High	High	Likely/Regular	**Major**
Construction	Bird	White-bellied sea eagle (nest)	*Haliaeetus leucogaster (nest)*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of tree with nest with buffer zone	High	High	Likely/Regular	**Major**
Construction	Bird	White-bellied sea eagle (nest)	*Haliaeetus leucogaster (nest)*	Injury or mortality		Medium	Medium	Possible/Occasional	**Moderate**	Avoid site clearance during peak bird breeding season	Medium	Medium	Less likely/Rare	Minor
Construction	Bird	White-bellied sea eagle (nest)	*Haliaeetus leucogaster (nest)*	Loss of ecological		Medium	Medium	Almost	**Major**	Retention of areas of high conservation value and	Medium	Medium	Likely/Regular	**Moderate**
Construction	Bird	White-bellied sea eagle (nest)	*Haliaeetus leucogaster (nest)*	Light disturbances		High	High	Unlikely/Remote	Negligible	Retention of tree with nest with buffer zone	High	High	Unlikely/Remote	Negligible
Construction	Bird	White-bellied sea eagle (nest)	*Haliaeetus leucogaster (nest)*	Human presence		High	High	Almost	**Major**	Retention of tree with nest with buffer zone	High	High	Likely/Regular	**Major**
Construction	Bird	Crested goshawk	*Accipiter trivirgatus*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Bird	Crested goshawk	*Accipiter trivirgatus*	Injury or mortality		Low	Low	Unlikely/Remote	Negligible	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Crested goshawk	*Accipiter trivirgatus*	Loss of ecological		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Crested goshawk	*Accipiter trivirgatus*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Crested goshawk	*Accipiter trivirgatus*	Human presence		Medium	Medium	Almost	**Major**	Restrict personnel access to areas of high conservation	Medium	Medium	Likely/Regular	**Moderate**
Construction	Bird	Grey-headed fish eagle	*Haliaeetus ichthyaetus*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Bird	Grey-headed fish eagle	*Haliaeetus ichthyaetus*	Injury or mortality		Low	Low	Unlikely/Remote	Negligible	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Grey-headed fish eagle	*Haliaeetus ichthyaetus*	Loss of ecological		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Grey-headed fish eagle	*Haliaeetus ichthyaetus*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Grey-headed fish eagle	*Haliaeetus ichthyaetus*	Human presence		Medium	Medium	Almost	**Major**	Restrict personnel access to areas of high conservation	Medium	Medium	Likely/Regular	**Moderate**
Construction	Bird	Crested serpent eagle	*Spilornis cheela*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Bird	Crested serpent eagle	*Spilornis cheela*	Injury or mortality		Low	Low	Unlikely/Remote	Negligible	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Crested serpent eagle	*Spilornis cheela*	Loss of ecological		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Crested serpent eagle	*Spilornis cheela*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Crested serpent eagle	*Spilornis cheela*	Human presence		Medium	Medium	Almost	**Major**	Restrict personnel access to areas of high conservation	Medium	Medium	Likely/Regular	**Moderate**
Construction	Bird	Blue-eared kingfisher	*Alcedo meninting*	Loss of/ reduction in	High	High	High	Unlikely/Remote	Negligible		High	High	Unlikely/Remote	Negligible
Construction	Bird	Blue-eared kingfisher	*Alcedo meninting*	Injury or mortality		Low	Low	Possible/Occasional	Minor	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Blue-eared kingfisher	*Alcedo meninting*	Loss of ecological		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Blue-eared kingfisher	*Alcedo meninting*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Blue-eared kingfisher	*Alcedo meninting*	Human presence		Medium	Medium	Almost	**Major**	Restrict personnel access to areas of high conservation	Medium	Medium	Likely/Regular	**Moderate**
Construction	Bird	Ruddy kingfisher	*Halcyon coromanda*	Loss of/ reduction in	High	High	High	Unlikely/Remote	Negligible		High	High	Unlikely/Remote	Negligible
Construction	Bird	Ruddy kingfisher	*Halcyon coromanda*	Injury or mortality		Low	Low	Unlikely/Remote	Negligible	Execute wildlife response plan	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Ruddy kingfisher	*Halcyon coromanda*	Loss of ecological		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Ruddy kingfisher	*Halcyon coromanda*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Ruddy kingfisher	*Halcyon coromanda*	Human presence		Medium	Medium	Almost	**Major**	Restrict personnel access to areas of high conservation	Medium	Medium	Likely/Regular	**Moderate**

Phase	Taxon	Common Name	Scientific Name	Impact Type	Sensitivity (S)	Impact intensity (I)	Consequence (C = S × I)	Likelihood (L)	Impact significance (C × L)	Mitigation measures	Residual impact intensity	Residual consequence	Residual likelihood	Residual impact significance
Construction	Bird	Chinese egret	*Egretta eulophotes*	Loss of/ reduction in	High	High	High	Unlikely/Remote	Negligible		High	High	Unlikely/Remote	Negligible
Construction	Bird	Chinese egret	*Egretta eulophotes*	Injury or mortality		Low	Low	Unlikely/Remote	Negligible	Execute wildlife response plan	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Chinese egret	*Egretta eulophotes*	Loss of ecological		Negligible	Very low	Unlikely/Remote	Negligible		Negligible	Very low	Unlikely/Remote	Negligible
Construction	Bird	Chinese egret	*Egretta eulophotes*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Chinese egret	*Egretta eulophotes*	Human presence		Medium	Medium	Unlikely/Remote	Negligible		Medium	Medium	Unlikely/Remote	Negligible
Construction	Bird	Oriental pied hornbill	*Anthracoceros albirostris*	Loss of/ reduction in	High	Low	Low	Almost	**Moderate**	Retention of areas of high conservation value and	Low	Low	Likely/Regular	**Moderate**
Construction	Bird	Oriental pied hornbill	*Anthracoceros albirostris*	Injury or mortality		Low	Low	Possible/Occasional	Minor	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Oriental pied hornbill	*Anthracoceros albirostris*	Loss of ecological		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Oriental pied hornbill	*Anthracoceros albirostris*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Oriental pied hornbill	*Anthracoceros albirostris*	Human presence		Negligible	Very low	Almost	Minor		Negligible	Very low	Likely/Regular	Minor
Construction	Bird	Red-wattled lapwing	*Vanellus indicus*	Loss of/ reduction in	High	Low	Low	Almost	**Moderate**	Retention of areas of high conservation value and	Low	Low	Likely/Regular	**Moderate**
Construction	Bird	Red-wattled lapwing	*Vanellus indicus*	Injury or mortality		High	High	Possible/Occasional	**Moderate**	Avoid site clearance during peak bird breeding season	High	High	Less likely/Rare	Minor
Construction	Bird	Red-wattled lapwing	*Vanellus indicus*	Loss of ecological		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Red-wattled lapwing	*Vanellus indicus*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Red-wattled lapwing	*Vanellus indicus*	Human presence		High	High	Almost	**Major**	Restrict personnel access to areas of high conservation	High	High	Likely/Regular	**Major**
Construction	Bird	Rusty-breasted cuckoo	*Cacomantis sepulcralis*	Loss of/ reduction in	High	Medium	Medium	Almost	**Major**	Retention of areas of high conservation value and	Medium	Medium	Likely/Regular	**Moderate**
Construction	Bird	Rusty-breasted cuckoo	*Cacomantis sepulcralis*	Injury or mortality		Low	Low	Possible/Occasional	Minor	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Rusty-breasted cuckoo	*Cacomantis sepulcralis*	Loss of ecological		Low	Low	Almost	**Moderate**	Retention of areas of high conservation value and	Low	Low	Likely/Regular	**Moderate**
Construction	Bird	Rusty-breasted cuckoo	*Cacomantis sepulcralis*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Rusty-breasted cuckoo	*Cacomantis sepulcralis*	Human presence		Low	Low	Almost	**Moderate**	Restrict personnel access to areas of high conservation	Low	Low	Likely/Regular	**Moderate**
Construction	Bird	Violet cuckoo	*Chrysococcyx xanthorhynchus*	Loss of/ reduction in	High	Medium	Medium	Almost	**Major**	Retention of areas of high conservation value and	Medium	Medium	Likely/Regular	**Moderate**
Construction	Bird	Violet cuckoo	*Chrysococcyx xanthorhynchus*	Injury or mortality		Low	Low	Possible/Occasional	Minor	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Violet cuckoo	*Chrysococcyx xanthorhynchus*	Loss of ecological		Low	Low	Almost	**Moderate**	Retention of areas of high conservation value and	Low	Low	Likely/Regular	**Moderate**
Construction	Bird	Violet cuckoo	*Chrysococcyx xanthorhynchus*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Violet cuckoo	*Chrysococcyx xanthorhynchus*	Human presence		Low	Low	Almost	**Moderate**	Restrict personnel access to areas of high conservation	Low	Low	Likely/Regular	**Moderate**
Construction	Bird	Little tern	*Sternula albifrons*	Loss of/ reduction in	High	Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Little tern	*Sternula albifrons*	Injury or mortality		Low	Low	Possible/Occasional	Minor	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Little tern	*Sternula albifrons*	Loss of ecological		Negligible	Very low	Unlikely/Remote	Negligible		Negligible	Very low	Unlikely/Remote	Negligible
Construction	Bird	Little tern	*Sternula albifrons*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Little tern	*Sternula albifrons*	Human presence		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Greater painted-snipe	*Rostratula benghalensis*	Loss of/ reduction in	High	High	High	Unlikely/Remote	Negligible		High	High	Unlikely/Remote	Negligible
Construction	Bird	Greater painted-snipe	*Rostratula benghalensis*	Injury or mortality		Low	Low	Possible/Occasional	Minor	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Greater painted-snipe	*Rostratula benghalensis*	Loss of ecological		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Greater painted-snipe	*Rostratula benghalensis*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Greater painted-snipe	*Rostratula benghalensis*	Human presence		Medium	Medium	Almost	**Major**	Restrict personnel access to areas of high conservation	Medium	Medium	Likely/Regular	**Moderate**
Construction	Bird	Buffy fish owl	*Ketupa ketupu*	Loss of/ reduction in	High	Medium	Medium	Unlikely/Remote	Negligible		Medium	Medium	Unlikely/Remote	Negligible
Construction	Bird	Buffy fish owl	*Ketupa ketupu*	Injury or mortality		Low	Low	Possible/Occasional	Minor	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Buffy fish owl	*Ketupa ketupu*	Loss of ecological		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Buffy fish owl	*Ketupa ketupu*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Buffy fish owl	*Ketupa ketupu*	Human presence		Medium	Medium	Almost	**Major**	Restrict personnel access to areas of high conservation	Medium	Medium	Likely/Regular	**Moderate**
Construction	Bird	Spotted wood owl	*Strix seloputo*	Loss of/ reduction in	High	Medium	Medium	Unlikely/Remote	Negligible		Medium	Medium	Unlikely/Remote	Negligible
Construction	Bird	Spotted wood owl	*Strix seloputo*	Injury or mortality		Low	Low	Possible/Occasional	Minor	Avoid site clearance during peak bird breeding season	Low	Low	Less likely/Rare	Minor
Construction	Bird	Spotted wood owl	*Strix seloputo*	Loss of ecological		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Spotted wood owl	*Strix seloputo*	Light disturbances		Low	Low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Low	Low	Unlikely/Remote	Negligible
Construction	Bird	Spotted wood owl	*Strix seloputo*	Human presence		Medium	Medium	Almost	**Major**	Restrict personnel access to areas of high conservation	Medium	Medium	Likely/Regular	**Moderate**
Construction	Butterfly	Ancyra blue	*Catopyrops ancyra*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Butterfly	Ancyra blue	*Catopyrops ancyra*	Injury or mortality		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Butterfly	Ancyra blue	*Catopyrops ancyra*	Loss of ecological		High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Butterfly	Ancyra blue	*Catopyrops ancyra*	Light disturbances		Negligible	Very low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Negligible	Very low	Unlikely/Remote	Negligible
Construction	Butterfly	Ancyra blue	*Catopyrops ancyra*	Human presence		Low	Low	Almost	**Moderate**	Restrict personnel access to areas of high conservation	Low	Low	Likely/Regular	**Moderate**
Construction	Butterfly	Formosan swift	*Borbo cinnara*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Butterfly	Formosan swift	*Borbo cinnara*	Injury or mortality		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Butterfly	Formosan swift	*Borbo cinnara*	Loss of ecological		High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Butterfly	Formosan swift	*Borbo cinnara*	Light disturbances		Negligible	Very low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Negligible	Very low	Unlikely/Remote	Negligible
Construction	Butterfly	Formosan swift	*Borbo cinnara*	Human presence		Low	Low	Almost	**Moderate**	Restrict personnel access to areas of high conservation	Low	Low	Likely/Regular	**Moderate**
Construction	Butterfly	Bengal swift	*Pelopidas agna agna*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Butterfly	Bengal swift	*Pelopidas agna agna*	Injury or mortality		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Butterfly	Bengal swift	*Pelopidas agna agna*	Loss of ecological		High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Butterfly	Bengal swift	*Pelopidas agna agna*	Light disturbances		Negligible	Very low	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Negligible	Very low	Unlikely/Remote	Negligible
Construction	Butterfly	Bengal swift	*Pelopidas agna agna*	Human presence		Low	Low	Almost	**Moderate**	Restrict personnel access to areas of high conservation	Low	Low	Likely/Regular	**Moderate**
Construction	Mammal	Smooth-coated otter	*Lutrogale perspicillata*	Loss of/ reduction in	High	Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Mammal	Smooth-coated otter	*Lutrogale perspicillata*	Injury or mortality		High	High	Unlikely/Remote	Negligible	Passive wildlife shepherding	High	High	Unlikely/Remote	Negligible
Construction	Mammal	Smooth-coated otter	*Lutrogale perspicillata*	Loss of ecological		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Mammal	Smooth-coated otter	*Lutrogale perspicillata*	Light disturbances		Medium	Medium	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Medium	Medium	Unlikely/Remote	Negligible
Construction	Mammal	Smooth-coated otter	*Lutrogale perspicillata*	Human presence		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Mammal	Sunda pangolin	*Manis javanica*	Loss of/ reduction in	High	High	High	Almost	**Major**	Retention of areas of high conservation value and	High	High	Likely/Regular	**Major**
Construction	Mammal	Sunda pangolin	*Manis javanica*	Injury or mortality		High	High	Possible/Occasional	**Moderate**	Passive wildlife shepherding	High	High	Less likely/Rare	Minor
Construction	Mammal	Sunda pangolin	*Manis javanica*	Loss of ecological		High	High	Almost	**Major**	Phase construction of trapezoidal drain	High	High	Likely/Regular	**Major**
Construction	Mammal	Sunda pangolin	*Manis javanica*	Light disturbances		High	High	Unlikely/Remote	Negligible	Limit lighting if night works are essential	High	High	Unlikely/Remote	Negligible
Construction	Mammal	Sunda pangolin	*Manis javanica*	Human presence		High	High	Almost	**Major**	Restrict personnel access to areas of high conservation	High	High	Likely/Regular	**Major**
Construction	Mammal	Long-tailed macaque	*Macaca fascicularis*	Loss of/ reduction in	High	Medium	Medium	Possible/Occasional	**Moderate**	Retention of areas of high conservation value and	Medium	Medium	Less likely/Rare	Minor
Construction	Mammal	Long-tailed macaque	*Macaca fascicularis*	Injury or mortality		High	High	Possible/Occasional	**Moderate**	Road calming measures; reduce vehicle speed	High	High	Unlikely/Remote	Negligible
Construction	Mammal	Long-tailed macaque	*Macaca fascicularis*	Loss of ecological		Low	Low	Possible/Occasional	Minor		Low	Low	Less likely/Rare	Minor
Construction	Mammal	Long-tailed macaque	*Macaca fascicularis*	Light disturbances		Medium	Medium	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Medium	Medium	Unlikely/Remote	Negligible
Construction	Mammal	Long-tailed macaque	*Macaca fascicularis*	Human presence		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Construction	Mammal	Eurasian wild boar	*Sus scrofa*	Loss of/ reduction in	High	Medium	Medium	Possible/Occasional	**Moderate**	Retention of areas of high conservation value and	Medium	Medium	Less likely/Rare	Minor
Construction	Mammal	Eurasian wild boar	*Sus scrofa*	Injury or mortality		High	High	Possible/Occasional	**Moderate**	Road calming measures; reduce vehicle speed	High	High	Unlikely/Remote	Negligible
Construction	Mammal	Eurasian wild boar	*Sus scrofa*	Loss of ecological		Medium	Medium	Possible/Occasional	**Moderate**	Phase construction of trapezoidal drain	Medium	Medium	Less likely/Rare	Minor
Construction	Mammal	Eurasian wild boar	*Sus scrofa*	Light disturbances		Medium	Medium	Unlikely/Remote	Negligible	Limit lighting if night works are essential	Medium	Medium	Unlikely/Remote	Negligible
Construction	Mammal	Eurasian wild boar	*Sus scrofa*	Human presence		Low	Low	Unlikely/Remote	Negligible		Low	Low	Unlikely/Remote	Negligible
Operational	Reptile	Asian softshell turtle	*Amyda cartilaginea*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Reptile	Asian softshell turtle	*Amyda cartilaginea*	Loss of ecological		High	High	Less likely/Rare	Minor		High	High	Less likely/Rare	Minor
Operational	Reptile	Asian softshell turtle	*Amyda cartilaginea*	Light disturbances		High	High	Likely/Regular	**Major**	Artificial light management	High	High	Possible/Occasional	**Moderate**
Operational	Reptile	Asian softshell turtle	*Amyda cartilaginea*	Human presence		High	High	Likely/Regular	**Major**	Limit human activities in areas of conservation value	High	High	Possible/Occasional	**Moderate**
Operational	Reptile	Malayan box terrapin	*Cuora amboinensis*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Reptile	Malayan box terrapin	*Cuora amboinensis*	Loss of ecological		High	High	Less likely/Rare	Minor		High	High	Less likely/Rare	Minor
Operational	Reptile	Malayan box terrapin	*Cuora amboinensis*	Light disturbances		High	High	Likely/Regular	**Major**	Artificial light management	High	High	Possible/Occasional	**Moderate**
Operational	Reptile	Malayan box terrapin	*Cuora amboinensis*	Human presence		High	High	Likely/Regular	**Major**	Limit human activities in areas of conservation value	High	High	Possible/Occasional	**Moderate**
Operational	Reptile	Common Malayan racer	*Coelognathus flavolineatus*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Reptile	Common Malayan racer	*Coelognathus flavolineatus*	Loss of ecological		High	High	Less likely/Rare	Minor		High	High	Less likely/Rare	Minor
Operational	Reptile	Common Malayan racer	*Coelognathus flavolineatus*	Light disturbances		High	High	Likely/Regular	**Major**	Artificial light management	High	High	Possible/Occasional	**Moderate**
Operational	Reptile	Common Malayan racer	*Coelognathus flavolineatus*	Human presence		High	High	Likely/Regular	**Major**	Limit human activities in areas of conservation value	High	High	Possible/Occasional	**Moderate**
Operational	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Changeable hawk-eagle	*Nisaetus cirrhatus*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Grey heron	*Ardea cinerea*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Grey heron	*Ardea cinerea*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor

Phase	Taxon	Common Name	Scientific Name	Impact Type	Sensitivity (S)	Impact intensity (I)	Consequence (C = S × I)	Likelihood (L)	Impact significance (C × L)	Mitigation measures	Residual impact intensity	Residual consequence	Residual likelihood	Residual impact significance
Operational	Bird	Grey heron	*Ardea cinerea*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Grey heron	*Ardea cinerea*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Purple heron	*Ardea purpurea*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Purple heron	*Ardea purpurea*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Purple heron	*Ardea purpurea*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Purple heron	*Ardea purpurea*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Black-crowned night heron	*Nycticorax nycticorax*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Black-crowned night heron	*Nycticorax nycticorax*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Black-crowned night heron	*Nycticorax nycticorax*	Light disturbances		High	High	Likely/Regular	**Major**	Artificial light management	High	High	Possible/Occasional	**Moderate**
Operational	Bird	Black-crowned night heron	*Nycticorax nycticorax*	Human presence		High	High	Likely/Regular	**Major**	Limit human activities in areas of conservation value	High	High	Possible/Occasional	**Moderate**
Operational	Bird	Oriental magpie-robin	*Copsychus saularis*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Oriental magpie-robin	*Copsychus saularis*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Oriental magpie-robin	*Copsychus saularis*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Oriental magpie-robin	*Copsychus saularis*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Red junglefowl	*Gallus gallus*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Red junglefowl	*Gallus gallus*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Red junglefowl	*Gallus gallus*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Red junglefowl	*Gallus gallus*	Human presence		Negligible	Very low	Likely/Regular	Minor		Negligible	Very low	Likely/Regular	Minor
Operational	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Blue-crowned hanging-parrot	*Loriculus galgulus*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Long-tailed parakeet	*Psittacula longicauda*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Long-tailed parakeet	*Psittacula longicauda*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Long-tailed parakeet	*Psittacula longicauda*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Long-tailed parakeet	*Psittacula longicauda*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Straw-headed bulbul	*Pycnonotus zeylanicus*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Straw-headed bulbul	*Pycnonotus zeylanicus*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Straw-headed bulbul	*Pycnonotus zeylanicus*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Straw-headed bulbul	*Pycnonotus zeylanicus*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Red-legged crake	*Rallina fasciata*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Red-legged crake	*Rallina fasciata*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Red-legged crake	*Rallina fasciata*	Light disturbances		High	High	Likely/Regular	**Major**	Artificial light management	High	High	Possible/Occasional	**Moderate**
Operational	Bird	Red-legged crake	*Rallina fasciata*	Human presence		High	High	Likely/Regular	**Major**	Limit human activities in areas of conservation value	High	High	Possible/Occasional	**Moderate**
Operational	Bird	Changeable hawk-eagle (nest)	*Nisaetus cirrhatus (nest)*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Changeable hawk-eagle (nest)	*Nisaetus cirrhatus (nest)*	Loss of ecological		Medium	Medium	Less likely/Rare	Minor		Medium	Medium	Less likely/Rare	Minor
Operational	Bird	Changeable hawk-eagle (nest)	*Nisaetus cirrhatus (nest)*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Changeable hawk-eagle (nest)	*Nisaetus cirrhatus (nest)*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	White-bellied sea eagle (nest)	*Haliaeetus leucogaster (nest)*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	White-bellied sea eagle (nest)	*Haliaeetus leucogaster (nest)*	Loss of ecological		Medium	Medium	Less likely/Rare	Minor		Medium	Medium	Less likely/Rare	Minor
Operational	Bird	White-bellied sea eagle (nest)	*Haliaeetus leucogaster (nest)*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	White-bellied sea eagle (nest)	*Haliaeetus leucogaster (nest)*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Crested goshawk	*Accipiter trivirgatus*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Crested goshawk	*Accipiter trivirgatus*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Crested goshawk	*Accipiter trivirgatus*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Crested goshawk	*Accipiter trivirgatus*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Grey-headed fish eagle	*Haliaeetus ichthyaetus*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Grey-headed fish eagle	*Haliaeetus ichthyaetus*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Grey-headed fish eagle	*Haliaeetus ichthyaetus*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Grey-headed fish eagle	*Haliaeetus ichthyaetus*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Crested serpent eagle	*Spilornis cheela*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Crested serpent eagle	*Spilornis cheela*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Crested serpent eagle	*Spilornis cheela*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Crested serpent eagle	*Spilornis cheela*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Blue-eared kingfisher	*Alcedo meninting*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Blue-eared kingfisher	*Alcedo meninting*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Blue-eared kingfisher	*Alcedo meninting*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Blue-eared kingfisher	*Alcedo meninting*	Human presence		High	High	Likely/Regular	**Major**	Limit human activities in areas of conservation value	High	High	Possible/Occasional	**Moderate**
Operational	Bird	Ruddy kingfisher	*Halcyon coromanda*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Ruddy kingfisher	*Halcyon coromanda*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Ruddy kingfisher	*Halcyon coromanda*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Ruddy kingfisher	*Halcyon coromanda*	Human presence		High	High	Likely/Regular	**Major**	Limit human activities in areas of conservation value	High	High	Possible/Occasional	**Moderate**
Operational	Bird	Chinese egret	*Egretta eulophotes*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Chinese egret	*Egretta eulophotes*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Chinese egret	*Egretta eulophotes*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Chinese egret	*Egretta eulophotes*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Oriental pied hornbill	*Anthracoceros albirostris*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Oriental pied hornbill	*Anthracoceros albirostris*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Oriental pied hornbill	*Anthracoceros albirostris*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Oriental pied hornbill	*Anthracoceros albirostris*	Human presence		Negligible	Very low	Likely/Regular	Minor		Negligible	Very low	Likely/Regular	Minor
Operational	Bird	Red-wattled lapwing	*Vanellus indicus*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Red-wattled lapwing	*Vanellus indicus*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Red-wattled lapwing	*Vanellus indicus*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Red-wattled lapwing	*Vanellus indicus*	Human presence		High	High	Likely/Regular	**Major**	Limit human activities in areas of conservation value	High	High	Possible/Occasional	**Moderate**
Operational	Bird	Rusty-breasted cuckoo	*Cacomantis sepulcralis*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Rusty-breasted cuckoo	*Cacomantis sepulcralis*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Rusty-breasted cuckoo	*Cacomantis sepulcralis*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Rusty-breasted cuckoo	*Cacomantis sepulcralis*	Human presence		High	High	Likely/Regular	**Major**	Limit human activities in areas of conservation value	High	High	Possible/Occasional	**Moderate**
Operational	Bird	Violet cuckoo	*Chrysococcyx xanthorhynchus*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Violet cuckoo	*Chrysococcyx xanthorhynchus*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Violet cuckoo	*Chrysococcyx xanthorhynchus*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Violet cuckoo	*Chrysococcyx xanthorhynchus*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**

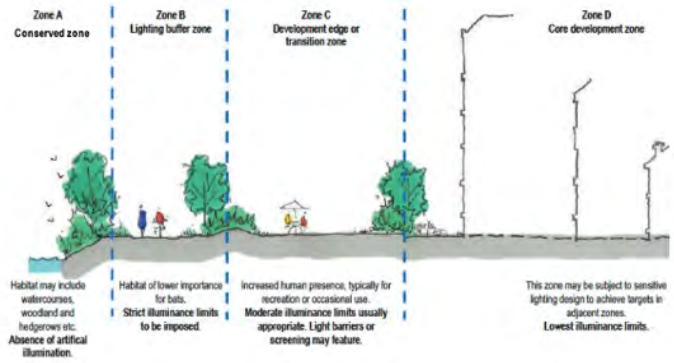
Phase	Taxon	Common Name	Scientific Name	Impact Type	Sensitivity (S)	Impact intensity (I)	Consequence (C = S × I)	Likelihood (L)	Impact significance (C × L)	Mitigation measures	Residual impact intensity	Residual consequence	Residual likelihood	Residual impact significance
Operational	Bird	Little tern	*Sternula albifrons*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Little tern	*Sternula albifrons*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Little tern	*Sternula albifrons*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Little tern	*Sternula albifrons*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Greater painted-snipe	*Rostratula benghalensis*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Greater painted-snipe	*Rostratula benghalensis*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Greater painted-snipe	*Rostratula benghalensis*	Light disturbances		High	High	Likely/Regular	**Major**	Artificial light management	High	High	Possible/Occasional	**Moderate**
Operational	Bird	Greater painted-snipe	*Rostratula benghalensis*	Human presence		High	High	Likely/Regular	**Major**	Limit human activities in areas of conservation value	High	High	Possible/Occasional	**Moderate**
Operational	Bird	Buffy fish owl	*Ketupa ketupu*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Buffy fish owl	*Ketupa ketupu*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Buffy fish owl	*Ketupa ketupu*	Light disturbances		High	High	Likely/Regular	**Major**	Artificial light management	High	High	Possible/Occasional	**Moderate**
Operational	Bird	Buffy fish owl	*Ketupa ketupu*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Bird	Spotted wood owl	*Strix seloputo*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Bird-friendly buildings Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Bird	Spotted wood owl	*Strix seloputo*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Bird	Spotted wood owl	*Strix seloputo*	Light disturbances		High	High	Likely/Regular	**Major**	Artificial light management	High	High	Possible/Occasional	**Moderate**
Operational	Bird	Spotted wood owl	*Strix seloputo*	Human presence		Medium	Medium	Likely/Regular	**Moderate**	Limit human activities in areas of conservation value	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Butterfly	Ancyra blue	*Catopyrops ancyra*	Injury or mortality	High	Low	Low	Likely/Regular	**Moderate**	Limit use of pesticides within agricultural areas and prevent spillover into natural areas	Low	Low	Possible/Occasional	Minor
Operational	Butterfly	Ancyra blue	*Catopyrops ancyra*	Loss of ecological		Negligible	Very low	Less likely/Rare	Negligible		Negligible	Very low	Less likely/Rare	Negligible
Operational	Butterfly	Ancyra blue	*Catopyrops ancyra*	Light disturbances		Negligible	Very low	Likely/Regular	Minor	Artificial light management	Negligible	Very low	Possible/Occasional	Minor
Operational	Butterfly	Ancyra blue	*Catopyrops ancyra*	Human presence		Negligible	Very low	Likely/Regular	Minor		Negligible	Very low	Likely/Regular	Minor
Operational	Butterfly	Formosan swift	*Borbo cinnara*	Injury or mortality	High	Low	Low	Likely/Regular	**Moderate**	Limit use of pesticides within agricultural areas and prevent spillover into natural areas	Low	Low	Possible/Occasional	Minor
Operational	Butterfly	Formosan swift	*Borbo cinnara*	Loss of ecological		Negligible	Very low	Less likely/Rare	Negligible		Negligible	Very low	Less likely/Rare	Negligible
Operational	Butterfly	Formosan swift	*Borbo cinnara*	Light disturbances		Negligible	Very low	Likely/Regular	Minor	Artificial light management	Negligible	Very low	Possible/Occasional	Minor
Operational	Butterfly	Formosan swift	*Borbo cinnara*	Human presence		Negligible	Very low	Likely/Regular	Minor		Negligible	Very low	Likely/Regular	Minor
Operational	Butterfly	Bengal swift	*Pelopidas agna agna*	Injury or mortality	High	Low	Low	Likely/Regular	**Moderate**	Limit use of pesticides within agricultural areas and prevent spillover into natural areas	Low	Low	Possible/Occasional	Minor
Operational	Butterfly	Bengal swift	*Pelopidas agna agna*	Loss of ecological		Negligible	Very low	Less likely/Rare	Negligible		Negligible	Very low	Less likely/Rare	Negligible
Operational	Butterfly	Bengal swift	*Pelopidas agna agna*	Light disturbances		Negligible	Very low	Likely/Regular	Minor	Artificial light management	Negligible	Very low	Possible/Occasional	Minor
Operational	Butterfly	Bengal swift	*Pelopidas agna agna*	Human presence		Negligible	Very low	Likely/Regular	Minor		Negligible	Very low	Likely/Regular	Minor
Operational	Mammal	Smooth-coated otter	*Lutrogale perspicillata*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Mammal	Smooth-coated otter	*Lutrogale perspicillata*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Mammal	Smooth-coated otter	*Lutrogale perspicillata*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Mammal	Smooth-coated otter	*Lutrogale perspicillata*	Human presence		Negligible	Very low	Likely/Regular	Minor		Negligible	Very low	Likely/Regular	Minor
Operational	Mammal	Sunda pangolin	*Manis javanica*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Mammal	Sunda pangolin	*Manis javanica*	Loss of ecological		High	High	Less likely/Rare	Minor		High	High	Less likely/Rare	Minor
Operational	Mammal	Sunda pangolin	*Manis javanica*	Light disturbances		High	High	Likely/Regular	**Major**	Artificial light management	High	High	Possible/Occasional	**Moderate**
Operational	Mammal	Sunda pangolin	*Manis javanica*	Human presence		High	High	Likely/Regular	**Major**	Limit human activities in areas of conservation value	High	High	Possible/Occasional	**Moderate**
Operational	Mammal	Long-tailed macaque	*Macaca fascicularis*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Building designs to prevent human-wildlife conflict Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Mammal	Long-tailed macaque	*Macaca fascicularis*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Mammal	Long-tailed macaque	*Macaca fascicularis*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Mammal	Long-tailed macaque	*Macaca fascicularis*	Human presence		Negligible	Very low	Likely/Regular	Minor		Negligible	Very low	Likely/Regular	Minor
Operational	Mammal	Eurasian wild boar	*Sus scrofa*	Injury or mortality	High	High	High	Possible/Occasional	**Moderate**	Building designs to prevent human-wildlife conflict Establish wildlife response plan	High	High	Less likely/Rare	Minor
Operational	Mammal	Eurasian wild boar	*Sus scrofa*	Loss of ecological		Low	Low	Less likely/Rare	Minor		Low	Low	Less likely/Rare	Minor
Operational	Mammal	Eurasian wild boar	*Sus scrofa*	Light disturbances		Medium	Medium	Likely/Regular	**Moderate**	Artificial light management	Medium	Medium	Possible/Occasional	**Moderate**
Operational	Mammal	Eurasian wild boar	*Sus scrofa*	Human presence		Negligible	Very low	Likely/Regular	Minor		Negligible	Very low	Likely/Regular	Minor

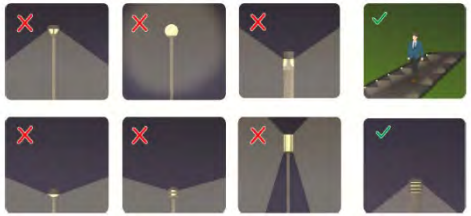
APPENDIX G

Design Phase Guidelines

No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
1	Bird-friendly buildings	Bird-building collisions occur when birds fail to perceive glass as a barrier due to reflection of sky, trees, or flyway on the glass surface, resulting in bird-building collisions. Mitigation measures will aim to increase the visibility of glass surfaces, regardless of building typology, in order to reduce the number of incidences of bird-building collisions.	Design phase	Increase visibility of glass surfaces (including mirrored and non-mirrored reflective glass, and transparent glass) ■ Incorporate features that increase the visibility of glass or dampen reflections to reduce the appearance of clear passage to sky or vegetation. ■ Break up reflections on glass façade by installing a decorative cladding. ■ Use decals or patterns can be used to increase the visibility of the glass. ■ Avoid interior or exterior vegetation near windows as birds may confuse this with exterior vegetation and	Features to increase the visibility of glass surfaces include: ■ Applying film coating (e.g., CollidEscape; http://www.collidescape.org) to glass surfaces. ■ Installing angled glass or designing fenestration patterns on the building. ■ Installing interior or exterior shades, grilles, sunshades, screens, blinds and/or netting over glass surfaces. ■ Applying visible visual markers, such as decals or patterns, to glass surfaces to increase the visibility of glass: ▪ A pattern density of 10 cm by 10 cm or less; ▪ Visual markers to be at least 5 mm in diameter; ▪ Visual markers should be high contrast; and ▪ Visual markers should be placed on exterior surfaces as it is the most effective for deterring bird collisions.

No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
				fly towards them. Especially for façades facing natural vegetation, shades or netting should be installed near the glass to prevent birds from crashing into it. ■ Buildings should not have courtyards or corridors that are enclosed by glass as these may confuse birds to fly through. ■ Where balconies are planned, increase the visibility of glass & dampen reflections to reduce the appearance of clear passage to sky or vegetation. ▪ Balconies to have a width-to-height ratio of 1 to block sunrays.	Film coating on glass surfaces. Image source: CollidEscape.org  Fenestration patterns on a building. Image source: mccoymart.com  Angled glass façade. Image source: wfmmedia.com  Exterior shades on a building. Visible visual markers.  **Figure 63: Examples of features to increase the visibility of glass surfaces**

No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
				▪ Use louvres to provide shade without extending balcony width. ▪ Use railings made of metal or other opaque materials.	Louvres and railings on a balcony. Image source: keathongglass.com  **Figure 64: Example of louvres and railings to be used for balconies**
2	Artificial light management	Ecological light pollution affects foraging, reproduction, migration, and communication of wildlife. Mitigation measures will aim to: • Reduce lighting in areas of high conservation value	Design phase	Reduce lighting in areas of high conservation value ■ Ensure that there is no lighting within areas of high conservation value. ■ Where possible, establish a lighting buffer zone to screen areas of high conservation value from light spillage from	 **Figure 65: Light management**

No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
		• Use lighting appropriate to the objectives		the development; if a lighting buffer zone is not possible, minimise illuminance in the transition zone between the areas of high conservation value and urban areas. ■ Permanent artificial lightings should be directed away from the areas of high conservation value.	
				Use lighting appropriate to the objectives ■ Optimise the placement of lights to minimize light spill, i.e., the light that falls outside of the area intended to be lit. Light only the object or area intended and keep lights close to the ground, directed and	 **Figure 66: Example of lighting for walkways**

No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
				shielded to avoid light spill. ■ Use adaptive light controls, such as smart controlled LED lights, to manage light timing, intensity and colour. The use of lights should be minimized during hours just before dawn and after dusk when crepuscular and nocturnal animals are the most active. ▪ Applicable to both indoor and outdoor lighting. ■ Optimise the placement of lights to minimize light spill, i.e., the light that falls outside of the area intended to be lit. Light only the object or area intended and keep lights close to the	 **Figure 67: Example of lighting fixtures and their suitability** Examples of wildlife-friendly light properties or features: ■ Use low-glare lighting. ■ Have non-reflective, dark-coloured surfaces around the development. Light reflected from highly polished, shiny or light-coloured surfaces such as white painted infrastructure, polished marble or white sand can contribute to sky glow. In

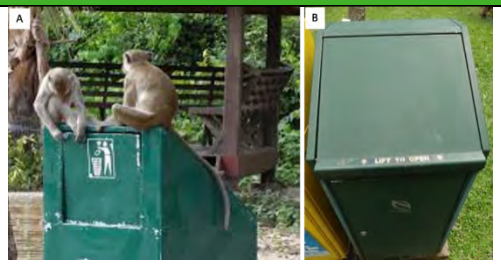
No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
				ground, directed and shielded to avoid light. ■ Existing lights can be modified by installing a shield. ▪ Ensure the luminaire is mounted horizontally (no upward tilt) relative to the ground and not at an angle, or mounted on a building so that the structure prevents the light shining above the horizontal plane, for example recess a light into an overhanging roof eave. Use luminaires with an upward light ratio of 0%. When determining angle	considering surface reflectance, the need to view the surface should be taken into consideration as darker surfaces will require more light to be visible. ■ Use lights with reduced or filtered blue, violet and ultra-violet wavelengths, as most wildlife is sensitive to short wavelength (blue/violet) light ▪ Lights with little or no short wavelength (400–500 nm) violet or blue light should be used to avoid unintended effects; and ▪ Consideration should be given to the spectral characteristics (spectral power distribution curve) of the lighting to ensure short wavelength (400–500 nm) light is minimised. ■ Warm colour temperature light sources to be employed preferably at <2,700 Kelvin (K). ■ Use lights that filter out wavelengths in the UV range, as humans are not able to perceive them, but wildlife such as bats are able to perceive and be affected by them.

No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
				of the mounting, consideration should be given to the reflective properties of the receiving environment. ▪ If an unshielded fitting is to be used, consideration should be given to the direction of the light and the need for some form of permanent physical opaque barrier that will provide the shielding requirement. This can be a cover or part of a building. Care should be taken to also shield adjacent surfaces, if they are lightly coloured, to prevent excessive	

No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
				reflected light from adding to sky glow. ▪ Reduce the height of light units to keep light as close to the ground as possible and reduce the volume of illuminated space. This allows nocturnal fauna, such as bats, to fly over the light units in the dark area above the light. ■ Configure the location, orientation and height of structures to minimize light spill on key habitats and features. ▪ Buildings, walls and hardscapes may be sited and designed to block light spill	

No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
				from reaching habitats. ▪ Taller buildings may be best located towards the centre of the site or sufficiently set back from key habitats to minimise light spill. ▪ Streetlights can be located so that the rear shields are adjacent to habitats thereby directing light into the task area where needed. ■ Screening of light spills or light trespass through soft landscaping and installation of walls, fences and bunding. Fencing can also be overplanted with climbers to soften its	

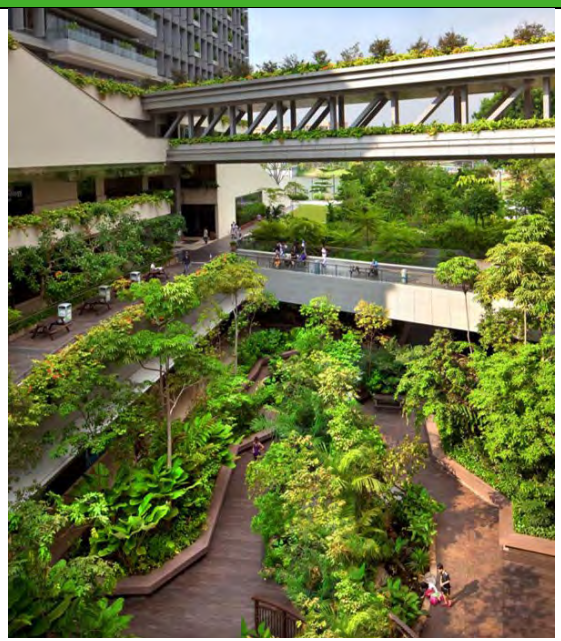
No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
				appearance and provide a vegetated feature for fauna. While newly planted vegetation (trees, shrubs and scrub) is unlikely to adequately contribute to light attenuation on key habitats for a number of years until it is well established, it should never be relied on as the sole means of attenuating light spill. ■ Use wildlife-friendly light properties or features.	
3	Human-wildlife conflict management	Human-wildlife conflicts (HWC) occur when there are negative interactions between humans and wildlife (e.g., injury to humans due to wildlife).	Design phase	Reduce wildlife access to anthropogenic food sources ■ Situate food and beverage establishments in the development on the lower floors indoors	Reduce wildlife access to anthropogenic food sources

No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
		HWC may be exacerbated when anthropogenic food sources (e.g., waste) are easily accessible, as they attract wildlife into proximity with humans, and increase the likelihood of negative interactions. Mitigation measures will aim to: • Reduce wildlife access to anthropogenic food sources. • Restrict wildlife access into buildings. • Increase awareness on human-wildlife conflict.		■ Ensure proper waste management via: ▪ For all bins situated outdoors, use wildlife-proof bins ▪ Enclose waste management centres	 **Figure 68: Example of wildlife-proof bins**
				Restrict wildlife access into buildings ■ Where possible, maintain a 6 m buffer between trees and building façade to prevent wildlife access into buildings ■ If facilities require perimeter fencing, one-way trap doors facing the natural vegetation are recommended to be included to allow for fauna to exit the facility safely	 **Figure 69: Example of one-way trap door**

No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
				■ Design controlled openings into buildings to ensure wildlife do not enter buildings ■ Structural elements on ground floors (e.g., pillars) to be smooth, and to be >75 cm (larger than arm span of long-tailed macaques) to prevent fauna from climbing these features ■ Between ground floors and upper floors, to include a cantilever of at least 75 cm to prevent climbing and scaling fauna (primarily targeted at long-tailed macaques) from accessing upper levels	
				Increase awareness on human-wildlife conflict	

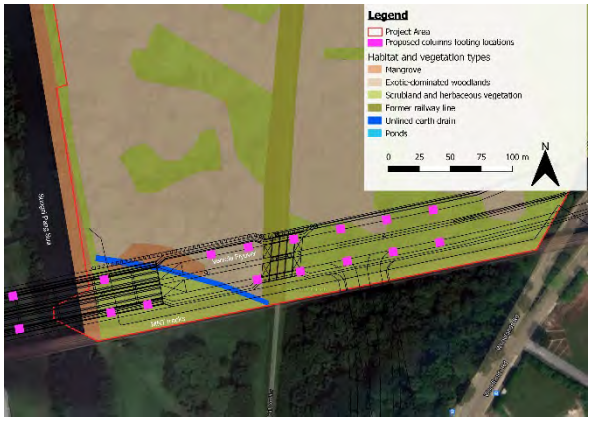
No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
				■ Educate tenants and members of public against food provisioning to wildlife using educational signages	 **Figure 70: Example of educational signboard**
4	Road calming measures	Traffic-related wildlife mortality can occur when roadway users are unaware that wildlife are using roadways as well. Mitigation measures will aim to increase the awareness of roadway users of wildlife.	Design phase	■ Limit the maximum speed within the development and install road-calming measures (e.g., speed bumps) within the development to reduce chances of collision ■ Install wildlife crossing signages reminding	 **Figure 71: Example of speed bumps**

No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
				drivers to look out for wildlife	 **Figure 72: Example of wildlife crossing signage**
5	Dual usage of space (skyrise greenery)	Spaces allocated for human usage can also benefit wildlife if they are designed using ecological concepts. One example of this is by incorporating skyrise greenery into the building design. Measures recommended will aim to allows both humans and wildlife to utilise the space whilst minimizing conflict.	Design phase	■ Incorporate biodiversity attracting plants no more than 50 m from the ground ■ Include naturalised ponds with gentle edges to allow fauna to interact with the water ■ Zoning skyrise greenery, by allocating a “human zone” situated away from the “biodiversity zone” to limit disturbance	

No.	Mitigation Objective	Overarching Principle	Timing of Mitigation Measures	Mitigation Measure	General Best Practices
				caused by human activities ■ Optimise exposure of roof gardens, as exposed greenery attract more biodiversity ■ Having larger planted areas to attract more biodiversity ■ Judicious maintenance of greenery by including naturalised wildflower zones where maintenance is kept infrequent and light ■ Incorporate a more diverse planting palette and vegetation structure, to attract more biodiversity; the planting palette should include bird nectar and fruit plants, butterfly nectar and host plants.	 **Figure 73: Example of skyline greenery at Khoo Teck Puat Hospital (Source: WorldArchitectureNews.com)**

APPENDIX H

Mitigation Measures Beyond Project Scope

Recommendation by Consultants	Description	Developer's Reason/s for Not Implementing
Vehicle flyover with retaining walls structures possibly over Sungei Pang Sua	Given the sensitivity of the unlined earth drain and its buffer zones, the vehicle flyover should consider swapping its current retaining wall structures to columns for support instead (**Figure G-2**). These columns should be designed such that there will be no construction works within 10 m from the water edge (**Figure G-1**) and should span the width of the unlined earth drain and Sungei Pang Sua.  **Figure G-1. Proposed columns footing locations to support vehicle flyover**  **Figure G-2. Example for usage of columns to support vehicle flyover (Seletar Expressway) to avoid unlined earth drain at Springleaf**	These recommendations are out of JTC's current Project scope and boundary. Recommendation is subject to discussion by the developer with the relevant agencies.

Recommendation by Consultants	Description	Developer's Reason/s for Not Implementing
Linear park along the edge of Sungei Pang Sua	The linear park is planned to be a 15m-wide park right next to the mangrove along Sungei Pang Sua. The linear park will invite high human activity as well as the need for artificial lighting which has negative impacts on the nocturnal and crepuscular fauna utilizing the mangrove. It is recommended that the public usage of the park be limited to daylight hours to minimise disturbance to fauna utilising the site. Where necessary, artificial light management strategies outlined in can also be adopted during the design of the linear park.	These recommendations are out of JTC's current Project scope and boundary. Recommendation is subject to discussion by the developer with the relevant agencies.

APPENDIX I

Wildlife Incident Form

Wildlife Incident Form

Date (YYYY/MM/DD):	Time:
Description of Location:	GPS Coordinates:
Wildlife Observed:	Condition of Animal (e.g., alive, injured, dead, etc.): Animal Activity (e.g., moving, trapped, etc.):
Photographs Taken (Yes or No):	
Describe Incident (e.g., activities being carried out; what animal was doing; personnel involved):	
Actions Taken:	
Reported by: _____ Contact #: _____	Reported to: _____ Contact #: _____
Remarks & Photos:	

APPENDIX J

Native Planting Palette

Scientific name	National Conservation Status	Habit
Acrostichum aureum	Common	Herb
Acrostichum speciosum	Common	Herb
Alocasia longiloba	Common	Herb
Alpinia aquatica	Critically endangered	Herb
Alstonia angustifolia	Common	Tree
Alstonia angustiloba	Common	Tree
Angiopteris evecta	Vulnerable	Herb
Ardisia elliptica	Endangered	Tree
Arundina graminifolia	Common	Herb
Asplenium longissimum	Common	Epiphyte
Asplenium nidus	Common	Epiphyte
Barringtonia asiatica	Critically endangered	Tree
Barringtonia racemosa	Critically endangered	Tree
Callicarpa longifolia	Endangered	Shrub
Calophyllum inophyllum	Critically endangered	Tree
Carallia brachiata	Endangered	Tree
Caryota mitis	Common	Tree
Centotheca lappacea	Critically endangered	Herb
Cerbera odollam	Vulnerable	Tree
Cissus repens	Critically endangered	Climber
Cleistanthus sumatranus	Vulnerable	Tree
Clerodendrum laevifolium	Common	Tree
Costus speciosus	Common	Herb
Cratoxylum cochinchinense	Endangered	Tree
Cratoxylum formosum	Endangered	Tree
Cyathea latebrosa	Vulnerable	Tree
Cynometra ramiflora	Critically endangered	Tree
Cyrtophyllum fragrans	Common	Tree
Davallia denticulata	Common	Epiphyte
Dillenia suffruticosa	Common	Shrub
Diospyros buxifolia	Vulnerable	Tree
Dolichandrone spathacea	Critically endangered	Tree
Elaeocarpus mastersii	Common	Tree
Ficus fistulosa	Common	Tree

Scientific name	National Conservation Status	Habit
Garcinia hombroniana	Endangered	Tree
Gnetum gnemon	Critically endangered	Tree
Horsfieldia irya	Critically endangered	Tree
Ilex cymosa	Common	Tree
Ipomoea pes-caprae	Common	Climber
Ixora congesta	Common	Shrub
Leea indica	Common	Tree
Mallotus paniculatus	Common	Tree
Maranthes corymbosa	Endangered	Tree
Melastoma malabathricum	Common	Shrub
Memecylon caeruleum	Critically endangered	Tree
Memecylon pauciflorum	Extinct	Tree
Morinda citrifolia		Tree
Palaquium obovatum	Vulnerable	Tree
Parkia speciosa	Vulnerable	Tree
Peltophorum pterocarpum	Critically endangered	Tree
Pouteria obovata	Vulnerable	Tree
Rapanea porteriana	Vulnerable	Shrub
Sandoricum koetjape	Endangered	Tree
Spathoglottis plicata	Common	Herb
Sterculia cordata	Critically endangered	Tree
Sterculia parvifolia	Critically endangered	Tree
Sterculia rubiginosa	Vulnerable	Tree
Streblus elongatus	Vulnerable	Tree
Suregada multiflora	Critically endangered	Shrub
Syzygium glaucum	Vulnerable	Tree
Syzygium myrtifolium	Extinct	Tree
Syzygium polyanthum	Vulnerable	Tree
Tarenna odorata	Critically endangered	Shrub
Tristaniopsis obovata	Critically endangered	Tree
Tristaniopsis whiteana	Endangered	Tree
Tristellateia australasiae	Endangered	Climber

APPENDIX K

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