Flora and Fauna Monitoring Plan

Person Responsible	HEC HSE Manager

REV	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
1	31/12/2019	Version 1 issued for Lender's Review	HEC		
2	08/05/2020	Version 2 issued for OE's Review	HEC		
3	02/06/2020	Version 2 issued for Lenders' Review – Access Road Lot 1	HEC	OE(JG)	
4	17/09/2020	Version 3 issued for Lenders' Review – Access Road	HEC	OE (JG)	
5	13/11/2020	Version 3 resubmitted for Lenders' Review – Access Road	HEC	OE (KS,JG)	

Revision Log

Rev.	Date (dd/mm/yyyy)	Revised Detail			
		Item	Page	Article	Description

Table of Contents

ACRONYMS

Acronym	Description
ADB	Asian Development Bank
AOI	Area Of Influence
BMP	Biodiversity Management Plan
BOOT	Build, Own, Operate and Transfer
CESMP	Construction Environmental and Social Management Plan
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CH	Critical Habitat
CR	Critically Endangered
DD	Data Deficient
DESCP	Drainage, Erosion and Sediment Control Plan
DIA	Direct Impact Area
DMU	Discrete Management Units
EDCF	Economic Development Cooperation Fund
EIS	Environmental Impact Statement
EN	Endangered
EPC	Engineering, Procurement and Construction
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Safeguards
FAM-MP	Fish, Algae and Macroinvertebrate – Monitoring Plan
FCP	Forest Clearance Plan
FF-CMR	Flora and Fauna – Construction Monitoring Report
FF-MER	Flora and Fauna – Monitoring Event Report
FFMP	Flora and Fauna Monitoring Plan
GIIP	Good International Industry Practice
GISD	Global invasive Species Database
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
HEC	Hyundai Engineering Corporation Limited
IA	Implementation Agreement
IBAT	Integrated Biodiversity Assessment Tool
IBRD	International Bank for Reconstruction and Development
IS-MR	Invasive Species – Monthly Report
IUCN	International Union for Conservation of Nature
LC	Least Concerned
KBA	Key Biodiversity Area
KPI	Key Performance Indicator
kV	Kilo Volts
K-water	Korea Water Resources Corporation
LTA	Lenders Technical Advisor
MAL	Solomon Island's Ministry of Agriculture and Livestock Development

Acronym	Description
masl	meters above sea level
MCT	Solomon Island's Ministry of Culture and Tourism
MDPAC	Solomon Island's Ministry of Development Planning and Aid Coordination
MECDM	Solomon Island's Ministry of Environment Climate Change, Disaster Management and Meteorology
MFR	Solomon Island's Ministry of Forestry and Research
MFT	Solomon Island's Ministry of Finance and Treasury
MH	Modified Habitat
MID	Solomon Island's Ministry of Infrastructure and Development
MLHS	Solomon Island's Ministry of Lands, Housing and Survey
MMERE	Solomon Island's Ministry of Mines, Energy and Rural Electrification
MW	Mega Watt
NH	Natural Habitat
NH-CH	Natural Habitat – Critical Habitat
NT	Near Threatened
OE	Owner's Engineer (Stantec New Zealand)
PCRRP	Post-construction Rehabilitation and Revegetation Plan
PO	Project Office
PPA	Power Purchase Agreement
RR	Restricted Range
SIEA	Solomon Islands Electricity Authority
SIG	Solomon Island's Government
SPS	Safeguard Policy Statement
TBA	To Be Appointed
THL	Tina Hydropower Limited
TCLC	Tina Core Land Company
TRHDP	Tina River Hydropower Development Project (the Project)
TRHDP-PO	Tina River Hydropower Development Project – Project Office
VU	Vulnerable
WB	World Bank Group

1. INTRODUCTION

The Tina River Hydropower Development Project (TRHDP or "Project") is a hydropower development located in Central Guadalcanal, Solomon Islands, managed by a dedicated Project Office (PO) under the national Ministry of Mines, Energy and Rural Electrification (MMERE).

Tina Hydropower Limited (THL) was established by Korea Water Resources Corporation (KW) and Hyundai Engineering Company (HEC). THL will Build, Own, Operate and Transfer (BOOT) the Project under an Implementation Agreement (IA) and a Power Purchase Agreement (PPA) with the Solomon Islands Government (SIG) and Solomon Islands Electricity Authority, respectively. The BOOT concession is expected to last for a 30-year period, following commissioning.

HEC will be responsible for the Engineering, Procurement and Construction (EPC) of the Project, while THL will be responsible for the Operation and Maintenance contract. THL will sell electricity to the Solomon Islands Electricity Authority (SIEA) trading as Solomon Power, the state-owned power utility, for the duration of the concession. At the end of the concession, the hydropower infrastructure will be transferred to the SIG or SIEA.

The present monitoring plan, Flora and Fauna Monitoring Plan (FFMP; M5), is part of the Construction Environmental and Social Management Plan (CESMP) as well as the Biodiversity Management Plan (BMP), prepared for the Tina River Hydropower Development Project (TRHDP or "Project").

1.1 PURPOSE AND SCOPE

The overall purpose of this FFMP is:

- To set out the environmental monitoring requirements for flora and fauna, to ensure that environmental monitoring will be undertaken in accordance with the CESMP (CESMP; P1), and the BMP (BMP; P2).

The scope of the FFMP is to present:

- information extracted from relevant studies to provide background information on flora and fauna species, as well as general environmental descriptions
- Identify institutional and legal framework
- Identify roles and responsibilities for the FFMP
- Provide flora and fauna monitoring methods and requirements, and
- Provide auditing and monitoring requirements.

The Environmental and Social Impact Assessment (ESIA) (August 2017) and Environmental Impact Statement (EIS) (July 2019) required the FFMP to include the following:

1. monitoring of invasive plant and animal species, e.g. Water Hyacinth to assess its presence in the reservoir and to ensure quick response in case it become established.

2. Monitoring of flora and fauna will be undertaken twice a year and will include surveys of the entire reservoir.
3. In the event that Water Hyacinth does becomes established in the reservoir, immediate removal of the plant and its roots will be carried out to limit the ability for it to propagate further.

The FFMP also incorporates the monitoring methods specified in the ESIA, which indicates the following with regards to flora and fauna monitoring:

- To ensure that no major rare or protected plant communities will be affected as a result of construction activities, a ground level reconnaissance survey will be done at the time the final road and transmission line alignments are identified, with the purpose of identifying potential threatened or vulnerable plant species that will need to be avoided. This reconnaissance survey will serve as the baseline for monitoring the construction of the access road to ensure that no threatened or vulnerable flora is destroyed.
- Section 3.5.2.2: Measures to mitigate impacts include conducting a pre-construction road alignment survey to delineate environmentally sensitive areas where valued or protected species are to be avoided or, where avoidance is not possible, transplanted where feasible. Changes in road alignment will be necessary based on this survey. Good international industry practice (GIIP) will be implemented by the construction contractor that is responsible for forest clearing to minimize impacts, including maintaining canopy trees where possible. Some Natural Habitat (NH) will be disturbed beyond the road alignment and footprint of other project components, as a result of colonization by invasive species and fragmentation of habitats.
- Section 3.5.2.2: Project operation will necessitate vegetation control under the transmission line. Herbicides will not be used for vegetation clearance, due to the potential toxic effects on amphibians and reptiles, fish and water quality. Instead, manual vegetation control methods will be employed for the Project to maintain the right-of-way.

The present FFMP is required to be prepared, reviewed and approved before land clearing.

1.2 PROJECT OVERVIEW

The Project consists of a 53 meter high Roller Compacted Concrete dam (from riverbed to dam crest) in the central area of Malango Ward of Central Guadalcanal, located 20 km southeast of Honiara, at a n elevation of approximately 122 meters above sea level (masl) and roughly 30 river km from the sea. It also incorporates a 3.3 km tunnel to a powerhouse and a tailrace at elevation 73 masl, centreline elevation, according to Technical Proposal. The reservoir formed by the dam will extend upstream ap proximately 2.6 km and will have a surface area of about 0.31 km^2 at an elevation of 175 masl. The p owerhouse will be located 5.4 km downstream from the dam on the left bank of the Tina River, and water will be diverted to the powerhouse from the reservoir through the underground tunnel. Initiall y, the powerhouse will have 3 turbine/generator units, each with a capacity of 5 MW, allowing a maxi

mum discharge of about 18 m^3/s and a minimum discharge of 2.4 m^3/s. An environmental flow of 1 m^3/s will be maintained between the dam and the powerhouse tailrace, a distance of 5.7 km.

An Environmental and Social Impact Assessment (ESIA) for the TRHDP was completed in 2017 (TRHDP PO 2017) and updated in July 2019, which includes requirements for a set of plans to guide implementation of the various phases of the Project, including Environmental and Social Management Plans (ESMPs) for each of the construction and operations phases, as well as a Biodiversity Management Plan (BMP; P2). The BMP sets out requirements for terrestrial and aquatic biodiversity management for the Project. The BMP is required to be developed prior to construction and is the overarching plan for the present Flora and Fauna Monitoring Plan (FFMP).

1.3 INSTITUTIONAL AND LEGAL FRAMEWORK

Delivery of the TRHDP required compliance with Solomon Island's national legislative framework as well as international standards, conventions and policies.

1.3.1 Institutional Framework

The Project is subject to compliance with the TRHDP via its Project Office (TRHDP-PO).

At a national level, stakeholders for the TRHDP include:

- Ministry of Mines, Energy and Rural Electrification (MMERE);
- Solomon Islands Electricity Authority (SIEA);
- Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM);
- Ministry of Lands, Housing and Survey (MLHS);
- Ministry of Forestry and Research (MFR);
- Ministry of Culture and Tourism (MCT);
- Ministry of Development Planning and Aid Coordination (MDPAC);
- Ministry of Infrastructure and Development (MID);
- Ministry of Agriculture and Livestock Development (MAL);
- Ministry of Finance and Treasury (MFT); and
- Guadalcanal Provincial Government.

At an international level, stakeholders include:

- World Bank (WB);
- Asian Development Bank (ADB);

- Australian Department of Foreign Affairs and Trade (DFAT);
- Green Climate Fund (GCF);
- Economic Development Corporation Fund (EDCF);
- International Renewable Energy Australia (IRENA);
- European Investment Bank (EIB);
- Korea Water Corporation (KW); and
- Multilateral Investment Guarantee Agency (MIGA).

1.3.2 Legislative Framework

Relevant legislation in Solomon Islands

National legislative instruments applicable to the Project include:

- Environment Act 1998 and Environment Regulation 2008;
- Biosecurity Act 2013
- Fisheries Management Act 2015 and Fisheries Management (Prohibited Activities) Regulations 2018;
- Protected Areas Act 2010;
- Wildlife Protection and Management Act 1998;
- The Forests Act 1999;
- River Waters Act 1964;
- River Water Ordinance 1969;
- Solomon Islands Water Authority Act 1992; and
- Provincial Government Act 1997.

Relevant International Agreements, Policies, Regulations and Standards

The international legislative framework complements and reinforces national legislation and ensures the TRHDP is undertaken under GIIP in a way that minimises risks, impacts and ensures compliance and fair practices. The international performance standards and guidelines provide guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities.

At an International level, the following institutions' policies and standards apply to the Project:

- World Bank (WB), is a sponsor for the Project, therefore, the Project needs to comply with the following policies:

- Performance Standards (PS):
  - PS 1 – Assessment and Management of Environmental and Social Risk and Impacts
  - PS 6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources
- Operational Policies (OP) (World Bank Group [WBG] 2019):
  - OP 4.01 – Environmental Assessment
  - OP 4.04 – Natural Habitats
  - OP4.36 – Forests

- Asian Development Bank (ADB): the following Safeguard Policy Statement (SPS) applies:
  - ADB (2002) Environmental Safeguard Policy: Safeguard Requirement 1
  - ADB (2006) Operations Manual: Section F1: Environmental Considerations in ADB Operations
  - ADB (2003) Handbook on Environmental Assessment Guidelines
- Economic Development Cooperation Fund (EDCF) Safeguard Policy 2016.

1.4 LINKS TO OTHER PLANS

The present Flora and Fauna Monitoring Plan (FFMP; M5) is one of a series of environmental and social management Plans (ESMPs) that have been developed to address key environmental and social aspects of the project. It is integrated with, or relevant to, a range of other ESMPs. The principal links are presented in

Table 1-1.

Of those listed in Table 1.1, the most directly relevant are:

- The Biodiversity Management Plan (BMP; P2), which sets out the overall framework and strategies for the protection and enhancement of identified biodiversity values in the Project DIA and Infrastructure Area, but also in the wider Tina River catchment. The scope of the BMP includes the construction and operational phases of the Project. The BMP contains detailed analysis of identified values, objectives, and management approaches to achieve those objectives. The management plan comprises four key biodiversity action plan elements that address the mitigation hierarchy and include: Element 1. Construction Management, Element 2. River Management, Element 3. Watershed Engagement and Element 4. Biodiversity Offset.
- This FFMP outlines the monitoring actions that are required to achieve objectives relating to the protection of **terrestrial** flora and fauna species (including amphibians, which can live in aquatic and terrestrial environments) during the construction phase of the Project. These

monitoring actions (and those in other monitoring plans, such as the FAMMP; M3) are also summarised in the BMP.

- The Fish, Algae and Macroinvertebrates Monitoring Plan (FAMMP; M3) is another monitoring plan which achieves a similar purpose to this FFMP, but relates only to the monitoring of **aquatic** flora and fauna species during the construction phase of the Project.

Table 1-1: Links to other management plans

Management Plan	Relevance
Construction Environmental and Social Management Plan (CESMP; P1)	Refer to this plan for presentation of organizational charts, detailed description of the audit process, description of process to amend the management plans.
Biodiversity Management Plan (BMP; P2)	The BMP presents the basis of this monitoring plan.
Forest Clearance Plan (FCP; C3)	Refer to this plan for mitigation measures when clearing vegetated areas
Post-Construction Rehabilitation and Revegetation Plan (PCRRMP; C4)	Refer to this plan for mitigation measures related to cleared areas.
Security Management Plan (SMP; P7)	Refer to this plan for measures to prevent poaching
Drainage, Erosion and Sediment Control Plan (DESCP; C10)	Refer to this plan for strategies to reduce transport of sediments to Tina River.
Watercourse Crossing Management Plan (WCMP; C8)	Refer to this plan for description of watercourse crossing structures to allow animal mobility.
Spoil and Topsoil Management Plan (STMP; C9)	Refer to this plan for the description of mitigation strategies to limit soil erosion in stockpiles.
Suspended Sediment Monitoring Plan (SSMP; M1)	Refer to this plan for the monitoring activities related to sediment drainage.
Water Quality Monitoring Plan (WQMP; M2)	Refer to this plan for the monitoring activities related to water quality.
Fish, Algae and Macroinvertebrate Monitoring Plan (FAMMP; M3)	Refer to this plan for the monitoring of aquatic organisms

1.5 SUMMARY OF BIODIVERSITY VALUES

Biodiversity values identified in relation to the Project DIA and Infrastructure Area, and wider Tina River catchment (and the processes used to initially identify, and continually assess those values) are described in detail in the BMP (P2). Please refer to that document in the first instance. A summary of the values identified is included here.

The Project is located in an overall setting that is recognised as one of the most biologically important regions on earth in terms of species richness and endemism. Within the Project DIA itself, there are undisturbed montane forests in the upper catchment that are a Key Biodiversity Area (KBA) on the basis of a unique assemblage of Restricted Range (RR) species, several of which are listed as Critically Endangered (CR) or Endangered (EN) under the International Union for Conservation of Nature (IUCN) Red List. This type of forest is considered to be Critical Habitat (CH) in the ESIA.

Natural habitat extends to the area of the proposed dam, although at lower altitudes, many areas are disturbed or partly cleared due to human settlements and commercial logging activities. The majority of habitat within the proposed Project footprint consists of such disturbed habitat. The Project directly impacts a small area of undisturbed habitat that could be considered CH, but given the small proportion of the Tina River catchment impacted by the entire footprint (<3% of land area), this is not considered significant in the ESIA. Nevertheless, the reservoir, dam and powerhouse areas provide important habitat with 161 flora species and 60 fauna species recorded during baseline surveys, including restricted range species and species listed as threatened under the IUCN Red List. A list of IUCN Red Listed species potentially occurring in the Project area is provided in Annex A.

In addition, the Tina River itself is considered to be a relatively pristine, low nutrient watercourse. A total of 59 fish species were recorded during baseline surveys, which is covered within the Fish Algae Macroinvertebrates Management Plan.

As per Dr Lavery's report (Annex C to the BMP), the review of ecological values in the TRHDP and potential for impact was undertaken by one of the foremost expects on these topics in the Solomon Islands. A total of 19 native mammals are either confirmed or considered likely to occur at the project site. Most species are categorised as Least Concern on the IUCN Red List. One flying fox (*Pteropus rayneri*) is regarded as Near Threatened (a non-threatened category), two are Vulnerable, and three are Critically Endangered.

All threatened mammals are species of *Pteralopex* or *Uromys*. The monkey faced bats and giant rats of the Solomon Islands are among the most endangered mammals in all of Melanesia. They are severely threatened by forest destruction and the introduction of feral cats and these five species, two *Pteralopex* (Guadalcanal monkey-faced bat, Montane monkey-faced bat), three *Uromys* (Emperor rat, Guadalcanal rat and King rat), are of paramount consideration for potential impacts from the project.

According to the report, among *Uromys* rodents, Guadalcanal rat (*U. porculus*) and emperor rat (*U. imperator*) might already be extinct as a result of predation by feral cats. Thus it considered unlikely that either species occurs within the TRHDP area. If they survive, it is likely they have been restricted to extremely complex areas of habitat (steep rocky slopes, thick vegetation) where the impacts of feral cats may be better avoided. However, King rat is arboreal and thus less likely to be driven to extinction by feral cat predation. Searches of intact lowland forests between Tina River and Valevahalo in 2015 did uncover signs (chewed ngali nuts – *Canarium indicum*) that are believed to be indications of the presence of *Uromys rex* (King rat).

Pteralopex monkey-faced bats have two species of monkey-faced bat inhabit Guadalcanal. The montane monkey-faced bat (*P. pulchra*) is known as the lower altitudinal limit of appearance may be greater than 1,500m on northern Guadalcanal. Thus it considered this species unlikely to occur in the TRHDP area. Guadalcanal monkey-face bat (*P. atrata*) is a more common species known from the lowland forests of Guadalcanal to approximately 400 m above sea level. Dr Lavery has made recent records of this species at a site on northern Guadalcanal, not far from the TRHDP. Guadalcanal monkey-faced bat is considered likely to occur within the TRHDP area.

1.5.1 CH Summary

An analysis of natural habitat and CH for the TRHDP based on requirements of the ADB's Safeguard Policy Statement (ADB 2009), as well as guidance in the World Bank Performance Standard 6, and its accompanying guidance note (IFC 2012) was originally undertaken by John Pilgrim based on information collated in the 2017 ESIA (see Appendix Q of the ESIA (TRHDB OP 2017)). Further analysis is now also included in the Biodiversity Management Plan (BMP; P2); please refer to that plan for a full summary.

The habitat assessment established two discrete management units (DMU) (see Figure 1-1) and described presence of habitat types therein.

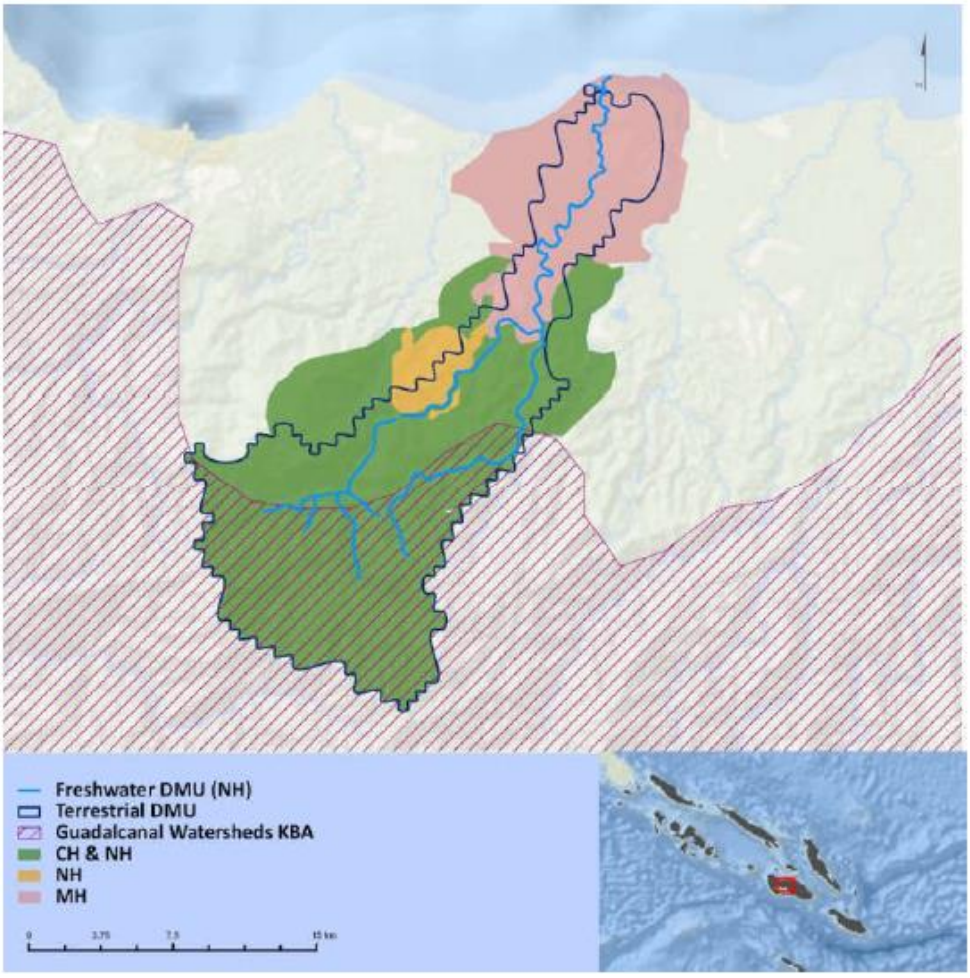

Figure 1-1: Map of Discrete Management Units and areas of critical, natural and modified habitat (source ESIA (TRHDP 2017)

DMU: Discrete Management Units

KBA: Key Biodiversity Area

NH: Natural Habitat

MH: Modified Habitat

The two DMUs and CH within them are:

- Tina River Watershed (Terrestrial DMU): this is all the terrestrial habitat assessed and comprises approximately 243 km^2. This DMU includes three types of habitat: Natural Habitat – Critical Habitat (NH-CH), Natural Habitat (NH) and Modified Habitat (MH). The following information is provided regarding the NH–CH area and CH therein:

- NH extends beyond the Project's area and includes part of the Guadalcanal Watersheds Key Biodiversity Area (KBA).

- NH is present within the Project area and outside the project area and occupies approximately 192 km^2. NH comprises of both undisturbed and disturbed/remnant forests. The undisturbed NH includes lowland and montane forests. The forests of the majority of the Tina River Watershed as the area remains largely forested and ecologically functional in spite of some degradation of forest and some incursion of invasive species. A total of 9.5 ha of primary forest will be cleared within the Direct Impact Area (DIA).

- CH: Many of the terrestrial areas of NH within the Tina River Watershed DMU (covering 184 km^2) comprise CH. The upper and outer watershed, upstream from the proposed dam location and further down away from the river itself, remain largely undisturbed and represent CH. Regarding the presence of CH within the Projects DIA, there is no current evidence that any species present in the project area or surrounding area qualify the area as CH. It is, nonetheless, apparent that some threatened species will remain undetected in the area and – if present – would qualify it as CH.

- An assessment of CH for threatened species assessed globally by IUCN was undertaken (no national Red List of species exist). The following candidate species were identified: two restricted-range bird species (Guadalcanal Boobook and Black-headed Myzomela) and one reptile (Guadalcanal Bow-fingered Gecko) qualify the Tina River Watershed as CH.

- Tina River and its tributaries (Freshwater DMU): This DMU represents the freshwater ecosystem and all of which is classified as NH. It is noted that identification of fish collected as part of the studies reported in the ESIA is pending and that further assessment will be required to assess whether the riparian habitat is subsequently classified as CH based on identification to species level.

Priority species for which CH is likely to occur within the project area had been identified by updating the IUCN listing status, in addition to searches in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) listing (CITES 2019) and Integrated Biodiversity Assessment Tool (IBAT) (IBAT Alliance 2019). Priority species are those listed as critically endangered (CR), endangered (E) and having restricted range (RR) (see **Error! Reference source not found.** in Appendix A and Table 10-6 in ESIA), and include the following species:

- Guadalcanal Monkey Faced Bat (*Pteralopex atrata*)
- King Rat (*Uromys rex*)
- Emperor Rat (*Uromys imperator*)
- Guadalcanal Rat (*Uromys porculus*)
- Borneo Teak (*Intsia bijuga*)
- Wild Rice (*Oryza schlechteri*)
- Papua New Guinea Rosewood (*Pterocarpus indicus*)

- White-eyed Starling (*Aplomis bruneicapillus*)
- Solomons Flying Fox (*Pteropus rayneri*)
- Malukuna Webbed Frog (*Cornufer malukuna)*
- Schmidt's Crocodile Skink (*Tribolonotus schmidti*)
- Guadalcanal Bow-fingered Gecko (*Cyrtodactylus biordinis*)
- Solomons Bent-toed Gecko (*Cyrtodactylus salamonesis*)
- Faro Island Tredfrog (*Litoria lutea*)
- San Cristobal Treefrog (*Papurana kreffti*)
- Guadalcanal Rail (*Hypotaenidia woodfordi*)
- Buff-headed Coucal (*Centropus milo*)
- Guadalcanal Boobook (*Ninox granti*)
- Black-headed Myzomela (*Myzomela melanocephala)*

The list above, established through ecological surveys of the Project area and literature reviews, is indicative. Priority species (and particularly those which can be used as key indicators for biodiversity values) will be finalised in consultation with Project-affected stakeholders and local biodiversity experts, to ensure that they truly reflect the values identified by stakeholders. The process by which this assessment will be made is detailed in the BMP (P2). Once the list of indicator species is final, this FFMP will be updated accordingly.

1.5.2 Key Threats to Biodiversity Values

The ESIA identified the following threats to Biodiversity Values:

- Habitat loss. A total of 115.54 hectares of habitat will be permanently removed to provide space for the Project. As result of clearing, other associated key threats to biodiversity are triggered, such as edge effects, fragmentation and indirect habitat loss due to hydrological changes.
- Edge effects on natural habitat in habitats to be retained within the project area as well as in areas outside of the project area. Edge effects identified relate to invasive species establishment and increase in predatory pressure due to cleared areas acting as grounds for predatory hunting.
- Loss of biodiversity and habitat alteration due to human harvesting of flora, fauna and wood due to creation of roads and cleared areas which will facilitate human transit.
- Colonisation by invasive species. It has been recognized that cleared areas, in particular the transmission line corridor are likely to promote invasive species establishment.

- Loss of biodiversity values due to pollution (e.g. use of herbicides) associated with the Project construction and operational activities.
- Habitat fragmentation, barrier effects and loss of habitat linkages for terrestrial and aquatic fauna due to road construction and river regulation.
- Decrease in population size and longevity due to mortality associated with noise, vibration, light and vehicle strikes.

The ESIA has identified key impacts that relate to the construction and/or operation of the Project. Mitigation measures to manage the above listed key threatening processes and the identified key impacts will be addressed in the CESMP, BMP and other associated monitoring plans.

Key threats to priority species include:

- Impact to their habitats and to the species due to logging and wood harvesting;
- Impacts associated to seasonal shifting agriculture.

Key Impacts of the Project

The ESIA provided an 'Overview of ESMP Biodiversity Management Measures during Operations', therein, 14 key impacts on the terrestrial environment had been identified as likely to occur on flora and fauna as result of the Project. Of these, only one (Key Impact 21) is directly related to preparation of this FFMP, whereas other impacts to biodiversity are addressed in the BMP.

Key Impact 21 states

- Impact: Road Access
- Key Biodiversity Impact: Spread of invasive species along project roads
- Means of verification: Reports of consultants
- Key Performance Indicators (KPI): No increase in occurrence of non-native rats or feral cats over time.

The present FFMP provides requirements to monitor the impacts from potential invasive species during the construction and operational phases of the Project (see Table 3-7).

1.5.3 CITES Listed Species

The following species were identified in the CITES list as having the potential to occur in the project area:

- Solomon's Flying Fox (*Pteropus rayneri*) (CITES listing II). This species often roosts in large colonies, but is also commonly seen roosting in small groups of 5-12 individuals or singly underneath caves and limestone overhangs, within the hollows of strangler figs (*Ficus* spp.) and concealed within the dead overhanging leaves of Pandanus. Favoured colony sites are

close to the coast and among mangroves or swamp vegetation. The species is estimated to have a generation time of five to six years (S. Hamilton and T. Leary pers. comm).

- Solomon Sea-Eagle (*Haliaeetus sandfordi*) (CITES listing II). This species prefers forested coasts (G. Dutson pers. obs. 1997-1998, Read 2013). In these forests, it scavenges and kleptoparasitises Osprey Pandion haliaetus (Blaber 1990, Webb 1992, G. Dutson pers. obs. 1997-1998). Some pairs also hunt far inland and others, especially on the eastern islands, appear to have entirely inland ranges where they prey largely on northern common cuscus Phalanger orientalis and perhaps arboreal rats and fruit bats (Buckingham et al. 1995, Olsen 1997, J. Hornbuckle in litt. 1999). It has been observed along primary rainforest lined rivers and over peaks in montane forest at elevations of 1,100 m, away from freshwater lakes (Pikacha et al. 2012). This species makes significant use of primary forests (Buckingham et al. 1990) but also hunts over open habitats such as deforested areas where it is reported to scavenge dead mammals including feral dogs (G. Dutson pers. obs. 1997-1998).
- Duchess Lorikeet (*Charmosyna margarethae*) (CITES listing II) It is usually found in lower montane forest, it occurs from sea-level to 1,350 m and in coconut plantations (Cain and Galbraith 1956, Diamond 1975b, Schodde 1977, Buckingham et al. 1995, G. Dutson pers. obs. 1997-1998). It may be nomadic and reliant on a combination of habitats at different altitudes. It feeds on pollen, nectar and some small fruits such as Schefflera.
- Guadalcanal Boobook (*Ninox granti*) (CITES listing II) It inhabits forest, including edges and patches of forest, up to 1,500 m, with some roosting in thickets (Dutson 2011).
- Pied Goshawk (*Accipiter albogularis*) (CITES listing II) Range of forests, including moist lowland and montane forests, as well as degraded and urban areas.
- Solomon Corella (*Cacatua ducorpsii*) (CITES listing II) inhabits dry and moist lowland forest
- Cardinal Lory (*Chalcopsitta cardinalis*) (CITES listing II) inhabits moist lowland and mangrove forest as well as plantations.
- Yellow-bibbed Lory (*Lorius chlorocercus*) (CITES listing II) inhabits moist lowland and montane forest, dry and moist shrubland, plantations and degraded habitat.
- Green Pygmy Parrot (*Micropsitta finschii*) (CITES listing II) the species occurs in lowland forests to about 1,000 m.

None of these species are currently considered Priority species.

1.5.4 Invasive Species

Feral animals such as cats and rats, introduced species such as cane toads, invasive plants (e.g., *Merremia peltata*), and introduced trees (e.g., paper mulberry) are widely distributed in the study area. Feral cats are a major threat to many vertebrate species, such as ground nesting birds, and introduced rats compete with native rats and prey on fledgling birds and eggs (Pikacha et. al. 2008). Cane toads have a devastating effect on the population of indigenous frogs (Pikacha et. al. 2008), as they are aggressive predators of native frog species. Moreover, eggs and tadpoles are poisonous and

affect native tadpoles that eat them (IUCN, 2014). These species were observed by the ESIA team as far upstream as the upper Tina River catchment area (TRHDP PO 2017).

The Giant African Snail was introduced into Solomon Islands, most likely by foreign logging machinery contaminated with soil containing eggs and juvenile snails. It competes with native species and damages food crops. During mitigation workshops, it was mentioned that the Giant African Snail had already reached Veraande village (along Black Post Road) and is a concern for villagers.

Insects such as the fire ants (*Wasmannia auropunctata*) are also a concern. Pathways created by logging roads have allowed this aggressive ant species that affects native insect biota to colonize new sites.

A list of invasive species referred to in the ESIA (THRDP 2017) is presented in Annex A (see Table).

The Global Invasive Species Database (GISD 2019) was interrogated to obtain a list of known invasive species in Guadalcanal, Solomon Islands (see Table in Annex A).

1.6 DEFINITIONS

Access Road — Roads to be constructed and/or upgraded as part of the Project. Detailed description available in Traffic Management Plan (TMP; P11).

Area of Influence (AOI) — The project's Area of Influence (AOI) is defined as the geographical area affected by the Project's construction and operation activities. This area excludes the wider area which will be affected by cumulative impacts. The AOI includes the following: Direct Impact Area, Upstream Area, Downstream Area and Infrastructure Area.

Areas to be cleared — Approximately 115.49 hectares (ha) of vegetation will be cleared in the Core Area, including NH (15 ha of non-montane disturbed forest, 15ha of cliff vegetation on riparian habitat and 9.5ha of forest (candidate CH)). Clearing will also include 50 ha of MH, including 20ha of disturbed forest and approximately 20ha of forest regrowth which has formed by natural revegetation of cleared areas. An additional 10ha will be necessary for the temporary storage of topsoil. This area will not be permanently lost and will be regenerated by TRHDP using native vegetation species toward the end of the Construction Phase.

Construction Phase — The period of time during construction and prior to commencement to operations of the hydroelectric plant. The construction period starts with the mobilization of machine and workforce, and includes all construction activities (e.g. road construction/demobilization, transmission lines, dam, reservoir, power station plant, tunnel, etc.) required for the Project. Construction activities will last three years and all construction activities will

occur within the Core Area and Black Post Road.

Direct Impact Area (DIA)

The DIA is the direct physical footprint of the Project being the land on which all project related infrastructure will be located and all construction will be undertaken. The DIA consists of:

- **Core Area:** 397ha site acquired by SIG in 2014 encompassing all land required for the construction and operation of the dam, reservoir, power station, and the portion of the access road from Managikki Village to the powerhouse and dam site (also known as Road Lot 2). The Tina Core Land Company (TCLC) will own the Core Area, including the access road. The company is a joint venture between customary landowners and SIG.
- **Infrastructure Corridor:** Encompassing a 50-metre corridor from Managikiki Village to the Black Post Turnoff to accommodate the access road and dual 66 Kilo Volts (kV) transmission lines, and the transmission line route from Black Post Road to the existing Lunnga Power Station.

Downstream Area

The Downstream Area is the area downstream of the dam to tide-water, (i.e., dam to the confluence with the Toni River, where the Tina and Toni Rivers then become the Ngalimbiu River, and beyond to where the river enters Iron Bottom Sound). The downstream area will be affected by changes in the Tina River flow pattern and water quality. Over the long term, erosion and deposition of materials on the riverbanks will modify the way the river is used for such purposes as household water supply, and exploitation of gravel deposits.

Employee(s)

Any person(s) who is/are directly employed by the PO, THL or HEC to work on the Project and who receives, or is entitled to receive, remuneration.

Employer / Owner

Tina Hydropower Limited (THL); the Project Owner, which will take over operation of the hydropower facility once it is constructed.

EPC Contractor

The engineering, procurement and construction contractor for the TRHDP; Hyundai Engineering Corporation Limited (HEC).

Infrastructure Area

Infrastructure Area is the geographical area within which people and communities are likely to be affected by the Infrastructure Corridor (modifications to, and use of, the access roads and transmission line corridor). It extends beyond the DIA to include villages or communities that will be impacted by noise, dust, traffic or electricity safety concerns.

Operational Phase

The period of time the hydroelectric power plant and associated infrastructure will operate. It is expected the TRHDP will have an operating life of 80 to 100 years.

Pre-establishment

Time before mobilization of equipment/HEC staff and commencement of

	any work in the project area. This is the period when baseline data is collected as no impacts due to the Project's activities have occurred.
Qualified Ecologist	Field surveys and laboratory species identification is required to be undertaken by a qualified ecologist.
Reservoir	A large natural or artificial lake used as a source of water supply. The one to be formed upstream of the Dam created as part of the Project. The reservoir will extend upstream approximately 2.6km, it will have a volume of 7Mm^3 and will have a surface area of about 0.28km^2 at an elevation of 175 metres above sea level.
Revegetation and Rehabilitation area	The areas defined in the Biodiversity Management Plan (BMP) and/or Post-Construction Revegetation and Rehabilitation Plan (PCRRP).
Stakeholder	Individuals or groups who are affected or likely to be affected by the project (project-affected parties); and may have an interest in the Project (other interested parties).
Subcontractors	All companies, persons working directly for these companies, or employed by an employment agency, that are under contract to carry out work for HEC, as part of the construction workforce.
Upstream Area	The Upstream Area is the portion of the Tina River Catchment located upstream of the dam and reservoir. Impacts considered in this area include impacts on migratory fish and other aquatic species and impacts of potential reduced access to the hunting and fishing grounds of local communities.
Worker(s)	Person(s) engaged in Project activities, including both employees and contractors.

2. ROLES AND RESPONSIBILITIES

2.1 TINA RIVER HYDROPOWER DEVELOPMENT PROJECT – PROJECT OFFICE

The Tina River Hydropower Development Project's Project Office (TRHDP PO) is overarching entity responsible for managing the implementation and delivery of the Project. Eventually this responsibility will be transferred to THL.

THL and HEC will collaborate with the TRHDP-PO to implement the BMP (P2), and HEC will be primarily responsible for ensuring that the monitoring activities described in this FFMP are carried out during the construction phase of the Project. Any activities continuing into the operational phase will become the responsibility of THL.

Key roles involved in delivery of this FFMP during the construction phase are outlined in Table 2.1.

Table 2-1: Key Roles and Responsibilities

Position	Responsibilities
HEC Project Manager (*Mr Eu Man Moon*)	• Ensure that adequate resources are provided to successfully implement this FFMP. • Ensure that all HEC project managers and subcontractors understand and fulfil their FFMP responsibilities.
HEC Construction Manager (*Mr Yoo Jae Bong*)	• Ensure that the HEC HQ Design Team integrates E&S mitigation measures into the final project design. • Participate in site inspections to plan and confirm the detailed design of E&S site measures. • Review and approve detailed site plans and method statements incorporating E&S measures. • Ensure that all personnel involved in construction activities, including subcontractors and vendors, are adequately trained and informed on the requirements of the FFMP. • Participate in site inspections in the early stages of works at each site with the HEC HSE Manager, subcontractors and THL. • Review and approve HSE reports. • Audit subcontractor performance.
HEC HSE Manager (*Mr Dae Yong Kim*)	• Maintain this FFMP. • Ensure that all personnel including subcontractors and vendors are adequately trained and informed on the requirements of this FFMP. • Lead site inspections with the HEC Construction Manager to plan and confirm the detailed design of E&S site measures. • Prepare detailed site plans integrating E&S measures into final design drawings and

Position	Responsibilities
	method statements and submit these to the HEC Construction Manager. • Lead weekly site inspections with subcontractors and THL during construction. • Prepare weekly and incident HSE Performance Reports. • Audit subcontractor E&S performance.
HEC E&S Supervisor (*Ernest Kolly & Tanzeel Ahmed*)	• Undertake field inspections to monitor flora and fauna, reporting any issues directly to the HEC HSE Manager on a daily basis. • Contribute to weekly and incident HSE reports prepared by the HEC HSE Manager. • Ensure the HEC E&S team conducts all monitoring and reporting as set out in the ESMPs. • Provide support to HEC HSE Manager in updating this FFMP as necessary. • Assist in worker training on flora and fauna protection.
HEC E&S Staff	• Implement wildlife management protocols • Manage weed and pest control measures • Clearance surveys
Terrestrial ecologist (*contracted to HEC; Myknee Sirokolo*)	• Undertake surveys of terrestrial flora and fauna as per the requirements of this FFMP, at the instruction of the HEC E&S Supervisor. • Produce reports detailing the results of each survey undertaken to fulfil the requirements of this FFMP.
Terrestrial fauna spotter/catcher(s) *(contracted by HEC as required during vegetation clearance)*	• Act as observers immediately prior to and during vegetation clearance activities (during construction) and carry out duties as described in the Forest Clearance Plan (FCP; C3). • Report to the HEC E&S Supervisor. • May conduct opportunistic surveys of flora and fauna while carrying out their duties; reporting any species observed to the E&S Supervisor and/or terrestrial ecologist (if actively engaged in the Project at the time).
Biodiversity Management Team (including consultants engaged by THL – see BMP for details)	• Implementation of the BMP • Survey of terrestrial and aquatic biodiversity matters • Provision of advice and training to the Contractor • Reporting of monitoring results • Management of wildlife, restoration and replanting • Establishment and management of site nurseries, and other activities as required by the C-ESMP and subplans.
HEC Training Supervisor (*Mr Patrick*	• Train HEC staff and subcontractors on flora and fauna management with the assistance of the HEC HSE Manager.

Position	Responsibilities
Kekete)	
Owners Engineer (OE) – *Stantec New Zealand*	• Review FFMP for compliance with the E&S Standards and GIIP [*Good International Industry Practice*. • Monitor and audit project delivery and HEC activities in accordance with the detailed project design, method statements, FFMP, related MPs, and detailed site plans. • OE Site Engineer (*Vilive Anise and/or William Waddell*) will undertake regular site supervision, and report any E&S non-compliances to the HEC HSE Manager, THL E&S Manager and OE Environmental & Social Safeguards (ESS) Lead (*Jessica Grinter – Off Shore*). • Audit HEC performance with respect to the requirements of the EPC Contract, and health, safety, environmental and social obligations (including but not limited to the E&S Standards, and Schedule 7 of the EPC Contract). Auditing will include a site visit conducted every six months from commencement of construction, for the duration of the construction phase, by the OE ESS Lead at minimum.
THL E&S Manager (*Samuela Tawakedrau*)	• Review FFMP compliance with the E&S Standards and GIIP. • Participate in daily site inspections in the early stages of works at each site with HEC and subcontractors. • Participate in weekly site inspections with HEC and subcontractors during construction (following early works). • Prepare monthly E&S performance reports, advising HEC of any non-conformances and required corrective actions. • Audit HEC compliance with the FFMP.
PO E&S Monitoring team (with Lenders Technical Advisor - LTA)	• Monitor that HEC and THL have: o complied with all requirements, guidelines, procedures, timetables and other specifications set forth in the FFMP at all times o obtained, maintained and complied with all applicable laws, regulations, permits, licences and consents. o Audit HEC and THL E&S performance.
Subcontractors	• Implement all flora and fauna protection measures set out in the FFMP. • Maintain E&S control measures in good working order, and modify these controls as needed. • Notify HEC of any E&S incidents and proposed corrective actions, and record these in an incident log. • Undertake the agreed corrective actions in a timely manner.

3. MONITORING AND EVALUATION

3.1 MONITORING

Monitoring requirements are provided in Table 3-1 below, whereas monitoring methods are provided in Flora Monitoring ***Methods***

The objectives of flora monitoring program is to determine the distribution and abundance of flora species during production and operations, and to determine if there are any ongoing impacts, such as threats from invasive species. Flora monitoring methods are provided in **Error! Not a valid bookmark self-reference.** below.

Table 3-2 to Table 3-7.

Table 3-1: Flora and Fauna Monitoring Requirements

S/N	Monitoring Requirement	Responsible Person for Ensuring Monitoring Requirement Implementation	Implementation Action Reference
1	**Flora and Fauna Monitoring**		
1.1	Flora Monitoring Survey	HEC Terrestrial Ecologist as specified in Table 2-1	Flora Monitoring ***Methods*** The objectives of flora monitoring program is to determine the distribution and abundance of flora species during production and operations, and to determine if there are any ongoing impacts, such as threats from invasive species. Flora monitoring methods are provided in **Error! Not a valid bookmark self-reference.** below. Table 3-2
1.2	Fauna Monitoring Survey	HEC Terrestrial Ecologist as specified in Table 2-1	Amphibians: Table 3-3 Birds: Table 3-4 Mammals:

			Table 3-5 Reptiles: Table 3-6
1.3	Invasive flora and fauna survey.	HEC Terrestrial Ecologist as specified in Table 2-1	Table 3-7– to be implemented during the construction and operational phase of the Project.

A further baseline survey was commissioned by HEC in August 2020 to establish reference sites for terrestrial ecology monitoring (flora and fauna, as described in Section 3.1.1 through 3.1.3 below). These sites are proposed, and shown in Figure 3-1. The sites will be finalised and identified with GPS coordinates and photos (if appropriate) once the BMP is approved and finalised by lenders (and in consultation with Project-affected stakeholders); for the time being, they should be considered as indicative.

The final reference and impact monitoring sites will guide the locations in which the monitoring described in Sections 3.1.1 – 3.1.3 is carried out.

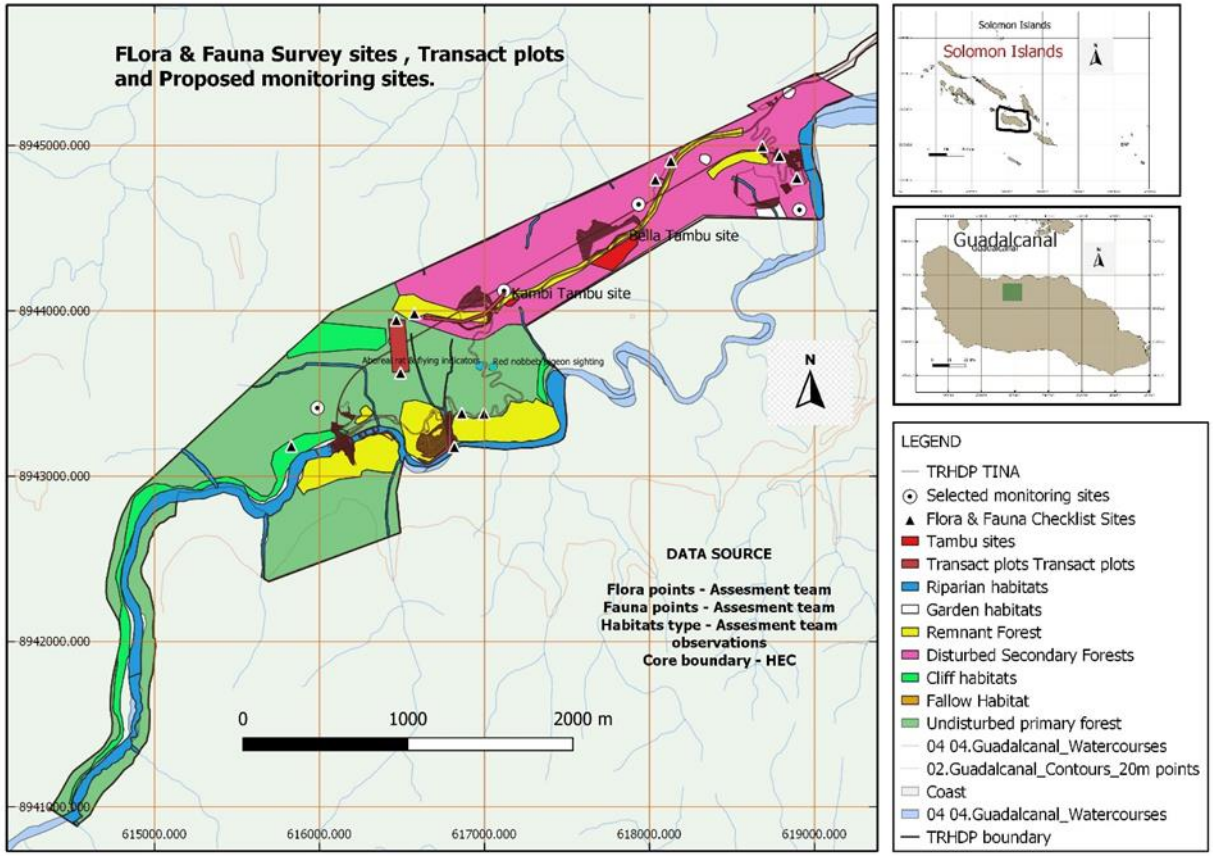

Figure 3-1 Indicative reference sites (to be confirmed, Q4 2020) from Myknee's Ecological Consultancy survey report, August 2020

3.1.1 Flora Monitoring Methods

The objectives of flora monitoring program is to determine the distribution and abundance of flora species during production and operations, and to determine if there are any ongoing impacts, such as threats from invasive species. Flora monitoring methods are provided in **Error! Not a valid bookmark self-reference.** below.

Table 3-2: Survey Requirements for Flora

Item		Survey Requirements
Target species	**Priority species**	Wild Rice (*Oryza schlechteri*) and Papua New Guinea Rosewood (*Pterocarpus indicus*)
	Other species	Invasive species and other flora species present in the project's area
Sites	**Areas to be cleared in the DIA**	• Along the final road and transmission line alignment. • In the areas to be cleared within the DIA to give way to the dam, power house, quarries, etc.
	Reservoir	• The entire reservoir during the operational phase of the Project.
Transects	**Areas to be cleared**	• Parallel transects with distance of 10m across the areas to be cleared.
	Reservoir	• Systematic survey across the entire reservoir either as parallel transects or concentric transects.
Time of the Year	**Areas to be cleared**	Prior to establishment and clearance works.
	Reservoir	Dry (May – October) and wet season (November – April).

Survey Method	**Areas to be cleared**	• Prepare a map with 10m parallel transects across the areas to be cleared within the DIA.
		• Use a hand-held Global Positioning System (GPS) to keep track of walked transects.
		• Walk along the transect lines undertaking targeted survey for primary flora species and other flora species present as per the pre-clearance and clearance protocol presented in FCP. Whenever a target species is located:
		  ○ Take a waypoint with GPS, collect a photographic record and tag the plant or area (ensure flagging tape is visible so that others can easily identify the location).
		  ○ Record in the Field Data Sheet the species name, number of individuals and an estimated cover area.
		• Report findings on the day of survey for actions to be taken in accordance to the BMP by a terrestrial ecologist (Kevin Sese). Note if threatened species had been identified and method for minimize impact as per the BMP.

Item		Survey Requirements
	Reservoir	Use a hand held GPS to map aquatic vegetation (submerged, emerged) and identify to species level.
Effort per Monitoring Event		Letter/report to be prepared and submitted within 30 days of completion of survey. If multiple days of survey are planned, scan and email copy of the field data sheets to the HEC E&S Supervisor to trigger actions as per the BMP by E&S Supervisor prior to clearing.
Frequency	**Areas to be cleared**	Prior to clearing within the DIA as stated in the FCP.
	Reservoir	Twice a year (dry (May-October) and wet season (November-April)).
Data collation		Flora species list, and cover area by each flora species Data to be presented in tabular and graphical form in the corresponding reports (see **Error! Reference source not found.**).
Analysis		Species diversity and species abundance
Reporting		See **Error! Reference source not found.**

3.1.2 Fauna Monitoring Methods

Tables below provide monitoring methods for amphibians (Table 3-3), birds (Table 3-4), mammals (

Table 3-5) and reptiles (Table 3-6). For each group, survey protocols are provided for pre-establishment and construction/operation phase. Surveys during pre-establishment aim to identify areas with sensitive species so that no-net mortality of ecologically significant species occurs. Monitoring during the construction and operational phases aims at measuring metrics defined in the BMP and PCRRP to achieve KPIs.

Table 3-3: Survey Requirements for Amphibians

Item	Survey Requirement
Target species	• Priority species: Solomon Island's Treefrog (*Litoria lutea*), and Malukana Webbed Frog (*Con ufer malukuna*) • Other species: Amphibian species recorded in the project area, including invasive species (see Appendix A).

Sites	• Pre-establishment:
	  ○ Areas to be cleared: random meander transects across entire areas to be cleared.
	• Construction and Operational Phase:
	  ○ Roads: A total of five monitoring points to be established in sites where sensitive species are identified during the pre-clearance phase.
	  ○ Revegetation and Rehabilitation areas: monitoring points as detailed in the PCRRP (PCRRP; C4).
	  ○ Reservoir: systematic survey to cover the entire reservoir area.

Transects	• Pre-establishment: Random meander transects. • Construction and Operational Phase: systematic survey across the entire reservoir. Monitoring points elsewhere.
Time of the Year	• Pre-establishment: during pre-clearance and clearing. • Construction and Operational Phase: Dry season (May – October) and wet seasons (November – April).
Survey Method	• Pre-establishment: The following survey methods are to be used: ○ Pre-clearance: Undertake random meander transects across the entire areas to be cleared and undertake searches for amphibian species (adults and tadpoles) in accordance with their habitats (e.g. forest interior, riparian areas, grasslands, etc.) Where individuals are found catch them and translocate them to suitable habitat mark the location (flagging tape and GPS). Ensure no translocation of cane toad or cane toad tadpoles. Handling of amphibians to follow hygiene protocol (DEHP, year

Item	Survey Requirement
	unknown) and use of clean disposable gloves to prevent damage to individuals. ○ Clearance: ▪ Step 1: A qualified fauna catcher to search for amphibians in areas marked during pre-clearance within 24hrs prior to clearance. In the event that individuals are found, these will be translocated to suitable habitat. ▪ Step 2: A qualified fauna catcher to be present during clearance to catch and translocate any individuals that will be present in the area being cleared. • Construction and Operational Phases: ○ Reservoir: ▪ Undertake nocturnal adult frog surveys along the edge of the reservoir, particularly in vegetated areas (emergent and submerged) and suitable habitats. Record species present and estimate abundance. ▪ Undertake diurnal tadpole survey in the reservoir using dip nets. Identify to species level and estimate abundances. ○ Road and Revegetation/Rehabilitation areas: ▪ Plot counts: visual and auditory survey at a set location (sampling station) for a duration of 20 minutes. All amphibian species seen or heard will be recorded in the fauna survey datasheet. Two diurnal and two nocturnal plot counts to be undertaken at each location per season.
Effort per Monitoring Event	• **Areas to be cleared:** pre-clearance survey across the entire area to be cleared. Clearance supervision during entire duration of clearing works. • **Construction and Operational Phase:** Two nocturnal and two diurnal surveys per season (i.e. Setting up ongoing camera traps and remain in place throughout project monitoring period and downloading a footage 3 monthly).
Frequency	• **Pre-establishment:** once during pre-clearance and during clearing. • **Construction and Operational Phase**: twice a year.
Data collation	Amphibian species list, and the number of amphibia seen or heard at a set location (the species of the amphibian seen or heard must be also recorded)
Analysis	Species diversity and species abundance
Reporting	See **Error! Reference source not found.**

Table 3-4: Survey Requirements for Birds

Item	Survey Requirement
Target species	• Priority species: White-eyed Starling (*Aplonis brunneicapillus*), Yellow-legged Pigeon (*Columba pallidiceps*), Chestnut-bellied Imperial Pigeon (*Ducula brenchleyi*), Solomons Nightjar (*Eurostopodus nigripennis*), Solomon Sea-Eagle (*Haliaeetus sanfordi*), Duchess Lorikeet (*Charmosyna margarethae*), Solomon Cicadabird (*Edolisoma holopolium*), Guadalcanl Rail (*Hypotaenidia woodfordi*), Guadalcanal Boobook (*Ninox granti*), Crested Cuckoo-Dove (*Reinwardtoena crassirostris*), and Solomons Pied Monarch (*Symposiachrus barbatus*), Pied Goshawk (*Accipiter albogularis*), Brown-winged Starling (*Aplonis grandis*), Solomons Corella (*Cacatua ducorpsii*), Buff-headed Coucal (*Centropus milo*), Guadalcanal Dwarf Kingfisher (*Ceyx nigromaxilla*), Cardinal Lory (*Chalcopsitta cardinalis*), North-melanesian Cuckoo-Shrike (*Coracina welchmani*), White-billed Crow (*Corvus woodfordi*), Midget Flowerpecker (*Dicaeum aeneum*), Pacific Imperial Pigeon (*Ducula pacifica*), Pale Mountain-pigeon (*Gymnophaps solomonensis*), Yellow-bibbed Lory (*Lorius chlorocercus*), Green Pygmy Parrot (*Micropsitta finschii*), Chestnut-bellied Monarch (*Monarcha castaneiventris*), Steel-blue Flycatcher (*Myiagra ferrocyanea*), Black-headed Myzomela (*Myzomela melanocephala*), Oriole Whistler (*Pachycephala orioloides*), Pacific Robin (*Petroica pusilla*), Yellow-banded Fruit-Dove (*Ptilinopus solomonensis*), White-winged Fantail (*Rhipidura cockerelli*), Ultramarine Kingfisher (*Todiramphus leucopygius*), and Grey-throated White-eye (*Zosterops rendovae*) • Other species: Bird species recorded in the project area (see Appendix A).
Sites	• Pre-establishment: opportunistic observations and targeted searches along equidistant parallel transects across the areas to be cleared within the DIA. • Construction and Operational Phase: ○ Roads: A total of five monitoring points to be established in sites where sensitive species are identified during the pre-establishment phase. ○ Revegetation and Rehabilitation areas: monitoring points as detailed in the PCRRP (PCRRP; C4). ○ Reservoir: Point survey at two locations in the reservoir area.
Transects	• Pre-establishment: Equidistant parallel transects across the entire area to be cleared within the DIA. Transects to be 10m apart from each other. • Construction and Operational Phase: Monitoring points as described in survey methods below.
Time of the Year	• Pre-establishment: during pre-clearance and clearing. • Construction and Operational Phase: Dry season (May – October) and wet seasons (November- April).
Survey Method	**Pre-establishment:** The following survey methods are to be used:

Item	Survey Requirement

	• Pre-clearance:
	  ○ Prepare a map with parallel transects separated by 10m from each other and across the areas to be cleared within the DIA.
	  ○ Upload transects in a hand-held GPS to navigate through them and keep track of walked transects.
	  ○ Walk along the transect lines undertaking rapid bird observations and targeted bird survey in suitable habitat for bird species. If a threatened or restricted range species is present, the following actions are to be undertaken:
	  ▪ Take a waypoint with GPS, collect a photographic record and tag the plant or area (ensure flagging tape is visible so that others can easily identify the location).
	  ▪ Record in the Field Data Sheet the species name and number of individuals. Report to the HSE Manager.
	  ▪ Report findings on the day of survey for actions to be taken in accordance to the BMP by the a terrestrial ecologist (Kevin Sese). Note if threatened species had been observed (see Table 4-2).
	Construction and Operational Phase:
	• Clearance: A capture-and-release method will be used to translocate fauna outside from the clearing area. A qualified fauna handler/catcher will carefully capture the animal to be released to an adequate area.
	• Reservoir: Visual and auditory surveys to be undertaken (diurnal and nocturnal) at two points at the Reservoir area. Each survey to be undertaken for 20 minutes using binoculars and recording the species and number of individuals observed.
	• Road and Revegetation/Rehabilitation areas: Plot counts: visual and auditory survey at a set location (sampling station) for a duration of 20 minutes. Plot dimensions as detailed in the PCRRP. All bird species seen or heard will be recorded in the fauna survey datasheet. Two diurnal and two nocturnal plot counts to be undertaken at each location per season.

Effort per Monitoring Event	• **Areas to be cleared:** pre-clearance survey across the entire area to be cleared. Clearance supervision during entire duration of clearing works. • **Construction and Operational Phase:** Two nocturnal and two diurnal surveys per season (i.e. Setting up ongoing camera traps and remain in place throughout project monitoring period and downloading a footage 3 monthly).
Frequency	• **Pre-establishment:** once during pre-clearance and during clearing. • Construction and Operational Phase: twice a year.
Data Collation	Birds species list, and the number of birds seen or heard at a set location (the species of the bird seen or heard must be also recorded)
Analysis	Species diversity and species abundance

Item	Survey Requirement
Reporting	See **Error! Reference source not found.**.

Table 3-5: Survey Requirements for Mammals

Item	Survey Requirement	
Target species	• Priority species	• Emperor Rat (Uromys imperator), Guadalcanal Monkey-faced Bat (Pteralopex atrata), Guadalcanal Rat (Uromys porculus), and King Rat (Uromys rex)
	• Other species	• Mammal species recorded in the project area including invasive species (see Appendix A).
Sites	• Pre-establishment	• opportunistic observations and targeted searches along equidistant parallel transects across the areas to be cleared within the DIA.
	• Construction and Operational Phase	• Roads: A camera trap line to be set up at each of five monitoring sites to be established • Revegetation and Rehabilitation areas: A camera trap line to be set up at each monitoring site as detailed in the PCRRP (PCRRP; C4). • Reservoir: Two camera trap lines to be set up along the reservoir area.
Transects	• Pre-establishment	• Equidistant parallel transects across the entire area to be cleared within the DIA. Transects to be 10m apart from each other.
	• Construction and Operational Phase	• Monitoring sites as described in survey methods below.
Time of the Year	• Pre-establishment	• During pre-clearance and clearing.
	• Construction and Operational Phase	• Dry season (May – October) and wet seasons (November – April).
Mammal's active times		Recommended survey times for mammal groups: • Dusk: The peak foraging time of fruit bats is dusk, they can be found active during the day or night. • Nocturnal groups include the flying foxes, leaf-nosed bats, rodents, marsupials. • Diurnal: wild pig.

Item	Survey Requirement	

Survey Method	• Pre-establishment	The following survey methods are to be used:
		• Pre-clearance
		  ○ Prepare a map with parallel transects separated by 10m from each other and across the areas to be cleared within the DIA.
		  ○ Upload transects in a hand-held GPS to navigate through them and keep track of walked transects and the location of the camera traps.
		• Report findings on the day of survey for actions to be taken in accordance to the BMP by a terrestrial ecologist, Kevin Sese (see Table 2-1). Note if threatened or ecologically significant species had being observed (see Table 4.).

		Uromys rodents • Transect surveys should be undertaken to detect the presence of Uromys at the development site. • Searches for chewed ngali nuts will provide a reliable indicator of their presence or absence. • The optimal time to survey using this method is October –January when the fruiting season is in progress or has recently finished. • In the event that chewed ngali nuts are discovered, more intensive methods (such as camera traps) can be deployed to confirm species identity. • During this process, the locations of ngali nut trees can be recorded to avoid clearing or mitigate for the potential presence of Uromys during clearing operations. Camera setup: • Cameras should be set in the canopy of lowland rainforest trees (especially *Canarium indicum, Canarium salomonsense* and *Dillenia salomonense*). • Cameras should be baited using canisters filled with fibre wadding soaked in ngali nut oil, or if ngali nut oil is unavailable, peanut or sesame oil. • The timing – fruiting season for *Canarium indicum* is September – November and this is an ideal time to target specific areas where ngali nuts occur. • Uromys rodents are nocturnal and so camera traps

Item	Survey Requirement	
		should focus on nocturnal hours. • Cameras can be left deployed for up to 12 months.
		Pteralopex • Pteralopex are relatively high-flying species rarely detected in mist nets set within the forest understory. • They are best detected via the use of canopy mist nets, which are set on ropes up to 30 metres above the forest floor. • This is a labour-intensive method, and successful capture often depends on expert knowledge and direct experience with these species. • Nets should be placed around 15–20m above the ground using ropes and positioned over clearings on ridgelines, over waterways or small tracks, or adjacent to fruiting trees to maximise captures. • October is a suitable time when ngali nuts, mangoes and stem-fruiting fig trees have fruit and are attracting Pteralopex. • Peralopex are nocturnal and so mist netting needs to be undertaken during nocturnal hours. • A standard survey of a site using mist nets should be a minimum of four nights in duration. A minimum number of two mist nets should be deployed. This should be increased if personnel are available. • Transect surveys should be undertaken to detect the presence of Pteralopex at the development site. • During this process, the locations of ngali nut trees can be recorded to avoid clearing or mitigate for the potential presence of Pteralopex during clearing operations. • The presence of Pteralopex can be surveyed for via searches for chew plugs. These signs are created by the animals chewing leaves, bark and tough fruits, extracting the juices and ejecting the tough pulp onto the forest floor. This method is a possible indicator only as species of Pteropus (notably *P. rayneri*) also create chew plugs. Areas with these signs could be targeted with mist net surveys for species confirmation

Item	Survey Requirement	
	• Construction and Operational Phase:	**Clearance** • A capture-and-release method will be used to translocate fauna outside from the clearing area, particularly in occupancy areas identified during pre-clearance. • A qualified fauna handler/catcher will carefully capture the animal to be released to an adequate area. • In the event that the presence of arboreal mammals or bats are detected on a tree, tree felling will be postponed until the animal has left the tree on its own accord. • Generation of mild human noise disturbance (e.g. talking loudly) may be used to encourage fauna movement. However, no attempt should be made to capture or handle these species, unless the animal is visibly injured in which case experienced wildlife handlers will carefully capture the animal for immediate veterinary attention. • If any individual fauna does not move on its own after sufficient time (i.e. up to one hour) has passed, the area where the individual is located should be GPS-marked and left overnight to provide additional opportunity for the individual to move on its own accord. Personnel shall return to the GPS-marked location on the following day to inspect the area. This process will be repeated until the individual has moved. **Reservoir** • Monitoring of small ground-dwelling mammals (Uromys species) in the reservoir area will require setting up trap lines at densities of two trap lines per 5 hectares. • A trap line consists of 10 Elliot or cage traps placed 10 metres apart in two parallel straight lines (transects) separated 25 metres (i.e. 20 Elliot traps per monitoring site). Bait and set traps for four consecutive nights. Check traps early in the morning and close during the day. Record species in the field data sheet. **Road and Revegetation/Rehabilitation areas** • Plot counts: o visual and auditory survey at a set location

Item	Survey Requirement	
		(sampling station) for a duration of 20 minutes. ○ Plot dimensions as detailed in the BMP and/or PCRRP. ○ All aerial mammals' species seen or heard will be recorded in the fauna survey datasheet. ○ A diurnal and a nocturnal plot counts is to be undertaken at each location per season. • Trapping: ○ small ground-dwelling mammals to be monitored with traps as per method and density described for Reservoir.
Effort per Monitoring Event	• **Areas to be cleared**	Pre-clearance survey across the entire area to be cleared. Clearance supervision during entire duration of clearing works.
	• **Construction and Operational Phase**	• Two nocturnal and two diurnal surveys per season. - Setting up ongoing camera traps and remain in place throughout project monitoring period and downloading a footage 3 monthly - Small ground-dwelling mammals: One trap line per monitoring site as per details in this plan as per method in BMP and PCRRP.
Frequency	• **Pre-establishment**	• Once during pre-clearance and during clearing.
	• **Construction and Operational Phase**	• twice a year.
Data collation	Mammal species list, and the number of mammals seen or heard at a set location (the species of the mammal seen or heard must be also recorded)	
Analysis	Species abundance and species diversity	
Reporting	See Table 4-2	

Table 3-6: Survey Requirements for Reptiles

Item	Survey Requirement
Target species	• Priority species: Guadalcanal Bow-fingered Gecko (*Cyrtodactylus biordinis*), Solomons Black-banded Krait (*Loveridgelaps elapoides*), and Schmidt's Crocodile Skink

Item	Survey Requirement
	(*Tribolonotus schmidti*) • Other species: reptile species present in the project area (see Appendix A).
Sites	• Pre-establishment: opportunistic observations and targeted searches along equidistant parallel transects across the areas to be cleared within the DIA. • Construction and Operational Phase: o Roads: A total of five monitoring points to be established in sites where sensitive species are identified during the pre-establishment phase. o Revegetation and Rehabilitation areas: monitoring points as detailed in the PCRRP (PCRRP; C4). o Reservoir: Point survey at two locations in the reservoir area.
Transects	• Pre-establishment: Equidistant parallel transects across the entire area to be cleared within the DIA. Transects to be 10m apart from each other. • Construction and Operational Phase: Monitoring points as described in survey methods below.
Time of the Year	• Pre-establishment: during pre-clearance and clearing. • Construction and Operational Phase: Dry season (May – October) and wet seasons (November – April).
Survey Method	Pre-establishment: The following survey methods are to be used (Morrison et al., 2007): • Pre-clearance: **Nocturnal Surveys** o Surveys will be undertaken during the evening between 2000-2200 at each site by four searches (search effort = 8 person hours/site) o Prepare a map with parallel transects separated by 10m from each other and across the areas to be cleared within the DIA. o Upload transects in a hand-held GPS to navigate through them and keep track of walked transects o Walk along the transect lines at each location, in suitable habitat for species listed in Table A5.1. When walking along each transect, active visual searches (e.g., in and on vegetation, between rocks, along streams, on creek banks, on the forest floor, under leaf litter etc.) and acoustic surveys will occur. o Whenever a target species is located, the following actions will take place: ▪ Take a waypoint with GPS, collect a photographic record and tag the plant or area (ensure flagging tape is visible so that others can easily identify the location). ▪ Record in the Field Data Sheet the species name and number of individuals,

Item	Survey Requirement
	habitat type and any other important ecological features. ▪ Report findings on the day of survey for actions to be taken in accordance to the BMP by a terrestrial ecologist, Kevin Sese (see Table 2-1 and Table 4-2). Note if threatened species have being observed. **Diurnal Surveys** o Surveys will be undertaken during the day between 0700-1000 at each site, by two searches o Prepare a map with parallel transects separated by 10m from each other and across the areas to be cleared within the DIA. o Upload transects in a hand-held GPS to navigate through them and keep track of walked transects o Walk along the transect lines at each location, in suitable habitat for species listed in Table A5.1. When traversing, active visual searches (e.g., in and on vegetation, the forest floor, under leaf litter and in rotten logs) will occur. Whenever a target species is located, the following actions will take place: ▪ Take a waypoint with GPS, collect a photographic record and tag the plant or area (ensure flagging tape is visible so that others can easily identify the location). ▪ Record in the Field Data Sheet the species name and number of individuals, habitat type and any other important ecological features. • Report findings on the day of survey for actions to be taken in accordance to the BMP by the HEC E&S Supervisor (see Table 2-1 and Table 4-2). Note if threatened species have being observed. Construction and Operational Phase: o Clearance: A capture-and-release method will be used to translocate fauna outside from the clearing area. A qualified fauna handler/catcher will carefully capture the animal to be released to an adequate area. o Reservoir: Diurnal visual surveys to be undertaken at two points at the Reservoir area. Each survey to be undertaken for 20 minutes searching for reptiles in suitable habitats (under rocks, logs, leaf litter, etc.) and recording the species and number of individuals observed. o Road and Revegetation/Rehabilitation areas: Plot counts: visual survey at a set location (sampling station) for a duration of 20 minutes. Plot dimensions as detailed in the BMP and/or PCRRP. All reptile species seen will be recorded in the fauna survey datasheet. Two diurnal plot counts to be undertaken at each location per season.
Effort per Monitoring Event	• **Areas to be cleared:** pre-clearance survey across the entire area to be cleared. Clearance supervision during entire duration of clearing works. • **Construction and Operational Phase:** Two diurnal surveys per monitoring point per season (i.e. Setting up ongoing camera traps and remain in place throughout project

Item	Survey Requirement
	monitoring period and downloading a footage 3 monthly).
Frequency	• **Pre-establishment:** once during pre-clearance and during clearing. • Construction and Operational Phase: twice a year.
Data Collation	Reptile species list, and the number of reptiles seen or heard at a set location (the species of the reptile seen or heard must be also recorded).
Analysis	Metrics and analysis as specified in the BMP to meet KPIs (see Table 3-8)
Reporting	See **Error! Reference source not found.**

3.1.3 Invasive Species Monitoring Methods

The objective of monitoring invasive species is to ensure that no increase in occurrence of non-native species occur over time and as result of the Project. This is particularly relevant as disturbed areas, e.g. roads, transmission lines and reservoir, has the potential to act as corridors for establishment of non-native invasive species.

Table 3-7 Survey Requirements for Invasive Species

Item	Survey Requirement
Target species:	All invasive species (see Table and Table in Appendix A).
Areas and Sites	• Opportunistically: Invasive Species will be surveyed opportunistically and concurrently with flora and fauna surveys during the pre-establishment, construction and operational phases. • The following targeted areas are required to be monitored with regards to invasive species: ○ Road access: the existing Black Post Road and the proposed access roads. ○ Reservoir: the entire reservoir area. ○ Dam and powerhouse: the entire project sites.
Time of the Year	• Opportunistically: at the time flora and fauna surveys occur. • Targeted areas: ○ Road access: monthly live trapping sessions along road access to monitor and remove invasive species (rats, feral cats) from the project area; ○ Reservoir: twice a year (Dry (May – October) and Wet season (November – April) during the entire operational phase of the Project). ○ Dam and powerhouse: dry season (May – October) and wet seasons (November – April).

Item	Survey Requirement

Survey Method	• Invasive Flora Species:
	  ○ Opportunistically during flora surveys. undertake a systematic survey (random meander transect) across the project area of influence.
	• Invasive Fauna Species:
	  ○ Opportunistically during survey of terrestrial fauna. undertake a systematic survey (random meander transect) across the project area of influence. Visual and auditory encounter surveys (diumal and noctumal) at a set location (sampling station) for a duration of 20 minutes, plot counts and mist netting will be used to identify terrestrial fauna species. Camera traps will also be used for surveying invasive species, and remain in place throughout the project monitoring period.
	  ○ Reservoir: undertake a systematic survey (random meander transect) across the entire surface of the reservoir and along its boundary.
	  ○ Invasive animals (feral cats, rats, cane toads and tadpoles) that are trapped during field surveys will be euthanized according to GIIP. When killing invasive species, humane procedures must always be used. These procedures must avoid distress, be reliable, and produce rapid loss of consciousness without pain until death occurs.
	  ○ Any invasive species appearing in the reservoir, such as Tilapia or Water Hyacinth, will be controlled immediately, through collection with nets, booms, etc. This monitoring will be done twice each year and will include surveys of the entire reservoir.
	  ○ Giant African Snails: undertake a systematic survey (random meander transect) at the project area, especially dam and powerhouse areas. It was introduced into Solomon Islands, most likely by foreign logging machinery contaminated with soil containing eggs. A washing station for construction equipment and machinery will be located at the area of Vera'ande village (along Black Post Road) where African Snails have already reached to protect carrying the eggs of them.

Frequency	• **Road access:** monthly during the construction and operational phases of the Project.
	  ○ Construction phase: monthly during the first six months of the construction phase, then based on results of monitoring the frequency can be reduced based on assessment of data.
	  ○ Operational phase: frequency to be established based on results of invasive fauna species population and frequencies observed during the construction phase. Annual assessment of data will be analysed to adapt monitoring frequencies during the operational phase of the Project.
	• **Reservoir:** Twice a year (Dry (May – October) and Wet season (November – April)) during the operational phase of the Project.
	• **Restoration and Revegetation Areas:** As defined in the BMP and PCRRP.

Item	Survey Requirement
Data collation	Invasive species list and distribution, and the number of invasive species seen or heard at a set location (the species of the amphibian seen or heard must be also recorded)
Analysis	Change in occurrence / number of invasive species
Reporting	See Table 4-2

3.2 EVALUATION

In accordance with the ESIA, collection of baseline data is required to be undertaken during pre-construction in order to gain an understanding of the baseline conditions of the terrestrial biodiversity. Periodic sampling should be subsequently carried out to measure potential changes to terrestrial flora and fauna that may result from construction and operation of the Project.

It has been estimated that the construction phase of the project will last 4.5 years (starting in 2020) and that the main construction works (i.e. dam, power house, tunnels, etc.) will commence subsequently to completion of the construction of the access road. It has been assumed that construction of the access road will be completed during Year 1.

Key performance indicators to ensure that no-net-loss occurs in the project area will be specified in the BMP and subsequently updated in Table 3-8 below.

Table 3-8: Evaluation Requirements

Group Monitored	KPI	Evaluation
Flora species	Species diversity and abundance approaching reference site(s)	Assessment of historical data and analysis required to measure KPIs.
Fauna Species	Species diversity and abundance approaching reference site(s)	Assessment of historical data and analysis required to measure KPIs
Invasive Species	No increase in occurrence of non-native rats or feral cats over time.	Analysis of frequency and distribution of occurrence of invasive species over time. Assessment of level of invasiveness over time and their adherence to KPIs.
	Manage invasive species in natural and critical habitats.	

3.3 OUTSTANDING INFORMATION

This section contains a summary of further tasks to be completed to inform development of the BMP and this FFMP. Specific actions to be completed in the early construction phase (and scheduled updates to this plan) are detailed in Section 5 of the Construction ESMP (P1 C-ESMP).

Offset Management

At the time of writing, the BMP is currently being finalised, pending Lender approval for construction works associated with the access road. Key biodiversity offset management tasks (relevant to this plan) that are outstanding and will be completed as a priority of the BMP include confirmation of:

- Extent (ha) of natural and critical habitat to be protected in the DIA from development

- Extent (ha) of modified habitat to be restored and protected in the DIA to achieve similar biodiversity values to the area of protected natural habitat, to contribute to net gain of critical habitat compared to baseline

A specialist Biodiversity Management Consultancy will be engaged by THL to finalise and implement the BMP during construction (including the preparation of a detailed biodiversity offset implementation framework and plan) for the Project. The management measures in the BMP outline the steps to identify suitable land, undertake implementation risk assessment and develop a detailed offset management plan.

THL will need the support of an international conservation organization to partner with them to achieve conservation outcomes in the medium to long term. They will bring expertise, knowledge, and funding opportunities and community engagement. This approach will also help to create linkages (spatial and collegial) with other conservation efforts on Guadalcanal / Solomon Islands / Melanesia. The mitigation measures in the BMP outline an approach to engaging with such an organization and developing the partnership.

Priority Species Confirmation

As discussed in Section 1.5, priority species (and particularly those which can be used as key indicators for biodiversity values) will be finalised in consultation with Project-affected stakeholders and local biodiversity experts (as detailed in the BMP).

Terrestrial Biodiversity Offset Baseline assessment – Proposed Access Road

A baseline assessment (walkthrough) has been conducted for targeted biodiversity elements, particularly for priority species and flora and fauna along the proposed access road. An additional Baseline Survey has been undertaken by Dr Lavery to provide current information on the terrestrial fauna including several priority species (notably *Uromys* spp. and *Pteralopex* spp.) Flora and fauna will be monitored as per this plan.

Establishment of Biodiversity Action Group

A Biodiversity Advisory Group (BAG) will be established and be composed of representatives of regional conservation groups with interests overlapping with those of the TRHDP, relevant government officials, and local experts (e.g. from academia). Meetings will be held six monthly and as required, aimed at coordinating conservation efforts, potentially including control of invasive species, such as non-native rats and cats, Giant African Snail (*Lissachatina fulica*), Cane Toad (Bufo marinus), and Little Fire Ant (*Wasmannia auropunctata*).

4. REPORTING AND AUDITING

4.1 AUDITING

HEC will be subject to internal and external audits. The internal audit will be conducted by the HEC Headquarter to the on-site team according to HEC's corporate internal HSE Audit Procedure (HEC-AH-H04-H13). This internal audit will be supported by a third party tax accounting firm and an employment specialist (to be hired early 2021). The internal examinations regularly performed by the on-site HEC staff are referred as inspections. External audits will be conducted by the E&S Manager from the THL, E&S Safeguards Manager from the PO, and the Owner's Engineer (OE).

The detailed structure and content of the auditing process is presented in the Project Construction Environmental Social Management Plan (CESMP; P1). Table 4-1 presents a summary of the process.

Table 4-1 Summary of auditing process

Auditor	Auditee	Frequency
THL E&S Manager	HEC	Every three months
PO E&S Safeguards Manager and Monitoring team (with LTA)	HEC and THL	Every three months
HEC Headquarter HSE Team	HEC on-site team	Every six months
HEC HSE Manager	Subcontractor	Every three months
HEC HSE team (with THL)	On-site workers	Every week
OE	HEC	Every six months

External and Internal auditors shall notify by email the HEC Project Management Team (Project Manager, Construction Manager and HSE Manager) about upcoming audit events. This will provide a mechanism to communicate the schedule, activities and objectives of the audits. If urgent, the Project Site may be notified via phone or fax.

The audit process involves reviewing on-site activities to assess compliance with the management plans and / or HEC internal standards. The auditor will review all records of previous audits and evaluate historic compliance and the use of appropriate corrective actions.

Findings from the audit will be summarised in an audit report. A copy of the resulting audit report is to be made available upon request for reference and, where necessary, implementation of any identified corrective actions.

The Key Performance Indicators to be considered when auditing this management plan are:

- Persistence of conservation significant species within the landscape;
- Area/number of invasive species managed;
- Presence and increase/decrease of invasive species;
- Number of animals rescued during catcher/spotter implementation; and
- Species diversity and abundance approaching reference site(s)
- No net loss of terrestrial biodiversity (as described further in the BMP; P2)

All reports are to be maintained at the project site for the entire construction period.

4.2 REPORTING

Reporting requirement for this monitoring plan are presented in Table 4-2. The qualified ecologist (or aquatic biologist) will communicate the results of the monitoring campaign to the HSE Manager. The HSE Manager distribute the report to the Project Manager and THL, which in turn will distribute to PO.

Table 4-2 Reporting Requirements for the FFMP

S/N	Auditing and Reporting Requirement	Person responsible for implementation	KPI	Implementation Action Reference	Person responsible for corrective action
1.	**Reporting Requirements**				
1.1	Invasive Species – Monthly Report (IS-MR). Letter-report to be issued within a week after completion of a monitoring event. The monthly letter-report will provide results of invasive species trapping and transacts, and monitoring to be issued by the ecologist to the HSE Manager.	HEC Terrestrial Ecologist as per Table 2-1	-Monthly letter reports is issued on time each month -Increase/ decrease of invasive species(Giant African Snail, etc.)	Table 4-3.	HEC HSE Manager
1.2	Flora and Fauna Monitoring Event	HEC Terrestrial	Flora and fauna monitoring event	**Error! Reference**	HEC HSE

S/N	Auditing and Reporting Requirement	Person responsible for implementation	KPI	Implementation Action Reference	Person responsible for corrective action
	Report (FF-MER) A FF-MER will be issued by the ecologist to the HSE Manager within two weeks of completion of the flora and fauna monitoring surveys.	Ecologist as per Table 2-1	report is submitted on time, during the reporting period	**source not found.**	Manager
1.3	Flora and Fauna Construction Monitoring Report (FF-CMR) ▪ To be issued within four weeks after completion of the construction phase of the Project. ▪ It will be a compilation of findings of all the FF-MERs and provide a general assessment of the conditions of the flora and fauna at the project area. ▪ The report is to be prepared by the Project's Ecologist and submitted to the HSE Manager.	HEC Terrestrial Ecologist as per Table 2-1	Flora and fauna monitoring event report is submitted on time, during the reporting period	**Error! Reference source not found.**	HEC HSE Manager
1.4	Adaptive Monitoring Requirements Identification of adaptive measures for the FFMP will be identified by the Ecologist on each report (FF-MER and FF-CMR) and their implementation in the next monitoring event. All adaptive measures are required to be reviewed and approved by the HSE Manager prior to the next monitoring event.	HEC Terrestrial Ecologist and THL E&S Manager per Table 2-1	Flora and fauna monitoring event report contains adaptive measurements and a timeline of when these will be completed, correlating to the next monitoring event	**Error! Reference source not found.**	HEC HSE Manager
1.5	Provide an update on monitoring in HEC's monthly report	HEC HSE Manager & HEC E&S Supervisor	Update provided in HEC's monthly report	As per items 1.1 – 1.4	HEC HSE Manager & HEC E&S Supervisor
2. Auditing Requirements					

S/N	Auditing and Reporting Requirement	Person responsible for implementation	KPI	Implementation Action Reference	Person responsible for corrective action
2.1	Auditing will be undertaken every three months and at completion of the construction phase of the Project.	THL E&S Manager as per Table 2-1	Auditing reports is scheduled and undertaken every three months	Table 4.	HEC HSE Manager

Table 4-3: Invasive Species – Reporting – for invasive species; and flora and fauna monitoring event

Item	Reporting Requirement	
	For invasive species	Flora and Fauna Monitoring Event
Report Name	Invasive Species Report – Date	Flora and Fauna Monitoring Event Report: Month – Year
Period of reporting	Date of the Monitoring Event occurred	Date the Monitoring Event occurred
Responsible	Ecologist	Ecologist
Content	As a minimum the following content will be included: ▪ Results of monthly results of transects and trapping. Tabular and graphical format, including historical results from pre-establishment to date.	As a minimum the following content will be included: ▪ Introduction ▪ Methods ▪ Results of monthly results of transects and trapping. Tabular and graphical format, including historical results from pre-establishment to date. ▪ Results of flora, fauna monitoring events during the monitoring period, including historical results (tabular and graphically). Adaptation monitoring requirements (if identified).
Due date	Within one week after completion of the trapping event.	Two weeks after completion of monitoring event.
Requirements for corrective actions	Invasive species are required to be managed as per the BMP and other sub-plans (e.g. FCP).	A daily flora and fauna report will be filled in each day containing details on daily observations which involve flora and fauna, such as any priority species identified during monitoring and/or clearing. This will be given to the Environment and Safety Team from HEC at the end of each day.

Item	Reporting Requirement	
	For invasive species	Flora and Fauna Monitoring Event
Person Responsible	The TRDHP Manager to engage a suitable person to undertake invasive species management (see Table 2-1).	N/A

Table 4.4: Auditing requirements

Item	Auditing Requirement
Report Name	Flora and Fauna Monitoring Auditing Report
Frequency	Interim Auditing reports: three monthly Final Auditing Reports: Two required, one to be issued at completion of monitoring requirements during the Construction Phase and the second at completion of the Operational Phase of the Project.
Responsible	E&S Manager from THL
Content	The Auditing report will provide results of assessment of monitoring requirements as per this FFMP and its updates incorporating adaptive monitoring measures.
Due date	Each annual report to be provided within two months of reception of the second season's FF-MER by the TRHDP-OP.

5. REFERENCES

ADB (2009) Safeguard Policy Statement. Asian Development Bank, June 2009.

ADB (2019) Asian Development Bank. Website accessed on 30 May 2019 via: https://www.adb.org/

CITES (2019) The CITES list. On-line resource accessed via: https://www.cites.org/eng/disc/species.php

Department of Environment and Heritage Protection (DEHP) (year unknown) Technical Manual: Interim hygiene protocol for handling amphibians. Online article accessed on the 11 October 2019 via: https://environment.des.qld.gov.au/__data/assets/pdf_file/0033/89592/tm-wl-amphibian-hygiene.pdf

IBAT Alliance (2019) IBAT report for Tina HPP Solomon Islands. Report generated by David Nicholson on 16/05/2019 under license number 523-1995 held by Environmental Resources Management.

IBRD/WB (2017) The World Bank Environmental and Social Framework. International Bank for Reconstruction and Development / The World Bank, Washington.

IFC (2012) Performance Standards on Environmental and Social Sustainability. International Finance Corporation (IFC), World Bank Group.

GISD (2019) Global Invasive Species Database. On-line database accessed on 31 May 2019 via: http://www.iucngisd.org/gisd/

IUCN (2014) IUCN Red List of Threatened Species.

Morrison, C., Pikacha, P., Pitakia, T., and Boseto, D., 2007. Herpetofauna, community education and logging on Choiseul Island, Solomon Islands: implication for conservation. Pacific Conservation Biology 13.

Pauku, R.L. and W.Lapo (2009) National Biodiversity Strategy and Action Plan for the Solomon Islands. Report prepared for the Ministry of Environment Conservation and Meteorology.

Pikacha P., Morrison C. and Richards S. (2008) Frogs of the Solomon Islands. Institute of Applied Science, The University of the South Pacific, Suva, Fiji.

THL (2019) Environmental Impact Statement (Expanded Summary based on ESIA 2017) for Tina River Hydropower Development Project, Solomon Islands. Tina Hydropower Limited (THL), April 2019.

TRHDP PO (2017) Environmental and Social Impact Assessment for Tina River Hydropower Development Project. Report prepared by Tina River Hydropower Development Project's Project Office (TRHDP PO) for Solomon Islands' Ministry of Mines, Energy and Rural Electrification.

WBG (2019) World Bank Group. Operational Policies available on-line and accessed on 29 May 2019 via: https://policies.worldbank.org/sites/ppf3/Pages/Manuals/Operational%20Manual.aspx

Annex A: Terrestrial Biodiversity Species Lists

Annex A presents Table A1, which combines all species identified within the Tina River catchment to date, including those identified in: the following species lists:

- 2017 ESIA
- 2019 EIS
- Further baseline flora and fauna survey commissioned by HEC in August 2020

This is followed by Tables A2 and A3 which identify known invasive species present in the Projetc area, as originally identified through the ESIA (2017) and EIS (2019) studies.

The list in Table A1 currently only contains IUCN Status (as of September 2020) and any observations noted regarding the species' habitat, where the species was identified as part of ESIA studies. The list will continue to be reviewed and updated as more information becomes available.

The following acronyms are the official status levels applied on the IUCN Red List (and which are applied in Table A1) in order of increasing threat to species:

- NE – Not Evaluated
- DD – Data Deficient
- LC – Least Concern
- NT – Near Threatened
- VU – Vulnerable
- EN – Endangered
- CR – Critically Endangered
- EW – Extinct in the wild
- EX - Extinct

Table A1 – Species identified within the Tina River catchment (including the Project DIA and Infrastructure Area), and their IUCN Status

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Plants				
Intsia bijuga	Borneo Teak, Kwila, Intsia, Ironwood	VU	Yes	Lowland rainforest
Intsia bijuga	Kwila, Intsia, Ironwood	Tree *, VU		
Oryza schlechteri	Wild Rice	EN	-	Landslips and beside rivers in shade or partial sun (70-340m asl)
Pterocarpus indicus	Papua New Guinea Rosewood / Rosewood	EN	Yes	This large tree species can grow up to 40 m in height. It grows within lowland rainforests as a emergent, canopy or subcanopy tree. The species is a pioneer and can occur in both primary and less commonly in secondary forests. The tree grows on all soils types and is most frequent along tidal creeks, rocky shore and some coastal sites.
Alpinia novae-pommeraniae	Wild Ginger	Ginger, Herb *, LC		
Alpinia oceanica	Ginger	Ginger, Herb, Not listed		
Alpinia purpurata	Ginger	Ginger, Herb, LC		
Alpinia stapfiana	Ginger	Ginger, LC		
Areca catechu	Betel nut	Palm *, LC		
Areca macrocalyx	Wild Betel nut	Palm, LC		
Aglaia ganggo	Aglaia	Tree, LC		
Alstonia scholaris	Milky Pine, Milky wood	Tree,-LC		
Alstonia spectabilis	Alstonia	Tree, LC		

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Barringtonia sp.	Barringtonia, Cut nut	Tree, LC		
Calophyllum peekelii	Calophyllum	Tree *, LC		
Calophyllum paludosum	Calophyllum	Tree *, Not listed		
Calophyllum neo-ebudicum	Calophyllum	Tree, LC		
Artocarpus altilis	Bread fruit	Tree *, LC		
Artocarpus vriense	Wild Bread fruit	Tree, LC		
Boerlagiodendron novo-guineensis	Boerlagiodendron	Tree, LC		
Canarium asperum	Wild Ngali nut, Canarium	Tree, LC		
Canarium indicum	Canarium, Big Ngali nut	Tree *, LC		
Canarium salomonense	Canarium, Small Ngali nut	Tree *, Not listed		
Cayratia trifolia	Cayratia	Vine, LC		
Commersonia bartramia	Commersonia	Tree, LC		
Cordyline terminalis	Cordyline	Herb, LC		
Donax canniformis	Donax	Herb, LC		
Dysoxylum excelsum	Dysoxylum	Tree *, LC		
Brousonnetia papyrifera	Paper Mulberry	Tree, LC		
Cananga odorata	Ylang ylang	Tree *, LC		

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Alocasia johstonii	Wild Taro	Herb, LC		
Clerodendrum buchanani	Clerodendrum	Shrub, LC		
Celtis latifolia	Celtis	Tree, LC		
Dioscorea sp.	Yam	Vine, Climber, LC		
Actinodaphne solomonensis	Actinod	Tree, LC		
Burckella obovata	Burckella	Tree *, LC		
Merremia pacifica	Merremia	Vine, Climber, LC		
Merremia peltata	Merremia	Vine, Climber, LC		
Mikania micrantha	Mile-a-Minute	Vine, Climber, LC		
Cryptocarya medicinalis	Cryptocarya	Tree *, LC		
Amoora cucullata	Amoora	Tree, LC		
Heliconia lanata	Heliconia	Herb, LC		
Heliconia solomonensis	Heliconia	Herb *, LC		
Macaranga dioica	Macaranga	Tree, LC		
Macaranga similis	Macaranga	Tree, LC		
Macaranga tanarius	Macaranga	Tree, LC		
Semecarpus forstenii	Semecarpus	Tree, LC		
Uncaria appendiculata	Water Rope	Liana, Woody vine, LC		

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Pometia pinnata	Taun, Akwa, Maple tree, Dawan	Tree, LC		
Gmelina moluccana	Canoe wood, Gmelina	Tree *, LC		
Litsea purglabra	Litsea	Tree, LC		
Garcinia sessilis	Garcinia	Tree, LC		
Garcinia solomonensis	Garcinia	Tree *, Not listed		
Guillainia purpurata	Ginger	Herb *, LC		
Grammatophyllum speciosum	Giant Orchid	Herb, Orchid *, Not listed		
Dennstaedtia sp.	Dennstaedtia Fern	Ground Fern, LC		
Lygodium palmatum	Lygodium Fern	Climbing Fern, LC		
Heritiera solomonensis	Bush Heritiera	Tree *, LC		
Dysoxylum caulostachyum	Dysoxylum	Tree, LC		
Mangifera indica	Wild Mango	Tree *, DD		
Trichospermum psilocladum	Trichosperma	Tree, LC		
Cinnamomum solomonense	Cinammon	Tree, LC		
Vitex cofassus	Vitex, Vasa	Tree *, LC		
Vitex negundo	Vitex	Tree, LC		
Celtis philippinensis	Celtis	Tree, LC		

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Ficus septica	Ficus, Fig tree	Tree, Shrub, LC		
Ficus wassa	Ficus, Fig tree	Tree, LC		
Alocasia macrorrhiza	Wild Giant Taro	Herb, LC		
Selaginella rechingeri	Selaginella	Herb, Fern Ally, LC		
Elatostema salomonense	Elatostema	Herb *, LC		
Belliolum haplopus	Belliolum	Tree, LC		
Falcataria moluccana	White Albizia	Tree*, LC		
Pandanus sp	Pandanus	Pandanus, Tree, LC		
Calamus hollrungii	Calamus, Lawyer Cane	Climbing Palm *, LC		
Calamus stipitatus	Calamus, Lawyer Cane	Climbing Palm *, LC		
Calamus vestitus	Calamus, Lawyer Cane	Climbing Palm, LC		
Begonia salomonensis	Begonia	Herb *, DD		
Broussonetia papyrifera	Paper Mulberry	Tree – Introduced *, LC		
Pleomele angustifolia	Pleomele	Shrub, Herb, LC		
Caryota rumphiana	Caryota Palm	Palm, LC		
Scindapsus salomoniensis	Scindapsus	Climber, Herb *, LC		
Schizostachyum tessellatum	Bamboo	Bamboo *, LC		
Schleinitzia novo-guineensis	Schleinitzia	Tree, LC		

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Sterculia parkinsonii	Sterculia	Tree, LC		
Piper wichmanii	Piper	Herb, False Kava, LC		
Piper betle	Piper	Herb *, LC		
Ptychosperma solomonense	Ptychosperma	Palm *, LC,		
Physokentia insolita	Physokentia	Palm *, Endemic, LC		
Heterospathe minor	Heterospathe	Palm, LC		
Heterospathe solomonense	Heterospathe	Palm *, Endemic, LC		
Albizzia falcate	Albizzia, Paraserianthes	Tree, LC		
Bambusa blumeana	Yellow Bamboo	Bamboo *, Not listed		
Ficus longifolia	Ficus, Fig tree	Tree, LC		
Euphorbia hirta	Euphorb	Herb, LC		
Mucuna elegans	Mucuna	Climber, LC		
Licuala lauterbachii	Licuala Palm	Palm, LC		
Nastus racembambose	Climbing Bamboo	Bamboo *, LC		
Timonius timon	Timonius	Tree, LC		
Terminalia complanata	Terminalia	Tree, LC		
Terminalia brassii	Brown Terminalia	Tree *, NT		
Terminalia sepicana	Terminalia	Tree, LC		

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Terminalia calamansanai	Yellow Terminalia	Tree*, LC		
Glochidion arborescens	Glochidion	Tree, LC		
Solanum torvum	Devil's Fig	Shrub, Herb, LC		
Hornstedtia scottiana	Sweet Ginger	Ginger *, LC		
Carica papaya	Pawpaw, Papaya	Tree, LC		
Ficus bracteata	Ficus, Fig tree	Tree, LC		
Pimeleodendron amboinicum	Pimeleodendron	Tree, LC		
Rhopaloblaste elegans	Rhopaloblaste	Palm, LC		
Kleinhovia hospital	Kleinhovia	Tree, LC		
Erythrina sp.	Erythrina	Tree, LC		
Elaeocarpus sphaericus	Elaeocarpus	Tree*, LC		
Dracontomelum sp.		Tree *, Rare, LC		
Homalanthus tatambense	Homalanthus	Tree, LC		
Nastus obtusus	Green Bamboo	Bamboo, NT		
Fagraea racemosa	Fagraea	Tree, LC		
Leucosyke salomonensis	Leucosyke	Tree, Shrub *, LC		
Hibiscus tiliaceus	Yellow Hibiscus	Tree, LC		
Pullea sp.	Pullea	Tree, LC		

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Ficus benjamina	Ficus, Fig tree	Tree, LC		
Schizaea sp.		Fern Ally, LC		
Pueraria sp.	Pueraria	Climber/Creeper, LC		
Finschia chloroxantha	Finschia	Tree *, LC		
Juniperus semiglobosa	Pencil Cedar	Tree *, LC		
Neonauclea orientalis	Neonauclea	Tree *, Not listed		
Nothofagus sp.		Herb, LC		
Phreatia sp.	Orchid	Herb, LC		
Saurauia purgans	Saurauia	Tree, LC		
Diplazium esculenta	Diplazium	Fern, LC		
Pipturus argenteus	Pipturus	Tree, LC		
Cyathea vittata	Cyathea fern	Tree fern, LC		
Wollastonia biflora	Wedelia	Shrub/Herb, LC		
Amphibians				
Litoria lutea	Treefrog	VU	-	This species is arboreal, and found in tropical rainforest. It possibly breeds in swamps in forests. In Bougainville it has been observed laying eggs on the vertical surface of trees above water-filled tree holes; the tadpoles then fall into the water.
Cornufer malukuna	Malukuna Webbed Frog	DD	-	Known to occur at 760 m. Not observed since 1968. No surveys done.
Batrachylodes vertebralis	Fauro sticky-toed frog	Least Concern (LC)		

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Batrachylodes trossulus	Torakino sticky-toed frog	Least Concern (LC)		
Ceratobatrachus guentheri	Guenther's triangle frog	Least Concern (LC)		
Discodeles bufoniformis	Warty webbed frog	(LC)		
Discodeles malukuna	Malukuna webbed frog	Data Deficient (DD)		
Discodeles guppyi	Giant webbed frog	(LC)		
Litoria thesaurensis	Treasury Island tree frog	(LC)		
Platymantis guppyi	Solomon Islands giant tree frog	(LC)		
Platymantis solomonis	Solomon Islands palm frog	(LC)		
Rana kreffti	San Cristobal tree frog	(LC)		
Rinella marina	Cane toad, Marine toad, Giant toad	(LC)		
Mammals				
Uromys imperator	Emperor Rat	CR	-	It seems as though this was a largely terrestrial species that was at one point found throughout much of Guadalcanal, including the dry northern lowlands and areas close to the coast. Later reports suggest that the species became restricted to mossy montane forest (Flannery 1995). Dr Lavery considers this species unlikely to be present at the site, as it has not been recorded since 1888.

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Pteralopex atrata	Guadalcanal Monkey-faced Bat	EN		There is little known about the habitat and ecology of this species. Flannery (1995) observed animals feeding upon unripe mangoes in an old garden. The most recent record was a subadult male captured in September 2015 on the edge of primary forest adjacent to a garden area with fruiting trees, including mangoes, ngali nuts (Canarium indicum), a stem-fruiting fig (Ficus sp.), and coconut palms. A large adult animal had been observed in the same location hanging from the fig in November 2014 (T. Lavery pers. comm). The species is probably dependent on undisturbed, old growth forests, and seems to roost in tree hollows. Its roosting habits likely render it subject to similar hunting and roost destruction threats faced by P. anceps on Bougainville (S. Hamilton pers. comm.), and also make it vulnerable to commercial logging. Dr Lavery considers this species to be likely present, as it has been recorded approx. 20km from the site between 2016 and 2019.
Uromys porculus	Guadalcanal Rat	CR		This species is known only from the holotype. However, it is considered that Guadalcanal has not been adequately surveyed for this species. Dr Lavery considers this species unlikely to be present at the site, as it has not been recorded since 1888.
Uromys rex	King Rat	EN	-	This arboreal species has been recorded from primary tropical moist forest, including relict patches of native forest. Dr Lavery considers this species likely to be present at the site, as it has not been recorded only 5km from the site in 2015.

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Pteropus rayneri	Solomon's Flying Fox	NT	Yes	This species often roosts in large colonies, but is also commonly seen roosting in small groups of 5-12 individuals or singly underneath caves and limestone overhangs, within the hollows of strangler figs (Ficus spp.) and concealed within the dead overhanging leaves of Pandanus. Favoured colony sites are close to the coast and among mangroves or swamp vegetation. The species is estimated to have a generation time of five to six years (S. Hamilton and T. Leary pers. comm).
Melonycteris fardoulisi	Fardoulis' Blossom Bat	NT		It has been recorded from primary montane tropical forest (Mount Makarakomburu, Guadalcanal) and in many other habitat types (e.g., lowland forest, disturbed areas).
Melonycteris woodfordi	Woodford's Blossom Bat	LC		It is known from primary tropical forest, but is also commonly found in disturbed habitats including secondary forest, rural gardens, and coconut plantations (Bonaccorso 1998, Flannery 1995). It roosts in foliage in small groups or individually and likely forages over a relatively small home range (S. Hamilton pers. comm.).
Phalanger orientalis	Northern Common Cuscus	LC		
Sus scrofa	Wild Boar	Least concern (LC)		
Canis familaris	Wild Dog	Not listed		
Felis domesticus	Wild Cat	Not listed		
Reptiles				
Cyrtodactylus biordinis	Guadalcanal Bow-fingered Gecko	LC~~/RR~~	Understood to occur within the	This fairly common restricted-range species occurs only on Guadalcanal. It is known from elevations of 300-500 m, rarely lower, and mainly lives on smaller trees and vines in the understorey of forest (Allison 2013). It

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
			TRHDP based on local knowledge	appears to have been recorded from the project area, on the basis of local knowledge (ESIA Appendix C). Within the project DMU, there is only about 33 km2 of suitable habitat. Nonetheless, given the limited range of this species, this is likely to represent more than 1% of the species' global distribution and population.
Cyrtodactylus salomonensis	Solomons Bent-toed Gecko	NT	-	It appears that the species can persist in moderately disturbed habitats. This is a strictly arboreal species, most commonly found on the larger forest trees where at night it comes down from the canopy to within a few meters of the ground (M. McCoy pers. comm. October 2011).
Loveridgelaps elapoides	Solomons Black-banded Krait	VU	-	Cryptozoic, sheltering under fallen leaf litter and fallen timber and tends to be crepuscular or nocturnal (McCoy 2006). It appears to be limited to primary forest (M. McCoy pers. comm. December 2011). It may be that this species has a diet consisting exclusively of snakes (M. McCoy pers. comm. December 2011). Its main prey appears to be blind snakes.
Tribolonotus schmidti	Schmidt's Crocodile Skink	LC	-	This small 'crocodile skink' is "cryptozoic in habit and generally lives in moist conditions under fallen timber in forest areas. .... and is dependent upon cool, moist conditions...it is probably mostly diurnally active...feeds mainly on small insects and their larvae....and gives birth to a single young" (McCoy 2006).
Ramphotyphlops depressus	Melanesia Blind Snake	LC		
Boiga irregularis	Brown Tree Snake	LC		
Dendrelaphis calligaster	Green Tree Snake	LC		
Cyrtodactylus salomonensis	Ring-tailed Gecko	NT		
Emoia pseudocynura	Solomons Blue-tailed	LC		

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
	Skink			
Hypsilurus macrolepis	Solomons Tree Dragon	NT		
Birds				
Aplonis brunneicapillus	White-eyed Starling	VU	-	It has been recorded breeding colonially in both lowland swamp and hill forest. It is not known whether it usually nests in isolated trees or whether colonies were originally in closed forest (Coates 1990). Foraging birds have been recorded in forest, forest edge and secondary growth, feeding on fruit, sometimes in flocks (Beecher 1945, Finch 1986, Gibbs 1996, Marki et al. 2014).

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Columba pallidiceps	Yellow-legged Pigeon	VU	-	It has been recorded only in primary or tall secondary forest, with most records from hills up to c.650 m, but also in lowlands and one recent record at 1,300 m (Dutson 2011). It appears to be principally a subcanopy species, often seen feeding on fruiting gaivou trees at Hauta (Buckingham et al. 1995, R. James in litt. 1999), but its long stout legs suggest that it is partly terrestrial, and is thought to be partially nomadic. It is not exclusively a ground feeder, and congregates in gaiwou trees (Lauraceae, possibly a Litsea species) when they are fruiting. Between 1995 and 1996, it was common to see up to five Yellow-legged Pigeons feeding in a fruiting gaiwou tree. While occasionally seen in lowland coastal forest, it was most frequently seen in hill forest between 400 and 600 m altitude in the Bauro area.
Ducula brenchleyi	Chestnut-bellied Imperial Pigeon	VU	-	It is usually recorded in primary forest but also occurs in fruiting trees in degraded forest and gardens (Cain and Galbraith 1956, Buckingham et al. 1995, R. James in litt. 1999). Recent records have been from sea-level to 700 m, but has been reported by local villagers on Guadalcanal as occurring in mist-forest (Cain and Galbraith 1956, Buckingham et al. 1995). It appears to be nomadic (G. Dutson pers. obs. 1997-8, J. Waihuru verbally 1998, R. James in litt. 1999): at Hauta, birds congregate to feed on banyan figs for about a week until the fruit is finished and then disperse, often over large distances (Cain and Galbraith 1956, J. Waihuru verbally 1998, R. James in litt. 1999).
Eurostopodus nigripennis	Solomons Nightjar	VU	-	Occurs in forests and woodland alongside beaches and is confined to coasts, occurring from sea level to 300 m. (Holyoak 2001, Cleere 2010). Often roosts and nests on sandy beaches, but not lagoon beaches, as well as beside mature lowland moist forest (Dutson 2011). Breeding is thought to take place between October and December (Cleere 2010).
Haliaeetus sanfordi	Sanford's Sea-Eagle	VU	Yes	It prefers forested coasts (G. Dutson pers. obs. 1997-1998, Read 2013)

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
				where it scavenges and kleptoparasitises Osprey Pandion haliaetus (Blaber 1990, Webb 1992, G. Dutson pers. obs. 1997-1998). Some pairs also hunt far inland and others, especially on the eastern islands, appear to have entirely inland ranges where they prey largely on northern common cuscus Phalanger orientalis and perhaps arboreal rats and fruit bats (Buckingham et al. 1995, Olsen 1997, J. Hornbuckle in litt. 1999). It has been observed along primary rainforest lined rivers and over peaks in montane forest at elevations of 1,100 m, away from freshwater lakes (Pikacha et al. 2012). This species makes significant use of primary forests (Buckingham et al. 1990) but also hunts over open habitats such as deforested areas where it is reported to scavenge dead mammals including feral dogs (G. Dutson pers. obs. 1997-1998).
Charmosyna margarethae	Duchess Lorikeet	NT	-	It is usually found in lower montane forest, it occurs from sea-level to 1,350 m and in coconut plantations (Cain and Galbraith 1956, Diamond 1975b, Schodde 1977, Buckingham et al. 1995, G. Dutson pers. obs. 1997-1998). It may be nomadic and reliant on a combination of habitats at different altitudes. It feeds on pollen, nectar and some small fruits such as Schefflera.
Edolisoma holopolium	Solomon Cicadabird	NT	-	It occupies the canopy of hill and lowland forest from sea-level to 950 m.
Hypotaenidia woodfordi	Guadalcanal Rail	NT	-	It had been assumed to be a species of lowland forest, as supported by records from Guadalcanal in patchy forest (Webb 1992, G. Dutson pers. obs. 1998). It may nest at any time of the year (Hadden 2002) and may do so near to streams (Webb 1992). It is said to be omnivorous (Webb 1992) and has been observed wading into streams to feed (Hadden 2002).
Ninox granti	Guadalcanal Boobook	NT	-	It inhabits forest, including edges and patches of forest, up to 1,500 m, with some roosting in thickets (Dutson 2011).
Reinwardtoena crassirostris	Crested Cuckoo-Dove	NT	Yes	It inhabits primary forest in the hills to a maximum of 1,500 m, more usually to 1,000 m (Cain and Galbraith 1956, Schodde 1977, Coates 1985, Webb

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
				1992, D. Gibbs in litt. 1994, Buckingham et al. 1995, G. Dutson pers. obs. 1997-1998, R. James in litt. 1999) and is considered a frugivore (Davies et al. 2015).
Symposiachrus barbatus	Solomons Pied Monarch	NT	-	It occurs in primary and old-growth closed-canopy secondary forest to at least 1,200 m (Cain and Galbraith 1956, Schodde 1977, Coates 1990, Webb 1992, Buckingham et al. 1995, Dutson 2011). It is rare in flat lowland forest and heavily degraded forest (Dutson 2011).
Accipiter albogularis	Pied Goshawk	LC	-	Range of forests, including moist lowland and montane forests, as well as degraded and urban areas
Aplonis grandis	Brown-winged Starling	LC	Yes	Moist lowland forest as well as degraded and urban areas
Cacatua ducorpsii	Solomons Corella	LC	Yes	Dry and moist lowland forest
Centropus milo	Buff-headed Coucal	LC	Yes	Moist lowland forest, dry and moist shrubland, and degraded forests and gardens
Ceyx nigromaxilla	Guadalcanal Dwarf Kingfisher	LC	Yes	Occurs in forested habitats, not necessarily near watercourses and may tolerate secondary forest and plantations as noted in other Ceyx (del Hoyo et al.2001).
Chalcopsitta cardinalis	Cardinal Lory	LC	-	Moist lowland and mangrove forest as well as plantations
Coracina welchmani	North-melanesian Cuckooshrike	LC	-	Moist montane and lowland forests, mangroves, savannah and arable land
Corvus woodfordi	White-billed Crow	LC	Yes	The species is found in forest and some degraded forest habitats to an altitude of 1,000 m, occasionally 1,250 m.
Dicaeum aeneum	Midget Flowerpecker	LC	Yes	Wide range of forest, shrublands, grasslands, and disturbed habitats

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Ducula pacifica	Pacific Imperial Pigeon	LC	-	Moist lowland and montane forest, dry and moist shrubland
Gymnophaps solomonensis	Pale Mountain-pigeon	LC	-	Moist lowland and montane forest
Lorius chlorocercus	Yellow-bibbed Lory	LC	Yes	Moist lowland and montane forest, dry and moist shrubland, plantations and degraded habitat
Micropsitta finschii	Green Pygmy Parrot	LC	Yes	The species occurs in lowland forests to about 1,000 m
Monarcha castaneiventris	Chestnut-bellied Monarch	LC	Yes	Moist lowland and montane forest and dry forest and shrubland
Myiagra ferrocyanea	Steel-blue Flycatcher	LC	Yes	Moist lowland and montane forest, mangroves, gardens, degraded forests
Myzomela melanocephala	Black-headed Myzomela	LC	Yes	Moist lowland forest, rural gardens
Pachycephala orioloides	Oriole Whistler	LC	-	Moist lowland and montane forest, dry forest, savannah, mangroves, swamps
Petroica pusilla	Pacific Robin	LC	-	Lowland moist and dry forests, gardens, degraded forest, savannah, urban environments, plantations
Ptilinopus solomonensis	Yellow-banded Fruit-Dove	LC	-	Moist lowland and montane forests, degraded forests, rural gardens
Rhipidura cockerelli	White-winged Fantail	LC	-	It occurs in primary and closed secondary forest and forest edge to about 1,150 m. It is fairly uncommon and intolerant of degraded forest
Todiramphus leucopygius	Ultramarine Kingfisher	LC	-	Moist lowland forest, moist and dry shrubland, plantations, rural gardens
Zosterops rendovae	Grey-throated White-eye	LC	-	Moist lowland and montane forests, moist shrublands
Insects				

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
Lieftinckia lairdi	Dragonfly	EN	-	Freshwater /Swamps
Coracina lineata	Barred-Cuckooshrike	LC		
Aceros plicatus	Blyth's Hornbill	Not listed		
Trichoglossus haematodus	Coconut Lorikeet	LC		
Todiramphus chloris	Collared Kingfisher	LC		
Coracina tenuirostris erythropygia	Common Cicada Bird	Not listed		
Eclectus roratus	Eclectus Parrot	Not listed		
Collocalia esculenta	Glossy Swiftlet	LC		
Pachycephala implicata	Guadalcanal Hooded-Whistler	LC		
Mino kreffti	Long-tailed Myna	LC		
Macropygia ~~m.~~ mackinlayi	Mackinlay's Cuckoo-Dove	LC		
Aplonis metallica	Metallic starling	LC		
Hemiprocne mystacea	Moustached treeswift	LC		
Nycticorax caledonicus	Rufous Night-Heron	LC		
Cinnyris jugularis	Olive-backed Sunbird	LC		
Eudynamys orientalis	Eastern Koel	LC		
Ducula rubricera	Red-knobbed Imperial	NT		

Scientific Name	Common Name(s)	IUCN status[1]	Observed	Habitat
	Pigeon			
Aplonis cantoroides	Singing Starlin	LC		
Cacatua Ducorpsii	Solomons Corella	LC		
Dicrurus bracteatus	Spangled Drongo	LC		
Aerodramus vanikorensis	Uniform Swiftlet	LC		
Accipiter hiogaster	Variable Goshawk	LC		
Coracina papuensis	White-bellied Cuckooshrike	LC		
Rhipidura leucophrys	Willie wagtail	LC		
Ptilinopus solomonensis	Yellow-bibbed Fruit Dove	LC		

Table A2 - Invasive Species referred to in the ESIA (TRHDP OP 2017)

Species Name	Common Name
Plants	
Eichhornia crassipes	Water Hyacinth
Merremia peltata	Fitau, Abui
Broussonetia papyrifera	Paper Mulberry
Mikania micrantha	Mile-a-Minute
Mimosa invisa	Giant Sensitive Plant
Mimosa pudica	Shy Plant
Mammal	
Felis catus	Cats, Feral Cats
Canis lupus familiaris	Dog
Rattus exulatus	Polynesian Rat
Rattus rattus	House Rat
Amhibian	
Bufo marinus	Cane Toad
Invertebrates	
Achatina fulica	Giant African Snail
Wasmannia auropunctata	Fire Ant

Table A3 - Invasive Species, Guadalcanal Island (GISD 2019)

Scientific Name	Common Name	Kingdom	Phylum	Class	Order	Family	System
Acridotheres tristis	Common Myna	Animalia	Chordata	Aves	Passeriformes	Sturnidae	Terrestrial
Canis lupus	Dog	Animalia	Chordata	Mammalia	Carnivora	Canidae	Terrestrial
Cenchrus echinatus	Southern Sandbur, Spiny Sandbur	Plantae	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Terrestrial
Imperata cylindrica	Cogongrass, Kunai Grass	Plantae	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Terrestrial
Mus musculus	House Mouse	Animalia	Chordata	Mammalia	Rodentia	Muridae	Terrestrial
Rattus exulans	Polynesian Rat	Animalia	Chordata	Mammalia	Rodentia	Muridae	Terrestrial
Rattus rattus	Black Rat	Animalia	Chordata	Mammalia	Rodentia	Muridae	Terrestrial
Rhinella marina	Cane Toad	Animalia	Chordata	Amphibia	Anura	Bufonidae	Freshwater / Terrestrial
Sus scrofa	Wild Boar	Animalia	Chordata	Mammalia	Artiodactyla	Suidae	Terrestrial
Wasmannia auropunctata	Fire Ant	Animalia	Arthropoda	Insecta	Hymenoptera	Formicidae	Terrestrial

GISD (2019) Global Invasive Species Database. Accessed via: http://www.iucngisd.org/gisd/

Annex B: Field Data Sheets

Annex B includes the following field data sheets:

- Fauna data sheet
- Flora data sheet

Annex C: Dr. Lavery Report