Environment Social Management Plan/Public Environment Report

Baolo Solar Hybrid Subproject

January 2022

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ACRONYMS

AP	Affected Person
BMP	Building Materials Permit
BOQ	Bill of Quantities (BOQ)
CITES	Convention on International Trade in Endangered Species
SIEAREEP	Solomon Islands Electricity Access and Renewal Energy Expansion Project
ECD	Environment Conservation Division
EIA	Environment Impact Assessment
EIS	Environment Impact Statement
EMP	Environment Management Plan
EPC	Engineering Procurement Construction Contract
ERW	Explosive Remnants of War
ESIA	Environment Social Impact Assessment
ESMP	Environment Social Management Plan
CESMP	Construction Environment Social Management Plan
ESO	Environment Safety Officer
GEF	Global Environment Facility
GRM	Grievances Redress Mechanism
IDA	International Development Association
MECDM	Ministry of Environment, Climate Change, Disaster Management and Meteorology
MID	Ministry of Infrastructure Development
MMERE	Ministry of Mines Energy Rural Electrification
NAPA	National Adaptation Plan of Action
NEMS	National Environment Management Strategy
PER	Public Environment Report
RSIPF	Royal Solomon Islands Police Force
SDA	Seventh Day Adventist
SICA	Solomon Islands Christian Association
SIDS DOCK	Strategic Climate Fund and Small Islands Development State Initiative Multi-Donor Trust Fund
SIEA	Solomon Islands Electricity Authority
SIG	Solomon Islands Government
SINDS	Solomon Islands National Development Strategy 2011-2020
SINEP	Solomon Islands National Energy Policy 2014-2024
SIWA	Solomon Islands Water Authority
SOP	Standard Operating Procedures
SP	Solomon Power
SSEC	South Sea Evangelical Church
SWIM	Supporting Work in Mission
TCPB	Town Country Planning Board
UAE	United Arab Emirates
UXO	Unexploded Ordnance
WB	World Bank

EXECUTIVE SUMMARY

Subproject Background: Solomon Islands Electricity Authority (SIEA) trading as Solomon Power (SP) established under the Electricity Act 1969 is the sole provider of grid electricity throughout Solomon Islands. Within Honiara itself, it has two power stations (where more than 95% of the energy is from diesel generators) located at Lungga and Honiara producing a combined capacity of 32MW. Development partners over the last 10years have provided financial assistance to Solomon Power (SP) in its efforts to meet obligations under the Solomon Islands National Energy Policy 2014-2024 (SINEP).

Recently, World Bank (WB), Global Environment Facility (GEF), Strategic Climate Fund and Small Islands Development State Initiative Multi-Donor Trust Fund (SIDS DOCK) have agreed to finance capital works under the Solomon Islands Electricity Access and Renewal Energy Expansion Project (SIEAREEP). The SIEAREEP comprise of International Development Association (IDA) Credit 5.55m, IDA Grant 4.75m), and trust funds (Strategic Climate Fund 7.1m, GEF Grant 0.9m and SIDS DOCK grant 1.6m). The project development objective is to increase access to grid-supplied electricity and increase renewable energy generation in Solomon Islands. SP will therefore utilize this funding to increase its footprint throughout Solomon Islands through service connection subsidies and the expansion of solar farms at Henderson and Roof top of SP building together with Solar Hybrid systems and to increase the share of renewable energy from its current and proposed power stations. The project is divided into three (3) components:

Component 1: Involve installation of new hybrid mini-grids in key locations within Solomon Islands.

Component 2: involve new electricity service connections and subsidies for household wiring for low-income households accessing electricity services connecting to the mini-grids to be built under Component 1, and others across Solomon Power's grid network.

Component 3: involve installation of between 0.5MW and 2.5MW of solar (PV) generation to be connected to the existing grid on Guadalcanal and/or Malaita islands.

Planning and designs of the subprojects are underway by SP Engineers. The completion of the SIEAREEP project in the next five (5) years will go a long way in promoting the use of clean energy with minimal effects on the environment.

Subproject Location: The Baolo Solar Hybrid is a subproject under component 1. The subproject site is located on the north western end of Isabel Island and is fifteen minutes by OBM from the nearest airport, Suavanau, Isabel Province. The proposed solar site is located on a Perpetual Estate (PE) land in Baolo registered to five trustees. SP has acquired 1.446ha of the land.

Parcel Number	Area	Registered Owners	Tenure
071-004-001 (Lot 5 of LR 676)	704ha	Basil Manepuhi, Ezekiel Hilly, Michael Belama, Joses Lote and Manasseh Haridi	Perpetual Estate
07-004-8	1.446ha	Solomon Power	Fixed Term Estate

Subproject Scope of Work: Construction activities for the solar hybrid will be restricted to creating a driveway onto the site, removal of vegetation from the site, installing foundations for the solar arrays, erection of a secure building to house storage batteries, a diesel generator for generation backup and other ancillary equipment, installing the solar arrays and controllers, and installing of security fencing. Construction of the distribution grid will involve excavating holes for placement of power poles alongside existing roads and tracks, erecting the poles, stringing the power wires, and establishing the electrical connections to existing buildings.

Rational for Environment Social Management Plan or Public Environment Report: The WB Policy has been triggered for this subproject[1]. As a result, an Environment Social Management Plan (ESMP) or Public Environment Report (PER) has been developed. The Environment Social Management Framework (ESMF) outlines the environmental and social safeguards instruments for the SIEAREEP. Likewise, the subproject is classified under the "Public Works Sector" in the Solomon Islands Environment Act 1998. It is a prescribed development and requires an environment impact assessment.

Consultations: Community Consultations were conducted in Baolo and Zuoto villages to ensure wider participation among affected person and relevant stakeholders. The objectives of the consultation were to create awareness to those likely to be affected by the subproject. The agenda include the subproject scope, requirements of the SIG and WB as far as safeguards policies are concerned and likely impacts on the surrounding communities.

Subproject Environment and Social Impacts and Mitigation: The study shows that there are no significant environmental and social impacts and the ESMP/PER has described mitigation measures in chapter 7 to ensure that all impacts can be mitigated to environmentally friendly levels. No significant flora or fauna, nor will any conservation, cultural or heritage sites be affected. There will be removal of mainly betel nuts (areca catechu) and shrubs at the proposed solar subproject site. Affected owners will be compensated based on the MAL rates. The Baolo coastal forest however is considered degraded due the intense logging overtime by different companies. The road networks including the road access from the coast will be used to transport subproject materials from the coast. These avoids construction of a new road access and further damage to the environment. Grievance Redress Mechanism: A Grievances Redress Mechanism (GRM) was developed for the project in the ESMF because it is possible that people may have concerns with the overall project's environmental social performance including the implementation of the Construction Environment Social Management Plan (CESMP). Common complaints arising during construction are expected to be minor concerning dust, noise pollution and health and safety implications that should be promptly addressed and resolved.

The Baolo ESMP/PER concludes that the subproject have few impacts, none of which are catastrophic. All of the impacts can be satisfactorily mitigated and minimized to minor levels.

[1] SIEAREEP is the project, subproject are referred to as individual sites where specific works are to be delivered.

1.0 INTRODUCTION

1.1. Project Background and Baolo Solar Hybrid Subproject

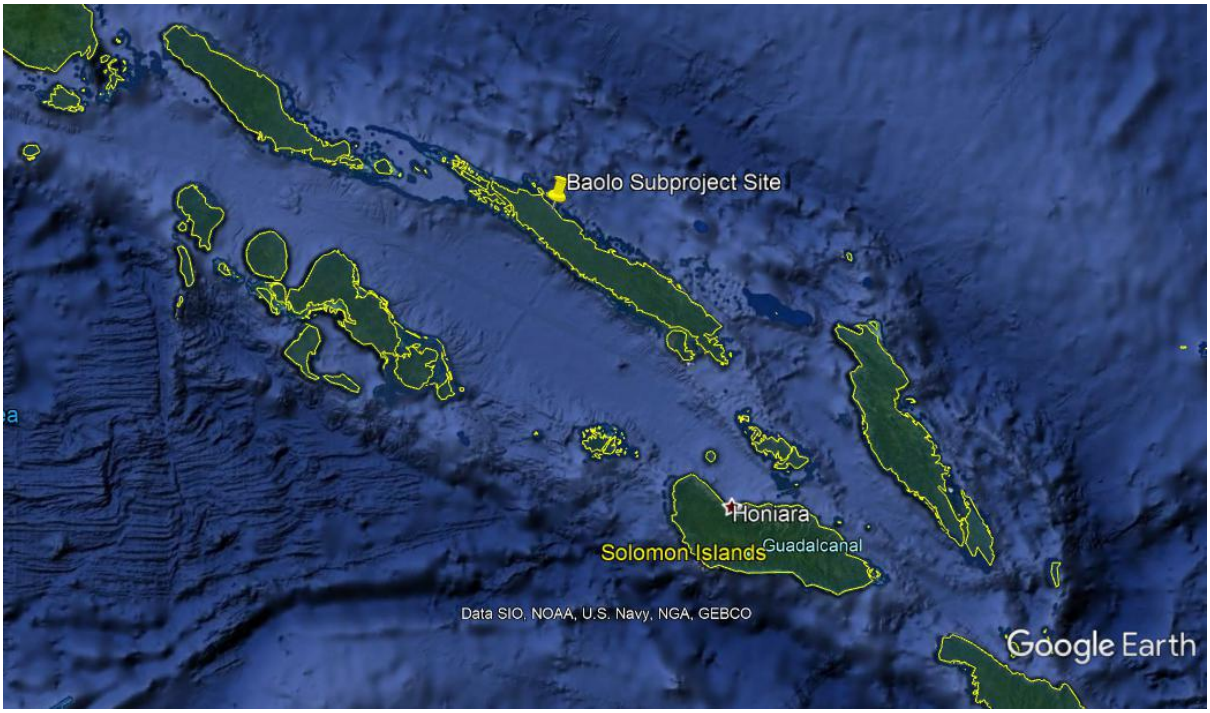


Figure 1: Baolo Subproject Site

Demand for electricity is heavily influenced by the economic performance of the country. There is a need to plan for sufficient electricity capacity to meet the growing demand as stipulated in the revised SINEP 2014-2024 and the SINDS 2011-2020.

The Solomon Power as the agency responsible for generation, transmission and distribution of electricity is a key figure in the realization of this strategic area of development. At present, Solomon Power is 98 percent dependent on diesel generation and most probably the highest retail electricity tariff in the region.

The strategic goal that SIG has set for SP is to make electricity accessible to all Solomon Islanders by year 2050.To achieve this goal, SP is embarking on exploring opportunities in renewable energy sources. Development partners including World Bank, ADB and the New Zealand Government to name a few have committed funds through grants and loans to SP for installation of on grid and off grid Solar Systems. The objectives of these projects are to introduce power generation that have the potential to significantly reduce reliance on diesel generations. Diesel generation is an expensive expenditure resulted in high tariffs.

The Baolo Solar Hybrid subproject is a component 1 subproject of the SIEAREEP. The WB Policy has been triggered for this subproject[2]. As a result, an Environment Social Management Plan

[2] SIEAREEP is the project, subproject are referred to as individual sites where specific works are to be delivered.

(ESMP) or Public Environment Report (PER) has been prepared. The Environment Social Management Framework (ESMF) outlines the environmental and social safeguards instruments for the SIEAREEP. Likewise, the subproject is classified under the "Public Works Sector" in the Solomon Islands Environment Act 1998. It is a prescribed development and requires an environment impact assessment.

Based on high level concept design the system will be comprised of battery storage of 336kWh, and a 132kW back-up diesel generator.

Baolo is located on the western end of Isabel Province and is fifteen minutes by OBM from the nearest airport, Suavanau. The proposed solar site is located on a Perpetual Estate (PE) land in Baolo area. The SP board issued approval for Baolo to become a subproject under SIEAREEP in 2016 after it has met all technical requirements.

In Solomon Islands, solar hybrid installation is a prescribed development under public works, 2nd schedule of the Environment Act. SP is required to produce PERs and management plans for the subproject. PER's are undertaken for activities that are likely to have an impact on the environment and are subject to the decision of the national authority, the Environment Conservation Division (ECD) under the Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM). The ESMP/PER will be approved by the Director ECD who will then issue a development consent for the subproject.

1.2. Scope and objectives of the study.

The main objective of this assessment is to identify potential environmental and social impacts and risks of the subproject throughout the project life cycle, and formulate recommendations to ensure that the environmental and social impacts and risks of the project are avoided, minimized, reduced or mitigated.

The assessment was undertaken in full compliance with the WB 4.01, ESMF and the Solomon Islands environment impact assessment guideline. In addition, appropriate sectorial legal provisions relevant to such subprojects have also been referred to for the necessary considerations during the project life cycle of the subproject.

Specific objectives of the study include the following:

- Establish the environmental and social baseline conditions of the subproject area and review available information and data related to the subproject;
- Identify environmental and social risks and impacts in the subproject's area of influence and outline the process of mitigating and managing adverse environmental and social impacts throughout project implementation;
- Examine project alternatives and identify ways of improving project selection, siting, planning, design and implementation by preventing, minimizing, mitigating or compensating for adverse environmental impacts and enhancing positive impacts;
- Establish a comprehensive environmental and social management plan (ESMP) covering the project life cycle of the subproject; and

- Preparation of an ESMP/PER and submission to WB and ECD for approval.

1.3. Report Structure

The PER consists of ten chapters: (Chapter 1) Introduction; (Chapter 2) Legal and Policy Framework; (Chapter 3) Description of Project; (Chapter 4) Description of Environment; (Chapter 5) Potential Impacts and Mitigation Measures; (Chapter 6) Analysis of Alternatives; (Chapter 7) Environment and Social Management Plan; (Chapter 8) Public Consultation and Participation and (Chapter 9) Grievance Redress Mechanism (10) Conclusion and Recommendation.

1.4. PER Methodology

The ESMP/PER assesses the potential negative impacts of the project on the biophysical, ecological and social environments. It suggests measures for addressing any potential impacts that may have been identified. A site visit to investigate the environmental and social parameters and associated impacts was conducted in February 2020.

The approach taken to develop this ESMP/PER include:

(i) A review of existing baseline data (climate, geology, soil, physiography and biological resources);

(ii) consultation with stakeholders including Isabel Provincial Government (IPG), MEMRE, MECDM and Affected Person (AP);

(iii) Identification of potential impacts based on the design and scope of work;

(iv) Consideration of potential subproject alternatives;

(v) Identification of mitigation measures for potential impacts; and

(vi) Preparation of ESMP matrix as part of the ESMP/PER.

2.0 LEGAL AND POLICY FRAMEWORK

2.1. Solomon Islands Legislations and Regulations

Environmental impact assessment in the Solomon Islands is provided for under the Environment Act of 1998 and the accompanying regulatory instrument, the Environment Regulation, 2008 and administered by the MECDM. Refer to annex 2 for relevant Acts.

2.1.1. Environment Act 1998

The Environment Act covers all the environmental issues in Solomon Islands and makes provisions for conservation and protection of the environment and establishes the ECD. The Act provides for an integrated system of development control, environmental impact assessment (EIA) and pollution control. The Environment Act has considerable power by virtue of Article 4 (1) which states that in the event of a conflict between the Act and other Acts, the provisions of the Environment Act shall prevail.

As required in Part III of the Act, all developers who intend to carry out or are carrying out a 'prescribed development' activity must make an application for development consent together with the relevant EIA report and any other relevant information as may be required by the Director. The Director with responsible staff and government agency then reviews the application with the relevant EIA report and make a decision on whether to grant or not to grant development consent. The developer shall not commence operation or continue to carry out any prescribed development unless it has complied with relevant provisions of the Act, been issued a 'development consent' or the Director has exempted the development from relevant approval requirements.

2.1.2. Environment Regulation 2008

The Environment Regulations 2008 covers detailed requirements for EIA. The Act has a schedule which lists all "prescribed' developments' that need to undergo the EIA process. All prescribed developments require a simple assessment through "screening" or "scoping" process to see what form of additional assessment is required. Most development projects require a PER, while many major projects will also need a second stage of appraisal which include technical, economic, environmental and social investigations presented in an EIA or environmental impact statement (EIS) report. Forms 1 and 3 are relevant forms in the second schedule of the environmental regulation that provides guidelines to assist in the preparation and drafting of the EIS and PER. This ESMP/PER report is a fulfilment of the environmental regulation and Act.

2.1.3 Electricity Act 1996

Under the Electricity Act 1969, SIEA trading as SP is an autonomous, government-owned entity, endowed with the necessary powers to carry out its functions as the responsible authority for the generation, transmission, distribution and sale of electrical energy throughout the Solomon Islands. The Authority falls under the portfolio of the MMERE, and in accordance with the Electricity Act, SP is answerable to the Minister for MMERE.

2.1.4. Land and Titles Act 1996

The Land and Titles Act is the major legislation that deals with land tenure in the Solomon Islands. Three main categories of land are recognized under the Act, and that includes:

(1) Customary Land;
(2) Fixed Term Leases;
(3) Perpetual Estates

The Lands and Titles Act has a system of registration of different types of leases which allows individuals and groups to acquire titles to land and own land, but one must develop the land that has been acquired or registered or else lose the title to the land. SP obtained rights to use the land at Baolo for the solar power plant by way of a voluntary lease agreement with the land trustees of the affected land. SP has completed the land acquisition of Baolo Subproject solar site. Refer to annex 13 for SP land title.

2.1.5. Town and Country Planning Board Act 1996

The Town Country Planning Board (TCPB) Act was enacted to administer, control and regulate all land developments other than those under customary land. TCPB was duly established in order to administer and implement the Act. Section 6 provides for the duty of the Board to prepare local planning schemes in consultation with the provincial assembly or the city council in the case of Honiara city. Then, submissions will be made for approval by the Minister so the schemes are gazette. Under the local planning scheme, the Board may under section 7, declare an area as "a local planning area".

The subproject is located in Isabel Province; therefore, a permit or consent is required from the Isabel Provincial Government (IPG) TCPB. In the Act "Development" is strictly defined and means; the carrying out of the building, engineering, mining or other operations in, on, over or under land, or the making of any material change in the use of any buildings or other land'. It, however, does not cover issues relating to agriculture, fishing and forestry developments.

2.1.6. Mines and Minerals Act (Amendment) Act 2008

Provide management for mining and mineral prospecting by regulating controls in all mining and prospecting associate activities, including alluvial mining. Part II of the Act regulates the mandate of the Minister to designate any area as a reserved area and prohibit the carrying out of reconnaissance, prospecting or mining thereon. The same section regulate reconnaissance, prospecting, and mining are prohibited in or any village, place of burial, tambu or other sites of traditional significance, inhabited house or building, any cultivated land or land rendered fit for planting and habitually used for the planting of crops, any land designated as town land, under the Lands and Titles Act, any state forest or controlled forest within the meaning of the Forest Resources and Timber Utilization Act unless some kind of arrangement authorized by the Minister in consultation with landowners and commissioner of forestry are established.

Section 65 outlines the format of the Building Materials Permit (BMP) application that will be made to the Director of Mines with a prescribed fee that is usually paid at the Inland Revenue Division (IRD) and a receipt attached to the application. Section 66 outlines the forms and content of the Building Materials Permit (BMP) application, and Sections 67 and 68 have provisions regarding the rights and obligations of the BMP holder, respectively. While Section 69 provides for exemptions for the national government or provincial government to mine building materials on any land that is owned by a government department or a provincial government.

2.1.7. Environmental Health Act [Cap 99]

The Environmental Health Act (Public Health Act), enacted on 1st August 1980, provides for the management and control of community health in the Solomon Islands. Mainly administered by the Minister, the provisions also identify Enforcement Authorities for purposes of preventing the occurrence or for checking the spread of any noticeable diseases, provision and protection of water supplies and management of drainage and sanitation practices.

The Public Health Act serves as the Health Impact Assessment reference in identifying the necessary practicable measures for preventing all conditions liable to injurious or dangerous to health arising from the erection, or occupation of the subproject.

2.1.8. Safety at Work Act

This Act consists of four parts. The key applicable sections of the ACT include:

Part II:

- Article 4 states that it is the duty of every employer to ensure the health and safety at work of his employees.
- Article 6: states that it is the duty of the employer to provide a safe workplace for persons other than his employees.
- Articles 7 and 8: requires manufacturers, suppliers of tools and equipment and suppliers of chemicals and other hazardous substances to ensure that these are safe and without health risks.
- Article 12: states that any employee who operates unsafe machinery or substances and is injured will be the employers responsible.

Part III:

- Article 15 requires the employer to protect people from dust, fumes, etc.
- Article 16 provides for limits of exposure to dust and fumes.
- Articles 17, 18, 19 and 20 require employers to comply with the operating requirements for: (i) pressure and vacuum systems; (ii) machinery; (iii) dangerous machinery; and (iv) electrical installations.
- Articles 21 and 22 require workplaces to have fire protection and to take precautions against explosions.

2.1.9. Wildlife Protection and Management Act 2010

The Wildlife Protection and Management Act 2010 provides for the conservation, management and protection of wild flora and fauna in the country. It regulates the export and import of wildlife ensuring compliance to obligations set under the Convention on International Trade in Endangered Species (CITES). The Solomon Islands is a refuge for many species of wildlife (that includes rare and endemic). Their need for protection and sound management of these species. The act prohibits the poaching of wild fauna and flora as well as harvesting of protected species.

2.2.10. Custom Recognition Act 2000

The Custom Recognition Act 2000 provides recognition to the existence of any customary law and the nature of such customary law in relation to a matter, and its application in or relevance to any particular circumstances shall be ascertained as though they were matters of fact. However, the existence shall be provided in proof as required under section 5 of the act.

2.2.11. Unexploded Ordnance (UXO)

Technically WWII ordnance found in the Pacific Islands can be defined as either unexploded (UXO) or abandoned (AXO). Unexploded ordnance is defined as explosive ordnance that has been primed, fused, armed or otherwise prepared for use in armed conflict but has failed to explode. Abandoned explosive ordnance is defined as explosive ordnance unused during an armed conflict and subsequently abandoned or left behind. UXO and AXO are defined collectively as Explosive Remnants of War (ERW)[3].

Solomon Islands was the scene of bitter fighting during World War II. While this was over 60 years ago, unexploded (UXO) may still be found around the Solomon Islands. Should UXO be discovered, the contractor is to immediately cordon off the area, arrange the evacuation of nearby residences and inform the police of the find. Currently all UXO finds are reported to the police who arrange the pickup, transport, storage and ultimate disposal of the finds. While construction sites are expected to be swept for and cleared of UXOs, a chance find procedure for handling the UXOs during the construction is included in the ESMF. This will be the responsibility of the contractor. Ultimately, the SP will be responsible for the supervision and monitoring of the contractor.

2.2.12. Provincial Ordinance

The provincial government is being given power under the Provincial Government Act to pass by-laws that are important to protect and perhaps improve the wellbeing of people. With that, the Isabel Provincial Government was known to have gazette the Conservation Area Ordinance which provide guidance towards conservation of certain areas including the Arnavon Islands and other conservation or protected areas on the Island

2.2. World Bank Safeguard Policies

2.2.1 OP4.01 - Environmental Assessment

World Bank financed projects or subprojects requires Environment Social Assessment to ensure that it is environmentally sound and sustainable. OP4.01 (Environmental Assessment) sets out the general policies and principles for environmental protection and the requirements for assessment of impacts and implementation of plans and measures to mitigate or manage impacts. The OP4.01 has been used to classify projects or subprojects. In the case of SP the Baolo Solar Hybrid is called the subproject.

The four categories defined in the OP4.01 are:

- **Category A.** The subproject is likely to have significant adverse impact on sensitive and valuable ecosystems (protected areas, wetlands, wild lands, coral reefs, and habitats of endangered species), cultural heritage sites (archaeological, historical sites or existing cultural sites), densely populated areas where resettlement is required or pollution may be significant, heavy development areas and conflict in natural resource allocation, water bodies and land or water containing valuable resources. Since the impacts are adverse, the level of assessment is an Environment Impact Assessment (EIA) or EIS as for the Solomon Islands.

[3]Francis S, L and Alama L, 2011. *World War II Unexploded Ordnance,* Retrieved at URL on 29thof October 2013 at URL: http://www.forumsec.org/resources/uploads/attachments/documents/UXO%20final.pdf.

- **Category B.** Potential adverse impacts on human population and environmentally important areas (e.g. wetlands, forest, grasslands and natural habitats) are less adverse, temporary, reversible and can be mitigated more readily than those of category A subprojects. The level of assessment required is equivalent to the SIG PER.
- **Category C.** The subprojects are likely to have minimal or no adverse environmental impacts. Category C subprojects do not require an EIA/EIS or PER. The subprojects require ESMPs.
- **Category FI.** Subprojects involve credit line or an equity investment in a financial intermediary. Involves subprojects that will have insignificant environment social impacts and do not require ESMP.

The Environmental and Social Management Framework (ESMF) was prepared to guide SP's social and environment safeguards requirements for the SIEAREEP. Following the screening exercise, the subproject was classified as Category C because it is expected to have less adverse environmental social impacts. These impacts are expected to be temporary and can be readily mitigated.

2.2.2. Other WB policies.

OP4.01 (Environmental Assessment) sets out the general policies and principles for environmental protection and the requirements for assessment of impacts and implementation of plans and measures to mitigate or manage impacts. The OP4.01 has been used to classify projects or subprojects. Baolo is one of the SIEAREEP subproject sites. See screening checklist in Annex 7.

Table 1: Other WB policies.

Policy	Policy Triggered	Reasons
OP4.04 (Natural Habitats)	Yes	The project involves clearing of natural and modified habitats.
OP4.36 (Forests)	No	The area does not have natural forests.
OP4.09 (Pest Management)	No	Subproject does not involve use of pesticides.
OP4.11 (Physical Cultural Resources)	Yes	Earth movement/excavation/digging can unearth cultural resources.
OP4.10 (Indigenous People)	No	SP to acquire land easement through lease arrangement.
OP4.12 (Involuntary Resettlement)	Yes	An abbreviated resettlement action plan will be prepared to capture land acquisition and non-assets likely to be affected by the subproject activities. There will be no physical displacement of people.
4.37 (Safety of Dams)	No	The Project does not involve the construction and operation of a dam.
OP 7.50 Projects on International Waterways	No	No subproject activities in international waters.

2.3. Solomon Islands Environmental Assessment Process

The Environment Impact Assessment guideline is designed to administer Schedule 16 of the Environment Act 1998. The guideline comprises of EIA procedural descriptions, stakeholders in the EIA process and fees required for development type. “The guideline was prepared by the ECD with the aim of simplifying the procedures in the Act, provide basic advice and guidance to government officers, planners, developers, resource owners on the environment impact assessment process” (MECM, 2010). The EIA guideline was reviewed by Technical Assistance under Asian Development Bank in 2015.

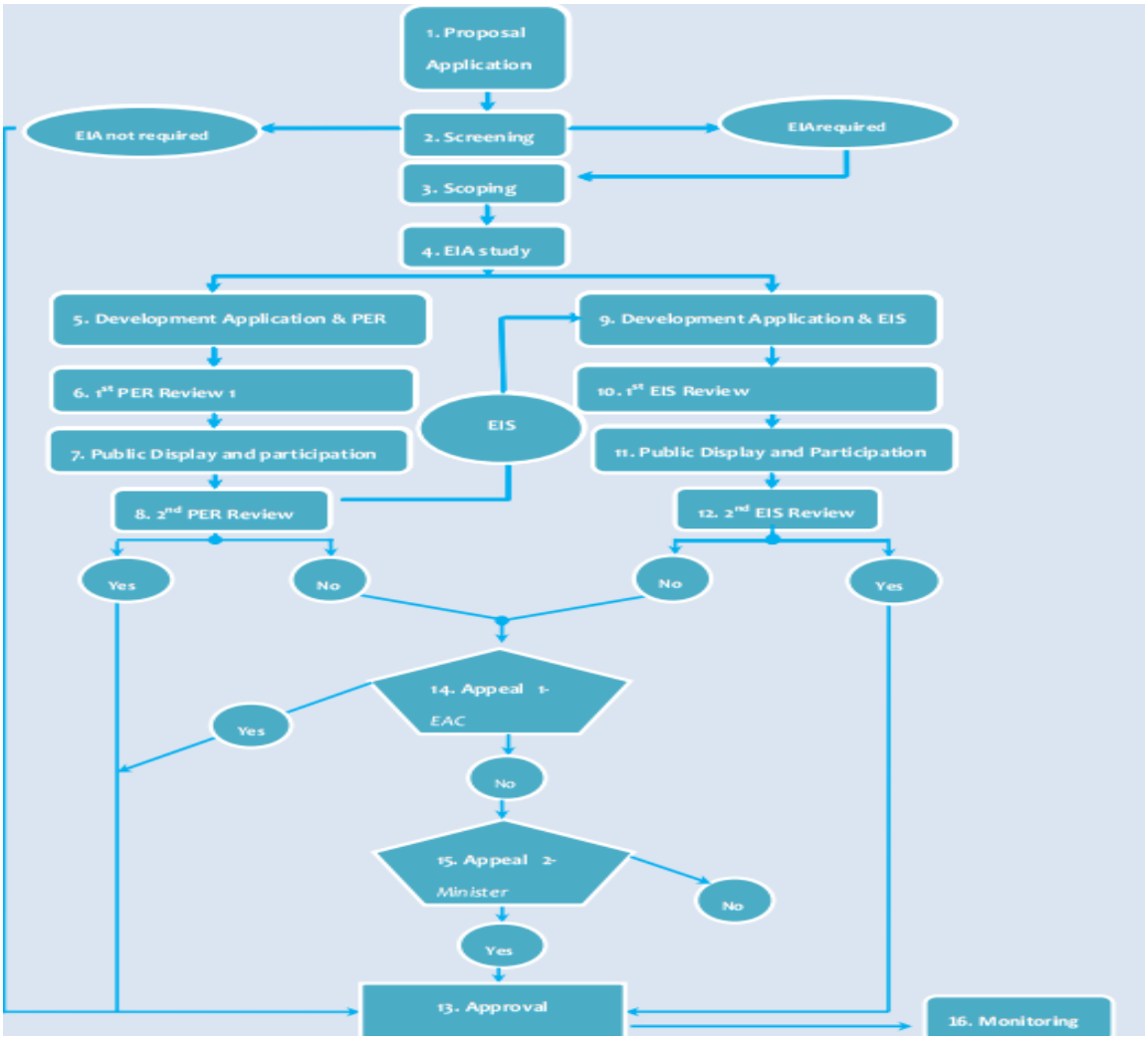


Figure 2: Procedural steps of an EIA[4]

2.4. Solomon Islands National Policies

2.4.1. National Development Strategy (NDS)

[4] MECM,2010, EIA Guideline

The National Development Strategy is a very comprehensive policy that strategizes ways in order to achieve the development aspirations of the country. Using the 17 United Nations Sustainable Development Goals (SDGs), "Transforming our World: the 2030 Agenda for Sustainable Development" as a reference, the NDS highlights five important long-term development goals and two of them; 1. NDS Objective One: Sustained and inclusive economic growth, and 2. NDS Objective Six: Develop Physical Infrastructure and Utilities to Ensure all Solomon Islanders have Access to Essential Services and Markets, are relevant to this subproject.

In order to achieve all the NDS objectives; it must be realized that access to electricity is crucial to all sectors. The subproject objective is in line with the NDS and promotes economic empowerment and sustainable development.

2.4.2. National Energy Policy 2014-2024

The NEP recognizes the importance of reducing dependency on imported fossil fuel. The Solomon Islands have renewable energy sources such as solar, hydropower, geothermal and biomass and wind energy. NEP was developed to guide the country in its efforts to provide electrification for the growing population by exploring opportunities in renewable energy sources. SP is a key player and is embarking on solar energy projects to meet obligations under this policy.

2.4.3. National Energy Policy Framework 2007-2009

The National Energy Policy Framework sets out the Government's policies for planning and management of the energy sector over the next 10 years. The framework defines strategies the government is taking to ensure the objectives of this policy are fully realized. Twelve strategic areas covered in the policy include 1. Energy Sector Planning; Coordination and Management; 2. Petroleum Sector; 3. Transport Sector; 4. Electricity Sector – Urban; 5. Electricity Sector – Rural; 6. Renewable Energy; 7. Environment; 8. Energy Conservation and Efficiency; 9 Capacity Building and Information; and 10. Legislation and Regulations. The subproject is a fulfillment of the fourth strategic area (Electricity urban).

2.4.4. Climate Change Policy

The Solomon Islands Government launched the Climate Change Policy through the MECDM, highlighting steps the government would take in aiding the country and its people to exist and adapt to present imminent climate change and its impact. The Policy aims to integrate climate considerations within the framework of national policies to guide the government and its partners to ensure the people, natural environment and economy of the country are resilient and able to adapt to the predicted impacts of climate change. The SIEAREEP is partially funded by Strategic Climate Fund and SIDS DOCK. Hence, the commitment to greenhouse gas reduction by reducing reliance on diesel generators by SP is aligned to global efforts on climate change.

2.4.5. National Environment Management Strategy

The primary document for environmental policy in the country is the 1993 National Environment Management Strategy (NEMS), although outdated; it is an import document at the present time in the absence of an environment policy.

2.4.6. National Waste Management and Pollution Control Strategy

The formulation of the National Waste Management and Pollution Control Strategy (NWMPCS) 2016-2024 is part of the ongoing efforts in the country to address the issue of waste and pollution as the country enters a period of rapid social and economic change. The objectives are:

1. The development of natural resources does not compromise the wellbeing of natural environment, ecosystems and wellbeing.
2. Ensure that existing legislations, strategies and guidelines on waste management and pollution control are effectively implemented and enforced.
3. Support and encourage the 4Rs (Recycle, Reuse, Refuse and reduction) and where relevant regulate waste minimization for solid wastes noting that organic waste form a large component of wastes produced in the country.
4. Develop institutional capacity and train waste and pollution experts for the country.
5. The government through MECDM, provincial government and Ministry of Infrastructure Development (MID) ensure that all provincial centres have in place proper landfills or waste disposal sites and a functioning waste collection system.
6. All Solomon Islanders are aware of the issue of waste and pollution and are taking appropriate actions address it.
7. Waste management and pollution control activities are undertaken based on accurate data and research, updated information, new innovation and technology
8. Encourage public-private partnership and investment in waste management and pollution control.
9. There is a long-term financial mechanism at the national level to manage waste and address pollution issues.
10. International guests and tourists are able to enjoy the natural beauty and aesthetic value of the country.
11. Waste management and pollution control are fully addressed in responding to climate change and natural disasters.

One of the highlights of the strategy is the management of e-wastes such as solar batteries. It is important all waste collection and disposal associated with the subproject during construction, operation and decommissioning are in line with the strategy.

2.5. International Conventions and Agreements

Solomon Islands is a party to some of the international treaties and conventions. The agreements are in Annex 1

3.0 SUBPROJECT DESCRIPTION

3.1. Subproject Proponent

Name of Company: Solomon Power

Address: Solomon Power, P.O. Box 6, Ranadi, Honiara

Contact Person: Jeremy Maneipuri

Official Designation: General Manager Capital Works (Ag)

Tel: + 677 42463,

Email: Jeremy.Maneipuri@solomonpower.com.sb

3.2. Subproject Objectives

The subproject development objective is to increase access to solar grid-supplied electricity and increase renewable energy generation in Solomon Islands. This will in turn:

- Promote clean renewable energy;
- Assist in reducing green-house gas emission;
- Promote environmental benefits by reducing fossil fuel and oil usage including disposal;
- Support the realization of the National Energy Policy (NEP) target; and
- Reduce reliance on diesel-generated electricity.

3.3. Subproject Justification/Need

The obligation of SP and development partners is to support SIG commitments to the NEP goals and targets. The NEP major target is to ensure all communities in the Solomon Islands have accessed to electricity by 2020. The SIEAREEP project is aligned to efforts to improve energy access in rural communities through the use of solar energy.

Baolo comprise of several business undertakings including canteens, fishery, timber and farming to name a few. The informal sector plays an important role in Baolo as it provides opportunity for self-employment for rural people and women. Institutions, religious organizations, government agencies, businesses and communities consulted confirmed that access to electricity is important to their operations, programs and creates opportunity for income generation. Mini fishery operators reiterate that electricity is crucial to their operations and perhaps plans to expand depend entirely on access to consistent and efficient electricity. Mini fishery operators indicated that expenditure in terms of fuel and maintenance is high with generators. Access to electricity is important and will enhance operations of all businesses, increase profit and creates employment for locals.

3.4. Baolo Subproject Location

The subproject site is located in a Perpetual Estate land on the Western end of Isabel Island. The network will cover two main villages (Baolo and Zuto).

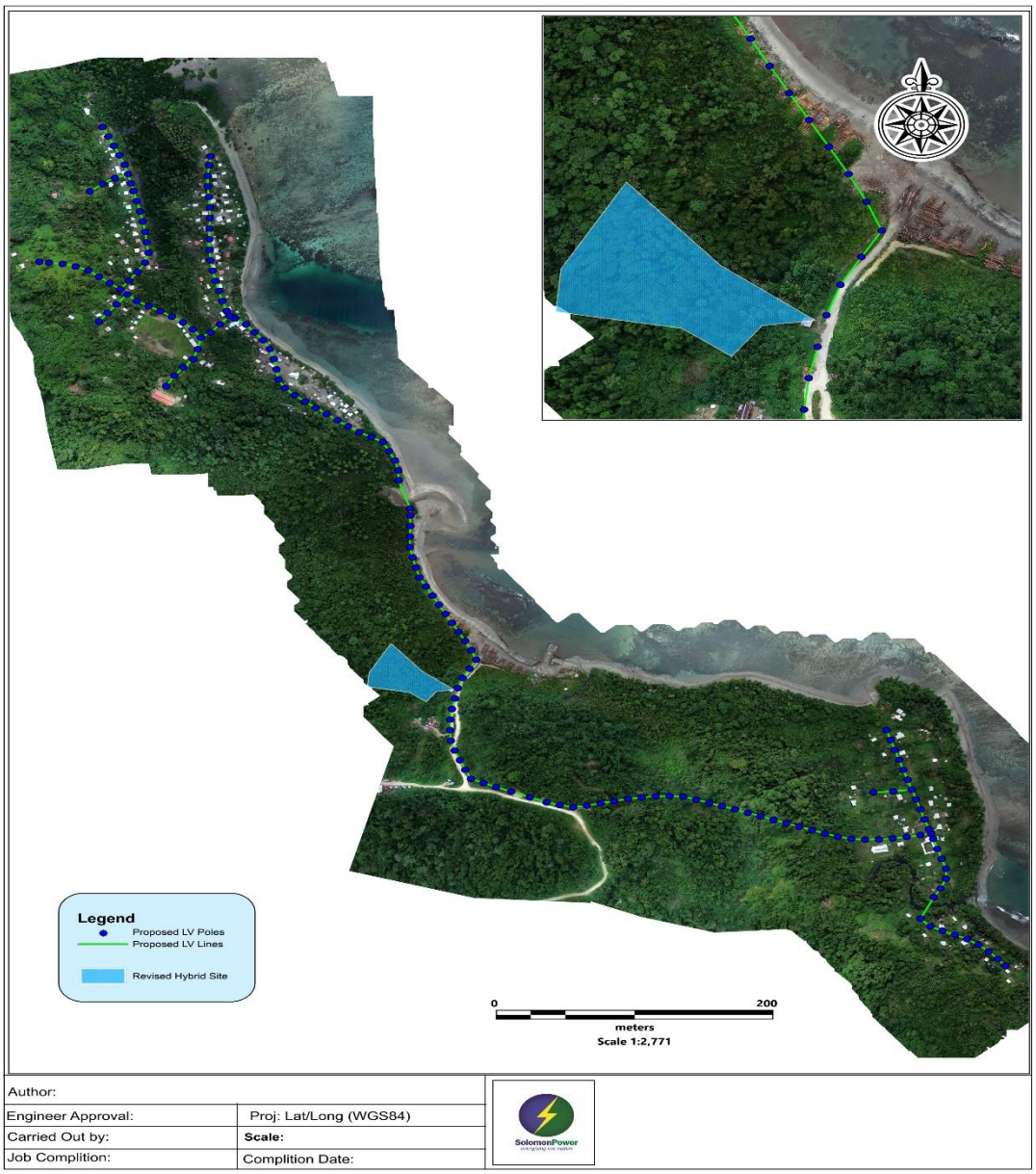


Figure 3: Baolo Subproject site, Planning Report.

3.5. Project Scope of Work

Table 2: General Solar Hybrid System component, business case report, 2019.

Component	Description
Generator	35 kW Generator
PV	107 kWp Solar Panel string inverters
Storage	1 x Tesla Battery & Inverters (50kW, 228kWh each)

3.5.1 Vegetation Removal during Surveying, Demarcation and Clearance

Minor impacts upon terrestrial habitats and flora at the subproject site are expected as a result of the surveying, demarcation and vegetation clearance/trimming for the distribution lines. The majority of the area had been subjected to clearance for the coconut plantation in the past and as a result colonized by weeds, scrub, and ground cover, and in some cases planted with garden crops. An inventory of crops and trees was completed by a SP safeguard's officer and submitted to MAL Honiara for review and confirmation of the cost. Surveying and demarcation would cause minor degradation of local ecology through the clearance of small areas of this vegetation. There are no vegetation species that have conservation significance nor is the area representative of the original vegetative cover.

All material, slash and debris resulting from clearing works would be disposed at a provincial designated site on the approval of the Project Manager (PM). Materials may be buried or disposed of outside the subproject site and at a designated approved by the nearby communities and the provincial government.

Section 3.5.9 in this report discusses vegetation clearance for the distribution network.

3.5.2 Fencing and security

The remoteness of the subproject site substantiates the need for fencing and twenty-four hours' security service. A chain link fence is recommended and three layers of barb wire. According to the specification, the contractor will provide secure perimeter fencing prevent ingress of unauthorized personnel, general populace and small animals such as cats. Positioning shall nominally at property boundaries. Fencing for the system shall attach to and expand the area boundary of the existing system. The existing design is acceptable to be continued for the expanded perimeter of the site, SP preference is galvanized fence type with sufficient galvanizing layer to resist corrosion in the environment. Fencing should not shade the solar Photovoltaic (PV) panels during prime generation periods. Sufficiently heavy padlocks resistant to corrosion are to be provided by the contractor to secure access gates provided. It is standard practice for Solomon Power to fence areas acquired for all Solar Farm sites and its utility assets. This would not only provide public safety during construction but long term safety measures for resident near the subproject site and public. Signage and public notices about safety and description of the subproject will be installed at designated locations for public to read and view. There are no impacts associated with restrictions on local community access since there are no roads inside the acquired site. An indicative design would include:

- A heavy mesh fence of 2.5 m overall height with the upper section barbed (2m mesh section and 0.5m barbed). Steel posts shall be "hockey stick" design, heavy-duty galvanized, in concrete foundations.

- A continuous concrete strip approximately 200x150mm reinforced with 2x 12mm rebar with an upper surface at ground level is proposed. The lower section of mesh shall be secured to the strip using galvanized rebar or stainless steel loops set in the concrete and secured to the fence by stainless steel fixings at intervals not exceeding 600mm.

- At access gates, the strip shall be further reinforced for heavy traffic to 300mmx300mm and necessary reinforcement.

3.5.3 Installation and mounting of solar

The main component of the system is an array of solar panels mounted above ground level. Based on high-level concept design the system will be comprised of PV capacity of 107kWp Solar Panels String Inverters. The proposed height at this stage is 1-2.5m depending on the topography. The solar panels will be mounted on reinforced concrete platform. There will be walkway between the solar rows or columns to enable maintenance and regular inspection. See below design layout.

Figure 4: Design Layout, Baolo Solar farm

The mounting structures (also referred to mounting system), which includes its footings or piles, shall be appropriate for the site. The modules shall be positioned in such a way as to maximize the annual electrical energy output and avoid shading from adjacent structures (including PV

arrays) and trees. The PV mounting structure should be from at least a Tier-2 manufacturer with a strong technical, service and warranty capability and with the following minimum requirements:

- Structure requirements apply to all items required to accommodate the modules and associated electrical equipment including rails, module clamps, fasteners, cable trunking / purlins, cable clamps etc.;
- Structures shall be fixed, metallic and having appropriate design and adequate strength which can withstand the load of the modules, snow loads (not likely to be encountered in the applicable climate), seismic loads, cyclonic and high wind velocities as specified in this document;
- The mounting structure including fastenings shall be constructed of non-corrosive, UV-stable materials to meet the durability requirements for tropical marine environments;
- Use of dissimilar metals in contact with each other shall be avoided where practically possible in order to prevent galvanic corrosion. Where dissimilar metals must be used, suitable measures shall be employed in order to prevent galvanic corrosion (e.g. insulating material between dissimilar metallic materials);
- The structures shall be designed for simple mechanical on-site installation with no requirement for welding, cutting, drilling or painting of metal structures onsite;
- The mounting structure shall avoid accumulation of water or moisture within the structure and shall accommodate an adequate flow of water off the structure;
- The design of the array mounting structures should ensure that all parts are pre-cut, pre-drilled and prepared before delivery to the Site and should not require the need to be cut in the field. This is to avoid damage to corrosion resistant coatings. All sharp edges are to be removed at the factory;
- Modules shall be secured in line with the module manufacturer recommendations;
- Each PV module shall be fastened securely at least at four points or completely along two opposite sides, but under all circumstances adhere to the minimum fixing requirements as required by the PV module manufacturer;
- The structure shall be suitable for the module type to be installed with due consideration given to: o Module weight (inclusive of any micro inverters);
- Module manufacturer requirements with regards to mounting locations and cable management;
- Ability to expand / add additional modules without modifying the existing structure;
- Air ventilation to the back of the panel to prevent Power de-rating due to thermal buildup;
- The structure shall provide facilities for earthing of all metallic parts (inclusive of the modules);
- The mounting structure design shall be in accordance with the standard requirements and certification by the manufacturer to this extent would be required;
- Provision shall be made for cable management with no sharp edges that could result in damage to cables or persons during installation, maintenance or decommissioning (e.g. through the implementation of rounded edges or end covers/clamps on rails);

- Structures shall have a design life of at least 25 years.
- Solar PV modules mounted on the array frame structures shall be situated above the expected flood level and be at least consistent with the existing system design in terms of installed height.[5]

3.5.4 PV Modules

Only PV modules with the following minimum requirements should be considered:

- Poly or Mono crystalline cells including bifacial, back contact or other silicon cell design arrangement (thin film or amorphous is not preferred);
- Power tolerance shall be a positive power tolerance (+0 to +3Wp or better);
- The PV module shall withstand the wind loadings present at the Site;
- The PV module shall include drain, earth and mounting holes in its frame. No holes shall be drilled on site;
- The PV module frame shall be made from marine grade anodised aluminium or stainless steel with appropriate seals to prevent water ingress and damage to the active components;
- No specific colour (frame, back foil) requirements are requested;
- The front glass of the PV module shall be tempered glass with a minimum thickness of 3.2mm;
- The PV module shall comply with International Electro-Technical Commission (IEC) 61215, IEC61730, IEC61701 ED2 and IEC 62716;
- Potential-Induced Degradation-free PV cells and modules, unless the PV system is appropriately designed to reverse PIE-effects;
- Bypass diodes are required on each module. No reverse blocking diodes for the system are required;
- Standard locking connectors (e.g. MC-4 or equivalent) certified to EN 50521 are acceptable for panel connections. Corrosion of terminations causes increased voltage drops therefore the number of connections shall be limited. A wiring layout diagram defining the PV panel interconnections will form part of the documentation to be provided by the Detailed Design;
- The terminals must be clearly marked with + and – for the corresponding connections;
- Test certificates must be available;
- The manufacturer cannot be insolvent or going through (partial) bankruptcy at the time of design or installation of the PV System; and
- The modules shall be under the manufacturer's active production and shall not be superseded stock.

Manufacturer documentation with the following information about the PV modules must be available:

- Temperature coefficients for current, voltage, and power;
- I-V curves under different temperature and radiation conditions;

[5] James, J (2018), *Solomon Power Tingoa, Visale, Baolo, Dala and Buma Solar Hybrid Specifications:*

- Physical dimensions and weight;
- Details of the materials used in the module's frame;
- Type and number of cells per module;
- Cell efficiency and/or module efficiency;
- Details of the connectors used and the length of the connecting wires;
- The warranty statement and testing certificate;
- Proof of manufacturer financial stability;
- Solar Modules supplied must have individual flash test data available in soft copy; and
- Pallets and packaging PV modules are supplied within must list modules serial numbers contained within the pallet on the outside of the pallet in a collectable print out.

Note that the Contractor shall illustrate that the design allows for system flexibility to accept more than just one type of PV panel by providing a ranked list of 2 or more other OEM PV panel types suitable for conjoint use. It is expected that the concept design presented shall be able to have PV modules changed to the next highest power class if needed due to manufacturing improvements. Total installed panels at commissioning should guarantee the required plant sizing and output at 10years. [6]

3.5.5 String and Central Inverters

By definition, a String or Central Inverter (or a grid-tie inverter) is connected directly to the PV panels and contains an embedded Maximum Power Point Tracker (MPPT) which enables the Inverter to optimize energy production from the PV panels. The Contractor is required to specify the appropriate inverters for the site with respect to the capacity and suitability for the designed PV System. The minimum requirements for both types of inverters include:

- String inverters are connected to the PV panels and shall provide a balanced three phase power output to the AC bus;
- The string inverters shall be located near the PV panels unless larger central inverter types are used, have a protection rating of IP 65 (according to IEC 60529) and be protected from sea spray. For Sites where the inverters are located in an indoor dry space, this requirement may change to IP55;
- The string inverters shall have as a minimum one maximum power point tracker (MPPT) and only PV panels mounted on the same horizontal angle and orientations should be grouped together and connected to the same MPPT. It is however encouraged to use the same inverter but a separate MPPT to convert power from two strings mounted at different horizontal angles but with the same orientation because this will increase the conversion efficiency;
- Grid-tied inverters shall be sized appropriately for the maximum module peak power rating under all weather conditions of the Site;
- The Contractor shall ensure and confirm that the DC operating voltage window and current limits of the inverters are not exceeded under all environmental conditions.

[6] IBID 6

- The inverter shall be designed to operate from -20 to +60 degrees centigrade and from 5% to 95% relative humidity;
- It is of paramount importance that the output voltage capability of the inverter is matched with the supply voltage from the utility;
- The Contractor shall ensure that the ventilation and air requirements are appropriately specified so that the cooling requirements of the inverter can be met;
- The Contractor shall specify suitable mounting positions for the inverter (and enclosure, if applicable), in accordance with manufacturer's specification;
- Electronic components will be sealed from contact with salt air and all cooling will be through external heat sinks and not through ambient or forced air flowing across the electronic components;
- The inverters shall not be placed in direct sunlight;
- The location and installation of the inverter shall comply with site restrictions for appropriate and safe access during operation of the inverter;
- The Total Harmonic Distortion injected onto the grid by the inverter shall be less than 3%, and the output of the inverter shall be a true sine wave;
- The Contractor will endeavour to minimise the number of different types of string inverters by standardising on a typical inverter size to reduce the number of spares. SP prefers the use of 3-phase string inverters with a minimum unit rating of 20 kW. On this basis sizing of any plant can be increased or decreased by this as a multiple and that any section of 20kW (or greater) may be taken out of service for maintenance with minimal overall Plant impact;
- The power conversion efficiency of the DC>AC string inverter shall exceed 97% and that of the bi-directional inverters >94% while operated above 20% of PV array rated power. Cable length and cable diameter shall be carefully considered to optimise system efficiency;
- Terminations between PV panels and string inverters shall be in accordance to manufacturer specifications and no installation practices or terminations shall be used that may void manufacturer warrantees;
- Inverters shall comply with AS/NZS 4777.1, 2 & 3 and shall have an option or setting to respond to grid voltage to curtail the power fed from the PV panels to the local grid. This is possible in the case of a high ratio of on grid generation to load;
- Inverters shall have a valid Certificate of Suitability, numbered and dated to testify on its testing, which was conducted within the last five years;
- The inverters shall have passive and active anti-islanding protection as per AS 4777.
- The string inverters shall detect islanding mode when the grid fails and automatically shut down power from the PV system as per the requirements of AS 4777.3;
- The inverters shall detect normal main grid supply and automatically start supplying power from the PV system as per the requirements of AS 4777.3;
- Open protocol standard such as Modbus for seamless integration to third party systems are required. Closed or proprietary protocols are not acceptable unless approved by the Employer. It is anticipated that a separate energy meter for the system with MODBUS

communications available as a minimum is installed on the main Solar PV feeder to facilitate future monitoring from the future SCADA system installation;

- A separate, external manual isolation switch shall be installed to provide isolation of the inverters from the LV network;
- Inverters are to be installed in order to not interfere with onsite backup generation or transfer switching arrangements;
- The inverters shall be from a Tier 1 original equipment manufacturer (OEM) of inverters with a strong regional technical and service capability for Central and String inverters; and
- The minimum standard warranty shall be 5 years[7].

3.5.6 Solar System Integration and Electrical Interconnections

Electrically a string of PV modules are connected in series to form a PV string with a higher output Direct Current (DC) voltage. The strings may be collated in DC combiner boxes (generically referred to as combiner boxes) before it is supplied to the string inverters. The Alternating Current (AC) power supplied by the string inverters are collated in an AC distribution board (generically referred to as a DB), from where AC power is supplied to an AC bus which interconnects the system to the site electrical infrastructure and electricity grid. For all interconnection boxes in the PV system, such as junction boxes, combiner boxes and Low Voltage (LV) distribution, the Contractor shall ensure that the design allows for the following:

- Junction boxes (or combiner boxes) shall comply with AS/NZS 60529;

- All cable entries shall maintain the enclosure IP rating;

- Within the junction boxes, switchboards and equipment, conductors are loomed and laced together, with PVC straps or strings. The conductor is appropriately bent to ensure straight entry into the terminal, allowing sufficient spacing and length of the wire for easy disconnection and reconnection;

- DC from the PV arrays inputs shall be suitably fused with dis-connectable fuse holders to provide overcurrent protection and PV array disconnection;

- Should a DC system rated to 1500VDC be used, not just the cable insulating ratings but the plugs, sockets, interconnectors, fuse holders, surge diverters etc… shall be rated to 1500V DC;

- AC power inputs and outputs will be adequately protected by well-coordinated circuit breakers (CBs);

- The box is manufactured from powder coated hot dipped galvanized or Aluzinc coated steel or glass reinforced and UV stabilized plastic material and feature an IP65 rating or higher suitable for corrosive marine environment;

- All cable entries shall maintain the enclosure IP rating;

[7] IBID 6

- Where conductors enter a box without conduit, a tension relief system shall be used to avoid cable disconnections inside the junction box;

- All conductors inside the boxes shall be loomed and lace together, with UV rated straps, rated to be suitable for the life of the project; and

- Conductor if bent to enter terminals shall comply with manufacturer bending radius and be done in such a way as to allow sufficient spacing and length of the wire for easy disconnection and reconnection.

The Contractor shall ensure that all cable trays and other cable support systems for all cables, wiring and communication cables, allows for the following:

- The support system shall be positioned adequately to provide access and room for inspection, replacement or additional cabling;
- All components including but not limited to bends, connectors, trays, brackets shall be sized to adequately support the installed cable; and
- Sufficient spacing shall be provided for no less than 20% of additional cabling;

The cables shall be fixed to the support system by appropriate ties, straps or saddles. Stainless steel straps shall be used on cables that supply essential safety services. UV stability of all fixings shall be considered, Nylon 12 cable ties are commonly used for small cable support in areas exposed to direct UV radiation although non plastic materials such as Acetal are the only known materials that will provide a design life greater than 20 years.

- Cable trays shall be designed to ensure that there are no water accumulation points inside the tray;
- Provide segregation for LVAC, DC and communication circuits
- Cables exiting ground level must be mechanically protected by conduit or steel covering arrangement to at least 300mm above ground level so that maintenance use of mowers, trimmers or whipper snippers shall not risk damaging cable insulation near ground level;
- Provide conduit and cable management design such that termites or other insects shall not be able to affect cabling;
- Ensure bending radii are met on cabling; and
- Effectively manage thermal resistivity of soils and thermal loading on bunched cabling and conductors.

For all electrical cables or interconnecting wiring used in the PV System, the Contractor shall ensure that the design allows for the following:

- Installation, protection, termination and jointing of cables in accordance with relevant Australian standards and particularly Australia/New Zealand Standards (AS/NZS) 3000, AS/NZS 3008 and manufacturers' recommendations;
- All PV System wiring is designed in accordance with all relevant standards including AS/NZS 5033 and AS/NZS 3000 and AS/NZS 3008.1;

- The DC cabling from the PV modules to the inverters is sized such that the installed voltage drop for each circuit remains below 2% at all times;
- The AC cabling from the inverters to the connection point meter is sized so that the installed voltage drop of each circuit remains below 1% at all times;
- DC Cables are double insulated and sheathed. Cable sheathing is UV stabilised to ensure that no degradation throughout its working life occurs;
- DC cables are neatly secured behind modules and between sub-arrays. Also that DC cables are sheltered from direct rainfall;
- All cables are protected from the effects of climatic conditions and in particular UV radiation;
- No cabling is exposed to direct sunlight, even if sheathing is labelled as UV stabilised. All cabling that may be exposed must be routed through UV stabilised conduit;
- All cables are protected from mechanical damage in accordance with AS/NZS 3000;
- Cables shall be clamped in order to relieve tension and prevent conductors coming loose. Plastic cable ties must be protected from both direct and reflected UV radiation. Cable ties exposed to UV must be stainless steel;
- DC cabling shall achieve type test in accordance with EN50521 for 1500V.
- DC cables is rated to operate at the open circuit voltage (Voc) generated by the longest string of modules in the facility at the lowest expected temperature at the site;
- Cables are secured and mechanically protected over their entire length. Steel wire armour shall only be used for large sub-array DC voltages and multi-core cabled for AC voltages;
- Energy losses due to cabling shall not exceed 2% of generated power (considered from the main LV circuit breaker at the connection transformer);
- Cables shall occupy less than 66% of the available conduit space;
- All conduit installed within reach of the PV rays shall be UV resistant or protected from UV using an appropriate method;
- Cables are provided with protection against vermin, where required by site conditions;
- DC cables are installed in a manner which minimises induction loops between positive and negative cables. In particular, for string cables, large loops of excess DC cabling shall be avoided;
- All underground cable routes (if applicable) are clearly marked with suitable above ground cable markers to prevent accidental damage to the underground cables;
- Cable joints are limited by planning continuous cable runs along entire cable route lengths;
- Marking of all electrical equipment (including conduits and ducts) are compliant with the Standards and Regulations (or as otherwise agreed upon with the Employer) for marking. All signs and signage are clearly visible, located visibly on the equipment, constructed and installed to remain legible for the design life;
- Markings distinguish between operable control devices, equipment, wiring, indicators, isolation switches, outlets and enclosures to provide instant and ready identification to aid operability and maintainability. Terminology of the marking and labelling matches the documentation provided;
- The numbering system is applied to all DC wiring, AC wiring, PV strings, combiner boxes and inverters. Also that isolating devices such as switches, fuses, isolators and push buttons are

numbered and labelled in accordance with the local regulations and good industry practice. Where appropriate, that each label includes the unique number and a description of the device;

- If 1500VDC rated arrays are designed, cabling insulation must be rated to 1500/1500 VDC to achieve 1500V DC conductor to ground rating. The sheath thickness shall be in accordance with AS5000.1 with Nylon 12 extruded jacket or double brass tape to prevent insect attack; and
- Detailed calculations of cable rating covering maximum anticipated load and fault currents shall be provided together with the construction drawings prior to the procurement of the cable. The calculation shall show all derating factors applied to the cable and shall consider all methods of cable installation used (e.g. direct buried, conduits, etc.)[8].

3.5.7 Secure storage shed for spares

All buildings shall have raised floor and concrete basement. They may have all the necessary appliances for running the solar PV including batteries, transmitters, and transformers. Relevant buildings will have the necessary components of standard building codes such as store rooms, toilets facilities, and sewage system to the agreed standard.

The shed shall be at least of large enough size that the amount of spare PV modules required by this document shall fit securely within with enough space left for storage of sundry maintenance tools for vegetation management including trimmers and a ride on mower. The shed shall have secure roller-shutter door, personnel door access and adequate ventilation from whirly-birds or similar arrangements, if windows are included then they are to be of a type that is secure or resistant to forced entry. All entry points are to be lockable. The shed shall be constructed of weatherproof sheeting and design shall consider the climatic conditions outlined in Section 4 of the Specifications.

3.5.8. Diesel generator

Based on the high level concept design, a 35kW diesel generator shall be installed as standby to provide the support whenever there is a voltage drop in the batteries. The generator shall be fitted with associated auxiliary equipment, switchgear, radiators for cooling of the generator and appropriate fuel storage and supply system. The site will have a concrete basement and will be sheltered from extreme weather events. The site and drainages will incorporate an oil separator to remove oil from surface run-offs and bund walls to protect the oil from spillage. The oil shall be pumped back to drums and stored at a secure storage. The storage areas will be bunded to avoid movement of oil into the environment.

3.5.9 Distribution network

Necessary electrical infrastructure to connect power from the Solar Hybrid Generation System to Baolo and Zuoto communities are also part of the subproject. These include the installation of poles, lines and cables. Installation of these infrastructures will require removal of road side

[8] IBID 6

vegetation. It is standard practice to compensate for crops and trees based on SIG MAL and MOFR rates.

3.5.10 Telecommunication

The sole supplier of telecommunication services in the Solomon Islands is “Our Telekom”. All connections to the main telecommunications system and the various services such as phone and internet will be arranged through “Our Telekom”.

3.5.11 Storage tank for water

The current plan is to connect to the existing water supply network and to support these with harvested rain-water. The harvested water will be stored in 400L water tanks and will be used for domestic purposes and on-site water for fire incidents.

3.5.12 Material requirements

The subproject requires gravel for concrete production. Gravel for concrete production will be sourced from Honiara. Cables, solar panels, poles, cement, solar installation parks, to name a few will be sourced from Honiara and Overseas. All materials including gravel, timber etc. will need to be cleared and certified by the MAL quarantine office prior to them being transported to site. It is an Engineering Procurement Construction (EPC) contract which means the contractor is responsible for detail design, procurement of relevant materials, construction and commissioning.

3.5.13 Construction Force and Equipment

Construction force of approximately 20 personals comprising of solar engineers, civil engineers, operators, securities and managers will be based at the subproject site for the duration of the construction. Workers will be engaged at different stages during construction when the need arises, so the approximate number will be 10 personals per day. Majority of the workers will be based in Baolo and Zuoto communities and travel to the subproject site during the day-time periods. Contractors will rent local houses or construction of an onsite campsite which will have all the necessary facilities including provision for sanitation and occupation. All Project worker (including construction workforce) will be required to undertake HIV, GBV and SEA prevention training and sign the associated Code of Conduct prior to commencement of works.

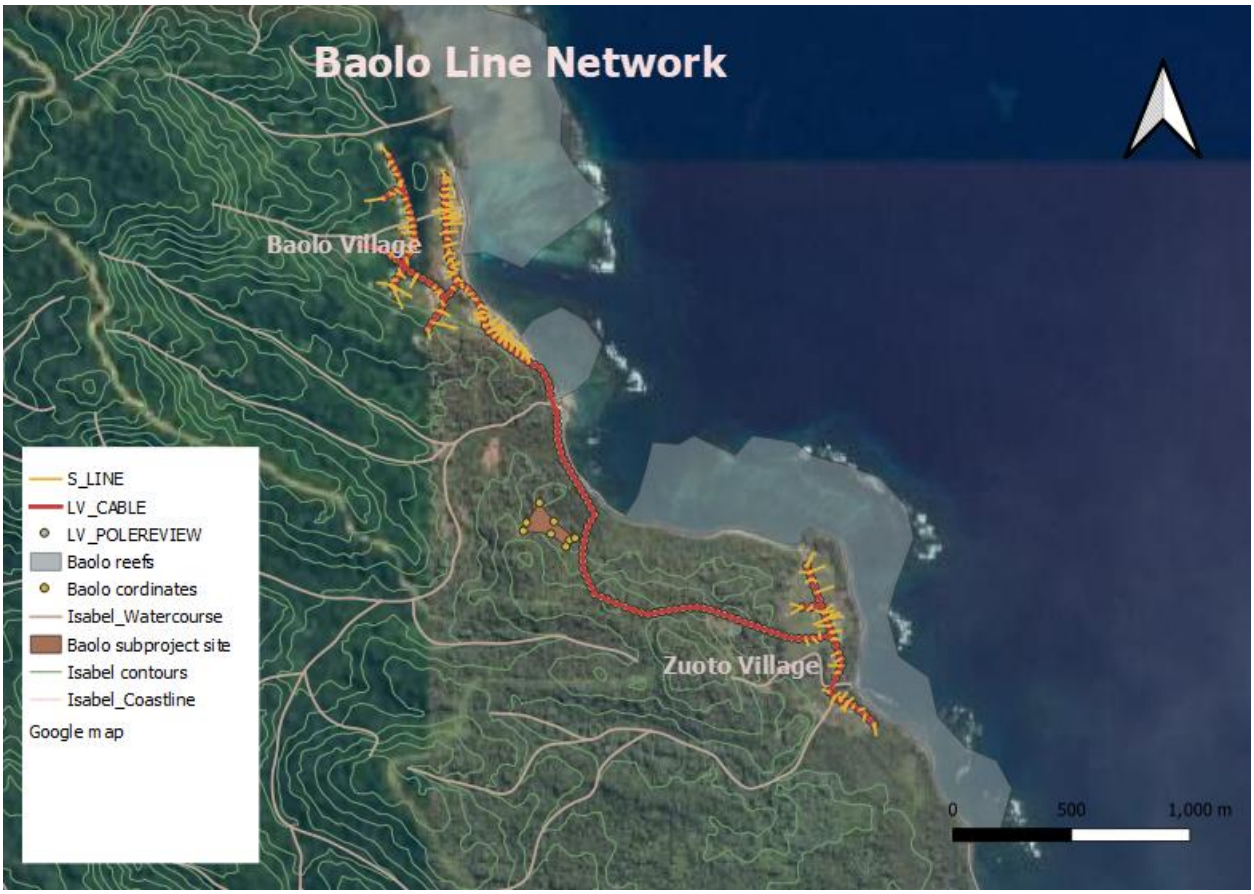


Figure 5: Baolo distribution network.

4.0 DESCRIPTION OF THE ENVIRONMENT

4.1. Physical Environment of Baolo subproject

4.1.1 Climate

The Solomon Islands is often subject to the south-easterly trade winds from May to October and the north-westerly trade monsoon winds from December to March. Due to proximity to the equator, air temperature has very little variation. The average annual rainfall ranges from 3,000 to 4,000mm. The daily average rainfall is averaged at 190 and 330mm November to January as being the wettest months.

The climate in Isabel is tropical with significant rainfall during the year. Generally, the weather between March and November is dry and humid followed by a wet season from December to April. However, during the driest months, Isabel still experience a lot of rainfall. Being a large and mountainous island attribute to the island as being less dry and colder than the smaller islands in the archipelago. Isabel is one of the provinces that is least affected by cyclone compared to other provinces in the Solomon Islands. Maximum average temperatures range from 29.8 to 32.3 degrees Celsius with a mean of 31.0 degrees Celsius while minimum temperatures average between 21.3 and 23.3 degrees Celsius with a mean of 22.5 degrees centigrade.

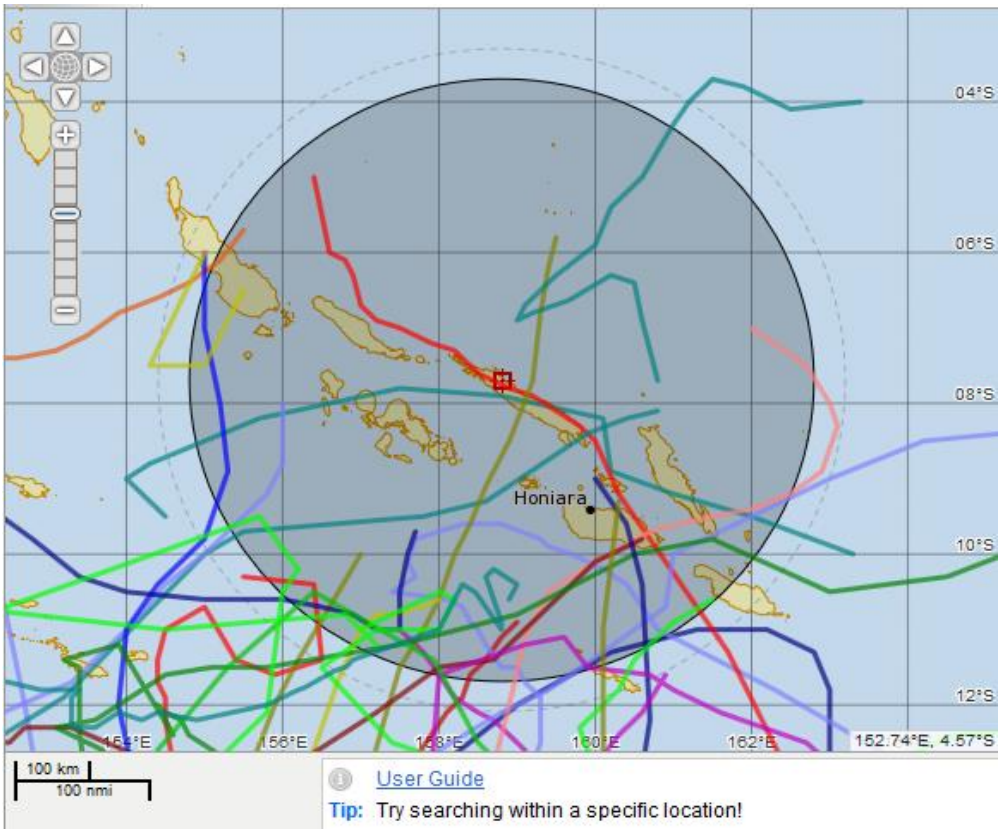


Figure 6: Cyclone track, 400km from Baolo, solar site.

Source: http://reg.bom.gov.au/cyclone/history/tracks/index.shtml, 2020[9]

4.1.2 Topography

Isabel is the longest landmass in the Solomon Islands extending to about 200km in length with an additional 35km taking in Barora Fa and the nearby islands in the west. Isabel is approximately 4,095km^2 in area with a width of 24km[10]. It consists of south-east trending, asymmetrically located mountainous spine on the eastern part of the island. The central range contains several mountain peaks including Mt. Kubonitu (1,250 m) the highest peak in Isabel about 32km north-west of the south-eastern end of the island. Drainage is mainly angular to trellised. The central backbone of Isabel is comprised of faulted basement basalt. Partly in the west and flanking in the east and west are marine and terrigenous sediments that form low hills, cuestas, plateaux, ridges and karst scenery which contradicts long, high and narrow ridges in the centre of the island[11].

Baolo site is approximately 100 meters from the coastline at an elevation of 30 meters at the highest peak. The terrace comprised of mainly shrubs and trees. Baolo and Zuoto communities including a log pond and campsite are situated along the coastline. A river approximately 150 meters from the site is heavily degraded due to logging activities upstream. Approximately 10 meters south are secondary rainforest and hard basalt stone. The northern end of the proposed subproject site is swamp wet land and the elevation is approximately 5 meters above sea level. Mangroves and *Blechnum serrulatum* species and pandanus dominate the area.

[9] BOM (2016), Cyclone tracks - Southern Hemisphere [beta], Retrieved URL on the 16t^h July 2015 at URL: *http://reg.bom.gov.au/cyclone/history/tracks/index.shtml*

[10] Webb, 1992

[11] Hansell *et al*, 1976

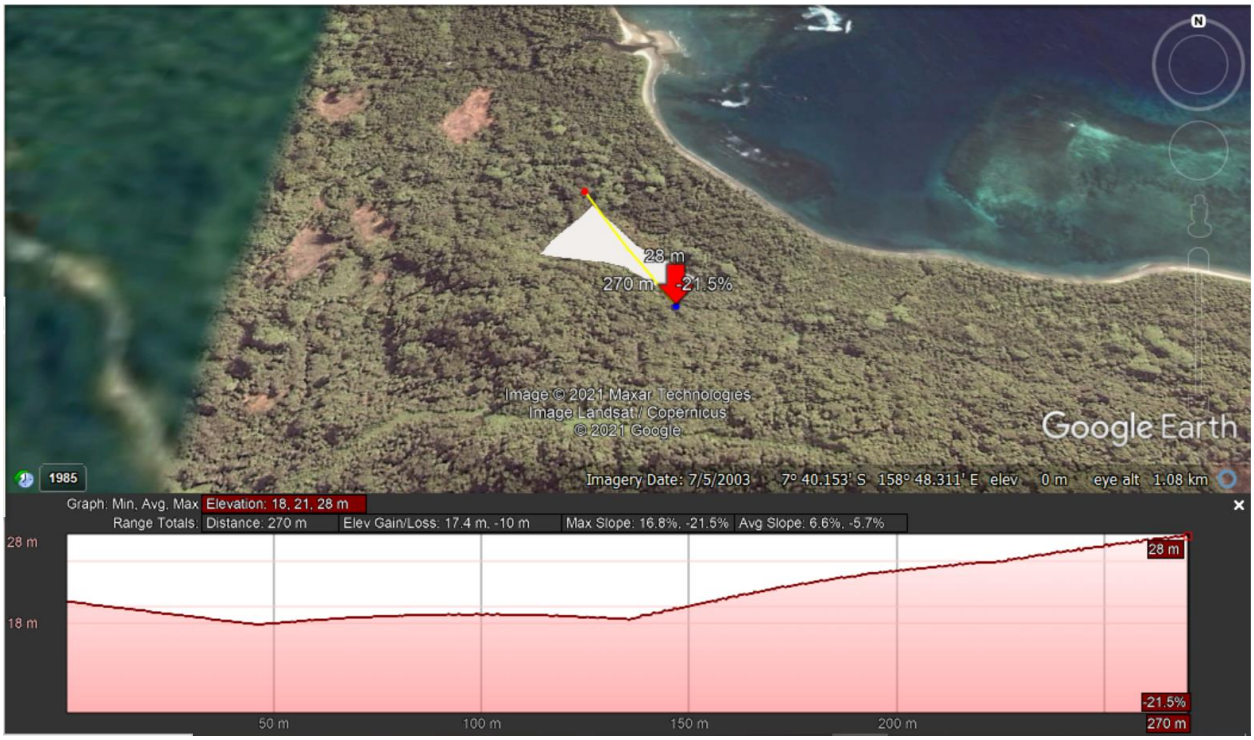


Figure 7: Elevation of the Baolo Solar Site, google earth.

4.1.3. Geology

Solomon Islands is a double chain archipelago of islands formed by fertile volcanic rock through tectonic activity also known as the Pacific Rim of Fire. The Solomon Islands (excluding the Santa Cruz group) are divided into three geological provinces: a pacific province, a central province and a volcanic province. The Central province includes the majority of Choiseul, Isabel, the Floridas, Guadalcanal and San Christobal. This particular province forms mainly by the interaction of two major faults resulting in the remobilization of Isabel people in the late tertiary and quaternary. The geology of Isabel consists of very fine-bedded limestone consisting of mudstones, shales and limestone.

Solomon Islands is situated on the ring of fire and is prone to earth quakes. Figure below indicate earthquake hotspots in the Solomon Islands. Western part of Isabel is situated on the low risk areas thus, deemed marginal. Designs have been ensured to integrate risk of earth quakes.

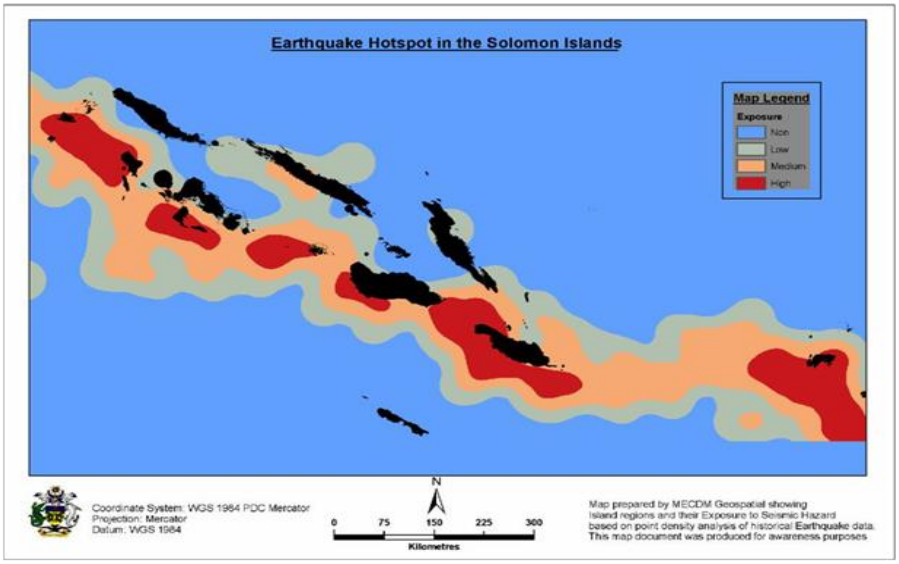


Figure 8: Earthquake Hazard Map (Source MECDM).

The central backbone of Santa Isabel comprises of faulted basement basalts largely laid beneath the sea. Partly laying them in the west and flanking them in the west and east are marine and terrigenous sediments which have been folded parallel to the main axis. These sediments form low hills, cuestas, plateau, ridges and karst scenery, in contrast to long, high and narrow ridges over basalts found in the centre of the island.

The sub-project area is situated in the physiographic region of Jajao-Hograno foothills. The total area is 490 sq km and is a distinctive region in Santa Isabel consisting of volcanic hills separated by valleys. The coast line is strongly indented and the inland boundary follows a major thrust fault over a distance of 45km. Most of the area is underlain by basement volcanic rocks ranging from metaphosed lavas to phyroclaustics to intrusive gabbros and diorites

4.1.4. Soils

There are 27 soil groups in Solomon Islands. The most fertile and agriculturally important of all soils found in Solomon Islands are the recent alluvial soil. The lithology of Isabel varied from mixed metamorphosed lavas and gabbros which was determined by the parent material and stability of the landscape. The western group which include Baolo generally contain sandstones and grits. The site consists of red, brownish and pale loam and clay[12].

The soil in the subproject area contains brown to black fertile soil, dark brown clays to clay loam, mottled loams and clays, brown to reddish brown peak or muck, and pale to dark loose stands occurring on fluvial plains and swamps wet land. Internal drainage are somewhat poor on swamps but freely drain on the fluvial plains. The solar site comprise of a mixture of erode volcanic basalt rocks and dark humus fertile soil from dead remains and deposited swamp around the area.

[12] IBID 11

4.1.5. Water Resources

The main catchment of the Baolo area is the Varagia River which flows down near the s solar site on the North West end, approximately 350 meter from the site. The nearby areas also contain other streams. Farther along the coastline on the far northern end of Baolo site is a swampy area.

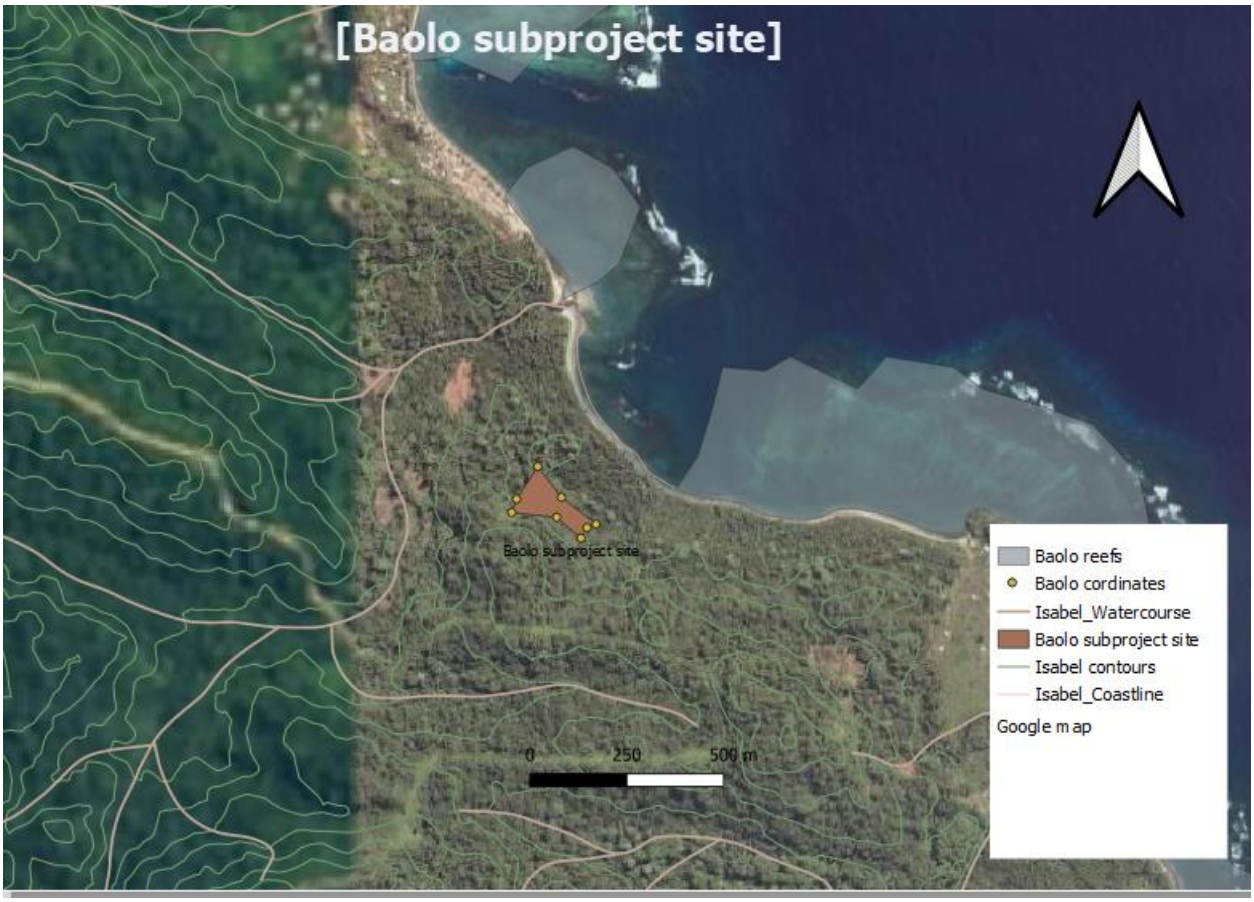


Figure 9: Rivers and streams near the subproject solar site.

4.2. Biological Environment of Baolo subproject

4.2.1. Forest

Despite the geographical spread of islands and relative varied flora in the Solomon Islands, the climax vegetation in the Solomon Islands archipelago shows similarity of appearance between islands. The five major vegetation types that have been identified in the Solomon Islands include:

1. Grassland
2. Swamps
3. Lowland Rainforest
4. Montane Forests

5. Secondary Vegetation

The vegetation types for the area are coastal lowland rainforest and swamps that have degraded overtime. The solar site comprise of degraded secondary vegetation and a coconut plantation.

4.2.2. Terrestrial Flora

The forest and vegetation within the solar site are fragmented and degraded vegetation. Some of the species which make up this particular forest include *Pometia pinnata, Gmelina moluccana, Vitex cofasus,*and *Parinari salomonensis, Campnosperma auriculatum* to name a few.

Subsistence gardens within the land areas comprise of pineapples (*Ananas comosus*), banana, betel-nut and 40 percentage where covered by coconut plantation. Leaving Along with most common fern and *Alpinia s*pecies. Field observation established that none of these terrestrial floras are of any significant conservation value.

Figure 10: Typical vegetation, Baolo solar farm site.

The adjacent foreshore is dominated by *barringtonia sp*, *terminalia cattappa*, hibiscus, spinifex, *Cyperus Scaevola* and coconuts (*Cocos nucifera*). Coconut plantation is noted inside the solar site and along the coast. The area comprised of Coconuts, bananas (*Musa sp*), betel nut (*Areca catechu*), tree ferns (*Cyathea sp*), fern allies (*Dicranopteris linearis*), *Terminalia cattapa*, bamboo (*Bambusa sp*), *Premna crymbos*, *Callophullum inophyllum*, *Anacardium occidentale, Macaranga sp, Ficus sp, Wolstonia biflora, Heliconia sp,* and *Inocarpus fagiper* in the coastal areas.

Small swamps associated with the coast and streams are usually characterised by the presence of *inocarpus fargifer,* sago palms (*Metroxylon sp*), *pandanus tectorius, pandanus poronaliva* and are sometimes planted with swamp taro *(Cyrtosperma johnstonii)* and *Colocasia esculenta*. The streams and wetland systems also include nypa palms *(nypa fruticans*), and mangrove strands.

4.2.3. Terrestrial Fauna

The forests of Isabel are known to support abundant number of fauna species. There are 76 species of land birds known from Isabel, of which some were sustained from Garanga river valley[13]. Terrestrial fauna includes a large number of birds such as parrots, pigeons, kingfishers and hawks. Isabel also sustain highest diversity of frog species in the Solomon Islands, approximately 22 distinct frog species[14]. Besides, fifty six percent (56%) of mammals in Solomon Islands can be found in Isabel and Choiseul alone[15].

In the vicinity of the subproject site, human settlements and activities such as logging have disturbed the area and thus rendered the area devoid of any significant wildlife to be of much concern. Most of the original vegetation that are critical in accommodating much of the original wildlife are now degraded due to logging activities.

[13] Kratter *et al*, 2001
[14] Pikacha *et a*l, 2008
[15] Pauku *et al*, 2009

4.2.4. Marine Flora

The coastal areas of Isabel Island are surrounded by an extensive coastline and characterized by different types of ecosystems. These typically are coral reefs, mangroves, estuaries, beaches, sea grass beds, alga beds and small island ecosystems. Reefs of Isabel are diverse with rich and relatively healthy communities. The most unusual reef communities were found in the many fjords like coastal formations typical of the southern coasts of Isabel. Overall coral diversity was very high, which makes the Solomon Islands listed in the 'Coral Triangle'.

In Isabel, the area around Kia Village (north-western Isabel) provides an excellent variety of well-flushed sheltered reef habitats and extensive mangrove environment. It is perhaps the best example of this sort of habitat in the entire Solomon Islands. The mangrove-reef habitat is vital for many commercial species, such as snappers and Napoleon Wrasse. Therefore its inclusion in any protected area network is essential.

There are 26 mangrove species currently known in the Solomon Islands which represent around 43% of the worlds known mangrove species16. Most of these would occur in Isabel Island. Sea grass beds also characterize various parts of the islands coastal zone. Not much work has been carried out in terms of the number of species, but around 10 species are currently known[17]. Algae are common in the different types of coastal ecosystems, with around 233 species currently recorded.

The coastal area of Baolo comprises mostly of a major fringing coral reef that runs close to the entrance of the bay. There are mangrove strands in the area and along the river mouth. Sea grass beds dominate the coastal waters with sarggasum sp cited along the coastline.

The coastline near the solar site is heavy impacted due to construction of the log port and siltation from the nearby river. See figure below.

[16] Sulu. R. et al (2000), The Status of Solomon Islands Coral reefs. IMR/USP, FD/DFMR, SIG. Honiara, Solomon Islands

[17] Green.A. *et al*, (2000), Solomon Islands Marine Assessment Report, TNC, Honiara, Solomon Islands

Figure 11: Log Port Baolo, Isabel Province

4.2.5 Marine Fauna

Marine resources are an important component of the socio-economic livelihood of the rural Solomon Islander. The bay with a fringing reef as mentioned above has resulted in a very diverse marine environment. Katukatu (bait fish), yellow fin tuna, turtles, bonito, snapper, baraccuda, grouper, parrot fish, red emperor fish to name a few were noted around the area. The bay area is the villages main fishing ground. There is no Marine Protected Area (MPA) within the subproject area.

4.2.6. Rare and Endangered Species

Solomon Islands is home to rare and endangered species. The island of Isabel contains some of the rare and endangered species in the world. Endemic bird species to Isabel and Choiseul is the black-faced pitta (*Pitta anerythra*) also known as Solomons Pitta[18] along with fearful owl (*Nesasio solomonensis*). Isabel naked-tailed rat (Solomys sapientis) is an endangered species located in Isabel province also endemic to the province. Some species are previously rare and near threatened however, now common such as the flightless rail (*Nesoclopeus woodfordi*)[19].

[18] Habru P, 2017
[19] IBID 12

The subproject site and the surrounding area however, have no rare and endangered species that are of any conservation values. The inland forests are subjected to logging in the past and present.

4.2.7. Protected Areas

Protected areas are defined as geographical spaces, recognized, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values. There are about 42 protected around the country. They are managed by NGOs and the local communities, with most are managed through 'community-based resource management' approach as the resources are owned by traditional communities. The government also supported the management of a few of those protected areas. The subproject site has no areas declared as protected under the Protected Areas Act 2010. The provincial government is being given power under the Provincial Government Act to pass by-laws that are important to protect and perhaps improve the wellbeing of people. With that, the Isabel Provincial Government was known to have gazette the Conservation Area Ordinance which provide guidance towards conservation of certain areas including the Arnavon Islands and other conservation or protected areas on the Island. Arnavon Protected Area is approximately 100km west of Baolo.

4.2.8. Invasive species

Biological impacts from introduced species and invasive species can cause a great deal of damage to naturally adapted systems. Invasive or introduced species are species that are non-indigenous and can colonize and suppress local species. Most of these species are a major threat to ecosystems in the Solomon Islands. Table 3.2 of the State of the Environment Report, 2008 lists 11 invasive plants; 1 micro-organism and 2 aquatic vertebrates/invertebrates. Invasive plants include the usual invasive species such as: *Acacia fanersiana* (Ellinton's curse) *Lantana camara*, *Makania macrantha* (mile a minute vine), *Mimosa invasa* and *Mimosa pudica* (Sensitive mimosa), *Eichhornia crassipes* (Water Hyacinth), etc. These plants have either arrived as agriculture, forestry or as garden ornamentals. The microorganism is *Phytophera colocasiae* (Taro leaf blight), while fish include Tilapia and the mosquito fish. Gastropods include African snail (Lissachatina fulica). The Cane Toad (*Bufomarinus*) is also included in the list. Fire ants (*Wasmania auropunctata*) are now established within the Solomon Islands but have not been noted as an invasive species. Nor is the Paper Mulberry *Broucessonetia papyrifera* which has established itself along roadsides.

4.3. Socio-Economic Environment

4.3.1. Beneficiary Population

Isabel province has a population of 26,158 people with 16 provincial wards and 3 constituencies. Baolo and Zuto communities are the primary beneficiaries to the solar subproject. Both communities are located in ward 2/Baolo ward that has a population of approximately 1,148 people[20].

4.3.2 Household and standard of living

[20] SIG, 2009

Dwellings: Majority of the building are permanent and semi-permanent buildings along with several leaf houses. People who resides in this area are customary landowners.

Water and Sanitation: The communities here are connected to a water supply system. The source is further inland, approximately 3km from the subproject site. Stand pipes are shared between 2-3 houses. The majority of the homes surveyed do not have sanitation, people either use the bush or beach. Very few people owned flash, bucket and pit toilets.

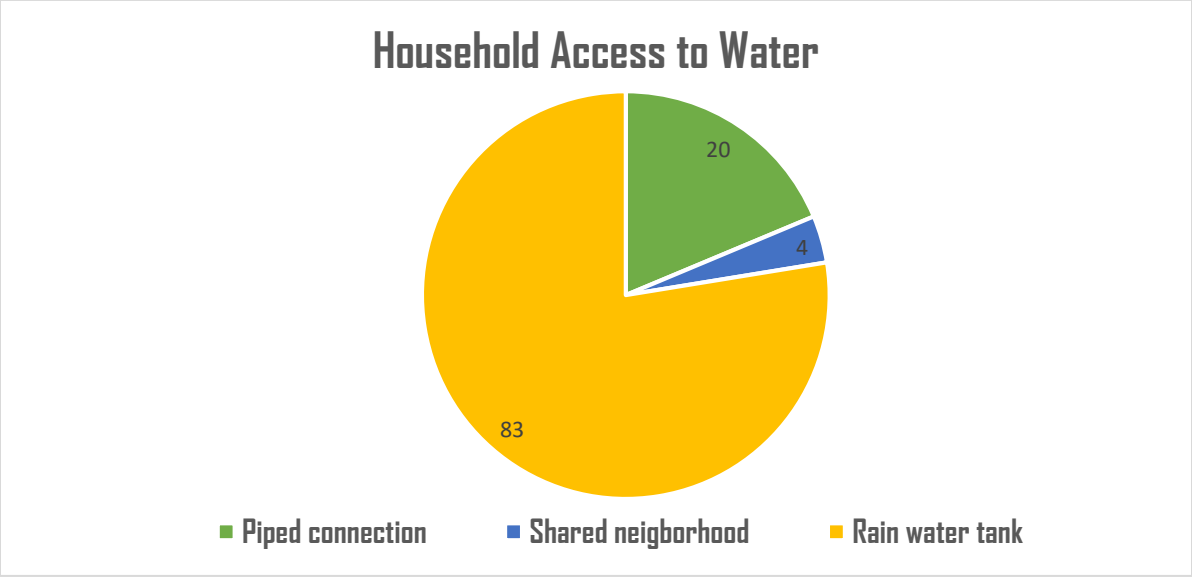


Figure 12: Household access to drinking water.

Energy: The majority of the people use home solar with limited energy output and very few use diesel/petrol generators. The generators are used for powering freezers to store fish. The current solar systems are not reliable and fuel and maintenance of these generators are expensive.

4.3.3. Community Consultation

Household interviews were held on Monday 24th – Wednesday 26th of February 2020 along with community consultation in the two main villages, Baolo and Zuoto. Another consultation was held on the 17th of September 2020 to clarify the MOU and its purpose with the communities. One hundred and seven (107) households within the project neighborhood were consulted. Consultation outcomes are detailed in chapter 8.

4.3.4. Social Services

Health and Education: Majority of the people in the area have access to basic health care and education. The closest school is Baolo Primary School and the two Kindergartens (one in Baolo and the other in Zuto). Secondary students go to Lilika Community High School which is 100m northwest of Baolo. People in Baolo and surrounding villages usually seek medical attention at theBaolo Clinic.

Figure 13: Baolo clinic.

Figure 14: Baolo Kindergarten School

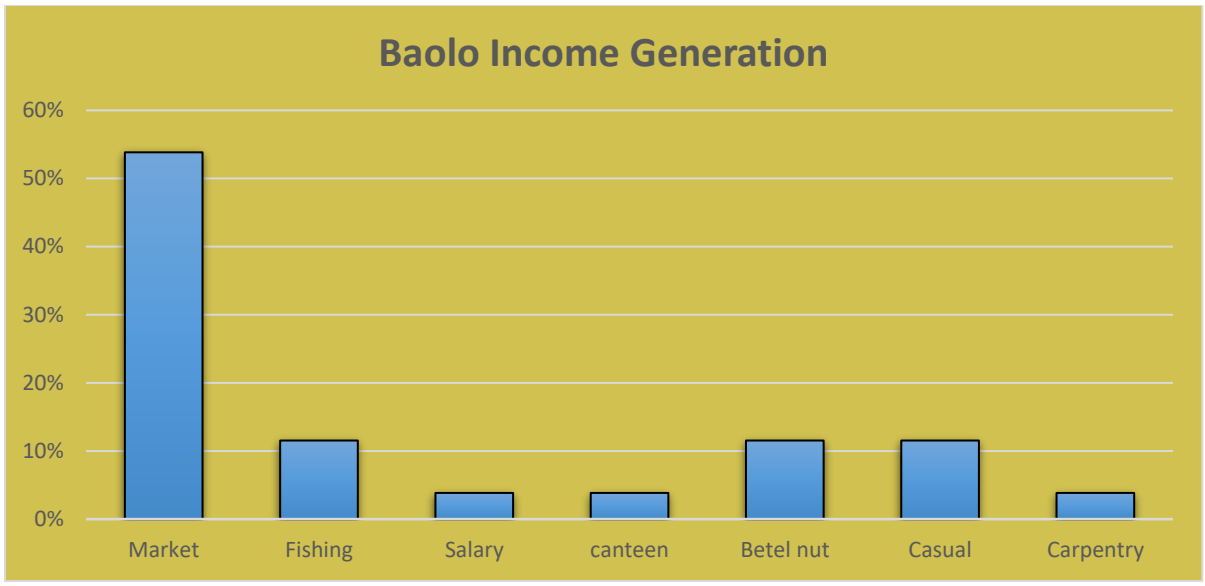
Communication: The subproject area has access to communication services. Baolo and Zuoto communities have Telecom coverage.

Transport: Transportation to other communities or islands are by Out Boat Motor (OBM) engines and ferries. Network of roads in the area were constructed by a logging company. The same company constructed a road from Suavanau (the airport) to Baolo, however was no longer in use due to its poor condition. Most of the people in the area normally walk to nearby communities or gardens using the logging roads and bush tracks.

Figure 15: Logging Road and Log Port

4.3.5. Income generations

The source of income comes from marketing of timber, livestock (pig and chicken), seafood, root crops, fruits and vegetables. 12% from fishing, 20% from wages and salary, canteen and 12% from betel nut alone. The informal sector plays an important role in Baolo as it provides self-employment for the community especially the women and youths.



Analysis of household income indicated that (14.95%) earned between SBD0-200 dollars per week, 14.95% HH earned between SBD201-500 per week, 12.15% HH earned between SBD501-800 per week, 23.36% HH earned between SBD801-1300 per week, 17.76% HH earned between SBD1301-2000 per week and 16.82% HH earned more than SBD2001 per week.

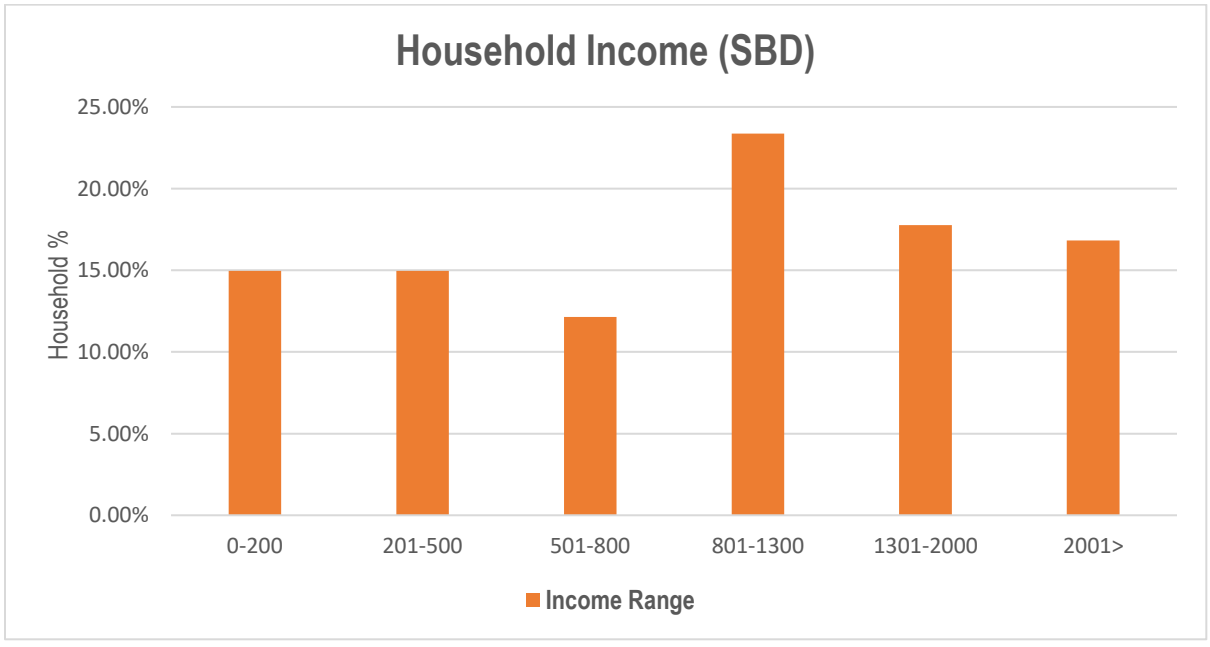


Figure 16: Household income per week.

Figure 17: Piggery and chicken business.

4.3.6. Social Organization

Tribal Affiliation: The majority of the people in Baolo and Zuoto are from the Bulau tribe.

Leadership:

There is a sense of communal affiliation at the subproject site. Just like any Melanesian society, the area does have big men, chiefs and elders who were charismatic leaders or focal points able to use their personal abilities and enterprise to organize community activities and resolve grievances. All tribal units have chiefs who are responsible for tribal issues and matters regarding land. The subproject is located in Baolo (Havulei) ward under the Hograno/Kia/Havulei constituency. The governance system for hearing and resolving grievances is through the tribal chief and church elder. Grievances can be expressed verbally to the chief and church elder for discussion and deliberation.

According to the “Solomon Islands community governance and grievance management project briefing note”, the disputes that rural Solomon Islanders encountered as concerns can be grouped into three categories:

- Social order disputes – family disputes, domestic violence, and drug and alcohol-fueled,
- Transactions involving land and natural resources- land disputes
- Competition for the benefits of public spending- competition for jobs, assets, services and other benefits arising from donor aid and constituency development spending.

In Isabel, communities and tribal groups have their own pathways of handling social issues to ensure communities live in peace and harmony. This is done through the tribal chief and church elder.

Religion: 97% of the people in Baolo and Zuoto are Anglicans and 3% from other religious communities. People in the area normally walk to church to commune with other church members on Sundays and every morning.

Women and Youth: In Baolo and Zuoto, women's groups are part of a church based organizations called mothers union. The women's groups focus on religious commitment and "empowering and equipping women with the skills and knowledge to make better decisions on issues that affect their lives and those of their families and communities"[21], and promote self-reliance and rural economic empowerment. These groups provide training in cooking, sewing, making baskets and dying clothes. They also organize cooperative activities to improve food security for women and their families. Most youth groups are associated with the local churches and majority promote religious activities.

4.3.7. Land Registration

The network MOU had been signed with the landowners and communities. Land acquisition for the solar farm site is in progress. Solomon Power is expecting the Land title in June 2021.

[21] https://www.spc.int/sdp/70-inspiring-pacific-women/dr-alice-pollard. Retrieved 28 August 2018. See also https://iwda.org.au/case-study-west-areare-rokotanikeni-association-solomon-islands/

5.0 ANTICIPATED ENVIRONMENTAL SOCIAL IMPACTS AND MITIGATION MEASURES

5.1 Significance of Impacts

The potential environment and social impacts for the subproject have been identified, and their significance assessed. The duration of the impacts is assessed with reference to the scope of work and the bio-physical and social environment in the subproject site. Mitigation measures are designed in order to avoid and/or minimize each of the potential environmental and social impacts. Impacts may be minor, moderate, major or negligible based on the scale of impact itself and whether it be mitigated or not.

5.2 Potential preconstruction impacts and mitigations

5.2.1 UXO

During WWII, the subproject site was subjected to intense battles and while this occurred over 60 years ago, it is possible that a chance discovery of a UXO may occur. Provision in the contract BOQ will ensure the contractor conduct a UXO survey prior to any construction and during construction when the need arises. Should UXO be discovered, the contractor is to immediately cordon off the area, arrange the evacuation of nearby residences and inform the RSIPF of the find.

5.2.2 Preliminary designs and design specification

Preliminary designs and design specification will need to be approved by SP and the IPG TCPB. The board will issue a building permit or consent for the development to proceed. This process is a legal requirement under the Town Country Planning Act, which means consent has to be acquired prior to any civil works onsite. The designs avoids resettlement and unnecessary clearance to vegetation.

5.2.3 Land restrictions

The initial consent from the landowners and community representative is in annex 12. MOU for the network had been signed with the landowners and communities. See annex 8.

5.3 Potential construction impacts and mitigations

5.3.1 Impact on Flora and Fauna

During the construction phase, flora and fauna can be affected but any potential impacts are considered to be minimal as the construction will be performed at previously developed site. Measures to be included in the subproject to ensure protection of flora and fauna within the site include:

- At the induction meeting, the contractor and SP will provide guidance on felling and clearing of vegetation;

- Contractor will be responsible for providing adequate knowledge to construction workers in respect of fauna. The poaching of fauna will be prohibited. Anyone behaving in such manner will be reported to the management and disciplined and
- Construction workers will be informed about general environmental protection and the need to avoid un-necessary felling of trees whenever possible.

5.3.2 Impacts on Air Quality

The quality of air within the subproject site is typical of a rural setting in the Solomon Island. The construction works will have a minor and temporary impact on local air quality through emission of exhaust from construction machineries, as well as through dust generation from vehicles transporting materials and from exposed stock-piles. There are no air quality or emission standards in Solomon Islands, and as the subproject is not a green-field development nor is it highly polluting, preparing a baseline for subsequent monitoring is not considered warranted. Total Suspended Solids (TSS), SO_2 and NO_2 gases are expected because of the diesel and petrol fueled equipment as well as dust from exposed ground or stockpiles. There are a number of good engineering practices that can be employed to ensure that any air quality impacts generated during construction are mitigated. These include:

- Construction equipment being maintained to a good standard. The equipment will be checked at regular intervals to ensure they are maintained in working order and the checks will be recorded by SP as part of environmental monitoring;
- Prohibition of the use of equipment and machinery that causes excessive pollution (i.e. visible smoke) at the subproject sites;
- Provide workers with protective safety equipment including masks;
- Ensuring that all vehicles transporting potentially dust-producing material are not overloaded, are provided with adequate tail-boards and side-boards, and are adequately covered with a tarpaulin (covering the entire load and secured at the sides and tail of the vehicle) during transportation;
- Wetting material (for example prior to transport or when stockpiled) when conditions are such that there is a high risk of dust generation. This is particularly important when climatic conditions expose sensitive receptors to potentially damaging levels of suspended particulates.
- Material stockpiles being located in sheltered areas and covered with tarpaulins or other such suitable covering to prevent material becoming airborne;
- Contractor to develop a trigger action response plan (TARP) that details what the construction workers should do for different dust levels and wind directions and
- Periodic qualitative air quality monitoring (by observation rather than testing).

5.3.3 Impacts on Water Quality

Water quality can be affected during construction when soils, wastewater, oils and lubricants, sewage and other materials are discharged to the environment. Construction activities that may exacerbate the movement of these materials into the water environments will be examined and mitigation measures developed. Mitigation measures include:

- The implementation of erosion and sediment control measures such as silt fences and sedimentation ponds during clearing and construction. The direction in which water will flow

across the subproject area should be determined prior to the commencement of works and mitigation controls put in place to prevent turbid water from being discharged offsite.
- Minimizing interference with natural water flow within or adjacent to subproject site;
- Solid wastes, debris, spent oil or fuel from construction machinery or plant, construction material, or waste vegetation removed from subproject site will be disposed at a designated site approved by communities and the provincial authority;
- Hydro-carbons, fuel, and other chemicals as required for the works, will be stored in secure containers or tanks that are bunded and located away from the surface waters, or streams and shoreline. Any spills will be contained and immediately cleaned up as per the requirements of the emergency response plan prepared by the contractor; and
- All water, waste-water and other liquids used or generated by project works and activities will be collected and disposed of in an approved manner and in an approved location. Such disposal will not be permitted to cause either pollution or nuisance. All sanitary and kitchen waste water will be piped into soak hole and soak way.

5.3.4 Impacts on Soils and Erosion

There will be minor excavation work during construction. Measures will be taken to avoid the movement of eroded soil from the site onto adjoining areas including the worksite. At the completion of work, all disturbed areas will be stabilized by national re-vegetation. Existing patterns of erosion, soil characteristics and topographic conditions were taken into consideration in the concept design of the subproject. Certain types of earth works, e.g. vegetation clearing and excavation can result in sedimentation.

The potential impacts on soil, or from erosion, during construction are from (i) turbidity impact on the receiving water bodies; (ii) soil erosion and loss of protective vegetation; and (iii) soil contamination from fuel, chemicals and/or construction material spillage. Material stockpiles will be susceptible to erosion, creating sediment laden run-off, particularly during rains and re-suspension of dust during the dry season. Stockpiles will not be permitted near water bodies and should have an associated erosion and control plan to prevent sediment from leaving the site through rainwater run-off. Potential soil impacts and erosion will be mitigated by:

- In the event that the contractor causes damage to agricultural land, productive land or gardens, contractor is solely responsible for repairing the damage (It is expected all works carried out on SP registered land);
- Designs used that protect soils in order to reduce erosion; and
- Random and uncontrolled tipping of spoil, or any material, will not be permitted.
- How would hydrocarbon contaminated soil be disposed of?
- Ensuring bunding of areas at construction lay down areas for storage of fuels and other potential hazardous substances,
- Developing a spill response plan (emergency response plan) and provide training to contract workers on how to implement the same, etc.

5.3.5 Impacts on Noise Levels

There are no noise standards in Solomon Islands, and as any noise generated by the subproject will be temporary (i.e. during construction) and intermittent, preparing a baseline of ambient noise levels for subsequent monitoring is not considered warranted.

Construction noise is generally intermittent, attenuates quickly with distance, and depends on the type of operation, location and function of equipment. During construction, there will be a temporary impact due to the noise of the construction equipment, especially heavy machinery when construction activities are carried out close to residents.

The most sensitive receptors are mainly residential buildings. It is the responsibility of the contractor to arrange meetings between affected residents on feasible work schedules (hours of equipment operation etc). WB standard noise levels can be used as a guide[22].

Table 1.7.1- Noise Level Guidelines[54]		
	One Hour L_{Aeq} (dBA)	
Receptor	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational[55]	55	45
Industrial; commercial	70	70

Table 3: WB Noise guide

Measures to be included in the subproject to mitigate the effects of noise include:

- Requirements in the ESMP and contract documents that all vehicle exhaust systems and noise generating equipment be maintained in good working order and that regular equipment maintenance will be undertaken;
- Prohibition of any construction activities between 9pm and 6am in, or close to, residential sites;
- The contractor will prepare a schedule of operations that will be approved by affected stakeholders. The schedule will establish the days, including identifying days on which there should be no work, and hours of work for each construction activity and identify the types of equipment to be used;
- Workers will be provided with noise abatement equipment; and
- Any complaints regarding noise and other potential or perceived impacts will be dealt with by the Contractor in the first instance through the redress grievances mechanism.

5.3.6 Impacts on Access

The subproject will cause temporary impacts, including inconvenience, minor disruptions to traffic using the local access during the construction period. Where applicable, the contractor will develop a traffic management plan as part of CESMP. Mitigation of impacts on access will include:

- Care must be taken during the construction period to ensure disruptions to access and traffic are minimized;

[22] https://www.ifc.org/wps/wcm/connect/4a4db1c5-ee97-43ba-99dd-8b120b22ea32/1-7%2BNoise.pdf?MOD=AJPERES&CVID=ls4XYBw

- Locals will be provided with alternative access if the need arises;
- Signage and other appropriate safety features will be used to indicate construction works are being undertaken; and
- The contractor will ensure that access roads to privately owned land are not disturbed.

5.3.7 Impacts on Health and Safety

The subproject's activities can cause a range of health and safety impacts. The main impacts on health and safety are associated with (i) risk of accidents, (ii) traffic safety issues and (iii) chemical spills. The risk of the spread of communicable disease is considered to be negligible.

Observing general health and safety requirements, including the provision of safety and protective gear and equipment to workers, will reduce the risk of accidents at the subproject site. Air pollution and noise, which also have a health and safety aspect, have already been discussed.

The contractor will need to observe general health and safety requirements and, as a minimum, must be compliant with the Labor Act of 1978, the Safety at Work Act of 1996 and where application the WB/IFC EHS Guidelines. SP Project Engineers will undertake inspection and spot checks weekly to ensure the contractor is complied with the health and safety requirements. The SIG declared a state of public emergency in 2020 to protect the country against the risk of COVID-19 pandemic. All government agencies, including provinces, SOEs, the private sector and communities were required to comply with the SIG COVID-19 protection measures persuaded by the Ministry of Health and Medical Services (MHMS) and SIG COVID-19 task force committee. In order to comply with the country's management system, SP contractors have been advised to provide a COVID-19 management plan. This will also be required in all SP future contracts.

Mitigation measures for reducing and avoiding impacts on health and safety include:

- SP and the contractor to provide workers health and safety induction, and on the specific hazards of their work;
- Provide workers with personal protection equipment, such as safety boots, safety glasses, reflector vests, helmets, gloves, and protective clothing and ensure workers adhere to OH&S policy at all times;
- Garbage receptacles will be setup at subproject sites, which will be regularly cleared. The garbage will be dumped only at designated site approved by the communities and the provincial government;
- Provision of adequate protection to the general public in the vicinity of the work site, including advance notice of commencement of works, installing safety barriers if required and signage or marking of the work areas; and
- SP/Contractor will issue general and hot work permits at every stage of the work outlining the scope and precautionary and protection measures for example working at height, confined spaces, isolation of electrical equipment/ power-lines.

5.3.8 Fire

Smoking near fuel storage areas causing fire and loss to construction resources are expected to be minor. At this stage it is uncertain the amount of fuel likely to be onsite but it expected to be less than 100 gallons per month for the construction. Mitigations measures include:

- Prohibit smoking close to fuel storage areas;
- Erect signage of no go smoking zones; and
- Provide extinguishers and fire hydrants including training workers on their use.

5.3.9 Accidental discovery of archaeological resources

Any site clearance, digging and excavation activities undertaken during construction can un-earth archaeological sites or resources. In the event this occurs, work shall cease immediately and the authorities (National Museum Tambu Register, Ministry of Culture and MECDM) shall be informed.

- Activities shall not re-commence until the authorities have signed-off that the site/resources have been dealt with appropriately and that work may continue. The contractor will be responsible for complying with the requirements of authorities, and the SP shall monitor the same.

5.3.10 Emergency Response Plan

The contractor will be responsible for preparation of an emergency response plan in consultation with the relevant organization that will cover containment of hazardous materials, oil spills, and work-site accidents. The plan will detail the process for handling, and subsequently reporting, emergencies, and specify the organizational structure (including responsibilities of nominated personnel). The plan will also consider elements such as access to emergency services and medical treatment and the availability of emergency response resources on site such as medical equipment, fire extinguishers and spill kits etc. including ensuring that the contractor is able to effectively use them.

5.3.11 Climate Change and Adaptation

As for the subproject, the main climate change risk would be related to occurrences of extreme rainfall events and tropical cyclones. Extreme weather events have had the potential to cause damage the solar hybrid. Fumes from construction machineries used for the work will contribute to emission of greenhouse gases; however, can be considered very minimal and negligible. Therefore, the subproject will not have any significant impact on climate change. Risks of impacts on the solar hybrid and associated structures from climate change will be addressed through routine inspections. In addition to repairing solar hybrid components, one of the responsibilities of the contractor will be to report on cases where onsite drainages are failing and to recommend upgrades or additions as required.

5.3.12 Generation of waste during construction

Construction waste comes in solid and liquid form from different construction components. The ECD regulates the discharge of any substances on the environment. All construction materials whether liquid or solid will be disposed at designated site approved by the Project Engineer with prior approval from Isabel Province, Landowning Units or ECD.

Segregation of Solid Wastes: Solid is generally understood as solid or semisolid, non-soluble material (including gases and liquids in containers). All other forms of waste except for anything non-solid can be categorized as solid waste. Solid waste represents a majority of the waste

produced during the construction. Construction waste will include drums, cables, timber and metal off cuts and kitchen waste to name a few. The contractor will sort or segregate all solid waste before disposal. Willy Bins will be labeled with different waste categories for example “cans, plastic and organic” waste and be installed at designated sites especially at the entrance, campsite and construction area. The contractor’s obligation is to remind construction workers to adhere and comply with the segregation methods and penalize workers who defied the rules established.

Liquid waste management: Liquid waste can be fluids of any form, dirty or clean, toxic or not, can be oil, grease, fats, sewage to name a few. All these are expected during the construction period and will be managed at acceptable standards. Obviously waste oil is common during construction as a result will be stored in a safe location. There is provision for spate toilet at all construction sites.

Where fuel is being transferred from a vehicle, the tank truck must be certified to standard and that all trucks used to transport fuel tanks meet commercial vehicle inspection requirements. There should be signs, indicating that the ignition must be turned off and smoking is not permitted while the vehicle is being refueled and must be visible to every driver. Travelling along highway should be not more than 60km/hr to avoid accidents. Maintain at least one 20-B:C portable fire extinguisher with the tank vehicle. Refueling equipment from a tank vehicle is permitted if the following conditions are met:

- the fuelling is conducted outdoors on commercial or industrial establishments;
- the fuelling is conducted using approved hose-reel and automatic closing nozzles; and
- appropriate training and equipment are supplied to deal with any incidental spillage.

All storage tanks for combustible and flammable liquids will be built and maintained regularly. There will be thorough inspection for possible leakages and faults. Whenever a problem occurs, a spill response kit capable of containing and absorbing fuel spills will be made available and maintained. Company will ensure spills are recovered and that contaminated soil is removed or treated. Post spill response procedures and maintain an emergency response plan with the fuel facility.

Asbestos Removal and Disposal: No demolition works required for this subproject. However, when contact with asbestos, herewith are the management measures. If asbestos fibres are present in the air and are inhaled, there is a risk that they may cause a variety of serious health problems. Asbestos cement products, will be handled with care and through the use of standard operating procedures (SOP) or Material Safety Data Sheets (MSDS). Release of asbestos fibres into the air comes from drilled or cut during construction, especially if broken in the process may release asbestos fibres. A number of good engineering practices will be carried to avoid such risk:

- Workers familiarise themselves with the type and condition of asbestos cement product that will require removal and disposal of at the site.
- Will obtain approval for an appropriate disposal site prior to demolition.
- Will remove asbestos cement demolition materials immediately from the site to the disposal site without storing it.
- All workers handling the materials are supplied with the appropriate protection clothing and equipment, which are:
  - White disposable overalls to wear during the operation;

- Disposable dust mask suitable for work with asbestos; and
- Disposable gloves.

- Ensure that the following are available at the site:
  - A hose and a supply of water for wetting down materials;
  - A plastic groundsheet that can fully wrap the quantity of asbestos cement sheeting and which will be disposed of with it; and
  - Packaging tap to seal the wrapped sheeting.
- Prevent children, or anyone else who may be affected by the work, from entering the immediate work area.
- Wear a suitable disposable dust mask to prevent inhalation of asbestos fibres.
- Wear disposable overalls. These should be taken off at the site and disposed of with the AC sheets, These overalls will prevent asbestos fibres clinging to your clothes where they could cause contamination

Hazardous Waste Management: Hazardous and chemical wastes can be generally referred to as materials either in their solid, liquid or gas states that exhibit a 'hazardous characteristic', usually ignitability, corrosivity, reactivity and toxicity when made in reference to chemicals. It is possible that hazardous chemicals will be used during construction. Hazardous waste materials, such as catalysts, will be handed back to the suppliers for specialist disposal. All Hazardous waste shipped from the site will be subjected to waste manifest to track generation, transportation through licensed and approved contractors. The contractor will:

- Store kerosene, diesel, petrol and lubricants in a bunded area with an impervious surface and with stormwater drainage provisions as approved by the Engineer.
- Store paint, and chemicals in a hazardous materials storage shed with walls, roof, ventilation and a bunded floor with an impervious surface;
- Ensure that the storage capacity of each bunded area is at least 105% of the total volume of hazardous material stored;
- Secure the areas and sheds used to store hazardous materials by erecting a security fence of minimum height 1.80m around each facility with the fence located outside the bund;
- Locate the hazardous materials storage areas at least 10.0m away from any watercourse;
- Contain and mop up spills of hazardous materials in accordance with manufacturer's specifications.

Waste management training and awareness: SP and the contractor will pursue training on waste management protocols with the construction team before civil works commences. In addition to that, all new staff or visitors will be briefed on the waste management requirements before he/she takes up a job or visit site. Workers will be reminded regularly through weekly meetings or daily pre-starts on waste management obligations. The contractor has the right to penalize workers when waste management protocols are not being followed.

5.3.11. Impacts on Protected Areas and other Sensitive Ecosystem

The subproject activities will not have any impact on protected areas. The subproject site consists mostly of a disturbed deciduous and cassava/potatoes plots and with a small-scale operation, the

impacts are expected to be minor. All in all no impact is envisaged for protected areas and sensitive ecosystem.

5.3.12 Risk of Spread of Communicable Disease

The spread of STIs, HIV and COVID-19 could be a possibility during construction due to influx of workers in the country. Nonetheless, all risks will be considered as a precautionary measure and mitigation measures developed. Implementation of the STIs, HIV, AIDS, GBV, SEA and COVID-19 awareness and prevention campaign will be undertaken during the pre-construction phase as well as construction by the contractor.

5.3.13 Social concerns

Community concerns regarding the subproject will be dealt with through the grievance redress mechanism (GRM) in chapter nine. Impact on adjacent residential buildings will be from the noise and dust from equipment. Other risks including spread of diseases between the construction team and the residential population is deemed minor or negligible. The contractor will need to provide first aid kits, safety equipment for workers and provision for taking victim to hospital. The contractor will be responsible for providing adequate training to construction workers and public in relation to safety issues, code of conduct and GBV. Alcohol consumption and inappropriate behavior by the workers or public will be monitored and dealt with by police. Mitigation measures include:

- Contractor to ensure worker's actions are controlled and code of conduct observed; and
- Educate workers to respect public properties or other important services.

5.3.14 Employment

Direct employment possibilities may arise as a result. A few skilled workers may need temporary housing or camp and the provision of water, food and basic sanitation during the construction phase. Increase in income generation will take place for local market vendors as the workers will have to buy local food produces from the market and shops.

5.4. Potential Operation impacts and mitigations

5.4.1 Community Health Concerns

For concerns that the communities may have regarding safety and accidents. For example, electrocution and skin disease. Mitigation measures will include:

- Potential risks will be identified, evaluated and addressed in a manner that follows the safeguard policies; '
- Potential risks will be communicated through forms of community consultations or as deemed appropriate, in particular, risks associated with transmission lines to nearby communities;
- Provision for training will be made available to local communities to ensure that an understanding of OHS and social risk awareness is in place during accidents.

5.4.2 Natural Disaster Impacts

Isabel Island is vulnerable to cyclones. Therefore, it is important infrastructures, and utilities are design proof to such conditions. Extreme weather events may cause damage to the distribution line and solar farm. SP will develop an emergency response plan to manage and respond to such events

5.4.3 Climate Change

The risks to the subproject as a result of climate change revolve around the ongoing operation and maintenance of the assets. The main climate change risk would be related to occurrences of extreme tropical cyclones. These events have the potential to damage the solar hybrid, including the poles and distribution lines. Over time, it could lead to tear and wear of distribution lines and associated apparatus. Risk of impacts on the subproject can only be addressed through inspection and routine maintenance works.

Fumes from construction machinery will contribute to the emission of greenhouse gases; however, considered to be negligible on a global scale. Therefore, the subproject will not have any significant impact on climate change.

5.4.4 Health and Safety

Observing general health and safety requirements, including the provision of protective gear and equipment to workers, will reduce the risk of accidents at the work sites. Measures include ongoing training of workers and reviewing Standard Operating Procedures (SOP) to suit condition at the subproject.

Mitigation measures include:

- Provide workers with training in occupational health and safety (OHS) issues, and on the specific hazards of their work;
- Ongoing training in SOPs; and
- Provide workers with personal protection equipment, such as safety boots, safety glasses, reflector vests, helmets, gloves, and protective clothing.

5.4.5 Management of waste

There is a possibility that the remains of the construction and demolished materials accumulate at the subproject site. The demolished materials and construction materials will be disposed at the designated site approved by SP. These wastes should be removed at the first instance during the construction phase to allow accessibility.

Operation of the subproject will generate wastes including drums, cables, timber and metal off-cuts and kitchen. The contractor will develop a waste management plan as part of its CESMP. Waste management measures will include the following measures:

- Regular collection and disposal of waste at the approved site;
- Regular inspection on oil sumps;
- Waste oil inventory and oil stored in safe containers, careful attention given during overhauls and maintenance;
- Discussion currently being pursued with the ECD on possible export of waste oil.

5.4.6 Sewage and Hydrocarbons

The offices, workshop and related facilities will have piped sewerage connections to a specified septic tank. Sludge shall be stored in holding tanks. The holding tanks will be periodically pumped out and the sludge buried at a suitable location which minimizes the risk of any leaching to water bodies.

Activities likely to cause spillage of hydrocarbons either into land or water shall be undertaken so far as possible in bund areas. In particular, vehicle wash downs, maintenance and refueling, except in emergencies, should take place in workshops and other hardstand areas with appropriate drainage systems, dump, including the capacity to intercept spilt hydrocarbons or oily water; Earth-bund locations within the subproject site where spilt hydrocarbons or oily water can be contained within the bund.

5.4.7 Water Tank

SP ensures the water pumps, tanks and reticulation network are always operational through regular maintenances'. Continuous supply of water is important to subproject site for use in emergency responses as well as domestic purposes.

5.4.8 Impacts on Air Quality

The impacts on air quality during operation of the subproject are negligible unless there is a need for maintenance and the use of heavy machinery. Engineering practices that can be employed to ensure that any air quality impacts generated during operation are minimized includes the following:

- Equipment will be checked at regular intervals to ensure they are maintained in working order and SP will record the checks as part of environmental monitoring; and
- Periodic qualitative air quality monitoring (by observation rather than testing).

5.4.9 Noise

Noise from the operation of the subproject is negligible unless there is maintenance from the use of machinery.

5.5. Decommissioning Impacts

5.5.1 Waste Impacts

Decommissioning of the solar hybrid will result in recycled materials including glass, semiconductor, steel, aluminium and copper. All e-waste and materials associated with asbestos will be disposed at a designated site approved by the ECD, provincial government and community. At the end of its operational life, the component parts can be dismantled using minimal impact approach and recycled or disposed of safely. SP will manage all waste according to the SIWMPCS. At this stage, SP is yet to identify oversea companies who would be interested in recycling such waste. Normally ECD will facilitate waste transactions under the Waigani Convention. Following SP and ECD discussions on the matter, SP will explore the viability of

exporting solar waste overseas. SP will soon develop a waste management plan to address the issue of waste and pollution in the energy sector.

5.5.2 Storage sites

Minimal space is available for storage of waste materials unless it is recycled immediately after decommissioning. In Solomon Islands, recycling is a major concern as there are limited to no technology available. Therefore, SP and ECD will have to discuss a prior arrangement for recycling with companies overseas. Alternatively, while discussing disposal methods, a first priority will have to be determined for the appropriate sites for storage.

5.5.3. Access and Mobility

During decommissioning, access and mobility at the subproject site will have minor impacts. The contractor will agree on the work schedule with nearby communities or residential areas before decommissioning activities commence.

5.5.4. Vegetation restoration.

The emphasis will be on the use of local provenance species of native plants and that the emerging vegetation type and composition be similar, or at least close, to that was present before the subproject, at the same time considering vegetation types and densities that will produce a quick coverage to minimize further damage to the environment and restore functional ecosystems, as well as vegetation types of cultural and economic significance preferred by end-users.

5.6. Cumulative impacts

The subproject solar site is located on registered land currently used by locals for gardening. Network cables will be installed/constructed parallel to existing road corridors. The landowners have settled here in Baolo and Zuoto over the last 300 years and as a result, the natural habitats in the area have degraded exacerbated by change in land use patterns and Logging. The construction of the Solar Hybrid system and network will induce insignificant impact on existing processes and the environment. Minor impacts are anticipated since best engineering practices will be adopted. Noise, fumes and dust at the subproject site during construction and from the operation of the Solar Hybrid in addition to the daily operation of the road and domestic activities are negligible and deemed minor. It is therefore concluded that the subproject activities will not induce or enhance existing negative impacts but rather will increase opportunity for economic development.

6.0 ANALYSIS OF ALTERNATIVES

This section looks at undertaking the various alternatives of the subproject. There are three basic options: (1) Alternative Design and Technology (2) Alternative Site Options (3) leave the subproject as it is now without undertaking the proposed expansion (no subproject option). If the subproject were to continue, it would be necessary to take technical, environmental and social aspects of the subproject into consideration and ensure that these concerns are adequately considered in the decision making. It is therefore important to consider all practicable options and ensure that the best available option(s) is/are chosen. The following section details the development options.

6.1. Alternative to Design and Technology

The contract arrangement is an EPC contract. Therefore, the contractor is responsible for design, procurement, construction and commissioning of the subproject. The installation will be carried out in compliance to SP specification and SOPs for Solar Farm installation. The contractor will design and furnish all materials and equipment to be fully compatible with electrical, environmental and space conditions of the site. It will include all equipment to safely support the full demands of the solar farm and be designed for unattended operation.

Installation of the solar and substation requires technical machineries and equipment operated by technically approved people. Localized machineries and equipment may be used as support.

SP had completed concept designs of all poles, conductors and associated apparatus. Pole types are based on the span length, location and geotechnical features of the site. Unlike other initial solar hybrid sites in the Solomon Islands, the WB subproject sites will have 11kV HV line in its network purposely to allow expansion in the future. The subproject is currently in the concept design stage so it is highly likely that additional information on design alternatives and technologies will be available at detail design stage.

6.2. Alternative Site Options

Two potential solar sites were identified by the planning team. The two sites were described in detail in the Baolo Planning report 2019.

Table 4: Potential Sites

Site 1	2.19 ha
Site 2	2.05 ha

Figure 18: Potential Solar Sites identified by the planning team

Both sites are located on registered land south of Baolo Village. The land is registered to the Bulua Tribe under the parcel number 071-004-0005. Site 1 has steep slope and in addition to that not enough flat area for the solar panels. According to a local person who accompany the safeguards team during the site visit, site 1 is vulnerable to landslides and erosion. Solomon Power proceed into acquiring site 2 as it meet all technical requirements of the subproject. Thus, it is not feasible to consider alternatives to location which will increase expense, social and

environmental issues. There is no other realistic alternative to the site 2 that will provide the same economic, environmental, and social advantage.

Why work has to be done at site 2:

- Meet SP technical requirements and standards;
- Further away from residential buildings;
- Access to coastline; and
- Access to road.

6.3. No Development Option

The “No Development Option” implies not proceeding with the subproject rather choosing to leave the site as it is at the current state, which is certainly provided no alternative for the subproject. This option would likely lead to socio- economic impacts including but not necessarily limited to the following:

- Limited energy to meet growing demands;
- Without such expansion, SP will unable to meet SINEP targets set by the SIG;
- Failure to realize that by improving energy efficiency will boost the potential for increased income generation through various business undertakings,

In view of the above, it is important to consider that the positive benefits of the subproject will compensate the potential negative environmental and social effects. Therefore, the “No Development Option” is not recommended.

7.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Table 5: Environment Social Management and Monitoring Plan

IMPACT MANAGEMENT					IMPACT MONITORING		
Subproject activities	**Potential Environment Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
PRE-CONSTRUCTION PHASE							
UXO Survey.	• Contact with UXO.	• Completion of the UXO survey by qualified personnel.	• Contractor.	• To be include in the BOQ	• Survey been carried out by approved personals	• Certificate showing the subproject area is UXO free	• RSIPF and SP
Development of preliminary designs /site plans / maps.	• Resettlement and damage to vegetation.	• The concept drawings and route are designed to avoid resettlement impacts and disturbance to vegetation.	• Contractor and SP	• To be part of the subproject cost.	• Plans approved by SP	• Building permit	• SP
CONSTRUCTION PHASE							
Vegetation clearance for distribution lines and Solar Hybrid.	• Removal of grass.	• Minimize clearance to construction perimeter only. • Unnecessary clearance avoided.	• Contractor	• Include in construction cost	• Area of vegetation; area of felled trees/vegetation removal	• During survey and activities - visual inspection	• SP

IMPACT MANAGEMENT					IMPACT MONITORING		
Subproject activities	**Potential Environment Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
		• Contractor to communicate clearance area to workers and monitor clearance activities				before, during and after	
Operation of construction machinery generating emissions.	• Emission of exhaust from vehicles and machinery. • Emissions of CO^2 and POPs.	• Maintain construction equipment. • Prohibit use of equipment that generates smoke.	• Contractor.	• Inc. in construction cost.	• Air quality, emissions.	• Weekly or after complaint - periodic visual inspection; • Any particulate matter and smoke.	• SP.
	• Dust caused by construction vehicles running at high velocity, • Degrade air quality/ Increase TSS in the atmosphere.	• Thorough watering to avoid dust. • Restrict operations if particulates are causing nuisance to sensitive receptors.	• Contractor	• Inc. in construction cost	• dust, particulate matter; • Use of tarpaulins and loading of vehicles; • Stockpiles.	• Weekly or after complaint - periodic visual inspection.	• SP
Operation of construction machinery creating noise	• Noise to communities and schools.	• Construction machine exhaust systems and noisy equipment will be maintained to minimise noise. • Limit noisy construction activities to day time hours,	• Contractor.	• Inc. in construction cost.	• Adherence to agreed schedule; • Complaints (no. logged with resolution).	• Weekly or after complaint - review schedule. • Consultation (ensure	• SP • ECD

IMPACT MANAGEMENT					IMPACT MONITORING		
Subproject activities	**Potential Environment Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
		e.g. Construction activities. prohibited between 9pm and 6am. • Agree works schedule with stakeholders.				schedule being adhered to).	
	• Impacts on construction workers.	• Workers limit of exposure to noise will be strictly below 70 decibels per 8 hour shift. (See WB guidelines in Table 2) • Provide workers with noise abatement equipment (ear-muffs etc.). • Complaints will be addressed by contractor through the GRM.	• Contractor.	• Inc. in construction cost.	• Workers safety equipment.	• Weekly • Workers are provided with safety equipment.	• SP • ECD
Stockpile of Construction Materials.	• Construction materials washed out into marine environment • Increase siltation and turbidity or receiving environment	• Construction materials will be stockpiled away from the drain and covered. • Placement of diversion ditches around stockpiles.	• Contractor.	• Inc. in construction cost.	• No stockpiling close to water bodies.	• Weekly- Visual Inspection.	• SP • ECD
	• Dust from exposed stockpiles.	• Material stockpiles located in sheltered areas and to be covered. • Water stockpiles as necessary.	• Contractor	• Inc. in construction cost	• dust, particulate matter; • Stockpile covered.	• Weekly or after complaint - periodic visual inspection	• SP

IMPACT MANAGEMENT					IMPACT MONITORING		
Subproject activities	**Potential Environment Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
Excavation works, installation of Solar Hybrid Generation System and distribution lines.	• Risks of accidents.	• Standard Operating procedures (SOP) for instalment correctly executed. • Workers wear personal protective equipment including clothing, helmets, safety boots, earmuff etc. • Completion of a detail OHS risk assessment prior to the commencement of activities. • Instalment of signage boards, markings, barricades where applicable; • Speed limits should be set and a safety audit may be carried out prior to completion of construction to ensure road safety signs are properly implemented. • Contractor to develop a traffic plan as part of the CESMP.	• SP • Contractor	• Inc. in construction cost.	• Workers wore safety equipment.	• Workers are provided with safety equipment. • Daily inspection. • Risk assessment completed and identified controls complied with.	• ECD and SP.
	• Accidental Discovery of UXO.	• Should UXO be discovered, the contractor is to immediately cordon off the area arrange the evacuation of nearby residences and inform the UXO contractor and RSIPF of the find.	• Contractor, SP	• Include in construction cost	• Occurrence of UXO at the construction site	• Upon discovery of UXO	• SP and RSIPF

IMPACT MANAGEMENT					IMPACT MONITORING		
Subproject activities	**Potential Environment Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
	• Silt generation.	• Keep road side vegetation • Use of silt control devices and sediment traps/fences when required. • Construction of sediment settling ponds and bunds. Diverting turbid water to sediment settling ponds. • Implementation of an erosion and sediment control plan. •	• Contractor	• Include in construction cost	• Reduced soil erosion and sedimentation • Vegetation clearance minimized • No dump sites near waterways	• Weekly - visual inspection • Visual inspections during and after rain events to monitor the effectiveness of erosion and sediment control measures.	• SP and ECD
	• Accidental release of hydrocarbon from construction machines.	• Ensure all construction machines are well maintained. • A prestart on construction machine carried out every morning. • Oil/fuel remediation agents, oil pads, oil booms and geo-fabric clothes are procured for usage as part of the emergency response plan.	• Contractor	• Include in construction cost.	• Construction machineries maintain in good working order. • Spot check for visible oil • Water quality.	• Weekly - visual inspection.	• SP and ECD.

IMPACT MANAGEMENT					IMPACT MONITORING		
Subproject activities	**Potential Environment Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
	• Direct discharge to adjacent creeks or streams.	• Development footprint will be provided with effective drainage systems which will avoid direct discharge to creeks or streams/ when the need arises.	• Contractor	• Include in construction cost	• No direct discharge to water bodies	• Weekly visual inspection • SP ECD	• SP and ECD
	• Access and Mobility at several road sections will be prohibited temporarily during the construction.	• Contractor to allow sections of the road area to be continuously accessed by affected party. • Signs and other appropriate safety features will be used to indicate construction works are being undertaken. • Locals will be provided alternative access if the need arises.	• Contractor •	• Include in Contract	• Maintenance of access; • Signage; • Road free of materials and debris; • Haulage routes rehabilitated	• During activities - Visual inspection; • Consultations; • Review of traffic management plan	• SP and ECD
	• Risk of invasive species (e.g. giant African snail spread through materials and machineries	• SP to acquire clearance certificate from MAL quarantine for transportation of machineries and materials between islands.	• SP and MAL	• Include in Contract	• Ensure there are no invasive species associated with the subproject	• Visual inspection and consultation with affected community.	• SP and MAL and ECD
Fuelling construction machines and	• Hydrocarbon leakage / spills from construction sites / workshops.	• Detailed Emergency Response Plan (as part of CESMP) prepared by contractor to cover hazardous materials/oil	• Contractor.	• Include in constr	• Ensure storage sites are using existing.	• Weekly inspection.	• SP and ECD.

IMPACT MANAGEMENT					IMPACT MONITORING		
Subproject activities	**Potential Environment Impacts**	**Mitigation approaches**	**Respon sibility**	**Mitigatio n cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibilit y**
storage of Hydrocarbons		storage, spills and accidents to land and water. • Chemicals will be stored in secure containers away from the water bodies. • Chemicals stored in bund area or compound with concrete floor and weatherproof roof and fire extinguishers. • Protective Equipment (PPE) to workers directly involved in handling hazardous substances. • Ensure all construction machines are well maintained. • Accidents reported to police within 24 hours.		uction cost.	Concrete base.		
	• Spill associated with Hazardous substances.	• Store kerosene, diesel, petrol and lubricants in a bunded area with an impervious surface and with stormwater drainage provisions as approved by the Engineer. • Store paint, and chemicals in a hazardous materials storage shed with walls, roof, ventilation and a bunded floor with an impervious surface;	• Cont racto r	• Includ ed in constr uction cost	• Handling of hazardous materials.	• Weekly inspection	• SP

IMPACT MANAGEMENT					IMPACT MONITORING		
Subproject activities	**Potential Environment Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
		• Ensure that the storage capacity of each bunded area is at least 105% of the total volume of hazardous material stored; • Secure the areas and sheds used to store hazardous materials by erecting a security fence of minimum height 1.80m around each facility with the fence located outside the bund; • Locate the hazardous materials storage areas at least 10.0m away from any watercourse; • Contain and mop up spills of hazardous materials in accordance with manufacturer's specifications.					
	• Smoking near storage and workshop areas causing fire	• Prohibit smoking close to fuel storage areas. • Put up signs of no go smoking zones. • Provide extinguishers and train workers on their use.	• Contractor.	• Include in construction cost.	• Signs and fire extinguishers.	• Code of conduct and housekeeping rules being adhered to. • Verify records of accidents	• SP and ECD

IMPACT MANAGEMENT					IMPACT MONITORING		
Subproject activities	**Potential Environment Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
Presence of construction workers	• Waste generated at construction and installation sites causing nuisance and potential contamination to soil and adjacent water bodies.	• Garbage receptacles will be set up at construction sites, and will be collected and disposed every day. • Prepare waste management plan (as part of CESMP). • All wastes from work sites to be disposed of in approved landfill / areas by contractor. • Provide sufficient training in appropriate collection and waste disposal methods. • Collection and treatment of septic waste/temporary toilets during construction phase in accordance with ECD.	• Contractor.	• Include in construction cost.	• Waste management - visual inspection that solid waste is disposed of as per CESMP.	• Monthly, as required and spot checks - visual inspection. • Review of waste management plan.	• SP and ECD.
		• No wastes to be dumped in waterways. • Ensures wastes not discharged to rivers or coastal waters and that all wastes disposed of in proper areas. • Provide adequate and safe drinking water.	• Contractor	• Include in construction cost	• No direct discharges to local streams, coast or rivers; • Regularity of waste removal	• Visual inspection Weekly	• SP and ECD
	• Possibility of conflicts or antagonism between the public and the workers	• Facilitate reconciliation between parties- affected person, Contactor to involve in resolving the issue.	• Contractor	• Include in constr	• No. concerns raised and resolution;	• Ongoing - consult with public to monitor	• SP and ECD

IMPACT MANAGEMENT					IMPACT MONITORING		
Subproject activities	**Potential Environment Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
		• Call the Police once it goes beyond control.		uction cost	•	environmental concerns.	
	• Risk of contractor engaged in GBV	• All workers will be required to undertake GBV trainings and sign the associated code of conduct prior to commencement of civil works.	• Contractor	• Include in construction cost	• Zero GBV tolerance.	• Incident reports and consultations.	• SP
	• Climate Change and Natural disasters.	• Inspection and maintenance. •	• Contractor	• Include in construction cost	• Equipment failure	• Weekly inspection and after every storm.	• Contractor.
OPERATIONAL PHASE							
Operation of Solar Hybrid System	• Impacts from maintenance machineries	• Maintain machineries at standard working condition • Safety PPE for workers. • Workers carrying out maintenance are trained to avoid electric shocks. • Completion of a risk assessment and implementation of SOPs.	• SP	• Include in operational cost.	• Air quality, emissions.	• Monthly or after complaint - periodic visual inspection. • Any particulate matter and smoke.	• SP
	• Accidents (involving electric shocks and burning).	• All SP workers and contractors are trained and certified.	• SP.	• Operational cost.	• Zero incidents.	• Incident reports.	• SP.

IMPACT MANAGEMENT					IMPACT MONITORING		
Subproject activities	**Potential Environment Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
		• All households are wired by grade A licence contractors. • Advise communities during awareness to report to SP and Fire services of any burning incidents.					
	• Public safety on the use of electricity.	• Community Education and awareness at the preconstruction, construction and prior to commissioning of facility. • Awareness conducted at schools, church and institutions. • Awareness through media.	• SP.	• Operational cost.	• Zero Incidents.	• Incident reports. •	• SP.
	• Establishment of the network infrastructure throughout the district will introduce more roadside obstacles and the potential for collisions.	• Road safety assessment (majority of the poles will be within the road corridor and supposed to be 4m from road pavement-SP will avoid encroaching into people lands). Traffic in the area is lower and does not seem to pose any risk to the poles. Unless people are drunk which is law and order issue.	• SP.	• Operational cost.	• Zero Incidents.	• Incident reports.	• SP.
	• Road Accidents and safety of women associated with no street lamps.	• There are provisions to install streetlamps on its distribution network for the sake of community safety,	• SP.	• Operational cost.	• Budget for installation of street lamps.	• Installation of street lamps.	• SP.

IMPACT MANAGEMENT					IMPACT MONITORING		
Subproject activities	**Potential Environment Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
		however not at this stage. Assessment on suitable location for street lights will commence soon after the subproject.					
	• Waste generated at solar (Solid waste) old batteries	• Garbage receptacles will be set up at construction sites, which will be regularly cleared by the SP. • SP to prepare waste management plan. • All wastes from work sites to be disposed of in approved landfill / areas by SP. • Workers will provide sufficient training in appropriate waste disposal methods.	• SP	• Include in operational cost.	• Waste management - visual inspection that solid waste is disposed of as per CESMP; • Visibility of oil and fuel.	• Monthly, as required and spot checks - visual inspection; • Review of waste management plan. •	• SP and ECD
DECOMMISSIONING							
Dismantling the solar hybrid	• Solar waste	• SP will manage all waste according to the Solomon Islands Waste Management and Pollution Control Strategy. At this stage, SP is yet to identify buyers of solar waste. Normally ECD will facilitate waste transactions under the Waigani Convention. Following SP and ECD discussions on the	• SP	• To be part operational cost.	• Solar Panels and associated E-wastes.	• During decommission.	• SP/ECD

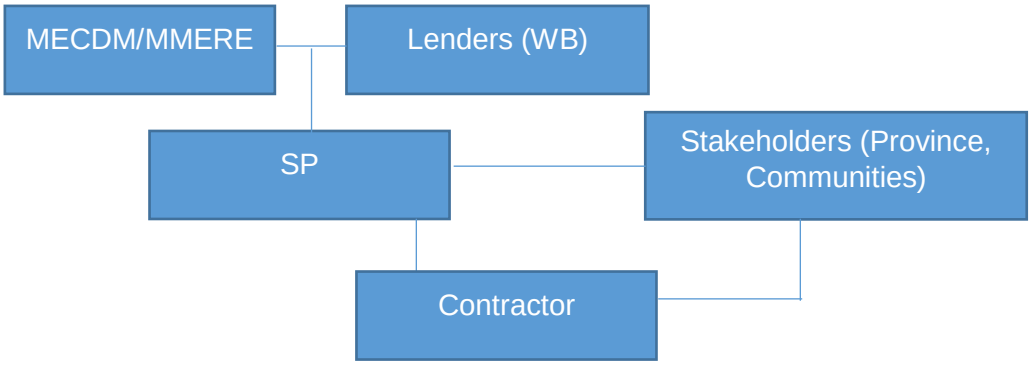
IMPACT MANAGEMENT					IMPACT MONITORING		
Subproject activities	**Potential Environment Impacts**	**Mitigation approaches**	**Respon sibility**	**Mitigatio n cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibilit y**
		matter, SP will explore feasibility of exporting solar waste overseas. ECD recommend that SP discuss with a Fijian company on batteries disposal.					
	• Storage of waste materials to certain extend can occupy space, unless they are recycled or removed immediately after decommissioning.	• Storage facilities spaces and secure.	• SP	• To be part operati onal cost	• Storage facility	• After decommissi oning	• SP/ECD
	• During decommissioning, access and mobility at the subproject site will have minor impacts.	• SP will agree work schedule with the community before decommissioning activities commences.	• SP	• Operat ional cost	• Road access, signage	• During decommissi oning.	• SP/ECD.
Dismantle of standby generator and fuel tank.	• Spillage of oil and fuel.	• Ensure standard operating procedures for dismantle of generator and tank are in place. • All fuel and oil from generator pumped into drums before lifting to vehicle.	• SP	• Operat ional cost	• spillage	• During decommissi oning.	• SP/ECD.

7.1. Institutional Arrangement

This section identifies implementation arrangement for managing environment and social impacts, mitigations and reporting.

The overall organizational structure for environmental and social management for the subproject is shown in figure 19 below.

Figure 19: Organizational Structure for Environmental Social Management



7.1.1 Solomon Power

The overall management of all monitoring and inspection tasks comes under the SP. This covers all aspects of the required activities including coordination with other agencies that have national responsibilities over some of the tasks. The company is responsible for general subproject execution and with day-to-day subproject management activities, as well as monitoring.

SP will include key performance indicators in the Contract that regarding the Contractor's environmental, social and health and safety performance that will inform their compliance monitoring schedule.

SP will be responsible for compliance monitoring during construction and operation of the subproject. The ECD will also be responsible for verifying the monitoring undertaken by the SP through audits and spot-checks. The outcomes of the monitoring will be included in the monthly progress report.

SP, through the Capital Works Department will be the key contact for the subproject. The department is responsible for the delivery of a capital program aimed at expanding and developing

SP's position to meet future demands and challenges. It is supported by operational and engineering departments to ensure reliable, efficient and safe delivery of energy.

A consultant was engaged by SP in mid-December 2018 to manage safeguards work pursued under the capital works department. The TOR includes:

- Preparation of screening reports, proposal applications, Environment Social Management Plans and Public Environmental Reports for subprojects as required to meet requirements of the Environment Act 1998 and WB Policies;

- Arrange public consultation to advise affected communities of the scope and scheduling of the subprojects;

- Arrange for ESMP/PER to be attach to Bid Document;

- Arrange for reports to be sent to the MECDM and WB for evaluation. Following approval by the MECDM and the issuing of permits/approvals advise the SP and WB of the approval;

- Evaluate and approve the CESMPs prepared by the contractors as a condition of the contracts;

- Assist the management of GRM; and

- Undertake regular site visits to independently monitor the contractor's compliance with the CESMP.

7.1.2 Contractor

The contractor will be responsible for preparing a CESMP at construction stage and during implementation that is aligned with this plan and also informed through a risk assessment, whenever additional engineering information is available. These includes an emergency response plan, health and safety plan and waste management plan as part of their CESMP. The contractor will also be responsible for implementing all environmental, health and safety actions included in the CESMP. As a condition to contract, contractor will recruit an environmental safety officer (ESO) whose responsibilities will include:

- Coordinating with SP for preparing the CESMP;

- Provide training and awareness on environment, health and safety.

- Undertake STIs, HIV/AIDS, Malaria, Dengue, GBV, SEA and COVID-19 briefings and awareness raising amongst the contractor's employees;

- Contractor complies with the clauses in the contract and bidding documents in respect of environment, health and safety;

- Ensuring the contractor does not commence construction activities until requisite approvals have been received from ECD, provincial authorities and SP;

- Participating in monitoring with SP to ensure environmental, social management and health and safety activities are reported as required;

- Produce monthly environment, social and health and safety monitoring reports to SP; and

- Facilitating consultation with the affected stakeholders and ensuring smooth implementation of the subproject.

7.1.3 Ministry of Environment Conservation, Climate Change, Disaster Management and Meteorology (MECDM).

As the national agency responsible for environment and conservation, the ECD under MECDM will need to be involved in the various aspects of the subproject. Under the requirements of the Environment Act 1998, the ECD will need to review the ESMP/PER and monitor the progress of construction. The ECD has been fully informed of the status of the subproject and also awaits the submission of the ESMP/PER. The ECD will review and issue development consent for the subproject.

7.1.4 Ministry of Mines, Energy and Rural Electrification (MMERE)

The Mines and energy division (MED) under MMERE is responsible for ensuring the smooth implementation of the subproject. The MED from time to time will carry out inspections ensuring subproject indicators are implemented on time, specification and national requirements are effectively executed. SP will need to seek BMP approval from the ministry for sourcing gravel at any location, however not at this stage. The MED will also be responsible for coordinating this requirement with other departments in the ministry for quick review and approval of the BMP.

7.1.5 Isabel Provincial Government

The provincial assembly is the governing arm of the province. The IPG TCPB shares an important role in approving development plans to certain extend. SP is responsible for liaising with Provincial planning division for consent. A building permit is tendered when a plan is being approved by the board or assembly.

7.1.6 Royal Solomon Islands Police Force

Central Solomon Islands is a major battle ground during the World War II. Provision in the contract BOQ will allow the contractor to carry out UXO survey prior to construction and during construction. Should UXO be discovered during the construction, the contractor and SP are to immediately cordon off the area, arrange the evacuation of nearby residences and inform the RSIPF of the find.

7.1.7 Communities

Baolo and Zuoto comprise with tribal chiefs, village chiefs, church leaders and women. Tribal chiefs and community elders are required to facilitate discussion with their tribes on easement for transmission and distribution lines. Provide support to SP on GRM issues, identifying landowners, signing the MOU and ensuring smooth implementation of the subproject. The interest of SP is to see successful completion of the subproject with equal participation from the communities and its stakeholders.

7.1.8 Land Trustees

The key contact for the subproject is the land trustees. The trustees will be the focal point for land matters in the community. The trustees are responsible for:

- Ensuring land lease is within the subproject timeframe;
- Ensuring necessary documents for transfer of land is available;
- Providing continuous support to the subproject during construction and when it is operational.

7.2. Environment Monitoring and Reporting

Monitoring is a component of an impact assessment that combats uncertainties pertaining to unanticipated impacts, to ensure mitigation measures are working and to reassure public on the progress of the development. Progressive monitoring must accompany various stages of the subproject activities (construction and operational phase). The Environmental social monitoring plan is based on the potential impacts, significance of the impacts and mitigation approaches identified during the screening. It comprises of parameters to be monitored, frequencies and responsible authorities as per impact. The Contractor is required to prepare a detailed environment social and health and safety monitoring plan based on Table 5 in consultation with SP. ECD is responsible for monitoring compliance, reviewing the company's monthly monitoring report and suggesting ways to improve or strengthen mitigation approaches. A monitoring checklist is in Annex 3.

Table 6: Responsibilities for Environmental Social Management & Monitoring

Subproject Stage	Responsible Organization	Responsibilities
Feasibility studies and appointment	Solomon Power	• Prepare ESMP/PER including overall ESMP (Table 5) • Preliminary design
Feasibility studies and subproject review and approval	ECD	• Review and approval of ESMP/PER including overall ESMP (Table 5)
Detailed Design	Contractor	• Prepare detailed design and specification • Submit design to SP for approval • Prepare CESMP based on specifics of detailed design • Submit CESMP to SP for review and approval
	SP	• Approve the Contractor's detailed design and specification and CESMP
Construction	Contractor	• Implementation of CESMP • Submission of monthly reports to SP • Provision of awareness/training to workers • Regular Safety awareness as part of tool box meetings (covering OH&S, PPE and safety signs displaying work progress) • Consultation and awareness to workers on code of conducts and management of communicable diseases

Subproject Stage	Responsible Organization	Responsibilities
	SP	• Supervise implementation of CESMP • Audit construction phase through environmental and OHS inspections and review monitoring data
	ECD	• Audits and spot checks
Operation	SP	• Provide budget to undertake environmental monitoring • Undertake environmental monitoring and prepare bi-annual reports • Prepare maintenance reports to adaptively manage environmental risks related to operations (as per ESMP/PER) • Complete preventative maintenance to prevent environmental, social and OHS incidents and nuisance.
Decommissioning	SP	• Ensure all waste associated with decommissioning is disposed in a manner accepted by ECD. Provide budget for waste export. • Consult with ECD who will provide options on disposals and processes.
	ECD	• Provide support to SP on Waigani Process and other conventions on export of waste.

7.3. Training.

SP and contractor will conduct the environment, social, health and safety training for all workers before construction commences. The training will prepare workers to manage and protect the environment, to manage any potential social impacts and to ensure the safety of the public and the construction team.

7.3.1 Environmental and Safety Induction Training.

Mandatory, all workers attend the Environmental Safety Induction Training. The training covers legislation and regulations, policy, organization structure, duties and responsibilities, mitigation measures, targets in the ESMP and housekeeping rules/guidelines. The major topics will include air pollution control; waste management; vegetation clearance controls, health and safety; handling of hazardous substances, emergency preparedness; and, first aid training.

7.3.2 Environmental and Safety Toolbox Talk.

In addition to that, all workers will attend the weekly environmental and safety toolbox talk. The purpose of the talk is to rectify lesson learnt and re-emphasizing the importance of environment and safety procedures. The Environment Safety Officer will update all workers when Standard Operating Procedures (SOP) is being developed or reviewed.

7.3.3 Refresher training.

There is provision for refresher training on specific topics. These can be done annually depending on the nature of the work and approval from the SP management.

8.0 PUBLIC CONSULTATION AND PARTICIPATION

8.1. Consultation Activities

The major stakeholders in this subproject include the Isabel Provincial Government, MLHS, ECD, MID, MAL, MECDM and MMERE. All these agencies are important because they produce approvals and permits important for the subproject. In addition to that, they provide support to communities through grants and technical resources. Sharing information with these agencies promotes collective planning and budgetary initiations for proposed communities. Align development activities and maximizing benefits to rural communities.

Initial consultation with communities and household surveys were completed by SP including subproject evaluation and economic viability through cost benefit analysis. See minutes of meeting in Annex 10 and 11. Therefore, the subproject goals are already known to the surrounding communities, businesses and the provincial government. The consultation for the ESMP/PER was conducted on February 2020. It includes community awareness, interviews and social surveys.

Consultation with the Baolo and Zuoto land owners and communities resulted in signing of the Memorandum of Understanding (MOU) for the line network. See annex 9 for signed MOU.

Further public consultations and media awareness will be carried out prior to commencing construction to alert the stakeholders about the works and the construction schedule.

8.2. Results of Household survey and interviews

The result of household survey provides opportunity to understand the current social-environment issues. Majority of the analysis are provided in section 4 of this report. Agenda on public consultation includes customer service, safety, subproject schedules and environment/social impacts and mitigation. Issues raised during the consultation and household surveys.

8.3. Consultation issues and measures suggested

Table 7: Consultation and measures suggested

Issues raised	Measures Suggested During Consultation
• Installation of the transmission line will require clearing of crops or trees along road side corridor. Communities feel that SP must compensate affected owners based on SIG rates. (Will there be compensation for crops and trees?)	• SP will compensate crops and trees affected by the subproject activities based on SIG MAL and MOFR rates.
• Locals want network extended from where it currently terminates. (Our homes were not part of the current concept designs, will the subproject expand the network so that households further away from the villages can also access power?)	• There is provision to expand the network in the future.

• Baolo and Zuoto communities and elders feel that a review in the tariff will enhance economic activities in the area. A reasonable rate for rural communities is important and SP management according to elders should relook at it. (Can SP review its current tariffs to suit the rural context?)	• Electricity tariff remains the same for urban and rural. SP is planning to review the tariff in the future.
• Reiterate the importance of electricity usage and its safety. (What are some of the safety requirements for the transmission line and solar farm?)	• Awareness on the use and safety of electricity will be conducted prior to construction and commissioning of the subproject by SP health and safety department. SP responded, it is important public avoid tampering on electricity and SP assets.
• Public safety during construction and operation-There are concerns access during construction. (Will the subproject provide continuous access during construction?)	• Contractor will submit a traffic management plan ensuring safety signs and speed limits. Sunday will be observed as a rest day.
• Majority of the questions are related to cost of connection to households. (Are there any cost to connect to the SP network?) (Can SP connect leaf houses?)	• There are two connections types (1. Normal and 2. OBA). • OBA cover the cost of connection and wiring for households. Each household will pay minimal cost to SP when they submit their applications. • Under normal connections, the customer meet the connection cost including of wiring. • The current scope of OBA is in Guadalcanal and Malaita Provinces. The program might expand to WB solar hybrid sites. • Leaf houses can be connected as long they meet SP regulatory standards. SP regulatory team will inspect all buildings to ensure they are safe prior to connection to the SP network.

Figure 20: Baolo consultation

Figure 21: Zuto consultation.

8.4. Consultation and Disclosure

The ESMP/PER documenting the mitigation measures and consultation process will be submitted to MECDM and will be available for public review. Further consultation and disclosure will be carried out during the implementation through:

- The media before construction and operation commences; and

- Information regarding the approved subproject and the proposed environmental management measures will be posted at suitable locations at the subproject site.

The ESMP/PER report will be available to the public from SP website or upon request through phone and email.

9.0 GRIEVANCES REDRESS MECHANISM

Any concerns, issues or grievance during the course of the subproject will be addressed in a transparent and timely manner, and without retribution to the affected person (AP)[23]. These concerns may pertain to the subproject's environmental performance or social risks.

An initial process has been set up to address any issues and/or problems raised directly at the subproject level in the first attempt. However, if this cannot be resolved, then the grievances will be addressed through a mechanism of referral to ECD within the MECDM. The GRM process and forms will be made available to all households within the subproject area.

9.1. During construction

It is anticipated, that during the construction phase, most complaints that may arise are expected to be minor complaints regarding dust, health & safety and noise, and can be resolved easily. All complaints received at the site office are to be entered into a registry kept on the site, this includes information such as date, name, contact address and reason for the complaint. A duplicate entry copy is given to the AP for their record when the complaint is registered. The register will indicate the party responsible for resolving the complaint and the date when this was made together with the date the AP was informed of the decision and how the decision was given to the AP. The register is then signed off by the person responsible for a decision to be made and dated. The register must be kept at the front desk of the contractor's office, and it is a public document. The contractor's GRM person is responsible for ensuring the forms or entries are filled out properly. The copy given to the AP will show the procedures for assessing the complaint with a statement affirming the AP rights to make a complaint. There are no costs involved when applying to AP for raising a complaint.

Complaints received by the AP are discussed directly with the SP Subproject Manager. For straightforward complaints, the PM can make an on-the-spot determination to resolve the issue. For complicated complaints, the PM will forward the complaint to the SP Management. The Management has five days to resolve the complaint and make a decision to the AP. If the AP complaint is dismissed, the AP will be informed of their rights to take it to the next level. A copy of the decision is to be sent to the ECD and MED.

If the AP is not satisfied, the complaint can be taken to the ECD Director, who will appoint the ECD Officers to review the complaint. The Director will then have 15 days to make a determination.

9.2. During Operation and Decommissioning

During operation, the same conditions apply; i.e., there are no fees attached to the AP for making a complaint, the complainant is free to make the complaint which will be treated in a transparent manner.

[23] *Affected Person (AP) refers to anyone affected by the development, can be an organization or government agency.*

10.0 CONCLUSION

The study shows that there are no significant, but reversable environmental impacts and the ESMP/PER has described mitigation measures as described in Chapter 7 to ensure that all impacts can be mitigated to environmentally friendly levels. No significant flora or fauna, nor will any conservation, cultural or heritage sites be affected.

The contract BOQ will ensure the contractor to carry out a UXO survey prior to any land disturbance or construction. Prior to commencing construction, the contractor will prepare a CESMP when further engineering details are available. During construction, SP will be responsible for monitoring and supervising compliance with the CESMP.

The subproject has minimal impacts, none of which are catastrophic, all of which can be satisfactorily mitigated. Based on the above, it is concluded that environmental social impacts arising from the subproject can be minimized to minor levels. There is no need for further assessment or EIS.

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ANNEX

Annex 1: Multilateral Agreements

Multi-lateral Agreements that the Solomon Islands is a party to Convention or Treaty	Status	**Purpose/Aim**	**Agency Responsible**
Regional MEAs			
i. Pollution Protocol for Dumping	Ratified 10/9/98	Prevention of pollution of the South Pacific region by dumping	Marine Div/ECD
ii. Pollution Protocol for Emergencies	Ratified 10/9/98	Cooperation in combating pollution emergencies in the South Pacific region.	Marine Div/ECD Project: National Pollution Prevention Plan
iii. Natural Resources & Environment of South Pacific Region (SPREP Convention)	Ratified 10/9/98	Protection of natural resources and environment of the South Pacific Region in terms of management and development of the marine and coastal environment in the South Pacific Region.	ECD
iv. Waigani Convention on Hazardous & Radioactive Wastes 1995	Ratified 7/10/1998	Bans the importation of hazardous and radioactive wastes into Forum Island countries and to control the trans-boundary movement and management of hazardous wastes within the South Pacific region.	ECD
Chemicals, Wastes and Pollution			
i. Liability for Oil Pollution Damage	Ratified	Strict liability of ship owner for pollution damage to a coastal state within a certain amount.	Marine Div
ii. Marine Pollution Convention (London)	Ratified	Prevention of marine pollution by dumping of wastes and other matter.	ECD/Foreign Affairs
iii. Desertification (UNCCD)	Acceded 16/4/1999	Agreement to combat desertification and mitigate the effects of drought in countries experiencing drought or desertification.	Agriculture Div/ECD Project: National Action Plan on Land Degradation and Drought; National Capacity Self-Assessment (NCSA)
iv. POPs Convention (Stockholm)	Acceded 28.7/2004	Protection of human health and environment	ECD/Environmental Health Div.

		from persistent organic pollutants.	Project: National Implementation Plan
Biodiversity			
i. CITES	Instrument of ratification being prepared	Regulations and restriction of trade in wild animals and plants through a certification system of imports and exports.	ECD
ii. World Heritage Convention	Acceded 10/6/1992	Protection of sites of Outstanding Universal Values. Solomon Islands currently has East Rennell Island as a World Heritage site.	Museum/ECD
iii. Convention on Biological Diversity (UNCBD)	Ratified 3/10/1995	Conserve biological diversity through the sustainable use of its components and the fair and equitable sharing of the benefits arising out of utilizing genetic resources.	ECD Project: NCSA; National Biodiversity Strategy and Action Plan; International Waters Program; 3rd National Report
iv. Cartegena Protocol	Acceded	Protection of human health and the	ECD

Annex 2: Other important Legislation

Act	Date	Main objectives
River Waters	1973	Control of river waters for equitable and beneficial use; establishes activities for which permits are required.
National Parks	1978	Establishes national parks; establishes restrictions on use and provides for appointment of park rangers.
Wild Birds	1978	List scheduled birds for protection. Establishes bird sanctuaries and strict hunting season for several birds.
Agriculture and Livestock	1982	Applies to agricultural and livestock industries. Defines noxious weeds and their control.
Forest Resource and Timber Utilization	1991	Governs licensing of felling of trees and sawmills; timber agreements on customary land. Establishes State Forest and Forest Reserves and management systems. The Forestry Bill 2004 seeks to replace the Act and provide more control in conservation of forests and improved forest management.

Fisheries	1998	Framework for fisheries management and development, including licensing of fishing vessels and processing plants. Lists prohibited fishing methods, provides for establishment of Marine Protected Areas (MPAs) and coastal management plans.
Provincial Government Act,	1997	The Provincial Government Act of 1997 gives power to the provinces to make their own legislation including environment and conservation. Schedule 3 of the Act provides a list of activities for which the provinces have responsibility to pass ordinances. The State of the Environment Report (2008) shows that eight provincial ordinances have been passed which include: o one environmental protection ordinance, o six wildlife and wildlife management and conservation area ordinances, and o one marine and freshwater ordinance.
Labour Act	1978	This Act deal with employment of workers. Part IX Care of Workers, requires the employer under: o Article 65: to provide workers with rations. o Article 66: to protect workers and dependents from malaria. o Article 67: to provide workers with an accessible supply of clean, non-polluted water for drinking, washing and for other domestic purposes. Water supplies may be inspected by a Health Officer. o Article 68: requires the employer to make sufficient and proper sanitary arrangements for workers. o Article 69: requires the employer to provide accommodation for the worker and his family if they are not conveniently located to the work place. o Article 70: requires the employer to provide medical care at the workplace. o Article 71: states that depending on the circumstances the employer may be required to provide medical facilities,
The Safety at Work (Pesticide Regulations)	1983	This regulation is included as a component within the Safety at Work Act and deals with the following: o Article 3: requires the formation of a Pesticides Registration Advisory Committee. o Article 4: Requires a Register of Pesticides to be maintained. o Article 13: shows that all pesticide containers are to be labelled with the following: a. The trade name of the pesticide. b. The net weight and ISO approved name of the active ingredient, together with its formulation. c. Directions for use and what the pesticide is to be used for. d. Hazard label regarding storage, and handling and safety equipment required for application. e. Minimum withholding periods prior to harvest. f. First aid treatment.

		g. Name of manufacturer and registration number of the pesticide. o Article 15: shows that no unlabelled pesticides can be imported, while Article 16 states that pesticides cannot be sold, supplied or used other than in the original container. o The First Schedule classifies pesticides into 4 hazard levels depending on their oral or dermal toxicity as follows: 1a - extremely hazardous; 1b - highly hazardous; II - moderately hazardous; and III - slightly hazardous.

Annex 3: Monitoring Checklist (pre-construction and construction)

	Subproject activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/Action
PRE-CONSTRUCTION PHASE	UXO Survey	• Contactor	• Provision in the BOQ to allow RSIPF to carry out UXO survey.	• SP,	• Survey been carried out by approved personals	• Certificate showing the subproject area is UXO free	•	•
	Development of preliminary designs /site plans / maps	• Contractor	• Design standards meet national and internal standards (designs and specification).	• SP.	• Plans approved by HCC and the town country planning board	• Building permit	•	•
CONSTRUCTION PHASE	Vegetation clearance	• Contractor	• Minimize clearance to the construction perimeter; • Unnecessary clearance avoided.	• SP, Contractor	• Area of vegetation; area of felled trees/vegetation removal	• During survey and activities - visual inspection before, during and after	•	•
	Operation of construction machinery generating emissions	Contractor	• Maintain construction equipment; • Prohibit use of equipment that causes excessive pollution (e.g. generates smoke).	SP, Contractor	• Air quality, emissions,	• Weekly or after complaint - periodic visual inspection; • Any particulate matter and smoke		
		Contractor	• Thorough watering to avoid dust	SP, Contractor	• dust, particulate matter; • Use of tarpaulins and loading of vehicles; • Stockpiles.	• Weekly or after complaint - periodic visual inspection	•	•
	Operation of construction	Contractor	• Construction machine exhaust systems and noisy equipment will be maintained to minimise noise	SP, Contractor	• Adherence to agreed schedule;	• Weekly or after complaint - review schedule	•	•

	Subproject activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/Action
	machinery creating noise		• Limit noisy construction activities to day time hours, i.e. construction activities prohibited between 9pm and 6am • Agree works schedule with stakeholders		• Complaints (no. logged with resolution).	• Consultation (ensure schedule being adhered to)		
		Contractor	• Workers limit of exposure to noise will be strictly below 85 decibels per 8-hour shift • Provide workers with noise abatement equipment (ear-muffs etc.) • Complaints will be addressed by contractor	SP, Contractor	• Workers safety equipment.	• Weekly • Workers are provided with safety equipment	•	•
	Stockpile of Construction Materials	Contractor	• Construction materials will be stockpiled away from the drain and covered when necessary. • Placement of diversion ditches around stockpiles	SP, Contractor	• No stockpiling close to water bodies.	• Weekly-Visual Inspection	•	•
		Contractor	• Material stockpiles located in sheltered areas and to be covered	SP, Contractor	• dust, particulate matter; • Stockpile covered.	• Weekly or after complaint - periodic visual inspection	•	•
	Clearing, excavations and installation of solar	Contractor	• Standard Operating procedures (SOP) for instalment correctly executed. • Workers wear protective equipment including clothing, helmets, safety boots, earmuff acts	SP, Contractor	• Workers wore safety equipment.	• Workers are provided with safety equipment • Daily inspection	•	•

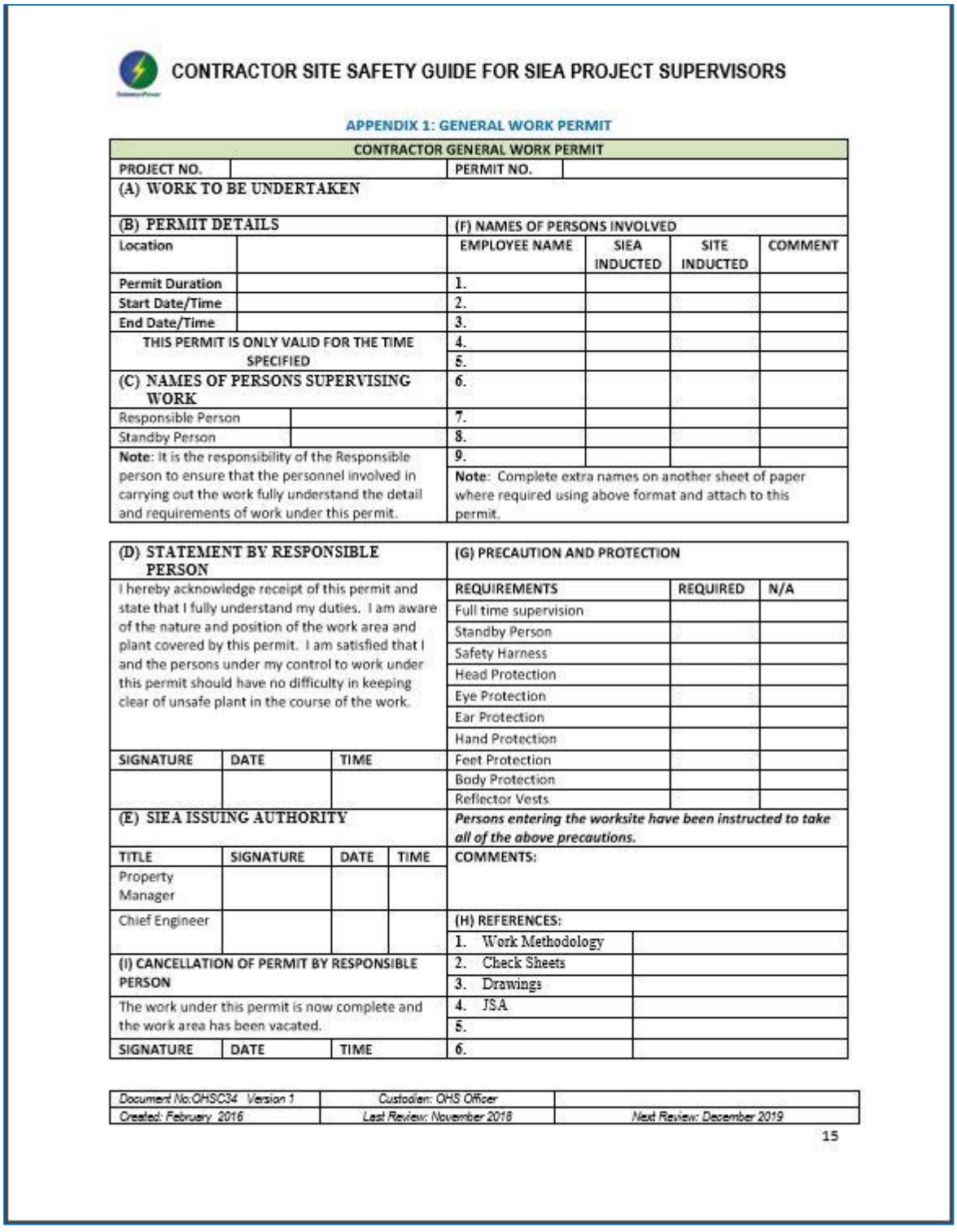
	Subproject activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/Action
		Contractor	• The area surrounding the instalment site bund and secure. • Spills clean as per emergency response plan	SP, Contractor	• emergency response plan; • Spills cleaned and area rehabilitated; • Workers are provided with safety equipment.	• Weekly inspection	•	•
		Contractor	• Should UXO be discovered, the contractor is to immediately cordon off the area arrange the evacuation of nearby residences and inform the RSIPF of the find.	SP, Contractor,	• Occurrence of UXO at the construction site	• Upon discovery of UXO	•	•
		Contractor	• Keep road side vegetation • Use of silt control devices and sediment traps/fences when required • Construction of sediment settling ponds and bunds. Diverting turbid water to sediment settling ponds.	SP, Contractor	• Reduced soil erosion and sedimentation • Vegetation clearance minimized • No dump sites near waterways	• Weekly - visual inspection	•	•
		Contractor	• Ensure all construction machines are well maintained. • A prestart on construction machine carried out every morning • Oil/fuel remediation agents, oil pads, oil booms and geo-fabric clothes are procured for usage as part of the emergency response plan	SP, Contractor	• Construction machineries maintain is in good working order • Spot check for visible oil • Water quality	• Weekly - visual inspection	•	•

	Subproject activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/Action
		Contractor	• Development footprint will be provided with effective drainage systems which will avoid direct discharge to creeks or streams (when the need arises)	SP, Contractor	• No direct discharge to water bodies	• Weekly - visual inspection • SP, ECD	•	•
		Contractor	• Contractor to allow sections of the road area to be continuously accessed by affected party and guided through to avoid any safety problems • Signs and other appropriate safety features will be used to indicate construction works are being undertaken	SP ,Contractor	• Maintenance of access; • Signage; • Road free of materials and debris; • Haulage routes rehabilitated	• During activities - Visual inspection; • Consultations; • Review of traffic management plan	•	•
	Fuelling construction machines and storage of Hydrocarbons	Contractor	• Detailed Emergency Response Plan (as part of CESMP) prepared by contractor to cover hazardous materials/oil storage, spills and accidents • Chemicals will be stored in secure containers away from the water birdies • Chemicals stored in area or compound with concrete floor and weatherproof roof and fire extinguishers • Ensure all construction machines are well maintained • Accidents reported to police within 24 hours	SP, Contractor	• Ensure storage sites are using existing concrete base;	• Weekly inspection	•	•

	Subproject activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/Action
		Contractor	• Prohibit smoking close to fuel storage areas • Put up signs of no go smoking zones • Provide extinguishers and train workers on their use	SP, Contractor	• Signs and fire extinguishes	• Code of conduct and housekeeping rules being adhered to. • Verify records of accidents	•	•
	Presence of construction workers	Contractor	• Garbage receptacles will be set up at construction sites, which will be regularly cleared by the contractor. • Contactor to prepare waste management plan (as part of CESMP) • All wastes from work sites to be disposed of in approved landfill / areas by HCC and SP • Contractor will provide sufficient training in appropriate waste disposal methods	SP, Contractor	• Waste management - visual inspection that solid waste is disposed of as per CESMP;	• Monthly, as required and spot checks - visual inspection; • Review of waste management plan	•	•
			• No wastes to be dumped in waterways • Contractor ensures wastes not discharged to rivers or coastal waters and that all wastes disposed of in proper areas • Contractor to provide adequate and safe drinking water	SP Contractor	• No direct discharges to local streams, coast or rivers; • Regularity of waste removal	• Visual inspection Weekly	•	•

	Subproject activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/Action
		Contractor	• Facilitate reconciliation between parties- affected person, contractor to involve in resolving the issue. • Call the Police once it goes beyond control	Contractor	• No. concerns raised and resolution; •	• Ongoing - consult with public to monitor environmental concerns	•	•

Annex 4: General Work Permit



CONTRACTOR SITE SAFETY GUIDE FOR SIEA PROJECT SUPERVISORS

APPENDIX 1: GENERAL WORK PERMIT

CONTRACTOR GENERAL WORK PERMIT			
PROJECT NO.		PERMIT NO.	
(A) WORK TO BE UNDERTAKEN			
(B) PERMIT DETAILS		(F) NAMES OF PERSONS INVOLVED	
Location		EMPLOYEE NAME / SIEA INDUCTED / SITE INDUCTED / COMMENT	
Permit Duration		1.	
Start Date/Time		2.	
End Date/Time		3.	
THIS PERMIT IS ONLY VALID FOR THE TIME SPECIFIED		4.	
		5.	
(C) NAMES OF PERSONS SUPERVISING WORK		6.	
Responsible Person		7.	
Standby Person		8.	
Note: It is the responsibility of the Responsible person to ensure that the personnel involved in carrying out the work fully understand the detail and requirements of work under this permit.		9.	
		Note: Complete extra names on another sheet of paper where required using above format and attach to this permit.	

(D) STATEMENT BY RESPONSIBLE PERSON			(G) PRECAUTION AND PROTECTION		
I hereby acknowledge receipt of this permit and state that I fully understand my duties. I am aware of the nature and position of the work area and plant covered by this permit. I am satisfied that I and the persons under my control to work under this permit should have no difficulty in keeping clear of unsafe plant in the course of the work.			REQUIREMENTS	REQUIRED	N/A
			Full time supervision		
			Standby Person		
			Safety Harness		
			Head Protection		
			Eye Protection		
			Ear Protection		
			Hand Protection		
SIGNATURE	DATE	TIME	Feet Protection		
			Body Protection		
			Reflector Vests		
(E) SIEA ISSUING AUTHORITY			***Persons entering the worksite have been instructed to take all of the above precautions.***		
TITLE	SIGNATURE	DATE / TIME	COMMENTS:		
Property Manager					
Chief Engineer			(H) REFERENCES:		
			1. Work Methodology		
(I) CANCELLATION OF PERMIT BY RESPONSIBLE PERSON			2. Check Sheets		
			3. Drawings		
The work under this permit is now complete and the work area has been vacated.			4. JSA		
			5.		
SIGNATURE	DATE	TIME	6.		

Document No:OHSC34 Version 1	*Custodian: OHS Officer*	
Created: February 2016	*Last Review: November 2018*	*Next Review: December 2019*

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SIEA UXO Clearance Framework and Guide

November 2014
Revised June 2019

12.0 Table of Contents

Acronyms

AOD	Abandoned Ordnance
CWPM	Capital Works Programme Manager
EOD	Explosive Ordnance Disposal
MID	Ministry of Infrastructure and Development
OH&S	Occupational Health and Safety
RSIPF	Royal Solomon Islands Police Force
RSIPF-EOU	Royal Solomon Islands Police Force – Explosive Ordnance Unit
SIEA	Solomon Islands Electricity Authority **(Authority)**
SIG	Solomon Islands Government
UXO	Unexploded Ordnance
WWII	World War 2

1.0 Introduction

Solomon Islands was the site of severe battle between the Japanese Army and the American Allied Forces during WWII. The war resulted in hundreds of thousands of firearms and UXO items left behind.

WWII ordnance found in Solomon Islands can be defined as either unexploded (UXO) or abandoned (AXO). Unexploded ordnance are explosive ordnances that has been primed, fused, armed or prepared for use in armed conflict but has failed to explode. Abandoned explosive ordnances are explosive ordnance unused during the war and subsequently left behind.

For the purpose of this guide, UXO is used as the general term to describe unexploded or abandoned ordnance, munitions and explosive devices left behind during WWII which represents a hazard to people and to any future development of the land on which they are abandoned.

Although UXO is not captured in the Environmental Act 1998 and Environmental Regulation 2008, UXO clearance activities have become an integral part in any development activity in the Solomon Islands. As the ministry responsible for infrastructure development in SI, MID has a draft UXO procedure developed as a means to render safe and take responsibility for UXO related hazards on any development activity occurring on SIG crown land.

Note that this guide only provides guidance for the management of UXO threats. It does not give detailed guidance on EOD contracting practise. The safety of SIEA employees, its clients and customers, developers and partners, consultants and contractors are not guaranteed.

More guidance on international standards on unexploded ordnance for the construction industry can be obtained from **CIRIA C681: Unexploded Ordnance (UXO)**

2.0 Objective of the Guide

The overall purpose of this guide is to provide a policy and framework governing responsibility and procedures to assess, mitigate and eliminate any UXO related hazard from any SIEA project site before any construction work commences. It provides guidance on the management of any UXO hazards associated with any development activity carried out by the Authority.

This guide also helps the Authority conduct appropriate UXO risk management procedures at the design phase, provide budget for and seek appropriate advice and guidance on UXO contamination and disposal.

It provides the steps to follow to allow EOD contractors to sweep and clear contaminated project sites before any building, engineering, geotechnical investigations, and maintenance work of a construction nature starts.

3.0 Target Audience

This guide is targeted for SIEA staff, its clients and customers, developers and partners, consultants and contractors. It should be applicable to health authorities, the environmental

division, land owners and other relevant local agencies and stakeholders involved in the development project.

SIEA Contractors and Engineers are equally responsible for the wellbeing of their personnel on site and would be advised at the initial contract meetings of their responsibility, the process to manage UXO risks and who to contact at SIEA regarding UXO sightings and threats during project construction.

4.0 Responsibility and Risk Mitigation Measures

Risk mitigation measures are put in place to ensure so far as is reasonably practical the health and safety of SIEA employees and of any other persons affected by the development activity.

4.1 Authority

SIEA and all its employees have a responsibility under the SIEA OH&S policy[24] to ensure the safety of its staff and every other person involved or affected by its normal day to day operation or any development activity.

The responsibility to report a sighting of a UXO or any suspicious article found at project sites or any SIEA location in the country resides with the SIEA and all its employees.

In the event of a suspicious UXO find, the following risk mitigation measures should immediately be followed.

- the area must be cordoned off appropriately
- physical measures put in place to avoid unauthorised tampering of the UXO find
- highly visible markings are provided at the HIGH RISK area.
- the UXO risk is communicated to surrounding communities

The find is reported to the SIEA Capital Works Programme Manager (CWPM) and the RSIPF-EOU. The CWPM will be responsible for the assessment, mitigation or elimination of any UXO related hazard with responsible authorities and EOD clearance contractors. SIEA will keep statistics and records of UXO information from studies done on its sites and the report made available to public upon request.

A reporting system is required to be established, communicated to all parties and managed for UXO clearance activities.

SIEA is responsible for public awareness and consultation and building employee and stakeholder capacity to respond to the UXO threats at SIEA locations

UXO clearance will be considered and integrated into capital development activities and budget.

4.2 General Public

[24] The SIEA policy on Occupational Health and Safety 2010 is being reviewed.

The general public must be consulted and encouraged to provide feedback and comments on their general short and long term safety during planning and design stage through the operational life of the project. These public consultations are carried out as part of required activities at the initial project initiation, planning and design stage.

Public comments and concerns must be properly documented and timely feedback provided. The mechanism to address public concerns will follow the existing SIEA mechanism for handling of customer complaints, through the Customer Service Department and the Public Relations Officer.

4.3 EOD Contractors

EOD contractors are required to be competent and registered to carry out this type of service. They are required to have the necessary expertise and equipment to identify, isolate, remove and safely dispose all UXO threats with assistance from the RSIPF-EOU.

The EOD contractor is responsible for site safety procedures and are required to have in place appropriate strategies to manage risks and environmental impacts and have appropriate insurance coverage.

The contractor will provide to SIEA before any clearance work begins,

- Supporting documentation on competency (experience and references), insurance coverage and legal registration where necessary
- Proposed suitably qualified and experienced staffing to carry out the service
- Proposed procedures complying with international standard UXO clearance practices
- Proposed UXO identification and clearance methodology and timing
- Contract amount for the service

The typical activities to be carried out by EOD contractors is summarised below.[25]

- Carry out and complete UXO survey of the project site including affected areas outside of the project site but related to the project.
- Cordon off areas and prevent unauthorised tampering where suspected UXO threats are determined.
- Arrange for and carry out safe removal of all UXO ordnance from project site.
- Responsibly dispose UXO ordnance in accordance with relevant local law
- Ensure strategies and resources are in place to manage unintended accidents and explosions.
- Provide a report confirming completion of UXO survey, detection, removal and disposal.
- Provide necessary documentation to RSIPF – EOD and other relevant SIG agencies for the issuing of a Certificate of Clearance.

[25] The procedures are summarised from the MID's '9.0 Unexploded Ordnance Procedure'

- Continuously monitor, document and report to SIEA and RSIPF any residual UXO threats arising during project implementation

The contractor will confirm and certify in accordance with **CIRIA C681: Unexploded Ordnance (UXO**) or an alternate internationally accepted standard.

4.4 RSIPF – EOU

The RSIPF– EOU is the body responsible for clearance and disposal of UXO finds. The RSIPF EOU also responds to public reports of UXO and undertake clearance activities. Where there are no nearby police stations in the outer islands, reports should be directed to relevant government district agencies which then notify police at the provincial headquarters.

The RSIPF EOU will provide a Certificate of Clearance after suspected UXO ordnances have been removed by them or by EOD clearance contractors before any construction work can begin.

5.0 Risk Assessment and Management

5.1 Preliminary Risk Assessment

Preliminary risk assessment is required to be carried out to enable SIEA to identify any potential UXO risk or threat and decide whether a detailed risk assessment is required.

Preliminary risk assessment includes:

- examination of existing historical data
- talking with local surrounding communities about any past occurrences with UXO's
- provide probability on threat potential and
- recommend further steps to take

This is to be documented and filed and communicated to the CWPM or Project Engineer. A Preliminary risk assessment form is attached in Annex 1.

If potential risks are identified, a detailed risk assessment leading to detection and identification, recovery and disposal will be initiated.

5.2 Detailed Risk Assessment

In the Detailed Risk Assessment stage, project planning will take into consideration UXO activities in the design and budget for the project.

Risk mitigation measures are put in place and the public made aware of the UXO risk.

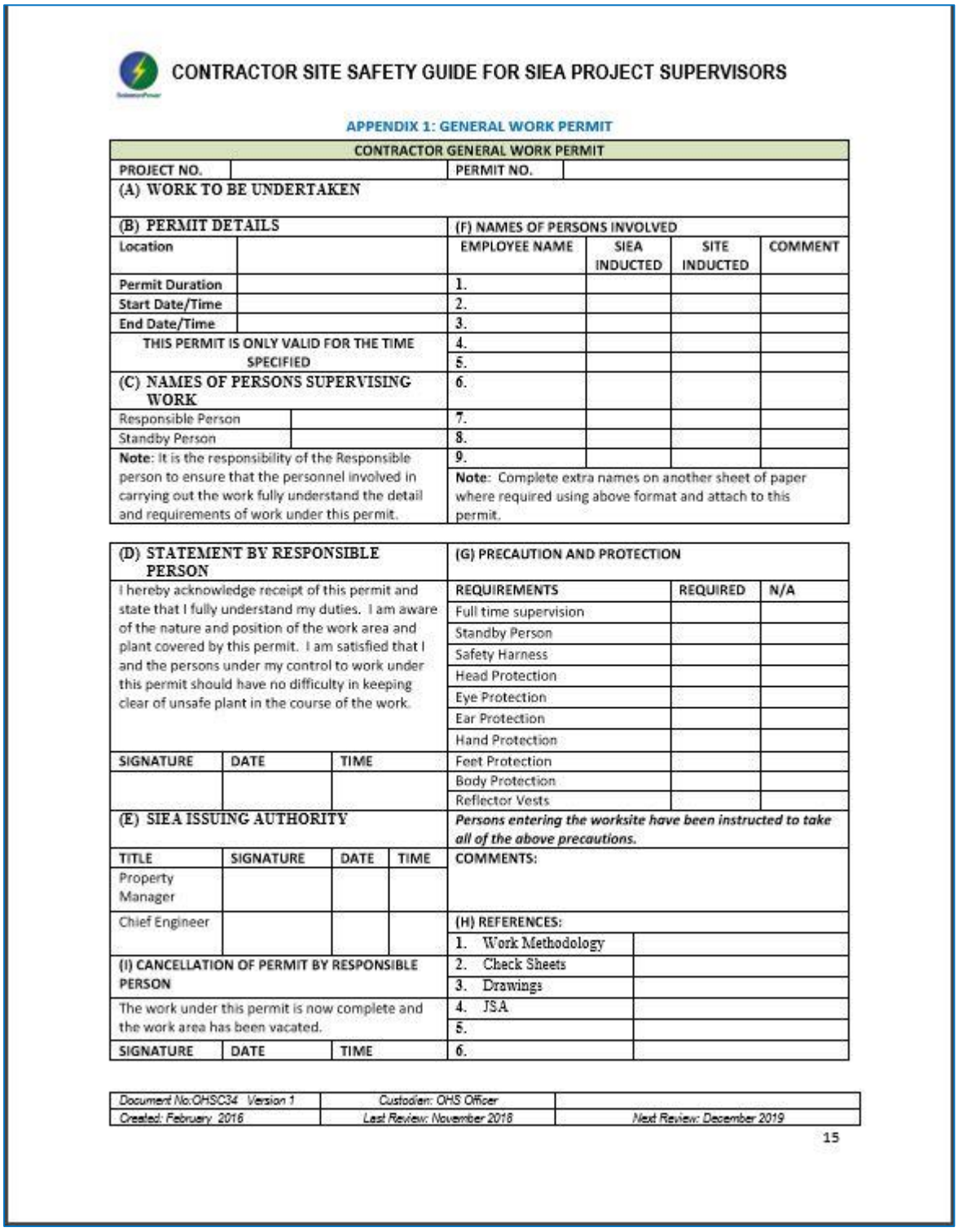
6.0 Contact Details

All SIEA staff, clients and customers, developers and partners, consultants and contractors are to contact the following SIEA and RSIPF personnel regarding UXO issues on SIEA land.

Organisation	**Contact Detail**
Royal Solomon Islands Police Force (RSIPF)	Director Explosive Ordnance Unit P.O. Box G1723 Honiara

	Tel: 23820
Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM).	Director –Tel:24070 Environmental Conservation Division P.O. Box 21 Honiara Tel: 23031/28054 Undersecretary technical
Ministry of Infrastructure (MID)	Under Secretary (Technical) P.O. Box G8 Honiara Tel: 24247-Undersecretary Admin Tel: 20331-Undersecretary Technical

Annex 6: Contractor General Work Permit



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Standby Person		8.	
Note: It is the responsibility of the Responsible person to ensure that the personnel involved in carrying out the work fully understand the detail and requirements of work under this permit.		9.	
		Note: Complete extra names on another sheet of paper where required using above format and attach to this permit.	

(D) STATEMENT BY RESPONSIBLE PERSON			(G) PRECAUTION AND PROTECTION		
I hereby acknowledge receipt of this permit and state that I fully understand my duties. I am aware of the nature and position of the work area and plant covered by this permit. I am satisfied that I and the persons under my control to work under this permit should have no difficulty in keeping clear of unsafe plant in the course of the work.			REQUIREMENTS	REQUIRED	N/A
			Full time supervision		
			Standby Person		
			Safety Harness		
			Head Protection		
			Eye Protection		
			Ear Protection		
			Hand Protection		
SIGNATURE	DATE	TIME	Feet Protection		
			Body Protection		
			Reflector Vests		
(E) SIEA ISSUING AUTHORITY			*Persons entering the worksite have been instructed to take all of the above precautions.*		
TITLE	SIGNATURE	DATE / TIME	COMMENTS:		
Property Manager					
Chief Engineer			(H) REFERENCES:		
			1. Work Methodology		
(I) CANCELLATION OF PERMIT BY RESPONSIBLE PERSON			2. Check Sheets		
			3. Drawings		
The work under this permit is now complete and the work area has been vacated.			4. JSA		
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Annex 7: Screening checklist

SCREENING QUESTIONS	Yes	No	REMARKS
A. Subproject Siting Is the Subproject area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		No	There are no cultural areas in or near the proposed sites.
• Protected area		No	There are no protected areas in or near the proposed sites.
• Wetland		No	Site 2 is located on a low spot. The swampy section is occupied by mangroves.
• Mangrove		No	Mangroves occupy the mouth of a river 313 meters from site 2.
• Estuarine		No	No estuarine in or near the proposed sites.
• Buffer zone of protected area		No	There are no protected areas in or near the proposed sites.
• Special area for protecting biodiversity		No	
B. Potential Environmental and Social Impacts Will the Subproject cause **.**			
• encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?		No	There are no historical and cultural areas in or near the proposed sites.
• encroachment on precious ecosystems (e.g. sensitive or protected areas)?		No	There are no sensitive or protected areas near or within proposed sites.
• alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site?	Yes		Minor silt generation due to clearing and exposure of soil surface.
• damage to sensitive coastal/marine habitats by construction of submarine cables?		No	No sub marine cables for this subproject.
• deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps, and chemicals used in construction?	Yes		Impact arises when silt are allowed to move in to the environment. All campsites will have proper sanitary facilities and chemicals (fuels and oils) stored in shed with concrete floor.
• increased local air pollution due to rock crushing, cutting, and filling?		No	No crushing, cutting or filling for this subproject. Air pollution due to dust generation or emission from vehicle running at high velocity.

SCREENING QUESTIONS	Yes	No	REMARKS
• risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during subproject construction and operation?	Yes		No radioactive hazards involved. Chemical handling resulted in spillages of (fuel and oil during construction and operation of solar farm) will be managed through an emergency response plan which will be developed as part of the CESMP.
• chemical pollution resulting from chemical clearing of vegetation for construction site?		No	No chemicals will be used
• noise and vibration due to blasting and other civil works?	**Yes**		Noise from construction machineries only
• dislocation or involuntary resettlement of people?		No	No households inside the proposed area.
• disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable groups?		No	The subproject promotes socio-economic opportunities including employment for local people.
• social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing roads?		No	The current access to both sites are owned by the same tribe. The road access were constructed by a logging company and is still operating in land.
• hazardous driving conditions where construction interferes with pre-existing roads?		No	
• creation of temporary breeding habitats for vectors of disease such as mosquitoes and rodents?		NO	The subproject activities will ensure no ponding.
• dislocation and compulsory resettlement of people living in right-of-way of the power transmission lines?		No	There will be no relocation for this subproject. The design team avoid relocation.
• environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)?	Yes		Vegetation clearance within the proposed solar farm area and corridor for transmission and distribution lines.
• facilitation of access to protected areas in case corridors traverse protected areas?		No	There are no protected areas near or within the proposed sites.
• disturbances (e.g. noise and dust)	Yes		Minor noise and dust disturbance due to construction machineries.

SCREENING QUESTIONS	Yes	No	REMARKS
• population influx during subproject construction and operation that cause increased burden on social infrastructure and services (such as water supply and sanitation systems)?		No	Majority of water for use at the solar farm will be harvested rain water stored in tanks. Campsite will have all the necessary building standards including proper sanitation.
• social conflicts if workers from other regions or countries are hired?		No	EPC contract, Code of conduct will be enforced.
• poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?	Yes		Contractor to produce a waste management plan as part of the CESMP
• risks to community safety associated with maintenance of lines and related facilities?	Yes		Radio announcement and notices will be placed at designated locations to inform communities.
• community health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization?		No	The subproject will not create electromagnetic fields, land subsidence, lowed ground water and salinization.
• risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel, and other chemicals during construction and operation?	Yes		Vehicles running at high velocity. No explosives will be used during construction and operation.
• community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the subproject (e.g., high voltage wires, and transmission towers and lines) are accessible to members of the affected community or where their failure could result in injury to the community throughout subproject construction, operation, and decommissioning?	**Yes**		Current elevation for site 1 is 80masl and site 2 5masl. Natural hazards including cyclones could have the potential of damaging transmission and distribution lines during operations. Safety awareness to communities will conducted at all stages of the subproject.
C. Land Acquisition and Access Issues Questions regarding land acquisition and access for the Subproject include:			

SCREENING QUESTIONS	Yes	No	REMARKS
• will there be land acquisition?	**Yes**		The subproject is subject to a voluntary land protocol procedure (The Baolo registered trustees had given their consent to SP to start the land acquisition process) Transmission lines will be covered under a Memorandum of Understanding (MOU). Baolo community landowners and residents have already signed the MOU.
• is the site for land acquisition known?	Yes		There are two potential site located within the same parcel.
• is the ownership status and current usage of land to be acquired known?	Yes		The land is registered to the Bulua Tribe as PE.
• will existing rights-of-way (ROW) be used for transmission line or distribution line easements?	Yes		An MOU will cover easements for transmission and distribution lines.
• will there be loss of shelter and residential land due to land acquisition?		No	There are no households inside the two potential sites.
• will there be loss of agricultural and other productive assets due to land acquisition?	Yes		In site two, there will be a need to remove coconuts.
• will there be losses of crops, trees, and fixed assets due to land acquisition?	**Yes**		There are no fixed assets. But crops mainly coconuts. An inventory of the crop will commence after the land transfer is made. Compensation will be based on Ministry of Agriculture Livestock (MAL) rates.
• will there be loss of businesses or enterprises due to land acquisition?		No	No loss to business or enterprises due to land acquisition expected.
• will there be loss of income sources and means of livelihoods due to land acquisition?	**Yes**		For site 2. Dry nuts from the coconut plantation were normally processed into copra.

SCREENING QUESTIONS	Yes	No	REMARKS
• will people lose access to natural resources, communal facilities and services?		No	There are no facilities within the two proposed sites. People will continue to access local resources near the proposed sites.
• if land use is changed, will it have an adverse impact on social and economic activities?		No	No changes expected
• will access to land and resources owned communally or by the state be restricted?		No	Communities will continue to access resources for example gardens or plantation near the proposed sites.
D. Indigenous Peoples Issues			
• are there socio-cultural groups present in or use the subproject area who may be considered as "tribes" (hill tribes, schedules tribes, tribal peoples), "minorities" (ethnic or national minorities), or "indigenous communities" in the subproject area?		No	There are no socio cultural groups present or use the proposed sites.
• are there national or local laws or policies as well as anthropological researches/studies that consider these groups present in or using the subproject area as belonging to "ethnic minorities", scheduled tribes, tribal peoples, national minorities, or cultural communities?		No	NA
• do such groups self-identify as being part of a distinct social and cultural group?		No	NA
• do such groups maintain collective attachments to distinct habitats or ancestral territories and/or to the natural resources in these habitats and territories?		No	NA
• do such groups maintain cultural, economic, social, and political institutions distinct from the dominant society and culture?		No	NA
• do such groups speak a distinct language or dialect?		No	NA
• have such groups been historically, socially and economically marginalized, disempowered, excluded, and/or discriminated against?		No	NA
• are such groups represented as "Indigenous Peoples" or as "ethnic minorities" or "scheduled tribes" or "tribal populations" in any formal decision-making bodies at the national or local levels?		No	NA

SCREENING QUESTIONS	Yes	No	REMARKS
• will the subproject directly or indirectly benefit or target Indigenous Peoples?		No	Baolo community are direct beneficiaries of the subproject. The subproject is expected to promote socio-economic activities and employment.
• will the subproject directly or indirectly affect Indigenous Peoples' traditional socio-cultural and belief practices? (e.g. child-rearing, health, education, arts, and governance)?		No	There will be no impacts on cultural beliefs and practices.
• will the subproject affect the livelihood systems of Indigenous Peoples? (e.g., food production system, natural resource management, crafts and trade, employment status)?		No	No impacts expected.
• will the subproject be in an area (land or territory) occupied, owned, or used by Indigenous Peoples, and/or claimed as ancestral domain?		No	No physical displacement involved. The land is registered as PE to Bulua Tribal trustees.
• will the subproject activities include physical displacement from traditional or customary lands?		No	No physical displacement involved. The land is registered as PE to Bulua Tribal trustees.
• will the subproject activities include establishing legal recognition of rights to lands and territories that are traditionally owned or customarily used, occupied or claimed by Indigenous Peoples?		No	The land is registered as PE to Bulua Tribal trustees. SP will acquire the land in accordance with the Solomon Islands Lands and Title Act.
• will the subproject activities include acquisition of lands that are traditionally owned or customarily used, occupied or claimed by Indigenous Peoples?		No	The land is registered as PE to Bulua Tribal trustees.

Conclusion: Environment Social Management Plan/Public Environment Report has been prepared in accordance to the project's ESMF.

Annex 8: Household survey list

#	Household Head	Gender
1.	Joveh Hileh	Male
2.	Nicolas Koteni	Male
3.	Mension	Male
4.	Nicolas Kikini	Male
5.	James Misi	Male
6.	Andrew Hou	Male
7.	Marion Bale	Female
8.	Kingsley	Male
9.	Father Brian Eniti	Male
10.	Noel Migosta	Male
11.	Abraham	Male
12.	Jefferey Tom	Male
13.	Reubenson	Male
14.	Albert	Male
15.	Neble	Male
16.	Francis Misi	Male
17.	George K	Male
18.	Tom Tareka	Male
19.	Hadson H	Male
20.	Desmond	Male
21.	Godrin	Male
22.	Steven Mae	Male
23.	Zenfa	Female
24.	Marvin	Male
25.	Sem	Male
26.	Walton Savere	Male
27.	Eddy	Male
28.	Dick Hapa	Male
29.	Ernest	Male
30.	Rolex	Male
31.	Ronny	Male
32.	Alfrance	Male
33.	Francis T	Male
34.	Lovelyn	Female
35.	Tony	Male
36.	Ian	Male
37.	Hauso	Male
38.	Haplyn Boka	Female
39.	Desmond	Male
40.	Luke Masura	Male

41.	Walter Susui	Male
42.	Leofat Sogaha	Male
43.	Wolford	Male
44.	Sandra	Female
45.	Lawrence	Male
46.	Raymond Lake	Male
47.	Dora Vurua	Female
48.	Nafhtali Podo	Male
49.	Raymond Pisu	Male
50.	Nelson Gore	Male
51.	John Preston	Male
52.	Heston Miller	Male
53.	Michael Belama	Male
54.	Osan Goru	Male
55.	Mark Holland	Male
56.	John Kennedy	Male
57.	Christopher Bale	Male
58.	James Kaiputi	Male
59.	Eric Gnokro	Male
60.	Nelson Kehe	Male
61.	Donald Bekele	Male
62.	Jeska Rare	Male
63.	Joseph Ziku	Male
64.	David Zagalulu	Male
65.	Nelson Roni Kile	Male
66.	Eric Boni	Male
67.	Henry Ulura	Male
68.	Elison Sato	Male
69.	Staling Legese	Male
70.	Steven Nabe	Male
71.	Rockcliff Pirivae	Male
72.	Senrose Baba	Female
73.	Fredrick Itekana	Male
74.	Frank Bollen	Male
75.	Brichard Pasa	Male
76.	Rodney Mae	Male
77.	Lily Lampiko	Female
78.	Tom Ripo	Male
79.	James Lent	Male
80.	Derick Maneipoi	Male
81.	Clement Parekana	Male
82.	Nickson Teo	Male
83.	Maelanga	Male
84.	Allen Brues	Male

85.	Moses Soni	Male
86.	Anthony Rato	Male
87.	Henry Sike	Male
88.	Tony Jeffa	Male
89.	Edward Bale	Male
90.	Cherry Lilo	Male
91.	Susan Lote	Male
92.	Liseh Duko	Male
93.	George	Male
94.	Willy Betu	Male
95.	Mirriam Hai	Male
96.	Flexes Kigisi	Male
97.	Samuel Zea	Male
98.	Daisy Organara	Female
99.	Clement Tom	Male
100.	Robert Afa	Male
101.	Nickson Kennedy	Male
102.	Allen Rokana	Male
103.	Lesta	Male
104.	Sam Nigro	Male
105.	Martin Azu	Male
106.	Nigel Rex	Male
107.	Nelson Willy	Male

Annex 9: Baolo Network MOU

MEMORANDUM OF UNDERSTANDING

SP-MOU-17: Easement for Power Line Construction

THIS MEMORANDUM OF UNDERSTANDING is made on the ....30th..... **Day of the month of** .....June....., **Year Two Thousand and Twenty (2020)**

BETWEEN the Solomon Islands Electricity Authority (SIEA) **trading as Solomon Power** (hereinafter referred to as **"SP"**) as one part;

AND: The Land Owning Groups of Baolo community, Isabel Province, (hereinafter referred to and "the Landowners") on the other part

The landowners are here representing the approval of clauses of this MOU in relation to the entire distribution line coverage and route as shown in the attached map.

WHEREAS:

A. Solomon Power is desirous of constructing its network which includes:

   - ☐ Building of High Voltage (HV) power lines and poles
   - ☐ Building of Low Voltage (LV) power lines and poles
   - ☐ Installing of Distribution Transformer and/or Ring Main Units

B. Solomon Power has the right to construct power poles, transformer, and other related infrastructure along the public and feeder roads within the concerned area. As part of its community consultation process, it had been engaging in a series of meetings with respective community leaders to obtain the approval and support for the project.

C. The Chiefs, Community leaders/Elders and Landowners along the access road, which the line will run, have an overwhelming support for the project to proceed.

D. The Chiefs, Community Leaders/Elders and Landowners are desirous of having power to their communities and pledged to support the project.

E. The parties to this MOU are desirous of making their commitments to the construction of the power lines in Baolo community under this MOU.

1.0 Solomon Power AGREED AS FOLLOWS:

1.1 To commence construction of the lines in and around Baolo community as soon as this MOU is signed by relevant parties.

1.2 To provide all the materials and technical staff for the purpose of constructing the power lines.

1.3 To ensure that safety of the community and the general public is maintained by placing appropriate sign boards and demarcations where constructions will be carried out throughout the duration of the project.

1.4 To ensure the built infrastructure is maintained such that vegetation is properly controlled and faulty lines, poles and transformer is repaired and addressed to Solomon Power Standards.

1.5 To carry out assessments and costing of either HV or LV extensions from the main line to connect individual homes/village/commercial undertakings on request. The cost of such extension will be subject for discussions between the interested parties and Solomon Power.

1.6 To compensate for any *cultural vegetation*[1] along the route of the easement required for construction purposes. The rate(s) will be according to standard agriculture rates as stipulated in "The Forest Resources and Timer Regulations".

2.0 LANDOWNERS AGREED AS FOLLOWS:

2.1 To pledge their support for the project to proceed by allowing Solomon Power to construct equipment as stated in Part A) along existing and new easements.

2.2 To inform members of their respective communities to support the project in order for its implementation to progress smoothly without interference.

2.3 To meet the cost (or to seek other assistances) of the service lines to individual homes/villages/community buildings/commercial buildings etc. where necessary.

IN WITNESS WHEREOF the PARTIES hereto have agreed on the afore-stated terms

and **SIGN** this **MEMORANDUM OF UNDERSTANDING** with their **SEALS**

affixed on this 30th **day of the month of** June **Year**

Two thousand and ~~nineteen~~ twenty **(2020).**

Signatory forming the agreement as per this MOU on behalf of Solomon Power:

Name: Martin Jones

Position: CEO (Ag)

Signature:

Date: 30/06/20

Signatories forming the agreement as per this MOU on behalf of the Land Owners:

Name of Person(s)	Position Relevant to the project	Signature	Date
Marilyn Tete	Land Owner 7987783	Tete	24-02-20
Emic Cnokra	7171955 Chairman		24-02-20
Philis Tugu	Landowner 7897158	Tugu	24-02-20
Kingsley Tugu	CLAN Member 776432		24.02.20
SELINA TALONI	CHAIRLADY 7677017	Taloni	24-02-20
MARK HOLLAND	Landowner 7618767		24/02/20
James. Kiriuti	LANDOWNER	Kiriuti	✓
CHRIS BALE	ELDERS		24/2/20
NOEL-MICHAEL	Land owner		24/2/20
DAISY OGANAH	LAND OWNER- 7282345		24/2/20

Loverlyn Legu	Land owner 7860934		24/2/20
Audrey Rex	Land owner 7853818	Rex.	24/2/20
FRANK BOLLEN	7384585		25/2/20
JOSHUA MARVIN	landowner		25/2/20
Anika Richard	land owner		25/2/20
John Freston	land owner		25/02/20
Michael Belama	Land trustee	MBelama	✓
DERICK. MANEPUTTA	CHIEF		/
JENEFER Porosi	Landowner	Porosi	/
Ruth Gore	Landowner		26/2/20
Nelson Gore			26/2/20

Doro Agatha	Landowner		26/2/2020
OSan Goru	landowner		26-2-20
CHRIS : Bale	Community Member		26-2-20
Happilyn Boka	Community member		26-2-20
vivien Mwaimae	Community member		26-2-20
Deluya Soni	Community Member		26-2-20
Greg Sike	Community member		26-2-20
Selo Bana	community member		26-2-20
ELLISON SATO	Zuto Chief		26-2-20
TONY Jeffer	Community member		26-2-20
KATE BALE	COMMUNITY Member	BALE	26-2-20

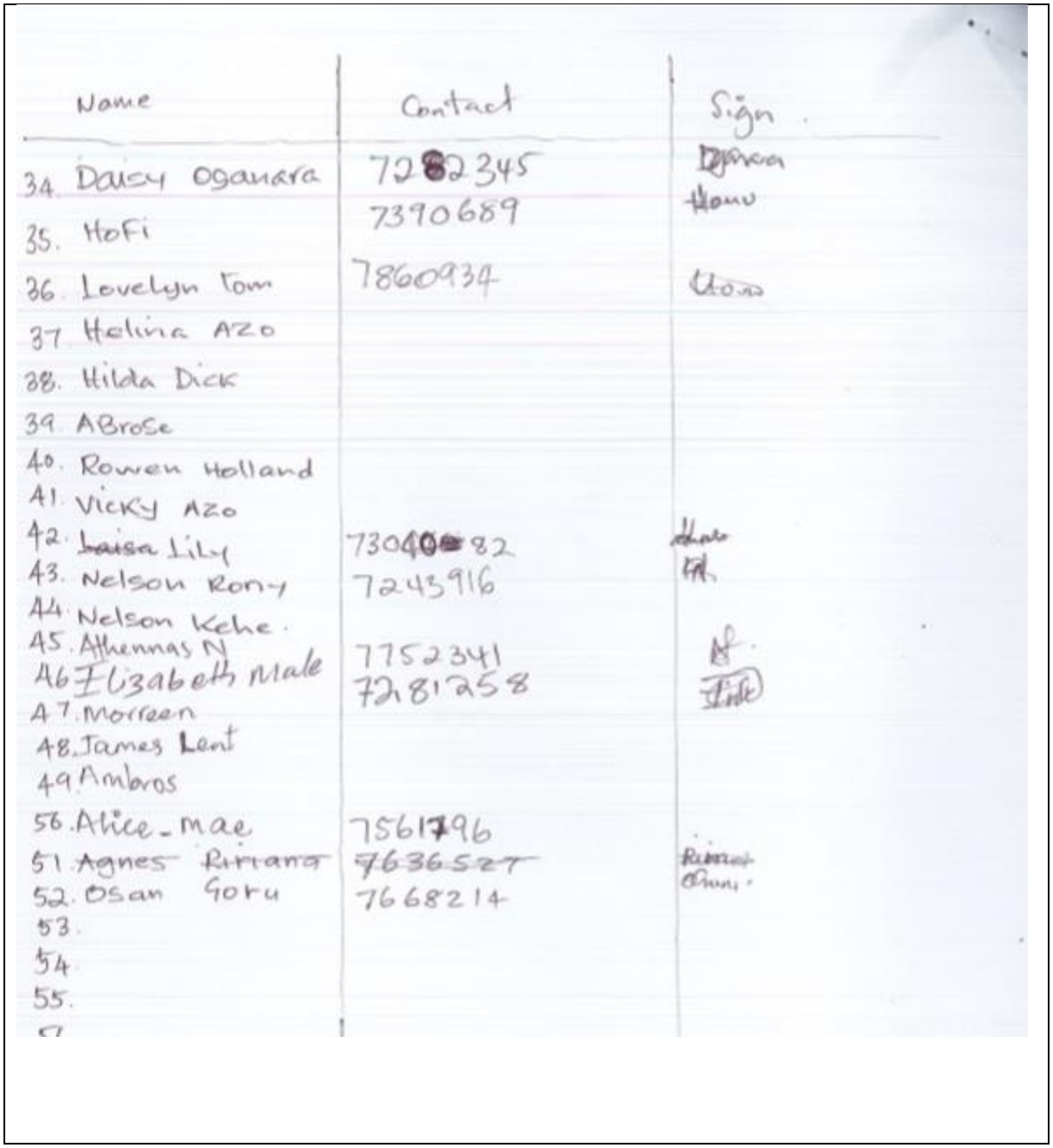
JEFFERY TOM	VEDRY CHAIRMAN	7642131	26-2-20
FR. BRAIN ENITI	DISTRICT PRIST		26-2-20
BASIL HIRU	LANDOWNER		26-2-20

Annex 10: Minutes of Meetings (Safeguards Team)

<table>
<tr><td colspan="2">Community Consultation for the Baolo Solar Hybrid Subproject</td></tr>
<tr><td colspan="2">Date: 23rd Feb 2019</td></tr>
<tr><td colspan="2">Time: 9am-12pm</td></tr>
<tr><td colspan="2">Objectives (in the invitation): Communities are informed about the subproject.</td></tr>
<tr><td colspan="2">Presenters and Topic: 1. Kenneth Laeta (Planning Engineer)-Subproject overview
2. Winston (Safeguards Officer) -Environment and Social Impacts and Mitigation</td></tr>
<tr><td>Issues raised
1. Importance of electricity usage and its safety.
2. Public safety during construction and operation.
3. Wiring and connection cost.
4. Vegetation clearing for transmission, distribution and service line in particular will require felling of important crops or trees along road corridor. Communities feel that SP and its contractor must compensate affected owners based on SIG rates.
5. Locals want network extended from where it currently terminates.
6. Baolo communities and elders feel that a review in the tariff will enhance economic activities in the rural area. A reasonable rate for rural communities is important and SP management according to elders should review it.</td><td>Measures suggested
1. Awareness on the use of electricity including standard safety requirements will be conducted prior to commissioning of the subproject. Solomon Power will also conduct awareness in schools and surrounding communities in Baolo.
2. Contractor will submit a traffic management plan ensuring safety signs and speed limits. Sunday/Saturday will be observed as a rest day unless something important requires action. Contractor to disclose appropriate information regarding road closure and anything that may impact on small businesses/ access to households. This is likely to occur during construction of distribution lines but is considered to minimal.
3. Cost of wiring and connection will be covered under the OBA arrangements. SP will meet all wiring and connection cost to each household. Each household will pay minimal cost to SP when they submit their applications.
4. SP will compensate crops and trees affected by the subproject based on SIG MAL rates.
5. There is provision to expand the network.
6. Electricity tariff remains the same for urban and rural. There is provision to review tariff by the SP management.</td></tr>
<tr><td colspan="2">Comments
A former member of parliament reiterate the importance of having electricity in the community. The main sources of income in Baolo is from the sale of marine resources including reef fish, shell and mud crab. Electricity is important in fish preservation and in ensuring the resources reach the market in fresh condition. The current solar system normally provided by members of parliament is not efficient and does not last long. The village chief and community elders acknowledge the Solomon Power team for identifying Baolo as one of their subproject site. The community promised to work with Solomon Power to ensure the subproject is implemented successfully. No E&S issues were raised by the attendees?</td></tr>
<tr><td colspan="2">Attendance</td></tr>
</table>

Community Consultation
Badlo village.
23rd February 2020.

	Name	Contact	Sign
1.	Jeffery Tom	7642131	
2.	Frank Bollen	7384585	
3.	Michael Belame	7911199	
4.	Chris Bale	7668062 7668062	
5.	Nizol Rex		
6.	Desmond		
7.	Gouge Harry		
8.	Nelson Gore		
9.	Ernest Fota		
10.	Fr. Brain Initi		
11.	Desmond Rex		
12.	Ianma		
13.	James lent		
14.	Betu metcalo		
15.	Elvis malagna		
16.	Salome Initi		
17.	Annette Pate		
18.	Prisca Puhikau		
19.	Esther Sosaka		
20.	Faith Gumi		
21.	Veronica Tony		
22.	Philis Tusumana		
23.	Unice Lina		
24.	Ethel Riko		
25.	Alice Mac		
26.	Ririana Goru	7636527	
27.	Elizabeth Kaiputi		
28.	Haplu Boka	7977144	
29.	Laisa oi		
30.	Loreta Tom	7668316	
31.	Mercelyn Tete	7987783	
32.	Marion Bale	7863461	
33.			



Name	Contact	Sign
34. Daisy Oganara	7282345	
35. HoFi	7390689	
36. Lovelyn Tom	7860934	
37. Helina Azo		
38. Hilda Dick		
39. ABrose		
40. Rowen Holland		
41. Vicky Azo		
42. Laisa Lily	7304082	
43. Nelson Rony	7243916	
44. Nelson Kehe.		
45. Athennas N	7752341	
46. Elizabeth Male	7281258	
47. Morreen		
48. James Lent		
49. Ambros		
56. Alice-mae	7561796	
51. Agnes Rirrana	7636527	
52. Osan Goru	7668214	
53.		
54.		
55.		

Annex 11: Minutes of Meeting, Initial Site Visit, Planning Team

Baolo – Suto Community Consultation

Meeting Minutes

June 22, 2019

Venue: Baolo Rest House

Attendees/Contact Numbers:
Josiah Rade, Solomon Power 7393000___
Kenneth Laeta, Solomon Power _____
Nigel Tutuo, Solomon Power _____
Merilyn Tete, Land Owner _____
Felish, Land Owner _____
Ruth, Community Representative _____
Billy Tete, Community Representative _____
Eric, Bulau tribal head chief _____
Tony Tete, Community member _____

Minute Taker: Josiah Rade

The meeting was called to order at 11 am in the rest house at Suavanao airport station upon invitation from land owning groups of Bulau tribe.

Business:
Solar hybrid for Baolo/Suto in Isabel.
Planning team was invited by the tribal chief and the land owning group members to talk to Baolo community on the solar hybrid program. The talk was attended by the following people;

- SP planning staffs
- Baolo land trustees
- Tribal chief
- Including members of Baolo neighbouring villages

Introduction – Introduction followed by Sharing of Solar hybrid brochure/pamphlets to attendees.
Objective: Communities are informed about the subproject.
Notes:
A community representative has expressed gratitude towards SP positive response to their invitation.
He highlighted that such initiatives is vital and must not be objected from their side.

Josiah Rade (JR) - Started the presentation with a brief background of Solomon Power which are not limited to Numbers of SP Outstations, Main Power Generating Sources, and SIG together with SP – Plans for Isabel, Challenges experienced so far and mitigating measures taken.
JR continues to talk on different Hybrid and mini grid systems and explained the function of each hybrid system components. He highlighted the importance of land, where he discussed land selection criterions for the hybrid system and also numbers of households required. During which, pictures of Taro/Seghe solar system were shown as an example of such system set up. **JR** explained every necessary steps/processes initially from community request (application) up to subproject approval.

Rick, (Baolo head chief) has welcome such development and stated that, there are 11 hectares of land(s) which owned by Baulau tribal group and this lands were registered under the Bulau tribal group. He is willingly enough to provide proves or land documents to SP upon request.

Land Owners/Community Response was positive. - **Merilyn** has expressed her appreciation (and on behalf of Baolo people) to SP Team for sharing/discussing/consulting and making known of SP plans and processes towards achieving such development. She commented that such development is a way of improving lifestyle and encourage villages based businesses such as fisheries and tourism (A way forward).She is willing enough to allow these lands for this undertaking.

"This meeting will be reveal to Baolo community by all the land owners and other community reps who have attended this session on the above mentioned date.

Baolo Community Action(s):

1: Land owners to prepare and then submit a written consent letter to SP team upon their departure to Honiara. This is to formally indicate their profound interest toward such SP program.

2: A committee has to form to liaise directly with SP on any future matters regarding solar hybrid development.

(Questions & Answers)

They are looking forward to this upcoming development.

The meeting was successfully conducted and concluded with few remarks by SP team and exchanged of hand shaking.

Annex 12: Landowners and community representative consent

To the Solar Hybrid Department

Some Landowner representatives of Baolo Village had attended a brief meeting held at Suavanao on the 21-06-19. regarding the Solar Hybrid System, conducted by the staff of Solomon Power.

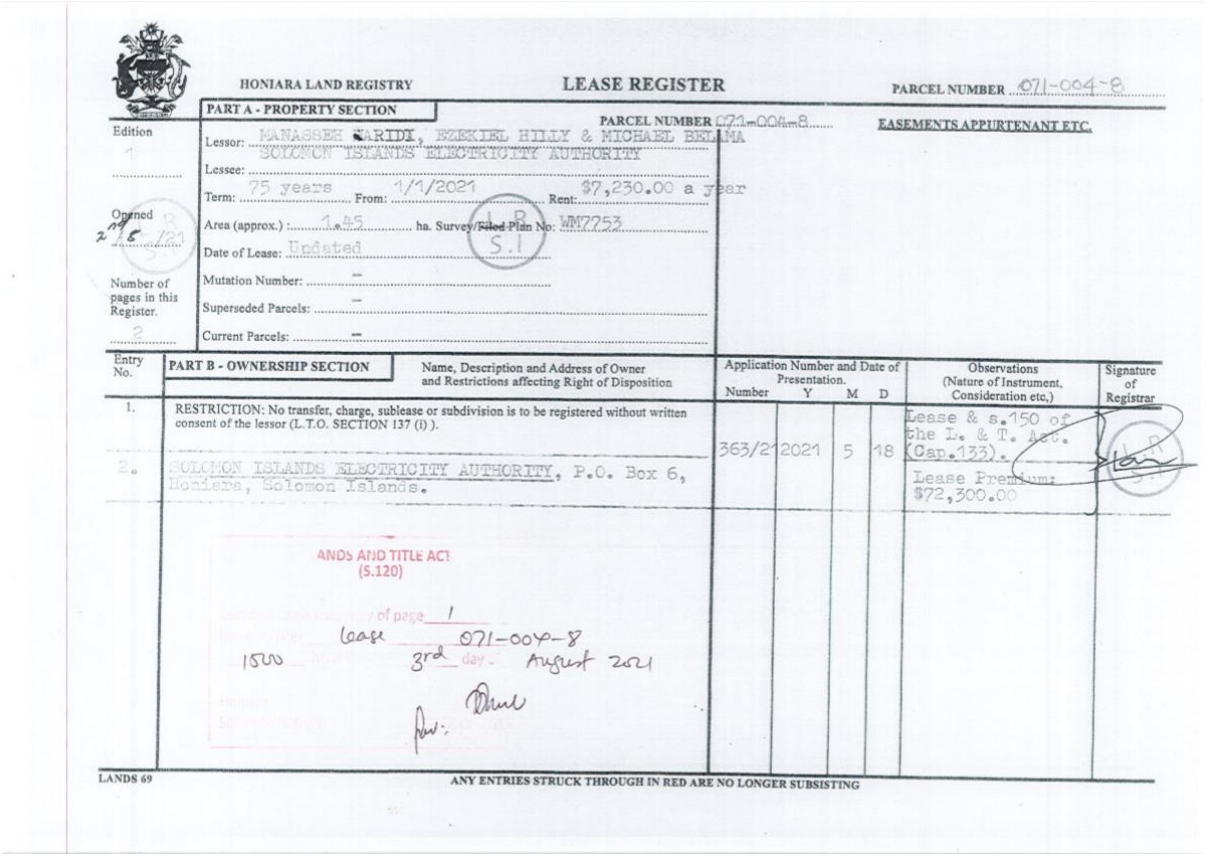
More members of the tribe also been informed later about the program and they too have agreed for your program be set up in our land. This indeed shows our interest. and willingly offer our land for your programme be set upon our village.

To show our appreciation on the accounts stated above, we the landowners of Baolo Village are herein signed below:

Marilyn Tete - Land Trustee. LR676.
Ruth Gore -
Philis Kulu -
Daisy Oga - Land trustee - LR676
Michael Bekama - Land Trustee - LR676.
Eric Nokro
Tony Tete
Raymond Pisu - Pisu
Lydia Bore - Bore
Dora Gabe
James Kaiputi - Kai
Mark Hollau -
Frank Bollen - Bollen
Noel Migeste -
John Freshton - Freshton
Lovelyn Legeu - Legeu

Audrey Rex - Rex
Jennifer Porosi -
Younglee Tugu -

Annex 13: Land Title



HONIARA LAND REGISTRY

LEASE REGISTER

PARCEL NUMBER 071-004-8

PART A - PROPERTY SECTION

PARCEL NUMBER 071-004-8

EASEMENTS APPURTENANT ETC.

Edition 1

Opened 2nd Feb 1921

Number of pages in this Register. 2

Lessor: MANASSEH SARIDI, EZEKIEL HILLY & MICHAEL BELAMA
SOLOMON ISLANDS ELECTRICITY AUTHORITY

Lessee:

Term: 75 years From: 1/1/2021 Rent: $7,230.00 a year

Area (approx.): 1.45 ha. Survey/Filed Plan No: WM7753

Date of Lease: Undated

Mutation Number: --

Superseded Parcels: --

Current Parcels: --

Entry No.	PART B - OWNERSHIP SECTION — Name, Description and Address of Owner and Restrictions affecting Right of Disposition	Application Number and Date of Presentation. Number	Y	M	D	Observations (Nature of Instrument, Consideration etc,)	Signature of Registrar
1.	RESTRICTION: No transfer, charge, sublease or subdivision is to be registered without written consent of the lessor (L.T.O. SECTION 137 (i)).	363/21	2021	5	18	Lease & s.150 of the L. & T. Act. (Cap.133). Lease Premium: $72,300.00	
2.	SOLOMON ISLANDS ELECTRICITY AUTHORITY, P.O. Box 6, Honiara, Solomon Islands.						

ANDS AND TITLE ACT (S.120)

of page 1

Lease 071-004-8

1500 3rd day August 2021

Dated:

LANDS 69

ANY ENTRIES STRUCK THROUGH IN RED ARE NO LONGER SUBSISTING