Initial Environmental Examination

July 2021

Solomon Islands: Sustainable Transport Infrastructure Improvement Program

Prepared by Ministry of Infrastructure Development for the Solomon Islands Government and the Asian Development Bank.

SOLOMON ISLANDS GOVERNMENT

MINISTRY OF INFRASTRUCTURE DEVELOPMENT

P.O. BOX G8

HONIARA

SOLOMON ISLANDS

PUBLIC ENVIRONMENT REPORT

FOR THE RECONSTRUCTION OF A HIGH-LEVEL BRIDGE AT MONGGA, EAST GUADALCANAL

PREPARED BY CPIU-MID

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Authors:	Steve Sae[1] and Doug Martin[2]
Reviewed by:	Pratush Kumar, STIIP Program Lead
Approved for submission by:	Mike Qaqara, Director Civil Engineering, CPIU-MID
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[1] Chief Safeguards Officer, CPIU-MID, EIA Practitioner (MECDM Ref no. 2/4/6 dt. 12/02/2020
[2] Safeguards Specialist (International), STIIP

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ACRONYMS

AP	Affected Person
BMP	Building Materials Permit (issued by MMERE)
CESMP	Construction Environment and Social Management Plan
CPIU	Central Project Implementation Unit
CSS	Country Safeguards System
DC	Development Consent (issued by ECD)
ECD	Environment Conservation Department
EDS	Environmental Impact Assessment Decision Statement
EIS	Environment Impact Statement
EHSG	Environmental, Health and Safety Guidelines (of World Bank Group)
ESMP	Environment and Social Management Plan
EHSO	Environment, Health and Safety Officer (of the contractor)
GRM	Grievance Redress Mechanism
MAL	Ministry of Agriculture and Livestock
MECDM	Ministry of Environment Climate Change Disaster Management and Meteorology
MF	Ministry of Forestry
MFMR	Ministry of Fisheries and Marine Resources
MID	Ministry of Infrastructure Development
MMERE	Ministry of Mines Energy and Rural Electrification
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
GPG	Guadalcanal Provincial Government
NAPA	National Adaptation Plan of Action
NEMS	National Environment Management Strategy
NGO	Non-Government Organization
NTP	National Transport Plan
PE	Project Engineer
PER	Public Environment Report

SIG	Solomon Islands Government
SMEC	Snowy Mountains Engineering Corporation
SPM	Safeguards Procedures Manual (of MID)
STIIP	Sustainable Transport Infrastructure Improvement Program
UXO	Unexploded Ordnance
WHO	World Health Organization

EXECUTIVE SUMMARY

The Solomon Islands Government takes responsibility to maintain, improve, rehabilitate, reconstruct and/or construct new infrastructure. This document is the Public Environment Report (PER) of a project funded under the Sustainable Transport Infrastructure Improvement Program (STIIP) whereby the Ministry of Infrastructure Development (MID) is the executing agency and the Central Project Implementation Unit (CPIU) is the implementing agency. The CPIU includes safeguards officers who, along with the environment specialist in the supervision consultant, is required to implement the safeguards requirements of SIG and ADB are implemented during project delivery & operation.

The proposed development involves the replacement of the crossing at Mongga River with a new high-level Bridge at Mongga River in East Guadalcanal, and is located approximately 70 km east of Central Honiara. The new bridge will be constructed at the same location and within same right of way where a log bridge used to exist until 1980. It is located within the declared or gazetted road corridor and therefore does not require any land acquisition and resettlement. When the proposal was first screened by ECD in 2017 for implementation, the Development Consent (DC) granted in 2013 as a part of Mbokokimbo- Aola Road & Bridge Project had not expired. Due to delays in the subsequent detailed design phase the consent expired in 2018 and a separate PER and DC for the bridge project was considered necessary by the Director of ECD.

The main objective of this project is to reconstruct the bridge to improve reliability of the crossing so that the people can enjoy better accessibility to key social services such as markets, health and education and a sound movement of goods between Honiara and East Guadalcanal.

Under the country safeguards system (CSS) the project is identified as a Prescribed Development as defined in the Environment Act 1998 and Environment Regulation 2008 Second Schedule (Section 16) including infrastructure development and extraction of aggregate stones and shingles and Regulation 21 of the Environment Regulation which states the developer is required to produce the PER in support of the application for development consent for the project. In addition, the MID has issued the Safeguards Procedures Manual (SPM) which sets out the requirements for ensuring MID complies with the CSS for infrastructure development projects.

The PER has identified and predicted the potential negative environmental and social impacts of the proposed project. It concluded that the negative impacts of the project will be minor and temporary with the main environmental impact being high siltation and sedimentation of the river and removal of adjacent vegetation during the construction phase. It is envisaged that the completion of the bridge will have significant socio-economic benefits and improve the livelihood of people in East Guadalcanal. People will enjoy better mobility and improved accessibility with the operation of the bridge. The positive impacts of having the new bridge constructed were found to outweigh the negative impacts.

The negative impacts and risks will be carefully managed with the implementation of the Environmental and Social Management Plan (ESMP) included in this PER. The ESMP, while generic in nature, will be developed further as a construction ESMP (CESMP) by the contractor based on their approach to and programme for, the construction. The contractor will submit the CESMP and its sub-plans and site-specific plans to the Resident Engineer and CPIU for approval prior to construction. The contractor will appoint an Environmental and Safety Officer (ESO) whose role is to ensure the works are constructed in accordance with the approved CESMP and will monitor and report on that complianceCESMP to the CPIU on behalf of ECD.

A Grievance Redress Mechanism (GRM) is required as part of the EMP and is set out in the document. The GRM is designed to address stakeholder concerns with the project's environmental performance including the implementation of the EMP. During construction, all grievances are entered in a Register that is kept at the site by: date, name, contact address and reason for the grievance.

The PER will be reviewed by the Environment Conservation Division (ECD) and once approved, the Director of ECD will issue the Development Consent (DC), the DC and the PER will form part of the bid documents and contract.

CONTACT DETAILS OF THE PROJECT PROPONENT / APPLICANT

Name of developer: Solomon Islands Government/Ministry of Infrastructure Development

Contact Person: Mike Qaqara

Designation: Director Civil Engineering (Ag.)

Address: Central Project Implementation Unit, P.O.Box 1067, Melanesian Haus, Honiara

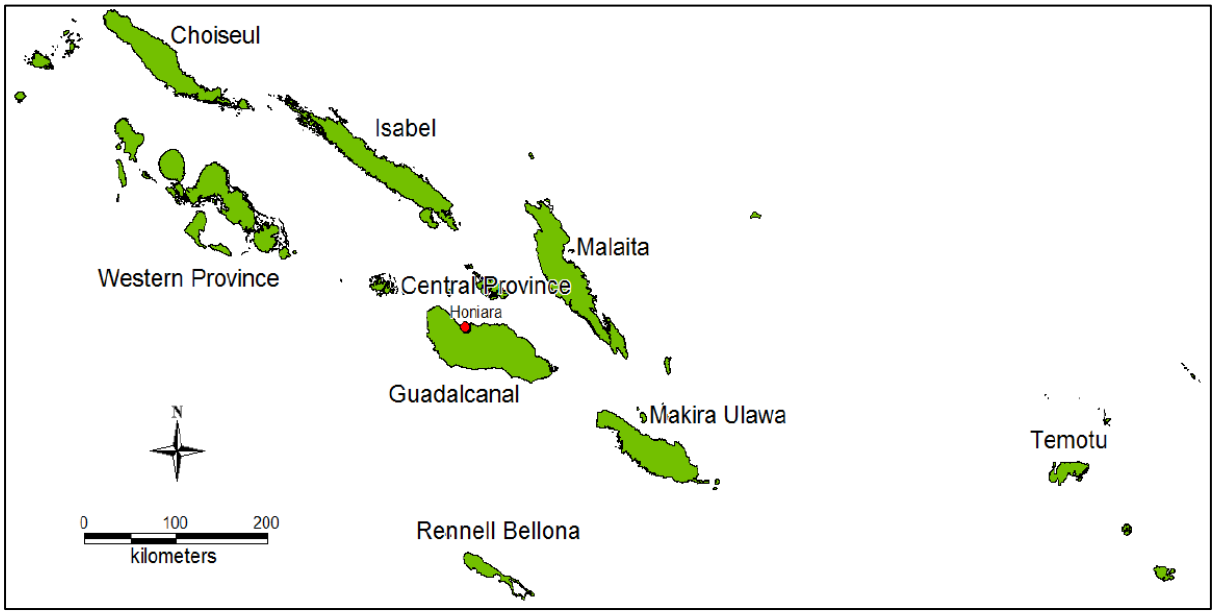
Phone: 21322 / 22262

1.0 INTRODUCTION

The Solomon Islands Government (SIG), supported by development partners, is implementing the Sustainable Transport Infrastructure Investment Program (STIIP) which aims to address constraints and deficiencies in the transport networks of the country. Transport infrastructure in the Solomon Islands consists of roads (with bridges) for land transport, ports, wharves and jetties for marine transport and airports/airstrips for air transport. The existing infrastructure is largely in poor condition as a result of neglected maintenance, insufficient funding, lack of comprehensive planning and poor management capacity.

While affordable transport services are essential for economic development, the widely dispersed and relatively small population in the Solomon Islands together with a relatively small transport demand and low economic activity creates a serious challenge in the provision and maintenance of transport services.

Figure 1: Solomon Islands Map



Any long-term development plans in the Solomon Islands must consider the archipelagic nature of the country and how this relates to economic development opportunities. The islands must be interconnected by good transport and communication networks that will open up new economic opportunities, reduce transport and transaction costs, increase access to social services, and foster national cohesion.

The project is consistent with the country's National Transport Plan, 2010 (NTP) which recognizes the provision of both land, sea and air transport as critical for increasing connectivity of communities, building local economies and assisting poverty reduction. The project has a strong focus on community empowerment with labor-based approaches in planning, construction and maintenance.

1.1. Background

The proposed project is to replace the crossing at Mongga with a new high level bridge, which once completed will improve mobility and accessibility of people of East Guadalcanal to and from Honiara. In 1975, the road was constructed to Mbokokimbo and in 1977 this was extended to Mongga. In 1978 a wooden bridge was constructed at Mongga but soon collapsed in 1980 in a flood event. Therefore, the SIG has now prioritized the reconstruction of the Mongga Bridge in order to serve the people of east Guadalcanal.

The country only has 631 roads with a total length of 1,523km, 441 bridges and 2,016 culverts, fords and wet crossing[3]. The completion and operation of the proposed bridge will be an addition to this existing infrastructure asset of the country. The road network on Guadalcanal includes 97 bridges comprising steel girder, concrete slab, bailey, timber and log/tree structure type. There are 133 roads with a total length of 489 km. Of the total road length, only 96 km are sealed. Most of the other roads are having base with gravel, earth and coronous material. . The current length of roads is a small fraction of what is required in the Transport Infrastructure Sector in order to achieve a fulfilling network of roads that can boost the social and economic development of the province and the country. Therefore, there is a need to construct or develop more infrastructure including roads and bridges in order to push services closer to the people, and that will improve their livelihood and boost economic growth.

In accordance with the requirements of the Environment Act 1998, the Ministry of Infrastructure Development (MID) is required to produce a Public Environment Report (PER) and Environment and Social Management Plan (ESMP) for the proposed development.

A PER or more detailed assessment through environmental impact statement (EIS), is required for any activity identified on the Prescribed Developments list included in the Environment Act 1998 including proposed activities that are likely to have impacts on the environment and are subjected to a decision of the competent national authority, the Environment and Conservation Department (ECD) under the Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM). The PER will be reviewed and

[3] SITAMS Asset Report, 2017.

approved by the Director of ECD who will then issue a Development Consent (DC) (with or without conditions) for the project.

The Ministry of Finance and Treasury and MID are the executing agencies of the project to be implemented through STIIP and MID's Central Project Implementation Unit (CPIU) is the implementing agency. The CPIU will be supported by a design and supervision consultant (DSC).

1.2. Scope and Objectives of this Report

The main objective of this report is to identify potential environmental and social impacts of the project, and identify the required mitigation and management measures in an environmental and social management plan (ESMP) that will avoid and/or reduce the potential adverse impacts on the environment and people's health.

The assessment was undertaken in full compliance with the Environment Act, Environment Regulation 2008 and MID's Safeguards Procedures Manual (SPM). In addition, other legal provisions relevant to the project such as biodiversity protection, water resources use, waste management, and materials sourcing have also been identified (refer to Section 2).

Specific objectives of the assessment include (but not limited to) the following:

- Establish the environmental baseline conditions (physical, biological and socio-economic) of the project area by conducting surveys and investigations and reviewing available information and data related to the proposed project;
- Identify the environmental, health and safety impacts and risks associated with the design, construction and operation of the proposed project;
- Consulting stakeholders and potentially affected people about their concerns related to project development;
- Establish a comprehensive environmental and social management plan covering the preconstruction, construction, decommissioning and operation phases of the project; and
- Preparation of a comprehensive PER report in accordance with the Environment Act & Implementing Regulations.

1.3. Report Structure

The PER consists of eleven sections: (1) Introduction; (2); Administrative, Legal and Policy Framework (3) Project Description including analysis of alternatives; (4) Description of

Environment; (5) Potential Impacts and Mitigation Measures; (6) Environmental and Social Management Plan; (7) Public Consultation and Participation; (8) Conclusion and Recommendation; (9) References and (10) Appendices.

1.4. PER Methodology

The PER assesses the potential negative impacts of the project on the physical, biological and socio-economic environments. It also suggests measures for addressing any potential negative impacts that may arise during the reconstruction of the bridge. There have been several visits to the site by CPIU Safeguards team to consult with the landowners and also investigate the environmental parameters and associated impacts of the project. A major site visit was done on 19 August 2019 and another on 27 July 2020.

The approach taken to develop this PER include:

(i) A review of existing baseline data (climate, geology, soil, physiography and biological resources) including the PER prepared for the Mberrande to Aola road upgrade project; in 2013.

(ii) Consultation with relevant landowning group and important stakeholders including Guadalcanal Province Executive, MECDM and Ministry of Mines, Energy and Rural Electrification (MMERE) in regards to materials sourcing and issue of a Building Materials Permit (BMP).

(iii) Identification of potential impacts based on the design and scope of work to be carried out, and

(iv) Development of mitigation measures for potential negative impacts and therefore an ESMP being produced.

The ESMP will be further developed by the contractor into a construction ESMP (CESMP) which will be a living document and will be updated whenever additional site plans are required or a deviation from the engineering detail design is necessary during project implementation.

The PER will be submitted to the ECD along with the DC application, Form 2. The Director and officers of ECD will review the application and may grant development consent with or without conditions.

2.0 ADMINISTRATIVE, LEGAL AND POLICY FRAMEWORK

2.1. Country Safeguards System

The country safeguards system (CSS) includes the primary environment protection legislation, other relevant laws covering materials sourcing, biosecurity, health and safety, labour, water resources, waste management and the like, and the institutional mechanisms for implementing the foregoing.

2.2. Relevant Legislation and Guidelines

The primary legislation is the Environment Act 1998 and its Regulation 2008 which make provision for the protection and conservation of the environment and establishment of the ECD.

The authority that is responsible for administering the environment legislation that includes the environment impact assessment system of the country is the ECD. It is being established under Part II of the Environment Act and consist of a Director and environmental inspectors as well as officers that are required for the due administration of the Act.

Other legislation that may have implications to this proposed development are:

- Forest Resources and Timber Utilization Act [Chapter 40, Laws of Solomon Islands]
- Protected Areas Act 2010.
- Wildlife Protection and Management Act 1998.
- Rivers and Waters Act
- Mines and Mineral Act 1990 (and Amendments 1996, 2008).
- Provincial Government Act and relevant Ordinances
- Forest Resources and Timber Utilization (Amendment) Act 2000.
- Resources Management Ordinance.
- Unexploded Ordnance (UXO) Protocol
- Biosecurity Act 2013 + Regs 2015
- Safety at Work Act
- Employment Act
- Lands and Tiles Amendment Act 2016

2.2.1. Environment Act 1998

The Environment Act is the fundamental policy in the country which makes provision for the conservation and protection of the environment. Apart from the provisions for the establishment of the ECD, the legislation also provides for the establishment of the Environment Advisory Committee (EAC). The role of the Advisory Committee is to advise ECD or the Minister on any issue or matters in relation to environment and conservation and to conduct or perform any task assigned and required thereto under the Act.

Importantly, the Act provides for an integrated system of development control, environmental impact assessment and pollution control including;

- Prevention, control and monitoring of pollution including regulating discharge of pollutants to air, water or land and reducing risks to human health and prevention of degradation of the environment;
- Regulating the transport, collection, treatment, storage and disposal of waste and promoting recycling, re-use and recovery of materials in an economically Viable manner; and
- Complying with, and giving effect to, regional and international conventions and obligations relating to the environment.

By virtue of article 4 (1), the Environment Act has significant power, which states that in the event of conflict between the Act and other Acts, the provisions of the Environment Act shall prevail. It was required under Part III of the Act, all developer who intends to carry out or are carrying out a 'prescribed development' activity, as listed in second schedule, 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 of ECD. The Director with responsible staff and government agency will then review the application with the relevant EIA report and make decision whether to grant or not to grant development consent. The developer shall not commence any work or continue to carry out any prescribe development unless it has complied with the relevant provisions of the Act, been issued a 'development consent' or the Director has exempted the development from the development consent processes.

2.2.2. Environment Regulation 2008

The Environment Regulation was gazetted in 2008 and enforced to effectively ensure the implementation of the Environment Act. The Environment Regulation entails detailed requirements for assessment of the "prescribed' developments' listed in second schedule of the Environment Act. 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 Environmental Impact Statement (EIS) report. All types and forms of major development activities are included in the schedule as a ‘prescribed development” activity and needs to undergo environmental impact assessment as detailed in the regulation. Forms 1 and 3 are relevant forms in second schedule of the environment regulation that provides guidelines to assist in preparation and drafting of the EIS/PER. This report is the fulfilment of the requirement of the Environment Act and Regulations.

2.2.3. Environment Regulation 2008

The ECD has a role with enforcement of national regulations regarding pollution control and environmental protection. It is the ECD that will issue the environmental development license and impose any conditions for the consent. The ECD will also have an interest in ensuring the implementation of the conditions. The Regulation also importantly included the need to assess social and health and safety impacts as part of the PER/EIS of a prescribed activity.

2.2.4. 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 a sound management is therefore remarkable. The Act prohibits the poaching of wild fauna and flora as well as harvesting of protected species.

2.2.5. Protected Areas Act 2010

The Protected Areas Act 2010 provides for the declaration and management of protected areas in the country. For those protected areas, special measures will be undertaken in order to protect and conserve biological diversity as well as regulating prospecting research on significant biological diversity for other matters in such areas. The Act also points to rehabilitation and restoration of degraded ecosystems and promotes the recovery of threatened species through the development and implementation of plans and other management strategies. There are no protected areas at the vicinity of the construction site.

2.2.6. River Waters Act (Revised Edition 1996)

The Rivers and Water Act was enacted to administer and control developments that would impact on a river. The Act however, only applies to rivers that have been designated under the Act. Which means that all activities taking place within and around the vicinity of the declared Rivers are governed under the Rivers and Waters Act 1996. Proper construction technique and environmental management practice including river bank management (such as protection works) will be used to control siltation/sedimentation and prevent erosions.

2.2.7. Waters Resources Bill

The Waters Resource Bill has been prepared to go through parliament and if approved, passed and gazetted, it will supersede the Rivers and Water Act [Revised edition1996]. The purpose of the Act is to:

- Provide for the integrated water resource management of Solomon Islands
- To promote the most efficient, fair and beneficial use of natural water
- To ensure the natural water resources are available for the sustainable use for the benefit of all present and future Solomon Islanders
- To provide for the protection of natural watercourses and water catchments
- To provide for the control of activities occurring over or beside waterways or watercourses

The Act requires a Waters Resources Advisory Board, whose function is to advise the Minister on matters pertaining to the Act and consult with the Director of Water Resources on technical matters. The Director with his/her staff shall administer, manage and implement the Act accordingly to achieve the purpose of the act. The Act covers all water bodies, rivers, streams whether in a registered or non-registered, public or private or customary land in Solomon Islands.

Currently, the Water Resources Department comes under MMERE. MMERE has the authority to control the use and development of all water catchments and riverbanks. Logging, mining and sands and gravel extraction in water catchments, riverbanks and river beds may be restricted by the Ministry according to the requirements of the catchment management and conservation. Section 21 of the Act provides for the Ministry to recommend to the Board to declare a water body such as a catchment, groundwater or flood control zone as a Water Control Area. If approved by the Minister and gazetted, mining of sand and gravel will be prohibited. This also includes any contraction, altering, removing or in any way impede or be likely to impede flow or movement of surface water. This clause of the Act is significant as it

may have a direct impact to sand and gravel extraction in the future if the current activities are not sustainably managed.

The Act clearly states that a development must not obstruct, divert or dam the river, if so it must make application to the Minister who upon receiving the request will direct the Director and/or his officers to assess and if agrees will issue a license accordingly.

2.2.8. Land and Titles Act 1996 & Amendments 2016

The Land and Titles Act is the main legislation that deals with land tenure system in Solomon Islands. The Act recognized three main categories of land, and that include:

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

A system of registration of different types of leases is provided for under the Lands and Titles Act. It allows individuals and groups to acquire titles to land and own land but one must develop the land that has been acquired or registered, otherwise they lose the title to the land. The land where the new bridge will be constructed is a customary land that belongs to a certain tribal group. In terms of aggregate extraction, the existence of a title to the land of interest or the recognition of customary owners of any customary land not covered under the Act is equally important.

The Land and Titles Act 1988 manages and defines all lands and sets out the procedures for land acquisition, lease or purchase. The Land and Titles Amendment Act 2016 revises the Act to provide a right to resume certain fixed term estates.

2.2.9. Mines and Minerals Act 1996

The Act has provisions for Building Materials Permit (BMP) which is relevant to infrastructure development in the country. Section 64 stipulates the Minister will issue the BMP to an applicant who will mine building materials in the country. Building materials is defined as clay, gravel, and sand and stone used for buildings, roads or other construction purposes. Section 64 also has it that the mining of building materials will at the utmost does not result in to erosion of coastal areas or river sediments that may have adverse effects on the environment.

Section 65 outlines the format of the 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 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.

2.2.10. Mines and Minerals Regulations 1996

The Mines and Minerals Regulation was gazetted in 1996 and complements and gives a clear detail of the Mines and Minerals Act. It further elaborates on the needs for a better step for achieving a sound minerals resource administration and management in the country. The Regulation has provisions that specify mineral rights holders which include BMP holders, to adhere to good mining practice so that their activities result in minimum ecological damage or destruction, prevent avoidable damage to trees and avoid harm to freshwater, marine and animal life.

2.2.11. Provincial Government Act 1997 and Ordinances

The Provincial Government Act (1997) gives power to the Provinces to make their own legislation including for environment and conservation. Schedule 3 of the Act provides a list of activities for which the Provinces have responsibility to pass ordinances. One of the activities includes Cultural and Environment - protection of wildlife, coastal and lagoon shipping.

2.2.12. Forest Resources and Timber Utilization Act 1991

The forest and Timber Utilization Act is the principal legislation that deals with felling of trees for sale, approved timber agreements affecting customary land, licensing of mills, timber levy, state forests, forest reserves, procedures and penalties and miscellaneous. Forestry Bill 2004 seeks to replace the Act and various amendments made in year 2000. The Bill provides incentive for conservation of forests and improved forest management including establishment of national forests. There is also provision for EIA to be conducted in collaboration with the MECDM for any forest developments before license and development consents are granted.

The new bridge will be constructed in an area where there has been very high disturbance from human activities. It will involve clearance of several trees and shrubs and some secondary regrowth vegetation. There are no commercial trees at the site and therefore the project does not require a Forestry Permit.

2.2.13. 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 Solomon Islands. Mainly administered by

the Minister for Health, 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 construction, or occupation of the project.

2.2.14. Unexploded Ordnance Procedures

Technically WWII ordnances found in the Pacific Islands can be defined as either unexploded ordnances (UXO) or abandoned explosive ordnance (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)[4]

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 Guadalcanal. Should UXO be discovered at the project site, 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/AXO 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/AXOs, it is important a chance find procedure for handling the UXOs/AXOs during the construction period is prepared and implemented. This will be the responsibility of the contractor as there are provisions for the same in the contract agreement for construction.

2.2.15. The Safety at Work Act 1996

The Safety at Work Act 1996 states that it is the duty of every employer to provide a safe workplace and to ensure the health and safety of employees under their control. This Act is linked to the Labor Act 1978 and the Safety at Work (Pesticide Regulations) 1983.

The Solomon Islands does not have emissions or water quality standards. While environmental standards are not provided in the regulations, the MECDM requires the use of World Health Organization standards to be used. Part IV of the Environment Act covers control

[4]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.

of pollution and includes need to apply for licenses to discharge waste or emissions, the enforcement of these are problematic without defined national standards.

2.2.15. Biosecurity Act

The Bio-Security Act 2013 and Biosecurity Regulations 2015: i) prevent the entry of animal and plant pests and disease into Solomon Islands; ii) to control their establishment and spread; iii) to regulate the movement of animal, plant pest and diseases and of animals and plants and their products; and iv) to facilitate international cooperation in respect of animal and plant diseases and related matters. Duties and responsibilities under the legislation are performed by Biosecurity Solomon Islands (BSI), a Department of the Ministry of Agriculture and Livestock.

2.3. Environmental Permits Required for the Project

Under the Environment Regulation, any developer must submit an environmental assessment report to the MECDM for all prescribed developments which includes construction of infrastructure and gravel extraction. The Regulation requires development of an ESMP integrated with the corporate policy of the developer that is involved in the project development.

The Director-ECD shall not issue any DC or license if the following had occurred:

- The PER or EIS did not support the application
- The discharge of waste, noise, odour, radiation or other forms of pollution is inevitable; or
- The discharge of waste or emission of noise, odour or electromagnetic radiation would be harmful to the environment.

2.3.1. Environmental Impact Assessment Decision Statement (EDS)

The Environmental Impact Assessment Decision Statement will be issued by the MECDM upon satisfactory review of an environment assessment report. The process is that upon receiving the environment assessment report, the Director-ECD shall convene a meeting and the Director shall receive both oral and written submission from any person in relation to the application. The Director within 10 working days, issues the decision statement along with a DC or license to discharge if there is no objection made on the application as consistent with the findings and recommendations of the environment assessment report.

The Director-ECD may also amend a license, if the discharge or emission will be carried out in a manner consistent with all relevant environmental policies; or all reasonable steps is taken to minimize the risk of environmental harm as a result of the discharge or if the amendment will not contravene any environmental obligation under the international treaty, convention or arrangement to which Solomon Islands is a party and that the applicant will comply with the amendment.

2.3.2 MID Safeguard Procedures Manual (SPM,2015)

MID has developed the SPM to guide the management of environmental and social impacts and risks that could arise in the course of implementing the NTP. The SPM is based on the national environmental assessment process and further elaborates on the existing procedures for avoiding, minimizing, and offsetting the environmental and social impacts.

The NTP identifies the types of infrastructure required and prioritizes the area for financing which includes the following in order of priority. i) Road maintenance and rehabilitation; ii) Wharf maintenance and repair; iii) New wharves; iv) Maritime navigation aids and maintenance; and v) Airfield maintenance. Construction of new bridges come under priority one.

The MID categorizes these priority activities in three tiers based on their environmental and social impacts, which include:

- Tier 1 – community-based routine and preventative maintenance through Labour Based Equipment Supported (LBES) contracts, mainly for roads;
- Tier 2 – Machine Based Maintenance Contracts (MBMC) for roads, wharves, and airfields; and
- Tier 3 - major rehabilitation, reconstruction and/or new construction contracts for roads, wharves, and airfields.

Each of these tiers has different environmental and social impacts, the management of which requires different mitigations under the CSS and development partner requirements. MID is required to ensure that its procedures meet both the legislative requirements of the Solomon Islands as well as the policy requirements of its development partners. The three tiers of NTP activities collectively trigger the environment assessment and Land Acquisition and Resettlement (LAR) safeguard policies of the development partners as well as CSS. Among the tiers, Tier 3 activities, major rehabilitation and new constructions, are anticipated to have the most environmental and LAR impacts. This PER for the Mongga Bridge project

incorporates the level of assessment and the bridge will be reconstructed at the existing gazetted road corridor and has very limited LAR impacts.

In contrast, Tier 1 and 2 sub-projects are considered to have low impacts and minimal risks and are considered to be able to be managed with standard practices and tools that have been developed, and refined through use, under the ADB-funded STIIP. The impacts and risks are site-specific, which can be mitigated and managed . Under the CSS for environment, Tier 1 and the majority of Tier 2 are not listed as 'prescribed activities' and are generally exempted from the development consent process.

According to the SPM a Community Advisory Committee (CAC) will be formed to assist the contractor and MID in ensuring the smooth running of the project works. In addition, the SPM provides detailed procedures to address the impacts and risks associated with the project and these have been taken into account during the due diligence assessment of the project site. Also the contractor is required to prepare a CESMP[5] and be implemented during the construction phase in order to mitigate potential risks and mitigate negative impacts of the project

2.4. Relevant Policies

The following policies are important consideration in terms of the service to be provided by the development proponent.

2.4.1. National Development Strategy

The National Development Strategy (NDS) is a very comprehensive policy that strategizes ways in order to achieve the development aspirations of the country. The NDS focuses on two key areas; social and economic livelihoods. These two key areas are enshrined into the NDS National Vision "Improving the Social and Economic Livelihoods of all Solomon Islanders".

Using the 17 sustainable development goals, "Transforming our World: the 2030 Agenda for Sustainable Development" as a reference, the NDS pinpoint five important long-term development goals and these include:

- Sustained and inclusive economic growth
- Poverty alleviated across the whole of the Solomon Islands, basic needs addressed and food security improved; benefits of development more equitably distributed

[5] CESMP – is a site specific environment and social management plan prepared by the contractor based on the ESMP embedded in a PER or EIS. The CESMP will be implemented by the contractor and monitored by CPIU for compliance.

- All Solomon Islanders have access to quality health and education
- Resilient and environmentally sustainable development with effective disaster risk management, response and recovery
- Unified nation with stable and effective governance and public order

Therefore, in order to achieve the objectives of the NDS, MID and its contractor are required to build and operate a bridge at Mongga which will provide better access to markets, quality health and education and boost the social and economic livelihoods of people to support growth and economic development of the country.

2.4.2. Environment Impact Assessment Guideline 2010

The Environment Impact Assessment Guideline is designed to administer Schedule 16 of the Environment Act The guideline comprises 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 streamlining procedures and providing guidance and advice to achieve consistency in implementation of the Act, provide basic advice and guidance to government officers, planners, developers, resource owners on the environment impact assessment process (MECDM, 2010).

2.4.3. Climate Change Policy

The Solomon Islands Government through the MECDM launched the Climate Change Policy, 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, and guiding the government and its partners so as to ensure the people, natural environment and economy of the country are resilient and able to adapt to the predicted impacts of climate change. MID also has a climate change manual to provide detailed guidance for designers and planners on climate change assessment and mitigation. The reconstruction of the bridge will take into consideration the climatic risks involved which may later have implication to the operational phase of the bridge. Climatic risks have been factored into the design of the bridge.

2.4.4. Solomon Islands State of Environment Report 2019

This Solomon Islands State of Environment (SOE) report was approved by the Solomon Islands Government on 30 January 2020, uses the 'Drivers, Pressures, State, Impact and Response' (DPSIR) model to describe the state of the environment, and analyze their most recent "conditions and grades" in relation to local and global goals. The State of Environment

(SOE) report highlights that the agricultural sector of the Solomon Islands is the most important sector for the country's economy, with subsistence farming being the predominant occupation of around 80% of the population. Further, it outlines that both the National Development Strategy 2016-2035 and the Agriculture and Livestock Sector Policy 2015-2019 of the country include targets and extensive proposals to sustainably increase the contribution of the sector to gross domestic product (GDP) of the country.

The 2019 SOE report describes challenges in developing the agricultural sector, with production in major crops, such as cocoa and coconut, having decreased in recent years. According to the report, factors that have contributed to this decline include flash floods, volatile prices, increasing pest and diseases, soil degradation, limited access to land, lack of private and public investment in the sector, as well as instability in the political and economic environment.

2.4.5. National Biodiversity Strategy Action Plan 2010

In July 2009, the Solomon Islands Ministry of Environment Conservation and Meteorology (MECM) now MECDM launched the National Biodiversity Strategy Action Plan (NBSAP) for Solomon Islands. The plan identifies mangroves as – at the interface of land and sea – as critical to SI biodiversity, and climate change as apriority theme amongst others. The development of the NBSAP is a response to the commitment made with UNCBD in 1995. The goal of the convention is to conserve the biodiversity of the country to ensure long term sustainability of the environment. The document highlights key threats and barriers in the country and formulates actions to mitigate any potential risks. NBSAP focused strategy is to address threats that arise from logging, inappropriate land use practices and over exploitation of natural resources compounded by natural disasters, population increase, invasive species, pollution & climate change including barriers such as lack of insufficient financial support, insufficient institutional support, conflict created by the land tenure system, lack of effective inconsistent awareness campaigns, insufficient and weak legislation & political instability. All these cross-cutting issues have resulted in habitat loss and species extinction.

2.4.6. National Adaptation Program of Action 2008

NAPA is geared towards fulfillment of commitment under the UNFCCC and is a country wide program of adaptation activities to address the effects of climate change, climate variability and extreme weather conditions. The priority sectors where adaptation actions urgently needed were identified through synthesis of existing information and community consultation. The project profile target areas that need urgent and immediate action includes: agriculture

and food security, water and sanitation, education, awareness and information, human settlements, human health, waste management, fisheries and marine resources, infrastructure, coastal protection and tourism. Three project profiles were identified in the program which intends to be implemented nationally through a collaborative approach.

- Project profile 1: Covers agriculture and food security, water supply and sanitation, human settlements, human health, education, awareness and information.
- Project profile 2: Covers fisheries and marine resources, infrastructure, waste management, coastal protection and tourism.
- Project profile 3: Covers the urgent need for adaptation action implemented in low-lying areas and artificial islands

2.4.7 DCGA Government Policy statement

The vision of the current Democratic Coalition Government for Advancement is to ensure all Solomon Islanders are empowered so as to enable them to attain a meaningful quality of life.

Not only that, the government's mission "is to create a God-fearing, peaceful, united and progressive Solomon Islands, led by ethical, accountable, respected and credible leadership that enhances and protects peoples' cultural, social and economic wellbeing". The reconstruction of this bridge will contribute to enhancing this mission in that it will improve the social and economic wellbeing of people.

2.4.8 ADB Safeguard Policy

As one of the development partners financing STIIP, ADB requires its Safeguard Policy Statement 2009 (SPS) to apply to all of the projects it finances or administers. The objectives of the SPS are to (i) avoid adverse impacts of projects on the environment and affected people; (ii) where possible; minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and (iii) help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks. The environment safeguard requires due diligence which entails addressing environmental concerns, if any, of a proposed activity in the initial stages of project preparation.

As part of the preparation of STIIP, a CSS analysis was undertaken to determine the consistency of the CSS with the SPS. Some gaps were identified and MID produced the SPM, to apply to all MID projects, to provide additional safeguard requirements to the CSS to closer align with the SPS. Since this project is funded under STIIP, the SPS and SPM also apply.

All ADB investments are subject to categorization to determine the level of environmental assessment required. According to SPS investments are classified as follows:

Category A: Projects with potential for significant adverse environmental impacts. An environmental impact assessment and detailed EMP are required to address significant impacts.

Category B: Projects judged to have some adverse environmental impacts, but of lesser degree and/or significance than those for category A projects. An initial environmental examination (IEE) is required to determine whether or not significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

Category C: Projects unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are still reviewed.

Category FI: Projects are classified as category FI if they involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all subprojects will result in insignificant impacts.

The project has been screened as category B for environment given that it will have site-specific, largely temporary and intermittent impacts, few if any of them are irreversible, and most impacts occur during construction and can be avoided or reduced through mitigation measures. The appropriate level of assessment for a category B project is an IEE, which is roughly equivalent to a PER as required under the CSS.

ADB's SPS applies pollution prevention and control technologies and practices consistent with good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines (EHSG). The EHSG provide the context of international best practice and contribute to establishing targets for environmental performance. Standards incorporated into the EHSG will be used in parallel with local Solomon Island environmental standards (where they exist) throughout this document with the principals of due diligence and a precautionary approach adopted. Application of occupational and community health and safety measures, as laid out in the EHSG are required under the SPS.

2.5. International Conventions and Agreements

Solomon Islands is a party to some of the international treaties and conventions. Highlighted in section below are some of the treaties and conventions, Solomon Islands government is committed to in meeting its obligations and requirements. The environment approval cannot be given if the proposed development is in breach of the international treaties. The agreements are detailed in Appendix 3.

2.5.1 Climate Change Convention and Kyoto Protocol

Solomon Islands has ratified the UN Framework Convention on Climate Change (UNFCCC) on 28 December 1994, and submitted its Initial National Communication (INC) to the UNFCCC on 30 September 2004. Following the preparation of its INC, the country has initiated efforts to create an institutional set-up that seeks to mainstream climate change issues into the national legal frameworks.

Ratification of the UNFCCC is one step forward in terms of commitment to addressing climate change and related issues. Solomon Islands is also a Party to many other UN conventions, such as those, among others: biological diversity, biosafety, persistent organic pollutants, and combating desertification.

Solomon Islands had also ratified the Kyoto Protocol on 13 March 2003. Solomon Islands has embarked on the implementation of sustainable development programs which have strong linkages to its reporting commitments under other multilateral environmental agreements. These reports include its contribution to WSSD and JPoI, BPoA and IM, NBSAP under the CBD. It is currently implementing a program to identify its urgent and immediate needs for adaptation to climate change which will culminate in a National Adaptation Programme of Action (NAPA). With the support of the Global Environment Facility (GEF), Solomon Islands has also begun to identify its capacity building needs relating to the implementation of the UNFCCC, CBD and the UNCCD through National Capacity Self-Assessment.

2.5.2. The Sendai Framework 2015-2030

Solomon Islands is a member of the Sendai Framework which succeeds the Hyogo Framework for Action (HFA) 2000-2015. It is a 15-year, voluntary, non-binding agreement which recognizes that each country including the national and local governments, private sector and other stakeholders must take the leading role to reduce disaster risk. What the Framework would like to achieve is:

- “The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries”[6].

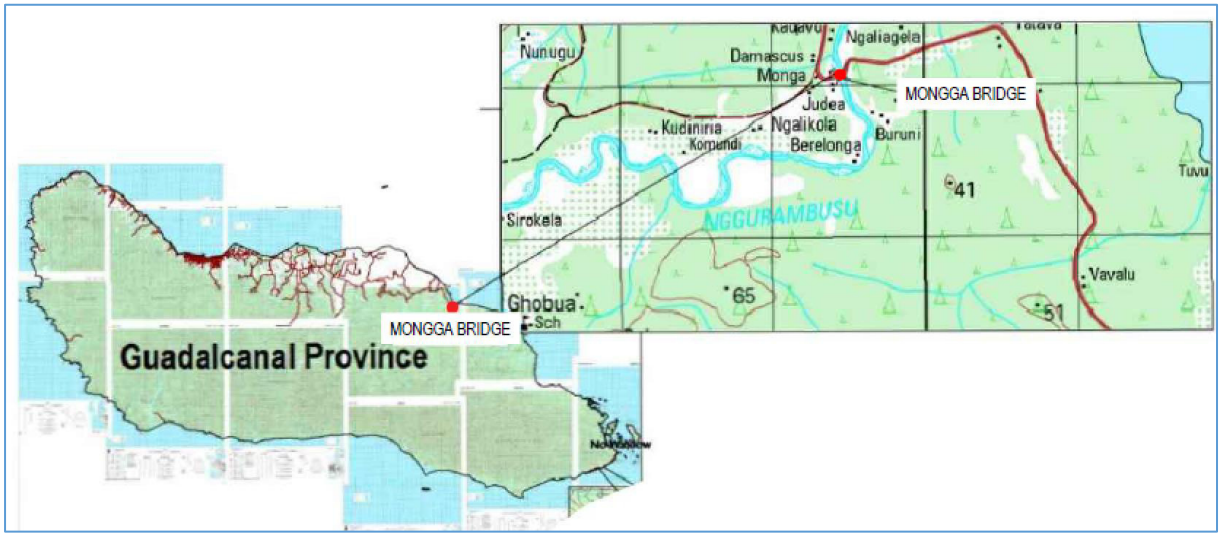
The new bridge construction will in partly uphold the main objective of the Framework whereby the developer will incorporate disaster risk reduction in its work plan during construction. Also, the operational phase of this new bridge will help in fostering increasing resilience of the communities of east Guadalcanal through a better access to the key social services, enhance their safety & stimulate rural economic activities.

3.0. PROJECT DESCRIPTION

The project for the reconstruction of the Mongga Bridge is consistent with the vision and mission of the NTP. It builds on the principle that rural areas will be unable to develop without access to transport services. Therefore, the proposed bridge will provide an effective piece of transport infrastructure for the rural people in that area, enhance access to and will contribute to boosting economic activities that are crucial for economic growth and social development of the country. The proposed site and the location map are shown in Figure 2 and 3 respectively.

Figure 2: Proposed Site at Mongga Village

Figure 3: Location Map (Mongga Bridge)



3.1. Project Justification

3.1.1. Existing Conditions

The Mongga Bridge collapsed and was totally destroyed during an extreme flooding event of the Mongga River back in 1982. For almost 40 years, people of east Guadalcanal were badly affected by the loss of the bridge. This had been a drawback for the improvement of livelihood of many rural families in that area.

Between 1982 and the present time, people travelling to and from Honiara were using a detour wet-crossing about 100-200 meters upstream of the previous bridge site. Many people lost their lives while attempting to cross the river during bad weather conditions (flooding of the river).

The riverbanks at the old bridge location are well defined and are about 2.0m in height to bankfull stage. The river approaches this old bridge location with a large radius curve as shown in Figure 4. As a result, there is riverbank clay (Mbokokimbo side) erosion which can be clearly identified and this is shown in Figure 5. Erosion gradually declines towards the old bridge location.

Figure 4: River alignment upstream to old bridge (10 October 2017)

Figure 5: View across proposed Location showing highly erodible banks

3.1.2. The Need for the Project

The population who are living further east of Mongga up to Aola are farmers and usually supply Honiara city market with their garden produces (fresh vegetables and root crops) and many of them are cocoa and copra producers and magnifies the importance of constructing the Mongga Bridge.. The bridge will enhance safety of traveling passengers, proper mobility of goods and people, stimulate rural-based economic activities, more children will go to school and more number of people will access good health facilities. These are crucial factors that will improve livelihood and wellbeing of people, stimulate economic growth and eventually contribute to the overall economic development of the country.

It will also provide a much safer connection to the west where people can use the land transport for travelling to and from Honiara, rather than travelling by boat using Outboard Motors (OBMs) and other vessels during bad weather (storm surges and high swells). There has been an increasing number of people travelling to and from East Guadalcanal, hence, an increasing need to construct the Mongga Bridge and the national government now considers building this bridge to be a national priority.

3.2. Project Objectives

The primary objective of this project is to replace the existing broken bridge with a higher level bridge less subject to overflow during heavy rain and river level rise so that the people can enjoy better mobility and accessibility to key social services that include markets, health and education.

After the completion of this project, it is anticipated there will be the following outcomes:

- Children will have improved access to school
- There will be improved mobility and increased safety for travellers
- Sustainable rural-based economic activities such as buying and selling of local products will increase through better access of market to and from Honiara, and,
- People in the area will have improved access health services and education.

3.3. Project Location and Design

Project location. The project is located at Mongga, East Guadalcanal, approximately 70 km to the east of Honiara city. Specifically, the Mongga Bridge is situated at geographical location of latitude of 9°30'15.27'' S and longitude of 160°27'08.22'' E. The immediate vicinity of the proposed bridge is shown in Figure 4 and Figure 5.

Project Design Features

The Mongga Bridge was prioritized for construction under the STIIP Project. This bridge will improve interconnectivity of the main road running from Honiara to Aola which is also prioritized by the SIG for rehabilitation. The project was subject to feasibility studies including preliminary engineering design, economic studies, social and poverty impact assessment and IEE or PER during the previous Transport Sector Development Project (TSDP) which was also supported as an ADB Loan to the government. These studies were reviewed and further feasibility studies were conducted during the previous years of the current STIIP project.

The bridge was designed to withstand climate change impacts and flooding. Proper drainage will be created on approach roads to collect surface runoffs. River bank protection is required to protect the riverbed, and the bridge abutments. As such gabion baskets or rip-rap will be used.

Figure 6: Design of the Mongga Bridge

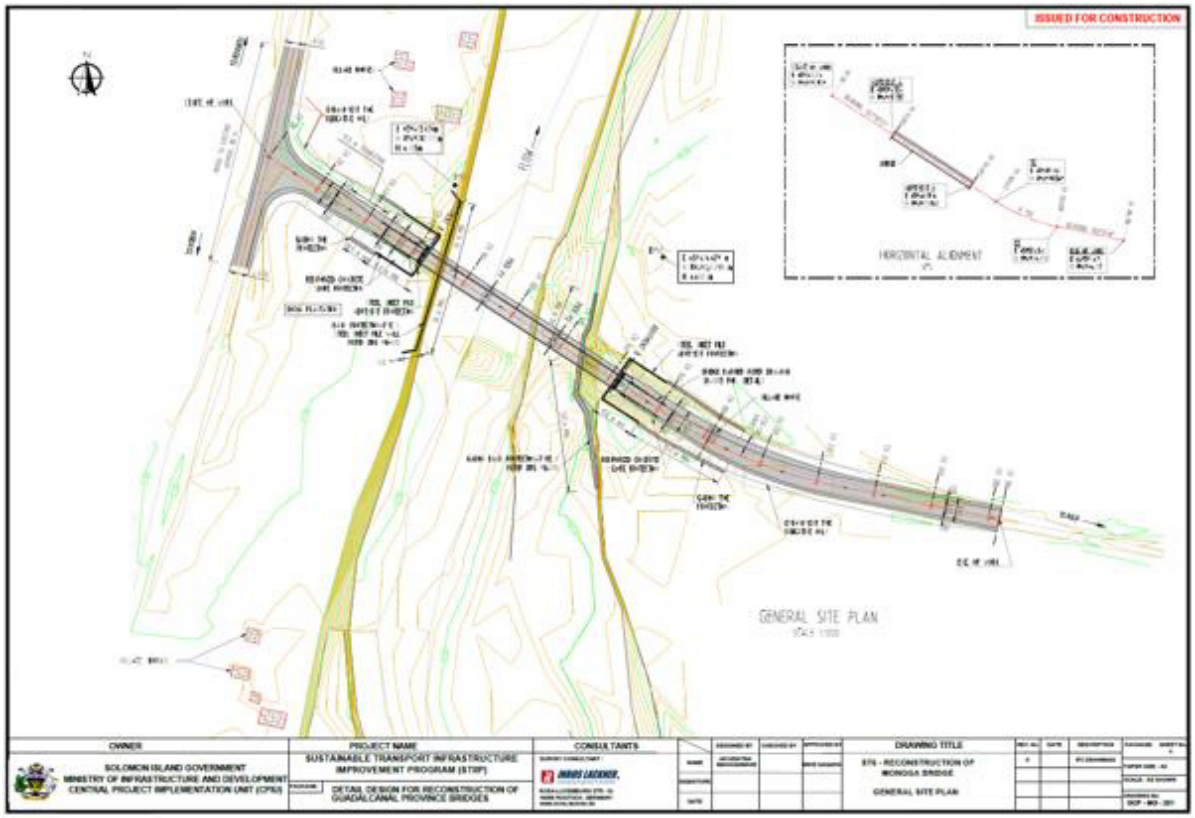
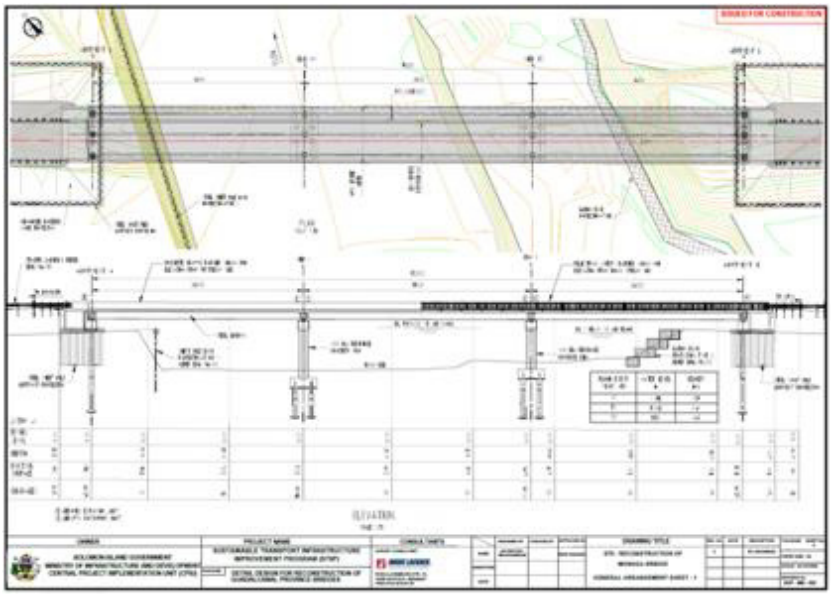


Figure 7: Elevation Design of the Mongga Bridge[7]



3.4. Scope of Work

The extent of the works will consist of the following major categories:

a. Removal of the existing low-level bridge
b. Construction of a new 70.0 m long two span (35m each) steel girder bridge at 7-8m height above ground;
c. Construction of river training measures, scour protection measures and associated water drainage facilities where specified as per design;
d. Construction of approach roads and associated works specified;
e. Establishing, and working in harmony with the local communities through the CAC to be established and funded by the project;
f. Control of traffic including the design and provision of temporary roadworks as necessary;
g. Clearing and grubbing;
h. All temporary works including stream diversions, coffer dams and shoring, dewatering and any other associated works;
i. Bridge construction including geotechnical investigations, pile design, piling, concrete work and structural steelwork;
j. Scour protection and river training works;
k. Drainage works;
l. Earthworks including forming open drains to the side of the embankments;

[7] In the revised design currently ongoing, there is only one pier in the waterway instead of two in the earlier design and two spans of 35m each.

m. Pavement construction;
n. Guardrail, road edge markers and signs;
o. Maintenance of the road and crossings;
p. Clean up and restoration of contractor's work area.

3.5. Construction Force and Equipment

The Mongga Bridge project will be awarded as a Central Tender Board competitive bidding contract. It requires construction workforces of bulldozer, excavator, crane and grader drivers, re- gravelling or erosion control crews, pavement work crews, bridge engineers, manager, and ancillary staff such as cooks and security guards.

A worker campsite is to be negotiated with the landowners and agreed by the local community and land-owners. There will be approximately 20-30 people likely to be required for this work. The construction workers will be accommodated in the campsite during the construction period (approximately eighteen months).

The equipment and plant to be used on the project includes dump trucks, graders, bulldozers, tracked excavators, front end loaders, vibrating drum rollers, water-trucks and concrete mixers.

Workshops will be required for the maintenance of equipment and vehicles. Staging areas for temporary storage of materials and machinery will also be required at or near each of the crossing construction sites. The site for this is proposed to be located at a distance of 200m from the bridge location. These facilities are the responsibility of the Contractor and an MOU will be negotiated with the support of the CPIU Safeguards team of MID.

3.6. Material Requirements

Engineers are currently in the process of identifying suitable sites for gravel. It is expected that gravels will be from Mberanade, Mbokokimbo and Mongga Rivers. Resource owners will be consulted and memorandum of agreement (MOA) signed between them and the contractor. MID/CPIU will facilitate the signing of the MOA and ensure there are no disputes. The contractor will also prepare a gravel extraction plan as per the SPM and apply for Build Materials Permit (BMP) for each source. The CPIU will review the BMP application and gravel extraction plan.

3.7. Analysis of Alternatives

This section provides details of alternative ways that are available for the proposed development. Literally, there are five alternatives being discussed in this section and these include: (1) alternatives to location, (2) alternatives to technology, (3) alternatives to design, (4) alternatives to operation, and (5) to remain with the status quo and do nothing with the proposed reconstruction of the bridge (no project option). For the proposed development to continue, it was necessary to take technical and social aspects of the project into consideration and ensure that these concerns are adequately considered in the decision making. It is therefore important to consider all the practicable options and ensure that the best available options are chosen.

3.7.1. Alternatives to Location

Other locations may exist for the bridge to be constructed, but due to challenges of landownership , only the current location is readily available as it is within the current road corridor alignment. MID decided to proceed with the construction at the existing location as it is within the current road corridor and there has been significant cooperation amongst the landowners. All communities along the vicinity of the proposed project have shown keen interest to cooperate with MID and the contractor to see the proposed development implemented. Also, other options were considered to lead to unnecessary clearance of significant and sensitive ecosystems especially wetlands.

3.7.2. Alternatives to Technology

The project will, wherever practicable, employ local unskilled labor for construction. However, the optimal use of machines with skilled labour in order to accomplish the work within given timeframe was considered to be the most cost effective option.

3.7.3. Alternatives to Design

Design alternatives are mainly limited by the availability of funds. Currently, the design of the bridge is limited to 70.0 m long two spans (35m each) steel girder bridge. Accordingly, Climate Change Adaptation has been considered and incorporated in conjunction with the design. The actual need for Climate Change Adaptation is important because the area has shown signs of natural disturbances. The bridge designed can withstand potential impacts of climate change such as cyclones, and high intensity rain fall with resulting floods of the Mongga River. Geotechnical studies were done and incorporated into the design taking into consideration the high seismicity risk of Guadalcanal. Other alternatives such as Bailey bridge or Timber Bridge

were considered to be less resilient compared to the steel girder bridge. The approach road will be constructed with proper drainage to withstand impacts of rainfall and surface run-off.

3.7.4. Alternatives to Operation

The Mongga Bridge will operate as an all-weather structure. During operation, routine maintenance particularly clearing of drainage and brushing grasses, vines and other shrubs along the bridge approach road sides is recommended to be undertaken by communities in the vicinity of the bridge using the MID LBES program. For major periodic bridge maintenance, the use of machines with a machine-based contract rather than labour-based will be necessary.

3.7.5. The “no project” alternative

Without the reconstruction of the bridge, there will be continuing hardship faced by the people of east Guadalcanal in regards to mobility and accessibility. Many other socio-economic drawbacks will still be experienced continually by the people.

Not undertaking the reconstruction of the bridge would mean accepting the status quo. This option provides no alternative for improvement of livelihoods and the objectives of the NDS.. The benefits of having the new bridge built will outweigh the potential adverse environmental and social impacts and the “No Development Option” was not recommended.

3.7.6. Reasons for Selection of the Proposed Project

The reconstruction of this bridge is included in the National Transport Plan (NTP) of the Solomon Islands Government. The reconstruction of the bridge will improve the quality of life of the rural based people in east Guadalcanal. There will be a robust flow of goods and services from Honiara to and from the rural area. There will be more and healthier garden products transported to the Honiara market and consequently increase local income. There will be a significant increase in the number of people who will benefit from income received from selling their garden products. Also, the proposed new bridge will help the people in the area to enjoy accessing more social services.

There is no issue of resettlement and no need for land acquisition. The negative environmental or social impacts associated with the construction activities will be minor, site specific and temporary only during the course of the construction. Workable and practical mitigation measures will be applied that will reduce and minimize the impacts to acceptable levels. All temporary uses such as the campsite, lay down areas, equipment yards off the corridor will be negotiated by the Contractor with the support of the Safeguards Team of the CPIU.

All the communities living along the vicinity of the bridge site in east Guadalcanal, expressed their support for the proposed development. They are ready to cooperate with MID and its contractor to see the project successfully implemented.

4.0. DESCRIPTION OF THE EXISTING ENVIRONMENT

4.1. Physical Environment

4.1.1. Climate

The Solomon Islands is usually subjected to the south-easterly Trade Winds from May to October and the North-westerly Monsoon Wind from December until March. Air temperature has very little variation due to its proximity to the equator. The average annual rainfall ranges from 3,000 to 4,000mm. The wettest period of the year is between the month of November to March with a daily average of 190-330mm.

The climate in Guadalcanal is tropical with distinct wet and dry seasons. Generally, the weather between March and November is dry and humid followed by a wet season from December to April. Being a large and mountainous island attribute to the island as being less dry and colder than the smaller islands in the archipelago. The weather between March and November is dry and humid followed by a wet season from December to April. The wet season also coincides with the cyclone season. Based on the rainfall data for Henderson from 1975 - 2015, the average monthly rainfall for the area of interest is averaged at 76 and 286 mm (Figure 8 and 9). 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 Celsius. The relative humidity normally varies diurnally from 62 to 90 percent. Total annual rainfall recorded at Henderson airport from 1975-2015 range from 1174mm to 2845mm (Figure 8). The sun is at zenith over Guadalcanal, and thus the effect is most pronounced, in November and February. Trade winds come during the southern hemisphere's winter, and from about April to August they blow from the southeast fairly steadily. During the summer, fringes of monsoon blow over the island.

Figure 8: Average rainfall data at Henderson airport

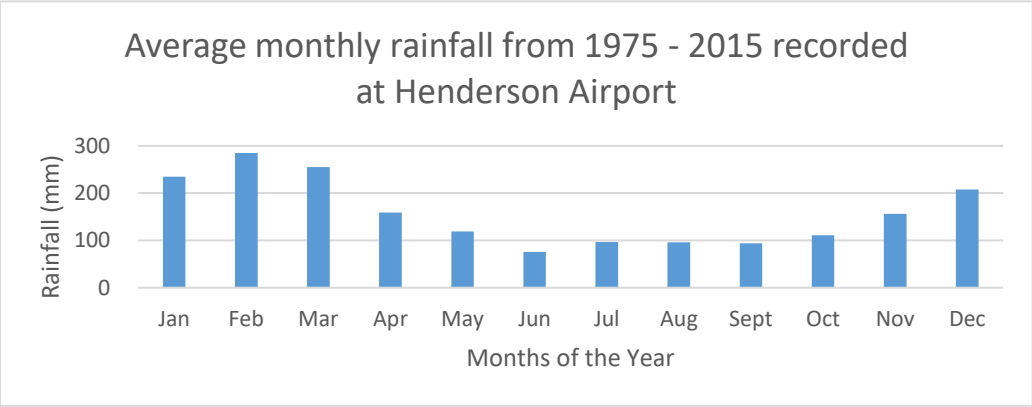


Figure 9: Average, minimum and maximum rainfall relevant for Mongga

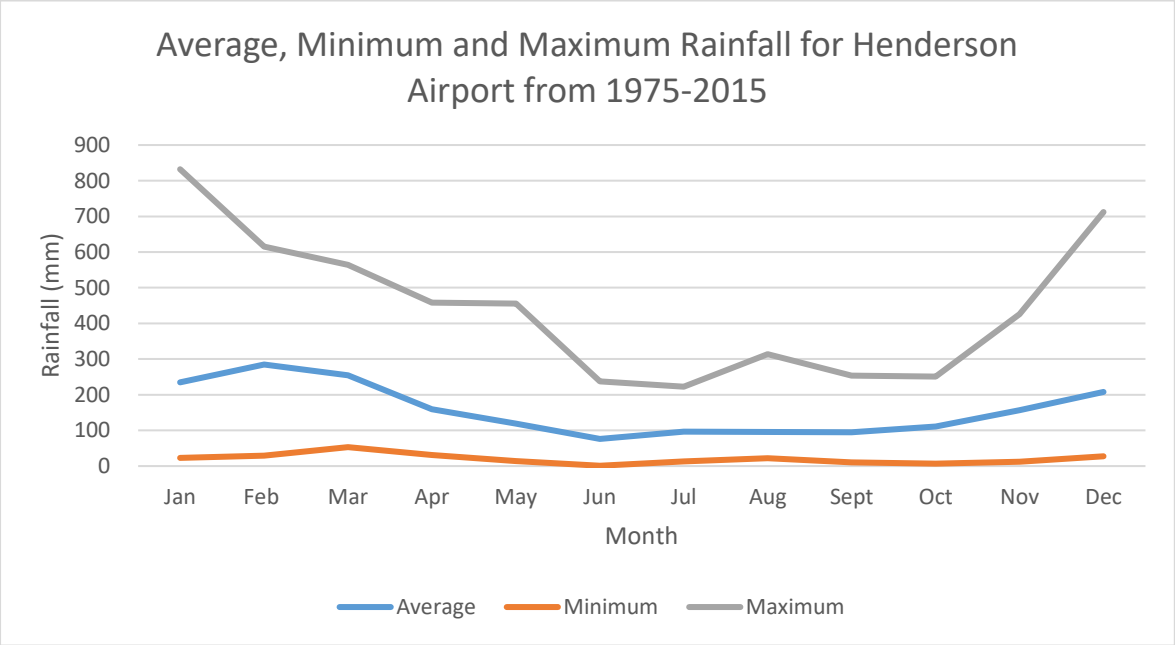
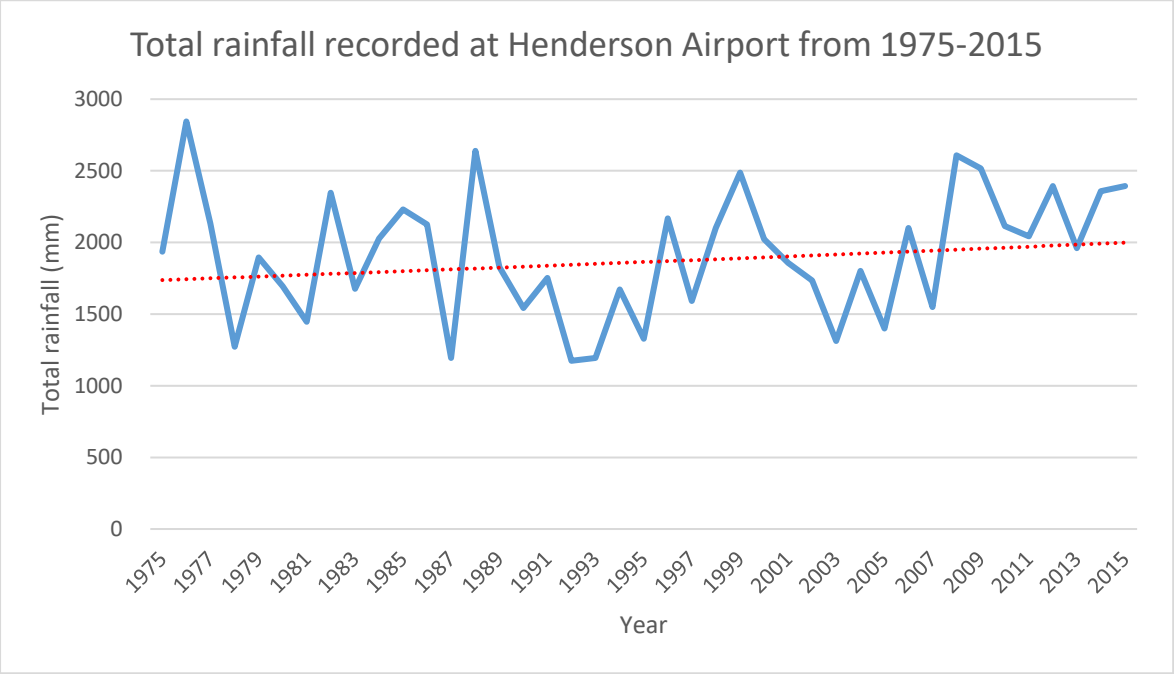


Figure 10: Total rainfall recorded at Henderson airport



The graph in Figure 10 shows a constant increasing trend of rainfall intensity for Henderson and the surrounding area which is consistent with the changing climate in Solomon Islands where it was predicted that there will be an increase in the intensity of rainfall. This is important for consideration in the civil works so as to consider proper management strategy in managing

the construction works and to minimize the potential risks of enhanced runoffs and bank erosion. Also, it is pertinent for general construction planning purposes.

4.1.2. Climate Change and Adaptation in the Design

The approach to be adopted in assessing climate change issues on the Mongga Bridge will follow the guidance given in the Guidance Manual "Climate Change Adaptation in the Transport Sector", Ministry of Infrastructure Development (MID), issued 2014.

Climate Change projections will be based on the document "Pacific-Australia Climate Change Science and Adaptation Planning Program (PACCSAP), Current and future climate of the Solomon Islands", CSIRO, Ausaid 2014/5.

A recent publication by ADB "Sea level change in the Pacific islands region – Guidance on what projections to use in climate risk and adaptation assessments" ADB, April 2020, advises adopting a conservative approach to climate change projections based on scenario RCP8.5 and a projected year of 2100.

4.1.3. Topography

The topography of Guadalcanal is made up of steeply dissected ridges and hill slopes, narrow valleys, shallow-angle coalescing fans and flood plains. The island has been divided into three physiographic regions, namely; Mountain zones, Intermediate or foothill zones and alluvial zones. The mountain zones occupy most of the southern half of the island and resemble patterns of very close dissection with deep, narrow ravines, steep slopes and razor back ridges. Intermediate zones comprise belt of dissected plateau running from the north-west corner of the island westward through the centre to form a belt of foothills covered by tropical rainforest

Mt Popomanaseu and Mt Makarakomburu are the highest mountains on the main island, formed as a result of volcanic activity rising to 2330 m and 2447 m respectively above sea-level. The 30000ha surrounding Popomanaseu is considered to be a potential area for protection. Seven major rivers drain down north towards the coast between Honiara and Aola. Of these rivers, the Mbokokibo-Manuhoho drains the largest area and is the longest river in the Solomon Islands. All these rivers are subjected to flash floods whose magnitude is related to the size of the catchment area in the hills. Generally, the rivers flow fairly swiftly over bed of cobbles and gravels.

The Guadalcanal Plain is roughly lens-shaped with its long axis oriented east –west. Plain tapers out west of the Lungga River and east of the Mbokokimbo river. Apart from undulation, the plain is flat with a gentle slope towards the sea. The banks of the river are clothed with dense bush which usually extends a few hundred feet on either side of the edge of the river. The Mongga or Nggurmbusu river is on the very eastern side of the island near Aola and has a catchment area of approximately 200sq-km.

The site for the reconstruction of the Mongga Bridgeis located at an elevation of 6 m above sea level and is approximately 2km km from the Mongga River mouth. The average slope from the Mongga Bridge to the river mouth is 1.4%, -1.7% (Figure 11).

The interior of Guadalcanal is generally rugged and mountainous. The mountains are flanked by hills and narrow coastal terraces, interspersed with swamps. The northern part of Guadalcanal where the project site is situated is mainly fluvial plains. The major rivers including Mongga River have incised the plains slightly. The inter-floodplain lands are effectively low terraces. The terraces have a gentle seaward gradient but local relief features, such as old levees, channels and backswamps, disturb this trend in many places.

Figure 11: Elevation of Mongga Bridge

Figure 12: Detail of bridge site elevation showing normal channel flow[8]

[8] Channel width is 20 m and average bank width at this location is 70 m

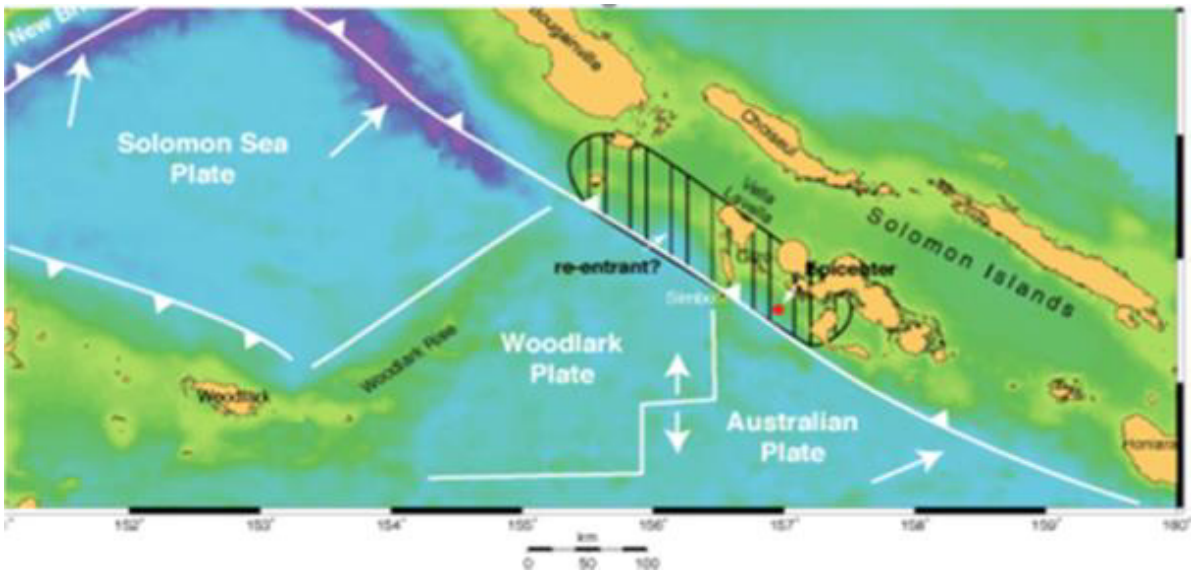
4.1.4. Geology

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. Islands with recent extinct volcano which includes the northwestern tip of Guadalcanal, the Russell Islands, Shortlands and Savo are found in this province. The volcanic geological province is much younger and consists of Late Miocene to Holocene period, and are five to six million years old.

There are two distinct stages of arc growth, which basically formed the Solomon block from the Eocene to the Early Miocene. The first stage arc growth created the basement of the central part of the Solomon block (the Central Solomon terrain), which includes the Shortlands, Florida and Isabel islands. The second stage arc growth led to crustal growth in the west and south (the New Georgia terrain), which includes Savo, and the New Georgia and Russell islands. Both stages of arc growth also added new material to pre-existing crustal units within other terrains. The present-day highly oblique collision between the Pacific and Australian plates has resulted in the formation of rhombohedral intra- and back-arc basins and have caused continuous earth tremors (Figure 13).

The proposed site is located in the Tenaru land System approximately 3 kms from the coast. This land system is formed from recent littoral strand lines and swales of coarse sediments and greyish sands under cultivation and grassland throughout Guadalcanal. This is evident at project influenced areas particularly between Ruavatu and Aola where the road in some sections runs close to the coastline. Sediments forming this land are both reworked fluvial materials, particularly on the northern coast that are weakly sorted and cliff fall debris.

Figure 13: Tectonic map for Solomon Islands[9]



4.1.5. Soils

The soils of Guadalcanal are derived from a mixture of volcanic and sedimentary rocks. On the old volcanic basement with deeply eroded topography are young, shallow loams and clays, humus rich at high altitudes and base poor. Sedimentary rocks have heavy textured soils, which range from those that are dark, rich in bases and organic matter over some limestone red, mottled, deeply weathered and leached clays over some conglomerates.

Alluvial zones occupy the river channels in the northern part of the island and widest between Honiara and Aola. The area is known as Guadalcanal plain and is suitable to agriculture.

In the Mongga - Aola area, depth of 0-18cm comprise of medium distinct strong, brown mottles, silt loam-silty sticky plastic, wet, poor drainage. The depth between 18cm and 117cm Grey to greenish grey-coarse to many coarse prominent brown mottles, very sticky plastic, very poorly drained. These soils are highly erodible along river banks. Alluvial gravels in the river channels are sourced from volcanic sources upstream.

4.1.6. Water Resources & Hydrology

The island of Guadalcanal has thousands of small springs, rivulets, and streams. This is a characteristic of a young drainage pattern. There are waterfalls that are common in higher altitudes, and in some places canyons have been cut through the limestone. There are rivers on the island which become slower near the coast and form mangroves swamps of brackish waters. Along the rivers were alluvial deposits of gravel, sand and/or mud. The island of

[9] Source: www.walrus.wr.usgs.gov/ tsunami/ solomon07

Guadalcanal have some of the larger rivers in the country. The project is located at the previous crossing point of the Mongga River,

There are insufficient gauging to estimate 'average recurrence intervals' (ARIs) with any degree of rigour. On the basis of river-cross section and related TSDP surveys, combined with extensive interviews of older villagers, shallow (<0.5 m) overbank flow appears to occur with an ARI of about 5 years, whilst deep overbank flow, some 1.5 to 2.0 meters higher than normal overbank flow, appears to have an ARI of about 40 years.

Table 1: Summary of components contributing to the minimum soffit levels of key bridges

River	Baseflow depth	Extreme flood	Debris allowance	Super-elevation	Tide & surge	Soffit level	
						R. bed	B/flow
Charupehe	0.34	3.0	1.0	0.1	0.1	4.2	3.86
Mbaranday	0.48	4.0	2.0	0.0	0.0	6.0	5.52
Mbokokimbo	0.59	4.6	2.0	0.1	0.0	6.7	6.11
Nggurambusu=Mongga	0.45	5.1	1.8	0.0	0.0	6.9	6.45

The rivers themselves rise and fall rapidly such that quickflow can be expected to last up to about 24 hours after heavy rain (50 to 100mm), and up to 48 hours after extreme rain. On the other hand, impeded drainage of overbank flow, such as in cane or oil palm plantations, may be substantively longer than 48 hours. That is, shallow flooding on approach roads may last much longer than floods under bridges of the active channels. This has not been well-quantified, but up to a week of minor flooding can occur.

In the major rivers of Guadalcanal, namely the Lungga, Mongga, Mbarande, and Mbokokimbo, Incipient overbank flow typically occurs at a river depth of about two meters. The most extreme flows result in a river depth of about four metres. The level for débris clearance, especially from floating tree roots, can extend a further 1.5 to 2.0 metres above maximum water level.
Peak discharges have become shorter but more intense in response to extensive logging in the mid-catchments. This trend is expected to continue, and should be a primary focus of field measurements and investigation if/when a current meter becomes available to the MID.

Virtually all of the upper catchments of the main rivers are at very high risk of landslide hazard. These could, either directly or indirectly, induce an extreme short-period flood wave in any of

the main rivers east of Guadalcanal. It is impossible to estimate the ARI of any such event other than to note that the ARI is very large decades to centuries), but associated with potentially catastrophic flood pulses.
The lag (time between maximum rainfall and maximum river flow) on the major rivers is normally a few hours, but can be strongly attenuated by dry antecedent conditions.

Normal flow was measured to have an average depth of 0.45 metres and the average width of the channel iat the bridge site 20 metres under normal condtions.. The total width of river bank at the proposed site is 70 metres. Consequently, under the normally dry channel conditions there is flexibility in diverting the flow when coffer dams are required for the construction of the main pier to ensure that normal channel flow will be retained. Silt traps and silt fences will be employed so as to reduce load of silts/sediments generated when driving bridge piles. The Mongga river has been highly degraded due to logging activities operating further upstream that generate silts/sediments into the river over time. The bridge reconstruction will only take a period of eighteen months and construction of one pier in the waterway (construction period 3-4months) represent the main period and extent of impact on the channel bed.

The hydrodynamic modelling package HEC-RAS was used to model the hydraulic characteristics of Mongga River along a reach extending approximately 500 m upstream and 220 m downstream of the proposed bridge location. The model was set up as a 2D semi-structured mesh with a default cell size of 4 meters. Key hydraulic controls such as tops of banks, embankments, bridge abutments, channel constrictions etc. were captured. The model was created for the following purposes (a) to assess the likely range of expected flood conditions (depths, velocities) for the river in its existing (ie. no bridge) state, and (b) to assess the impacts of the proposed bridge designs upon flood behaviour.

With respect to the longitudinal profile plots, it was observed that in the main channel the slope of the flood wave is relatively flat both upstream and downstream end of the bridge location, but undergoes a significant drop in the vicinity of the bridge location itself. This is indicative of a contraction and expansion caused by the presence of the old bridge approach embankment and is an expected result. The peak 100-year water surface elevation at the bridge location was calculated to be about 8 m RL, whilst 50 m upstream the corresponding peak level was approximately 8.4 m RL.

As it concerns velocities, several features are noteworthy. First is the region of very high velocities (in excess of 6 m/s) at the far upstream end of the model. These are most likely to

be artificial boundary effects, rather than indicative of actual velocities in this reach, a result which arises due to the limited survey extent and relatively close placement of model boundaries to the area of interest. Second, in the main channel the acceleration of flow through the bridge location was observed at a location that corresponds with the rapid drop in water levels on the water surface profile figure. Elsewhere, velocities in the floodplain are generally quite low, in the range of 0.5 m/s to 1.5 m/s.

The Design Consultant has proposed 35-35m two span option (only one pier in the waterway and two abutments) which provides best value for money option for the Mongga River crossing. This option provides wider clear span than the one provided by the earlier design and reduces the potential for debris built up.

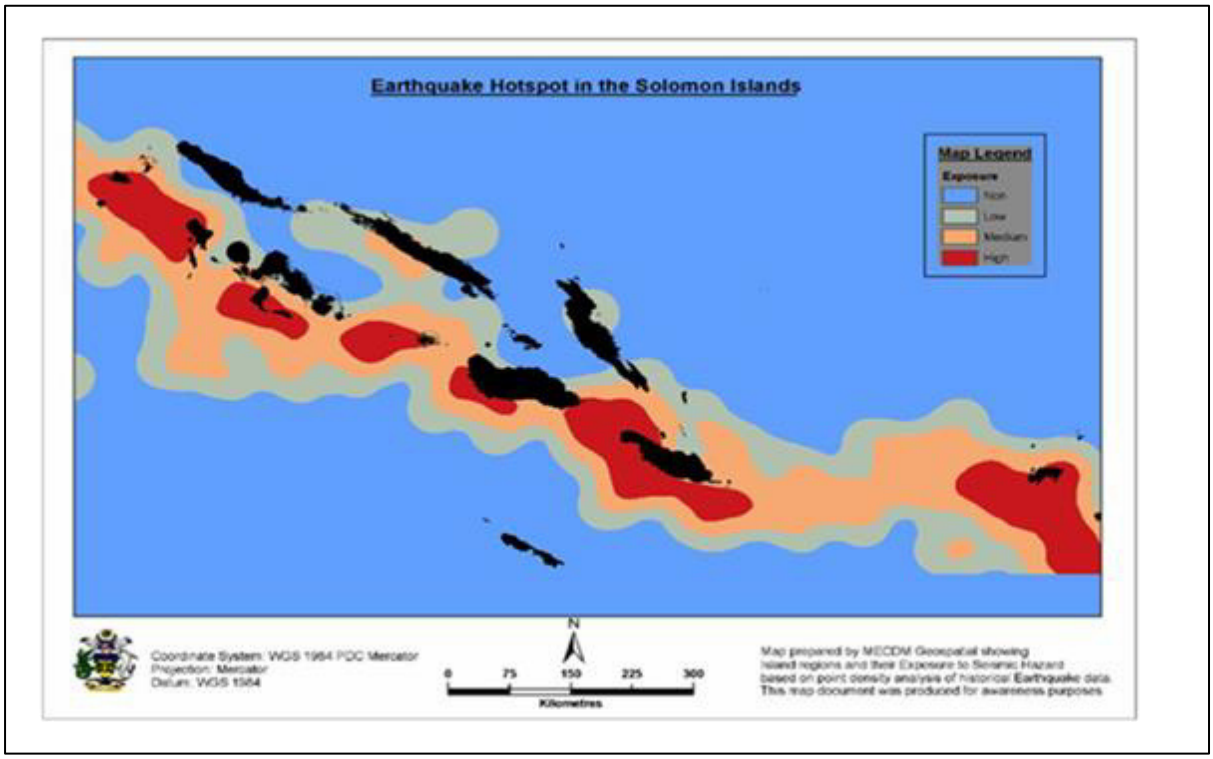
4.1.7. Natural hazards and disasters

Guadalcanal's topographical characteristics of high mountains with steep slopes, and a number of major rivers make it vulnerable to landslides and floods. Over three quarters of the 400 sq. km of the Guadalcanal Plain was flooded in the cyclone Namu. Damages worth millions of dollars and most of the deaths were recorded on the Guadalcanal Plain. Table 2 shows the island of Guadalcanal as being highly exposed to natural hazards and have had a fair share of disasters that has gone down the country's history. Figure 14 also show that the island is located on a high to medium seismic zone due to its location very close to the Pacific Rim of Fire and the Makira Trench where earth tremors happen frequently.

Table 2: Hazards and Natural Disasters that afflict Guadalcanal

	1950 - 1960		1961 - 1971		1972 - 1982		1983 - 1993		1994 - 2001		Total	
	No.	Deaths	No.	Deaths	No.	Deaths	No.	Deaths	No.	Deaths	No.	Deaths
Cyclone	1	0	5	1	5	4	3	97	0	0	14	102
Earthquake	2	0	12	0	22	12	n/a	n/a	n/a	n/a	36	12
Tsunami	0	0	2	0	1	0	0	0	0	0	3	0
Landslide	0	0	0	0	0	0	0	0	0	0	0	0
Flood	0	0	5	2	3	1	0	0	0	0	8	3
Drought	0	0	1	0	0	0	0	0	1	0	2	0
Volcano	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	0	25	3	31	17	3	97	1	0	63	117

Figure 14: Earthquake hazard map



4.2. Biological Environment

4.2.1. Forest

The Solomon Islands archipelago is geographically spread and has relatively varied flora. There are five main vegetation types that have been identified in the Solomon Islands that include:

1) Grassland
2) Swamps
3) Lowland Rainforest
4) Montane Forests
5) Secondary Vegetation

The vegetation type well away from the site is typical of a lowland forest. The site itself is highly disturbed and the bigger trees have been removed to make way for expansion of settlement in Mongga. Most parts of the site and nearby vicinity is mostly grassland with larger trees are breadfruit trees and nuts. Further, from the site are woodland with open and irregular canopy with many regrowth species beneath.

4.2.2. Terrestrial Flora

The site for the high-level bridge is the same as the existing bridge and therefore is already cleared. There are commercial trees like cocoa (*Theobroma cacao*) that flank the bridge approach site on the western bank. On the eastern bank there are subsistence gardens where food crops are grown. Food crops grown in subsistence gardens at the site include: sweet potato (*Ipomea batatas*), cassava (*Manihot esculent*), Sugar cane (*Saccharium* sp) and banana (*Musa* sp.). Fruit trees on the eastern bank include: Coconut (*Cocos nucifera*).), breadfruit, betel nuts (*Areca Catechu*), cut nut, pomelo and golden apple. Culturally significant trees at the site include: Kapok and pandanus. Some invasive species were also observed including ornamentals and fruit trees. It is observed that there are hibiscus trees, Bougainvillea (*Boungainvillea glabra*), *Polyscia* ssp., Sago palms (*Metroxylon salamonensis*), guava (*Psidium guajava*), *Alstonia scholaris*, *Heliconia* spp., *Cenchrus echinatus*, *Mikania micrantha*, *Themda australis*, *Imperata cylindrical, Mimosa invisa, Saccharum robusta* and sedges which are more common. None of this flora is of significant conservation value. Only fruit trees and cash crop were cut. No restricted species in the area were affected. MID have already paid about SBD 50,000 to the fruit tree/crop owners.

Figure 15: Vegetation at approaches to Mongga Bridge site

4.2.3. Terrestrial Fauna

The Solomon Islands terrestrial fauna is extremely diverse. It is believed that the country has a greater diversity of land animals with a high level of endemism than any other Pacific Island country (UNDP et al., 2002). Fauna includes 223 species of birds (173 residential terrestrial

species and 50 other species of shore/sea birds and visitors) including 19 species globally threatened (details in Appendix 5), 52 mammals, 61 species of reptiles (25 are endemic), and 17 species of frogs.

The forests of Guadalcanal are known to support very high levels of bird and vertebrate endemism. Terrestrial fauna includes a large number of birds (about 50 species) including the yellow-legged pigeon (*Columba pallidiceps*), thick-billed ground dove (*Gallicolumba salamonis*), white-headed fruit dove (*Ptilinopus eugeniae*), crested cuckoo dove (*Reinwardtiana crassirostris*), chestnut-bellied imperial pigeon (*Ducula brenchleyi*), as well as the abundant forest kingfishers. Reptiles include the large *Discodeles* frog which is common in the grasslands and lowlands. None of these are found in the project site.

At the project site, terrestrial habitats have been disturbed and thus have rendered the area lacking any significant wildlife to be of much concern. In areas of secondary growths, most of the original habitat that are critical in accommodating much of the original wildlife have all disappeared due to disturbed by natural processes, like climate change and through human induced activities such as clearing for settlements and gardening as well as logging. The following avifauna were noted including frigate birds, pigeon (*Ducula sp*), and cockatoo (*Cacatoo ducorpsi*). None of which has a high significant conservation value. Overall there were no specific rare, endangered, significant species, or communities of conservation significance and significant natural sites in Mongga. Field observations do not show significant wildlife species within the project area.

Figure 16: Dragon Fly (Libellulidae sp) and Butterfly Species (Ornithoptera sp)

4.2.4. Freshwater Ecology

The freshwater of the Solomon Islands show a high level of biodiversity and endemism, especially among the aquatic insects.

Attributed to their mountainous physiography, the larger islands in the Solomon Islands archipelago have Gobioid fishes as the dominant fresh water fauna, and are mainly represented by members of the Gobiidae, Eleotridae and Rhyacichthidae families.

The fauna in the Mongga river have been reported by the locals as mainly, tilapia, silver fish, eels, freshwater prawns, and freshwater crabs. As was common in all tropical islands, all native fish species encountered in the inland freshwater are migratory species with a life cycle that alternates between ocean and river. Two main migration patterns are followed: catadromous and amphidromous. Eels are catadromous fish with adults migrating to the ocean to spawn, and juveniles migrating back into freshwater systems to grow to maturity. Most of the other aquatic species, such as Gobioids are amphidromous. Spawning occurs in the rivers, and larvae drift passively to the ocean before migrating back as juveniles to the freshwater system where they grow into adults. The factors triggering upstream migration of juveniles are not completely understood. However, for some species, it is commonly postulated that flooding, which causes high turbidity, and lunar cycles, play a major role for triggering their migration.

The flora consists of mainly water cress and water cabbage and are located mostly in the river delta area 2km downstream, and hence not directly affected by the proposed construction. There is no aquatic flora present in the water column due to the sandy bottom and velocity at the proposed site during normal flow conditions. When above normal flows the river increases in velocity and larger vegetation eroded from the banks is present in the water column.

Specific to this project, mitigation measures will be implemented as discussed in other sections of this report. During extended periods of flooding, construction work on the banks and channel would be temporarily suspended.

4.2.5 Protected, Rare, Threatened and Endangered Species

The International Union for Conservation of Nature (IUCN) have undertaken a global assessment to classify species at varying risk of global extinction. The 2018 IUCN Red List provides the most up-to-date collated threatened species information for the Solomon Islands which is updated every year. It identifies and assesses the list of threatened species, which

includes 151 bird species, 181 mammals, 100 amphibians, 75 fishes, 60 plants, 522 invertebrates and 6 reptiles. (Figure 17).

Figure 17: IUCN Redlist 2018 for Solomon Islands Overall Listed Threat Summary

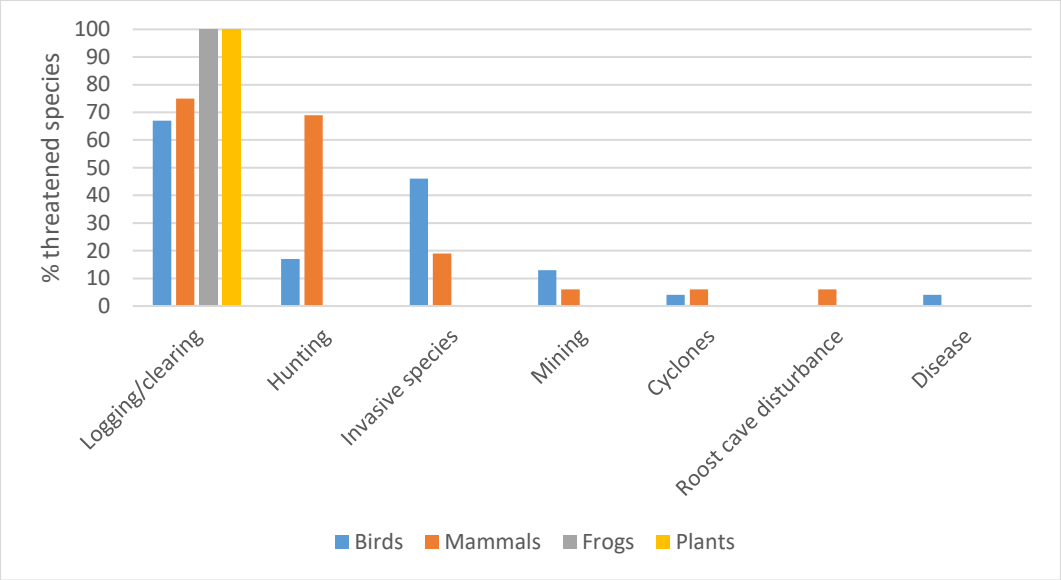


Table 3: Terrestrial Taxa under some level of Threat

Group	Extinct	Critically Endangered	Endangered	Vulnerable	Total
Birds	2	2	4	18	26
Mammals	0	6	7	3	16
Frogs	0	0	0	2	2
Reptiles	0	0	0	0	0
Insects	0	0	1	4	5
Plants	0	0	2	14	16

Source: IUCN Red List 2018 Solomon Islands

A specific fish survey was not conducted for the proposed bridge site. However, a recent study (Hevalao, Aug 2020) for the Poha and Mamara rivers further to the west in Central Guadalcanal reviewed 13 separate studies in the rivers of northern and eastern Guadalcanal in the period 1974-2016 and found 62 species of freshwater fish which had been assessed in the IUCN, Red List. Of these, two species were classified as Near Threatened (NT) and one was considered vulnerable (VU).

The project site and the surrounding area however, are currently sites of heavy disturbances from anthropogenic activities. Field visit to the site and observation did not identify any protected, rare, threatened or endangered species.

4.2.6. Protected Areas

In Guadalcanal Province protected areas include the Papai Island, Simeruka, Waimamauru, Wahere, Niuhoua, and Kerehira, all are located further east in Marau Sound. Initially these areas are Marine Protected area or individual Village Tabu sites manage by communities or tribal groups in collaboration with Foundation for the People of the South Pacific Islands, Solomon Island Development Trust and Ministry of Fisheries and Marine Resources. On land, Mt Popomanaseu and Lake Lauvi have been identified as a potential site worthy of protection but both are far inland north of the project area.

During the consultation, communities confirmed that there are no protected areas at the project site. The bridge reconstruction will be carried out on existing road alignment and will not involve a new site.

4.3. Socio-economic environment

4.3.1. Population Profile

According to the Solomon Islands Statistics Office, the country's population as of July 2019 is projected to be 680,806 and is dispersed widely across the archipelago[10]. This is an increase of 32% from the 2009 census (see Table 4). Guadalcanal is the second most populous Island in the country with a population of 150,067 as at July 2019 and experiences a steady increase of population (Figure 20). This is an increase of 46% compared to the 2009 population of the island and makes up 22% of the country's population (Figure 18 and 19). The population has a broadbased age-sex structure. 40% of the population was found to be below 15 years of age. Life expectancy of the country is averaged at 74.2 years (76.9 females, 71.6 males) and a density of 22 persons per square kilometer. This reflects a sharp increase from the 17 persons per square kilometer recorded in the 2009 census. The population was thought to be doubling every 30 years, and pressure on available services and natural resources was said to be increased dramatically during the previous decades. Therefore, this will require the Solomon Islands government to invest largely on resources for social infrastructure.

Table 4: Comparison of Solomon Islands Population Estimate in year 2009 and 2019[11]

Province	2009 Population	2019 Population
Malaita	137596	159,333
Guadalcanal	93613	150,067
Western	76649	97,197
Honiara	64609	88,501
Makira	40419	54,001

[10] https://www.statistics.gov.sb/sinso-documents

[11] https://www.statistics.gov.sb/sinso-documents

Province	2009 Population	2019 Population
Choiseul	26372	35,869
Isabel	26158	34,548
Central	26051	32,168
Temotu	21362	24,991
Renbel	3041	4,131
Tot: Population	**515,870**	**680,806**

Figure 18: Population of Solomon Islands: a comparison of 2009 and 2019 population

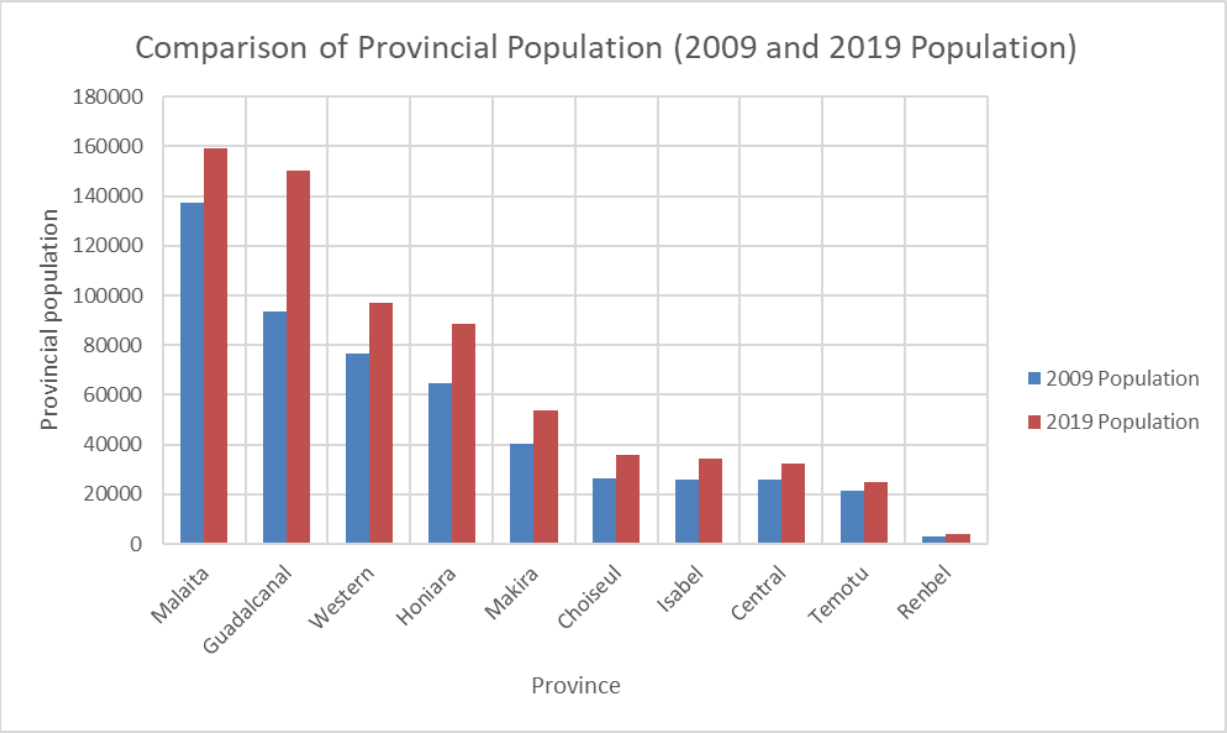


Figure 19: Population proportion by province

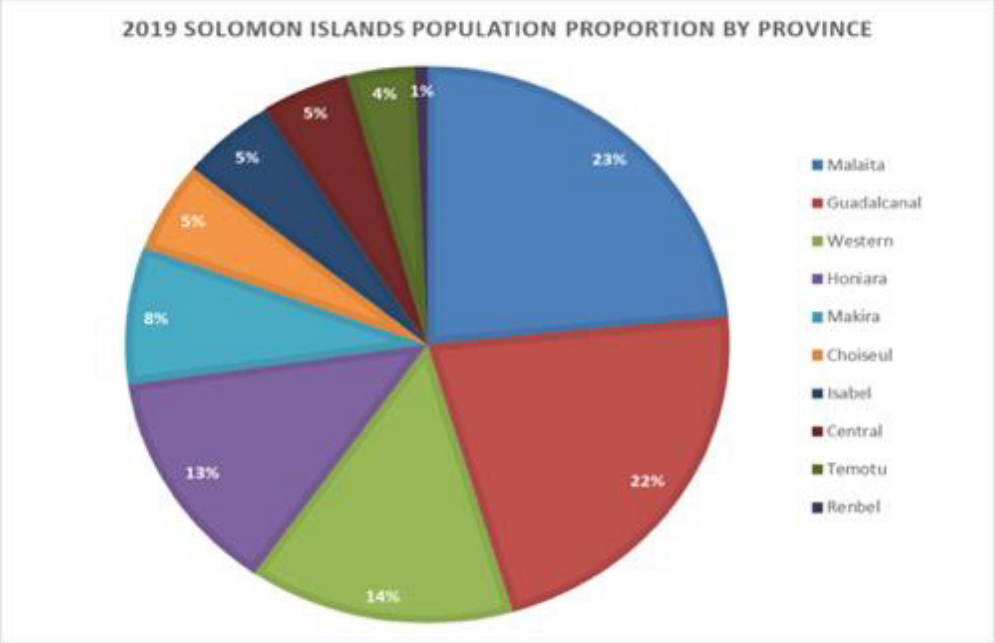
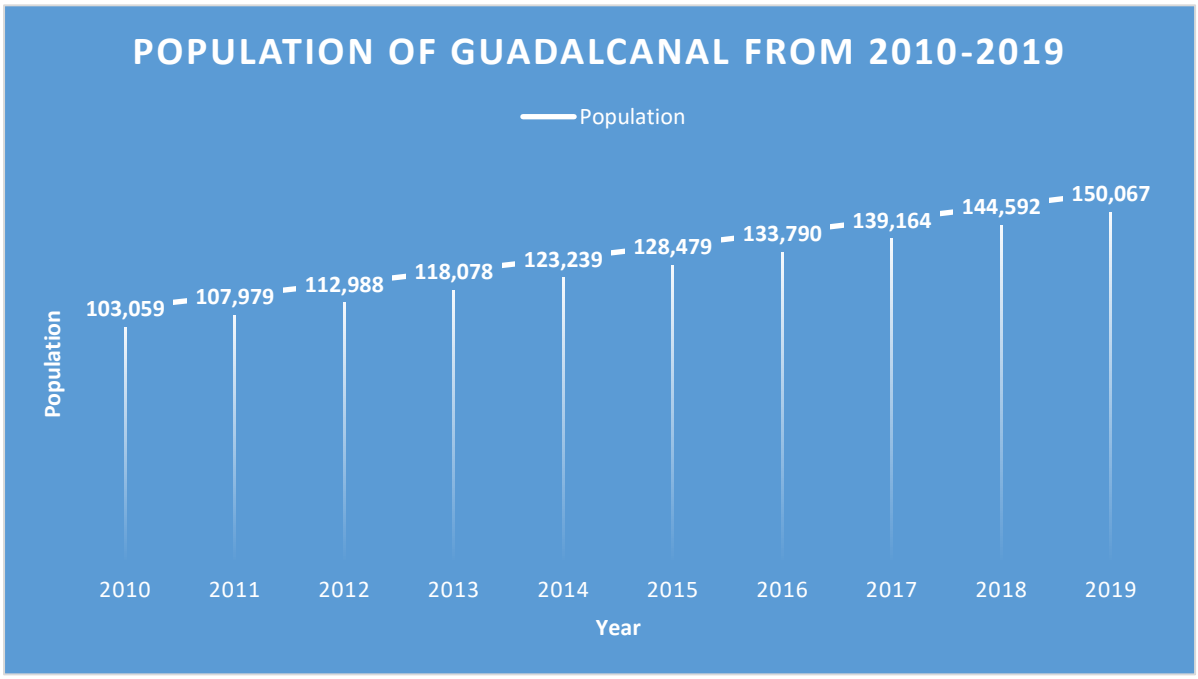


Figure 20: The steady increase of population growth of Guadalcanal Island



The proposed site is located in Aola ward in NE Guadalcanal which had a population of 4065 at the most recent Census available (2009). It is 17km to the west of the Mbokokimbo bridge which has recently been rebuilt and a further 7km to the large village of Aola. The population in the immediate vicinity of the proposed bridge reconstruction is made up of two villages – Monnga & Judea. Mongga has an estimated 30 households with a cluster near the bridge site

and other clusters to the north and south east within 400 metres of the bridge site. The estimate of the population in the vicinity of the site at 7/household was 210. Judea is approximately 1.5 km upstream to the south east along the river and made up of 13 households.

Distance to the main market in Honiara is more than 50km and the road is in reasonable condition to Mbokokimbo and then deteriorates rapidly. The round trip fare to Honiara costs between SB $200-300.

Figure 21: Village Houses to the south of the proposed corridor

4.3.2 Health Services

The nearest SIG health clinic is in Aola approximately 7 km from the site. There is planning in place for the refurbishment of the local Area Health Centre by Korean Aid, which will result in major improvements to current services, particularly in maternal and child health.

The upgrade is part of the Government's programme to reform the entire health system "to provide quality healthcare that is more accessible for all Solomon Islanders". WHO has been involved in the development of the Policy, and has worked with the Ministry of Health to design and develop standards for health care facilities as well as supporting reproductive, maternal, neonatal and child health programmes.

4.3.3 Education

School facilities in North East Guadalcanal where the sub project is located are shown in Table 5. Ruavatu Primary school and Community secondary school are located approximately 10 km to the north of the site. There is also a small primary school at Ade Ade Bridge, downstream approximately 1 km from Mongga Bridge.

Table 5: School Facilities in NE Guadalcanal

Type of School	Name	No.
Primary	Babala Adventist Primary	1
	Gilo Primary	1
	Horohana Extension	1
	Kolona Primary	1
	Kolosulu Primary	1
	Komukama Primary	1
	Luluga Primary	1
	Mataga Extension	1
	Mbalasuna Primary	1
	Nalei Primary	1
	Nughulathi Primary	1
	Reko Primary	1
	Ruavatu Extension (Vanua Levu)	1
	Tau Primary	1
	Tetupa Primary School	1
Subtotal		15
Community High School (CHS)	Kulu CHS	1
	Numbu CHS	1
	Tenakoga CHS	1
Community High School Subtotal		3
Provincial Secondary School (PSS)	Ruavatu Secondary PSS	1
Provincial Secondary School Subtotal		1

Source: Ministry of Mines, Energy 2015

4.3.4 Distance to Schools and Access to Education

Access to education is closely linked to the distance children need to travel from their communities along with existing road conditions and the availability of transport. Schools that are located farther away from the communities make access to education difficult. In all the schools in the study area, children travel to school on foot. Easy access to education by the

children is a major concern in the study area, especially for those at the preparatory stage. (Manetari,2008)

The bad condition of roads used by the children to travel daily to and from schools is one of the major problems. In some areas the children also have to cross rivers to reach schools. Flooding of rivers hinders access to schools and heavy flooding can cause casualties when children risk crossing rivers. The combination of heavy rain, flooding of rivers, poor road conditions and other adverse geographical conditions contribute significantly to absenteeism and irregularity in attendance at primary school and greatly jeopardizes the educational development in the study area. (Manetari, 2008)

4.3.5. Economic Context

The main sectors driving the economy in Solomon Island include fisheries, agriculture, mineral and forestry. Most goods (manufactured foods and petroleum) were imported. The islands were rich in mineral resources but yet to be developed. According to the 2014 CBSI report the economy had experienced resilience in 2014 in recovering from the negative fallouts from the 2014 flooding and the closure of Gold Ridge mine.[12] The growth for 2014 therefore was revised upward from 0.9% to 2.0% however there was a drop against pre-flood projection of 3.7% due to improvements in key non-mineral sector and swift expenditure adjustments from the national government and the development partners in addition, high export commodities and falling energy prices had also supported the economic recovery process[13]. The key drivers are forestry, fisheries and agriculture. Within the mineral sector, regardless of the positive role from the bauxite exports there will still be decline due to the absence of gold. As been expected the economy raised in 2015 to 3.5 percent harnessed by the key drivers of the economy.[14] Other key industries are mining, fishing, palm oil, copra and coconut oil and cocoa with a small level of coffee production also contributing to foreign exchange earnings.

According to the 2012/2013 Household Income and Expenditure Survey, the country has a total of 108,041 households. 19,015 are urban while 89,026 are rural households. The Survey establishes that urban households earn close to three times the average income of rural households, and twice the median and per-capita income. This is expected to increase for the 2019 Household Income and Expenditure Survey. This shows evidence of the extent of uneven income distribution amongst households and persons in urban and rural areas. The rural population at the project area however, earn income from agricultural activities, especially

[12] CBSI 2014 Annual Report
[13] ibid
[14] ibid

farming of quality food crops such as taros, potatoes and other vegetables. These people are renowned for supplier of quality market produces to the local market at Honiara.

4.3.6. Cultural Component

The country is culturally diverse with 120 indigenous languages. Melanesian pidgin is the lingua franca and the common language spoken. The population is made up of 93% Melanesian, 4% Polynesian, 1.5% Micronesian, 0.8% Europeans, and 0.3% Chinese. Honiara is the capital and main urban center and in 2019 has an estimated population of about 88,501 persons. This could be considered to be an underestimate as the census may not capture the large number of economic migrants. While this has provided the country with distinctive cultures, the isolation of these groups has also created a high dependence on natural resources. Development has not been uniform across the country and the resulting migration to urban areas has created squatter settlements in and around urban areas.

Honiara City is situated on Guadalcanal Island. It serves as the main Administrative, educational, and economic center for the country. It was developed from the rubble of an American war base, established during the Second World War, and has grown at a rate of 2.7 percent per annum over the years to become the primary city in the country. The city is made up of diverse ethnic groups and indigenous people. The people at the project influenced area (those that will benefit from the bridge) are indigenous Guadalcanal people and spread over six wards (Table 6).

Table 6: Wards likely to benefit from the project

Wards	Population
East Tasiboko	7438
Aola	4065
Paripao	3068
Kolokarako	1418
Longgu	3676
Vallasi	1459

4.3.7. Land-use

The most important land use activities on the northeast, north and northwest coasts includes Solomon Islands Plantation Limited on the Guadalcanal plains, the Gold Ridge Mining development behind Honiara and the prawn farm at Ruaniu in the northwest. All these were closed down and most infrastructure destroyed by the Guadalcanal militants during the social crisis (1999 – 2003). Cocoa and coconut plantations that are scattered round the island are the main land use, and prior to the ethnic tensions there were copra buying points at

Manikaraku (Marau Sound) Mbalo (southeast Guadalcanal), Haimarao and Marasa, (south Guadalcanal) and at Lambi (north-west Guadalcanal). The Livestock Development Association (LDA) holding grounds were also set up at Manikaraku (Marau Sound), Tangarare (on south-west Guadalcanal), and at Aruliho and Mamara (north-west of Honiara).

Exploitation of the natural forests plus the new enterprises of growing teak plantation and vanilla plants may also be added to the land use inventory. These activities are mainly carried out on the northeast, north and northwest of the island. The growing of spices and rice on the north-eastern side of the island are new ventures that may earn income for subsistence, or small-scale farmers and revenue for the province. They may also provide new rural-based employment for the large numbers of young people found in many villages.

There is more economic activity on the north coast than any other location in Guadalcanal. This was attributed to the fertility of soil occurring in the northern plains. Subsistence food production is important, with the main crops being sweet potato, cassava and banana. The main sources of cash income for villagers and settlers are sales of fresh food and animals at Honiara market and other locations, as well as copra and cocoa production. There has previously been significant agricultural development in North Guadalcanal with both small-holder agriculture and large-scale estate development. The latter includes production of copra, cocoa, rice, cattle, and oil palm. Previously, there is a logging company operating in the Kolokarako, Paripao and Aola Wards. The tracks constructed by the company provide continues access to communities living as far as Moga. The logging track and partially sections of the Mberande Aola Road at Adeade and between Calvary Hill and Mbokokimbo were still used by people to day. The previous log pond is at Ade Ade approximately 11 km north of the proposed site on the coast. This is the preferred site to be used by the contractor (the contractor) to land its machines to be used for the bridge reconstruction at Mongga. The immediate vicinity of the proposed bridge has no significant stands of timber and tree cultivation is coconut plantation for copra.

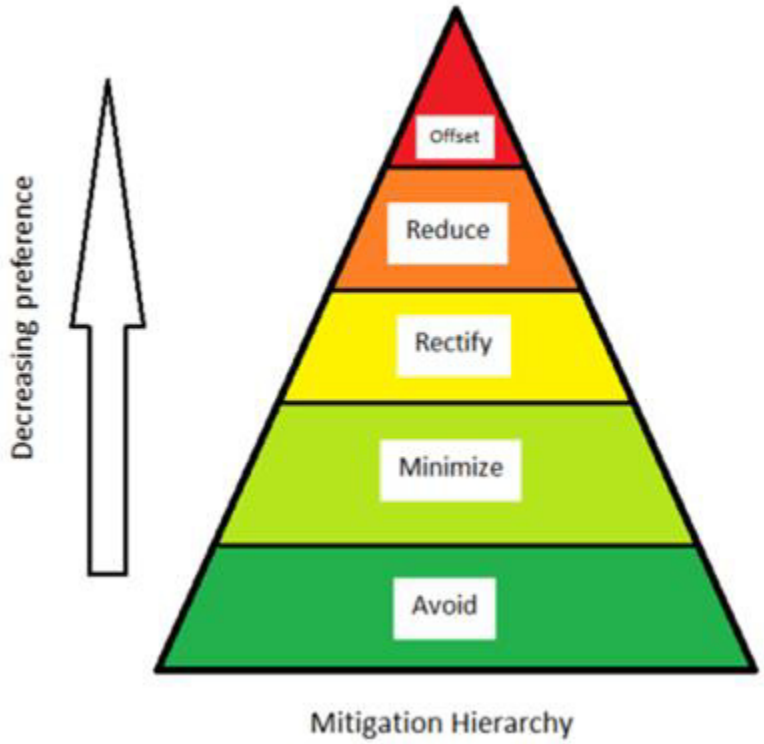
At the proposed site, there is a 30m corridor of gazetted Government land which will allow adequate room for the bridge approaches and bridge itself. Assuming 20 metres for the ROW there will be adequate area for construction lay down areas within the corridor. All other area off the corridor is custom land. A construction camp will be required and an MOU between the Contractor and the local community will be facilitated through the CAC.

5.0. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1. Significance of Impacts

The potential negative environment and social impacts for the proposed development have been identified and their significance assessed. The scale and durations of the impacts are assessed with reference to the scope of work, along with the bio-physical and social environment of the project site. Mitigation measures are designed to avoid, minimize, rectify, reduce or offset the potential negative environmental and social impacts. The World Bank Mitigation Hierarchy in Figure 22 is used as a reference to mitigate the potential negative impacts that may arise during the course of the road construction. Impacts may be minor, moderate, major or negligible based on the scale of impact itself and whether it is mitigated or not.

Figure 22: World Bank Mitigation Hierarchy



5.2. Design and Preconstruction Impacts

5.2.1 Development, Review and Clearance of the CESMP

The implementation of the project includes the preparation of a CESMP by the Contractor using the ESMP from Chapter 6 of this document as guidance. There is also a requirement for a dedicated Environment, Health & Safety officer to be appointed by the Contractor as soon as possible after contract award so that the officer can be tasked with preparation of the CESMP and subsequent implementation.

5.2.2 UXO

During WWII, Solomon Islands was a site of heavy battle between the Allies and the Japanese and while this occurred over 70 years ago, it is possible that a chance discovery of a UXO may occur. A UXO survey has been undertaken at the site in 2020 and clearance certificate provided by the agency. In case of any discovery of UXO during the bridge construction phase, the contractor will immediately cordon off the area and arrange the evacuation of nearby residences and inform the Royal Solomon Islands Police Force (RSIPF) of the find.

5.2.3 Climate Change and Design Adaptations

Climate change impacts have had the potential to negatively impact the project. The majority of risks to the proposed development as a result of climate change revolve around the ongoing operation and maintenance of the asset. The main climate change risks were considered to relate to occurrences of extreme rainfall events and tropical cyclones. Extreme rainfall events have the potential to cause flooding, erosion and increases in moisture content.

Catastrophic flood damage combined with logging occurring in the upper catchment was assessed as the most significant risk.

The documents as discussed in Section 4.1.2 indicate that short term rainfall intensity, that is less than 24 hours, may increase by 10% to 30% depending on which ARI is adopted, which future year and which RCP scenario. Similarly, the frequency of occurrence may change downwards, that is to say, what is now a 1 in 200-year event may in the future become a 1 in 100-year event. Also, a recent publication by ADB “Sea level change in the Pacific islands region – Guidance on what projections to use in climate risk and adaptation assessments” ADB, April 2020, advises adopting a conservative approach to climate change projections based on scenario RCP8.5 and a projected year of 2100. All these are being considered in the detailed design review ongoing.

The design consultant proposed an improved climate resilient option with a 35-35m two span option (only one pier in the waterway and two abutments) which was considered to provide best value for money option for the Mongga River crossing. This option provided a wider clear span than the one provided by an earlier design and reduces the potential for debris built up particularly in the scenario with logging occurring simultaneously in the upper catchment.

Fumes from machinery used for the work may contribute to the emission of greenhouse gases; however, this was considered very minimal on a local scale and negligible on a global scale.

5.2.4 Biosecurity and Prevention/Control of Invasive and Alien Species

There is one known invasive fauna species-*Achatina fulica* – Giant African Snail occurring widely in East Guadalcanal, as listed in the Global Invasive Species Database (ISSG 2016); this species was not observed at the site. However, there have been many observations of the species on other road sub-projects further to the west as far as the outskirts of Honiara.

In conjunction with SIG Agriculture Biosecurity Unit, the Contractor will be required:

- To quarantine all imported new equipment and spry with the recommended chemical before departure from the Port quarantine area
- For existing equipment operation to bund a quarantine area at the Contractor's existing equipment yard and spray with recommended chemical before removal to the proposed equipment yard near the site.

5.2.5 Identification of Materials Sources, Application for BMP and Development of Gravel Extraction Plan

The contractor is required to submit an application for a Building Materials Permit (issued by MMERE) and prepare a Gravel Extraction Plan for sources of gravel to be used for the approaches, pylon and abutments. The MID Safeguards Procedures Manual includes **Guidelines for Sourcing Road Construction Materials** which were developed by MID in 2012. These guidelines are to be utilized by the Contractor in development of the CESMP.

5.2.6 Vegetation Clearance in Gazetted Road Corridor

During the preconstruction stage, sparse secondary vegetation at the bridge approach will be cleared to make way for machinery to maneuver and build the approach road. This will lead to loss of food crops and fruit trees. The APs have been consulted and a due diligence assessment was already carried out. Following an inventory of the non land assets present in

the corridor by CPIU safeguards all the APs will be compensated for the potential damage to their non-land assets (food crops and fruit trees)before work commencement.

5.2.7 Land Access Arrangements for Customary Land

Land access arrangements have already been discussed with the local community during the extensive consultation carried out by CPIU safeguards and the DSC during the planning and design phase of the project. In principle MOU's have been negotiated with landowners for temporary access to customary land for a camp site. Further negotiations for access to lay down areas near the bridge and for access to gravel sources form part of the Contractor negotiated agreements during the development of the CESMP after the contract has been awarded. No actual works can take place until all the MOU/MOA's are in place and jointly signed by the landowners, the CAC, MID & the Provincial Government and a BMP has been issued by MMERE. The result of the consultation program was a very high level of support for the project and at this stage are subject to mutual Contractor financial and/or in kind agreements with the landowners.

5.3. Potential Construction impacts on the Physical Environment

5.3.1. Air Quality

The quality of air within the project area is typical of a rural setting in the Solomon Island. Fumes often emanate from fires as a result of subsistence gardening activities. 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. Total Suspended Solids (TDS), SO_2 and NO_2 gases are expected because of the diesel and petrol fueled equipment. The contractor will be required to maintain all construction equipment and avoid using machines emitting very dark smoke. There are 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 from time to time to ensure they are maintained in working order and the checks will be recorded by the contractor as part of environmental monitoring;
- Prohibition of the use of equipment and machinery that generate visible smoke at the project sites;
- Burning of vegetative matter or waste will be strictly prohibited;
- Provision of protective safety equipment including masks to workers;

- 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; and
- Periodic qualitative air quality monitoring (by observation rather than testing).

5.3.2 Soils Sedimentation & Erosion

The risk of sedimentation and erosion caused by the construction is considered moderate but if required, soil erosion and sedimentation impacts will be mitigated by:

- The Contractor being solely responsible for repairing the damage and/or paying damages if the Contractor causes damage to agricultural land upstream, productive land or gardens
- The side slopes of embankments, including the river bank areas surrounding bridges and approaches will be protected and designs used that protect soils as included in the project specifications in order to reduce erosion. Geotextile sand-filled bags will be used around bridge abutments to mitigate scouring and erosion
- Embankments and in-stream/river activities will be monitored during construction for potential erosion and, if necessary, prevention or permanent measures would be placed as soon as possible
- Slope areas needed for access will be revegetated with fast growing species, or other plants in consultation with the land owners and village chiefs, as quickly as possible after work in the slope areas has been completed
- Random and uncontrolled tipping of spoil, or any material, will not be permitted, with all spoil to be removed by the Contractors

Figure 23: Moderately Erodible Siltstones on Banks of Mongga River near site

5.3.3. Water Quality and Pollution

The work will involve sediment extraction using excavators and trucks and moving construction materials within a laydown area adjacent to the waterway. Silt runoff from the material laydown area is anticipated. There is also potential for spillages of petrol, oil and lubricants (POL) and other chemical spillages and such runoff has the potential of degrading water quality.

Any small excavation of the sediments near the water column has the risk of generating turbidity in the river. The discharge of water under the bridge is relatively low during the dry season so pollution risk is considered low. Even though the risk to water quality is considered moderate even without mitigations in place.

Mitigating measures include:

- Diversion of the main flow for progressive sequential sediment excavation will reduce the risk of substantially increasing turbidity and be subject to an approved site specific sediment extraction plan as part of the CESMP
- Separate, bunded area for storage of POL. The contractor will be required to store chemicals in a secure yard and/or /compound away from the waterway, with a concrete floor, bund wall and weatherproof roof. Only daily storage in the laydown area will be

allowed during use of products. Used oils and chemicals will be transported to approved, designated waste disposal site for hazardous material

- Sediment control measures including, sedimentation ponds, bunds and silt fences around the work areas whenever required to contain plumes of disturbed water from getting into water bodies. The site will be secured each day with sediment controls in place
- A waste management sub-plan as part of the CESMP
- Material stockpiles (laydown areas) must be located outside the 1:1 year ARI flood zone (i.e. the annual flood zone)

5.4 Potential construction impacts on biological environment

5.4.1. Terrestrial Flora and fauna

The risk to terrestrial flora and fauna is considered low as the site near the construction area is heavily disturbed with very scattered secondary vegetation. Measures to be included in the project to ensure protection of flora are:

- Strict adherence to the project design, and avoid unnecessary clearing;
- Construction workers will be informed about general environmental protection; and
- Poaching, hunting, trapping or killing of terrestrial and aquatic fauna by workers will be forbidden.

5.4.2 Impact on Freshwater Habitat

Changes in the hydrology may affect the aquatic ecology of the downstream environment over time. As shown in Figure 24, the reach of the river at the proposed bridge site has a normal flow width of 20m which allows considerable flexibility for placement of the main pier and flow diversion. The total width bank at the proposed site is 70m. Given the possibility of three species of concern that may inhabit the river flow regime, a precautionary approach to the construction of the bridge will be adopted. This approach involves (1) maintaining adequate flow at all times to ensure migration pathways are not disrupted and ii) reducing the potential for increased suspended sediment and turbidity from construction that could otherwise be harmful to aquatic fauna.

The proportion of exposed bed at the bridge site will facilitate these two requirements by allowing stream diversion around the main pier construction site and also minimizing sediment transfer to the water column by bunding the coffer dam. As a part of the detailed design review, some changes have been proposed that will help minimize the formation of eddy and maintain flow. The bridge substructure has been proposed to be skewed to align with the river flow. The

3-span configuration bridge has been changed to be a 2-span configuration ensuring only one pier in the waterway. The revised detailed design will be submitted for CPIU's approval.

Figure 24: Detail of Bridge site showing normal average channel flow width of 20m

Figure 25: Looking downstream at average flow with wide gravel beds

The Mongga river has been highly degraded due to logging activities operating further upstream that generate silts/sediments into the river over time. The bridge reconstruction will only take a period of eighteen months and construction of the main pier (3-4months) represent the main period of impact on the channel bed. With the construction mitigations in place, the impact on freshwater ecology and the main channel is considered low risk and will be minor and temporary only during the relevant months of the construction period.

Mitigation measures will include:

- Construction methodology mitigation involving dry season sequential construction of coffer dams around main pier and abutments to ensure flow regime can be directed and maintained for the period where access to the channel bed is required. For periods of higher flow or at bankfull stage construction of main pier to be suspended until flow decreases to normal average dry season condition.

- The design of the bridge avoids changes in the hydrology of the area and avoids possible negative impacts of the bridge operation to the aquatic environment.
- Proper temporary drainage system will be created to trap surface runoffs from construction work on the riverbanks

5.4.3. Impacts on Terrestrial Habitat Protected Areas and Other Ecosystems

The project activities will not have any impact on protected areas and sensitive ecosystem. Given that normal flow conditions within the channel at the bridge site is 20m across & averages 0.45 m , the impact on rare, threatened and endangered species is considered low without mitigations. Nonetheless assuming these species are present in the Mongga river, sequential construction of the coffer dams to isolate the main bridge pier bed location will allow the flow of the river to continue so the species of concern will have passage undisturbed. The area to be used for abutment construction is sparsely covered with secondary regrowth vegetation with heavy footprints of anthropogenic activities involving clearing of forest and vegetation for settlements and gardening. The bridge construction will take place on existing road alignment. There are no protected areas or any sensitive ecosystem at the site or nearby vicinity of the subproject site. Hence, no impact is envisaged for protected areas and sensitive ecosystem. There are no areas of natural or critical habitat impacted by the project.

5.5. Potential construction impacts on socio-economic environment

5.5.1. Impacts on public access and local mobility

The project will cause disruption to public access and mobility of people during the works, this is unavoidable but will be managed through the development of the traffic management plan (TMP). The proposed site has been abandoned for use since the destruction of the first bridge in 1980 and all through past years there was no access for the site. The current access was a detour wet crossing about 200m upstream. Therefore, during the reconstruction of the bridge, people will still use the current wet-crossing until such time the bridge is completed and operational.

5.5.2. Impacts on health and safety of workers

The project'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 at work sites, (ii) traffic safety issues in relation to the company's vehicles and the locals, and (iii) chemical spills. The risk of spread of communicable disease is considered to be minor but nevertheless needs to be addressed.

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

The contractor in this case will need to observe general health and safety requirements and, as a minimum, must be compliant with the Labour Act 1978, Safety at Work Act 1996 and the World Bank Group's EHSG. Mitigation measures for reducing and avoiding impacts on health and safety include:

- The contractor, as part of their CESMP, will develop a health and safety plan (HSP) that will address the specific risks associated with the works and activities at the site, adjacent communities and for people using this section of the road. The HSP will outline the contractor's corporate policy and requirements for health and safety, specify the roles of the EHSO in respect of health and safety, outline the work procedures (working at height, working in excavations, working on roads etc) and need for specific safety and personal protective equipment (PPE) for certain activities, program for training and tool-box talks, and H&S checklists to be completed ruing monitoring. The HSP will link with the emergency response plan (ERP).

- The contractor will engage an approved service provider to deliver a communicable disease awareness and prevention program covering malaria, measles, sexually transmitted infections (STI) including HIV.AIDS, and COVID-1915 for workers and adjacent communities. Reporting on delivery, and status, of the program will be included in the contractor's monthly reports;

[15] See e.g.: World Health Organization. 2020. Considerations for public health and social measures in the workplace in the context of COVID-19. Geneva. Available here: https://www.who.int/publications-detail/considerations-for-public-health-and-social-measures-in-the-workplace-in-the-context-of-covid-19; HM Government. 2020. Working safely during COVID-19 in construction and other outdoor work. Guidance for employers, employees and the self-employed. Available here: https://assets.publishing.service.gov.uk/media/5eb961bfe90e070834b6675f/working-safely-during-covid-19-construction-outdoors-110520.pdf. The Canadian Construction Association – COVID 19 Standard Protocols. Available here: https://www.cca-acc.com/wp-content/uploads/2020/04/CCA-COVID-19-Standardized-Protocols-for-All-Canadian-Construction-Sites-04-16-20.pdf

- Use of drugs and alcohol by workers at the site camp or office compound etc will be prohibited. Workers will be sanctioned or their employment terminated if they are caught using drugs or alcohol during work hours or are impaired following use of drugs or alcohol;

- The contractor to provide the workers, health and safety induction, and on the specific hazards of their work;

- Smoking near fuel storage areas that has the potential to cause fire and loss to construction resources are expected to be low and if occur will be minor. Mitigations measures include:

    - Prohibit smoking and prohibit unnecessary burning of vegetation close to fuel storage areas;

    - Erect signage of no-go smoking zones around potential fire hazard materials; and

    - Provide extinguishers and fire hydrants including training to workers on their use

- Access to and from the site and works compound will be strictly controlled. No children will be permitted entry. The site, office compound and camp etc will be securely fenced with one controlled point of egress and access. Any visitors to the site must be registered and accompanied by a designated person representing the contractor.

- Provide workers with PPE such as safety lanyards, safety boots, safety glasses, reflector vests, helmets, gloves, and protective clothing and ensure workers adhere to OH&S policy at all times;

- Ensure good selection of safety harnesses for work at height;
- Only workers with heavy vehicle license may operate trucks and other heavy machinery and equipment. The contractor will review all licenses and requirements for specific plant to be operated at the site and ensure all workers have requisite licenses and training required to operate such plant;

- Garbage receptacles will be setup at project site and the campsite, which will be cleared weekly The garbage will be dumped only at approved locations;

- The contractor will issue general work permits at every stage of the work outlining the scope, precautionary and protection measures.

Should lifting be required for the work, the lifting requirements to reduce hazards include:

- Lifting appliances and gears shall be maintained in good working order;
- Lifting appliances and gears shall be tested and examined in accordance with the relevant statutory requirements;
- Operators shall be competent to operate a lifting machinery with valid certificate meeting the legal requirement of the government;
- Competent person shall be appointed to carry out weekly inspection to the lifting appliances and report any faults discovered during the inspection onto the inspection form;
- Lifting operation should be supervised by a competent person or a trained signaler;
- Major and heavy lifting operation shall be planned and designed by a competent engineer, method statement including erecting and dismantling of lifting appliances should be prepared, where applicable;
- Overload lifting is prohibited; and
- During lifting operations, effective precautions will be taken to prevent any person under a suspended load.

5.5.3. Public Health and Safety

The contractor's HSP as a component of the CESMP will also ensure adequate health and safety protection to the general public in the vicinity of the work site. Mitigation measures include the following:

- Development and implementation of the HSP and TMP as part of the CEMP**;**
- Agreement and implementation of a site of protocols/code of conduct with village chiefs and elders governing behaviour of workers, especially toward women and children. Workers will be inducted to the site including training on requirements of the HSP and the code of conduct;
- Prohibition of employment of child or trafficked labor;
- Prohibitions on public access, especially by children, to work site, project office, camp and works yards etc

- Vehicles transporting materials and personal onsite fully license to operate in such condition and environment;
- Advance notice of commencement of works; and
- Installing safety barriers and marking of the work areas.

5.5.5. Emergency Response Plan

The contractor will be responsible for preparation of an emergency response plan as part of the CEMP which will cover disaster management, 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).

5.5.6. Social concerns

Grievances regarding the project will be dealt with through the redress grievance mechanism described in Chapter 6. Impact on nearby communities will be from the noise and vibration which are considered to be very minimal. Other risks including spread of diseases between the construction team and the residential population are deemed minor. the contractor will need to provide first aid kits, safety equipment for workers and provision for taking the victim to clinic or hospital. the contractor will be responsible for providing adequate knowledge to construction workers and public in relation to safety issues. Alcohol consumption and inappropriate behavior by the workers or public will be dealt with by the construction company including community leaders and of course the police if it's beyond the control of the contractor's management. Any issue related to the project will be addressed through the grievance redress mechanism (GRM) process as outlined in section 6.2.

Mitigation measures include:

- The contractor to ensure worker's actions are controlled and code of conduct observed;
- The contractor management to discipline workers who do not respect the code of conduct; and
- Educate workers to respect village protocol and public properties and other important services.

5.5.7. Employment

The contractor will employ unskilled workers from the local area but may also require in-migrant Solomon Islands workers. These workers will need temporary shelters and the

provision of water, food and basic sanitation during the construction phase. Approximately twenty workers are expected. However, this will be confirmed at the detailed design stage and more detail on a proposed camp site will be provided in the CEMP. The contractor will ensure equal opportunity for all gender in terms of workforce whether it is skilled or unskilled labor. Communities nearby will be given priority for all unskilled work. Payments to women will be equal to the men's salary or wages. the contractor management team will ensure where necessary, gender initiative be considered during the period for the bridge construction. The contractor will ensure that no child or trafficked labor is engaged on aspect of the project.

5.5.8. Noise and Vibration

Construction activities are expected to generate noise and, to an extent, vibration. The most sensitive receptors is the village near the proposed project site. It would be the responsibility of the contractor to arrange meetings with nearby communities on realistic work schedules (hours of equipment operation etc.). The general working hours at site will be 7:00AM to 6:00pm with a 2 hours break between 11:30 and 1:30pm. Pile driving has the greatest potential to develop noise and vibration from the impact of the driving action. The vibration will be temporary and is expected to last up to 2 months during the pile installation. This is not expected to cause adverse impacts to residents or the workers themselves. The contractor will be required to alert communities when noise and vibration activities will occur. The contractor will be required to monitor community reaction to these activities and manage work to minimize disruptions to communities.

Noise levels

Construction noise will cause moderate disturbance to the neighbouring community of Mongga village due to the need for the temporary use of a pile driver. The village is located approximately between 70-400m away to the west and north. Within 200m of the bridge there are 12 houses on the western side of the road and one on the eastern side of the river. The nearest receptor (a residential hut) is located at a distance of 130m.

Using an attenuation rate of 6 dBA per doubling of distance, the projected noise is found to be outside the standard in the main cluster of the village near the bridge site using the accepted daytime level of 55 dBA for residential land use in the village. The pile driver is the highest noise source and will need to operate for intermittently for up to eight weeks.

Table 7: Noise attenuation at Mongga Bridge[16]

Distance from source (m)	15.24	30	61	122	244	488	975
Number of receptors	0	0	0	13	20	30	43
Vibratory pile driver (dBA)	101	95	89	83	77	71	65
Concrete mixer truck (dBA)	79	73	67	61	55	49	43
Concrete pump truck (dBA)	81	75	69	63	57	51	45
Dump truck (dBA)	76	70	64	58	52	46	40
Excavator (dBA)	81	75	69	63	57	51	45

Source: U.S. Federal Highway Administration and IFC

The excessive noise and vibration of the machinery will require mitigations, including:

- Notification to all receptors. The Contractor will prepare a schedule of operations that will be approved by village chiefs and the Engineer involving CAC in all such discussion. 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.
- Requirements in the CESMP and contract documents that all vehicle exhaust systems and noise generating equipment be maintained in good working order and that regular maintenance will be undertaken
- Noise incurred by construction workers from construction machine is a workplace health and safety hazard. Workers will be provided with noise abatement personal protective equipment as may be required
- An integral part the EMP structure is the GRM and will be responded to by the contractor in the CESMP. The need and requirements for the GRM is established in the CCP and is detailed in the social safeguards DDR

5.5.9 Accidental Discovery of Archaeological Resources

Although highly unlikely, any site clearance, digging and excavation activities undertaken during pre- construction and construction may\ unearth archaeological sites or resources. In the event this occurs, work shall cease immediately and the authorities (National Museum

[16] Daytime (7am-10pm) maximum noise levels: Residential = 55 dBA; Commercial = 70 dBA

Solomon Islands) will be informed. Activities shall not recommence until the authorities have agreed that the site/resources have been dealt with appropriately and that work may continue.

5.5.10 Other social impacts

The Contractor will have a dedicated member (a CLO) of their staff to be the liaison between the village chief and elders and the Contractor.

Should construction workers be permitted to go into villages for any reason, the Contractor will be responsible for their behaviour. In the event that there are complaints about the behaviour or conduct of construction workers, complaints will be dealt with using the GRM procedure.

5.6. Potential Operational impacts on physical environment

5.6.1. Natural Disaster Impacts

There are unforeseen events in the future due to extreme weather events. The contractor will develop an emergency response plan in response to natural disasters. The contractor staff including communities nearby or within the project influenced area will be trained on all SOPs associated with disaster management and implementation of the plan.

5.6.2. Impacts on Air Quality

The impacts on air quality during operation are negligible. The operation of the bridge will see increase number of automobiles or vehicles travelling to and from the area and there is potential for the increase of emissions of carbon monoxide and carbon dioxide. However, to ensure that any air quality impacts generated during operation are minimized, the following are relevant mitigation measures:

- Burning of vegetative matter or waste will be strictly prohibited;
- Vehicles emitting black smokes must go through maintenance;
- Periodic qualitative air quality monitoring will be undertaken (by observation rather than testing).

5.6.3. Surface Runoff

Runoff from the operation of the bridge have the potential to impact water quality. Measures at the operation phase that are considered relevant include:

- Proper continuous maintenance of drainage along the approach road alignment to receive runoffs.

- Other controls such as silt fences or other sediment reducing devices (silt barriers), or settling ponds to prevent both siltation and silt migration will be installed whenever required or seen fit;
- Minimizing interference with natural surface water flow;

The mitigation measures identified above will properly contain runoffs should they occur.

5.7. Potential operational impacts on biological environment

5.7.1. Impact on Aquatic Environment

Due to the relatively remote location, changes to the aquatic environment are considered a low risk.

5.7.2. Impact on Poaching of Flora and Fauna

Improved access to previously inaccessible, or difficult to reach, areas increases the risk of poaching of flora and fauna. Restricted access means it is unlikely there will be any impacts on flora and fauna. When areas are unrestricted due to improved accessibility, it is likely that pouching or flora and fauna will occur more likely by visitors to the area who will be using the improved infrastructure. The good news is there are no rare or endangered species that could be affected during the operation of the bridge. Also, should anyone caught pouching flora and fauna, he/she will be prosecuted by violating the Wildlife Protection and Management Act 1998 and its associate Regulations. This will be an effective mitigation measure that will control the possible pouching of flora and fauna in the future.

5.8. Potential operation impacts on socio-economic environment

5.8.1. Community Health Concerns

Communities will have concern regarding safety and accidents. For example, traffic accidents from high speed vehicles due to good road and good bridge. Mitigation measures will include:

- Communicate potential risks associated with the operation to nearby communities; and
- Train local communities about safety approach during accidents and what to do to avoid accidents.

5.8.2. Noise

There are no noise standards in Solomon Islands. The operation and decommissioning noise are generally intermittent, attenuates quickly with distance. During operation, noise of passing

trucks during night times can cause disturbances to nearby community. WB standard noise levels can be used as a guide[17].

Based on current traffic volumes of less than 100 vehicles per day and the increase in accessibility brought about by the bridge, the risk of a significant increase in traffic noise is considered low. Main traffic flow is passenger truck traffic early in the morning from 6am to 8am for 2 hours followed by a similar return trip flow from 6pm to 8pm at night.

Table 8: World Bank noise level

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

Also during operation, minor noise are expected from maintenance. See Table 8 for World Bank guideline on noise. Mitigation measures:

- All machineries' exhaust systems and noise generating equipment be maintained in good working order and that annual equipment maintenance ne to be undertaken;
- During maintenance, workers will be provided with noise abatement equipment.
- During maintenance all machineries must be in good working condition to prevent emitting unacceptable noise levels.

5.9. Decommissioning Impacts

5.9.1. Access and Mobility

During decommissioning, access and mobility at the site will be restricted. The contractor will agree a work schedule with selected communities before decommissioning activities commence.

5.9.2. 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

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

before the bridge construction, 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.

5.10. Cumulative Impacts

Settlement patterns and subsistence farming have caused some unnoticeable impacts which in the long-term would become obvious. Burnings especially from subsistence gardening has resulted in producing dust and releasing carbon dioxide to the local atmosphere. Clearance for settlements and gardening alike have led to erosion, siltation and enhance surface run-offs that went unnoticed. Superimposed by the vegetation clearance, hence loss of habitats, this has become cumulative impact which will overtime be felt by the people in the area. These are exact real-life situations that their impacts went unnoticed or are negligible by human perception but in fact significant.

The contractor will ensure construction activities associated with the project does not eventuate into negative impacts that will enhance existing environment and social issues at the project site

The cumulative impacts relevant to the project are set out in Table 9 and include:

- Subsistence farming activities;
- New settlements; and
- Logging.

Table 9: Cumulative Impacts

Impacts of the proposed bridge construction project	Impacts of Subsistence farming	New settlements	Logging in upstream catchments	Mitigation measures
Vegetation clearing	Subsistence farming activities/shifting cultivation led to clearance of large areas of vegetation overtime leads	In recent years, people migration to inland areas has resulted in felling of trees and vegetation to build homes and settlements and gardening or farming.	Current and previous logging operations in the area especially in the hinterlands led to clearance of vegetation before felling of logable lowland tree species. Massive vegetation	Minimize vegetation clearing to project footprint. Non land assets to be compensated at replacement cost.

Impacts of the proposed bridge construction project	Impacts of Subsistence farming	New settlements	Logging in upstream catchments	Mitigation measures
	secondary regrowth		destruction and road deterioration	
Water Quality Impacts	Siltation/sedimentation/runoffs from soil exposure can impact water quality.	The increase settlement patterns in land will generate silt and enhance runoffs that will contaminate water bodies. Inadequate sanitation facilities will also contaminate waterbodies	Top soil in logged areas are exposed to sunshine and rainfall due to no canopy protection. Thus, very high silt/sediment load washed through surface runoff to be deposited in waterways. Unused or discarded logs destroy culverts and some bridges	Siltation/sedimentation from soil exposure impact water quality. Construction of silt barriers and sediment ponds. High level bridges, Culverts with open sections or causeways designs
Disturbance to flora and fauna	Vegetation clearance will result in degradation to precious habitats.	Vegetation clearance will result in degradation to precious habitats.	Clear felling method by logging companies result to loss of niches and habitats. Also lead to loss of key cornerstone species.	The project will minimize any impacts that are likely to affect flora and fauna in the area through educating workers.
Employment for unskilled labours.	Self-employment.	Majority of the homes are semi-permanent. These buildings have had to acquire minimum labor.	Most unskilled labour are sourced from the area particularly from relevant tribes.	Unskilled work may be sourced from the nearby communities.
Accessibility.	Increase subsistence activities demands more access.	Increase settlements demands road access and proper bridge.	Logging roads in the area have made it easier for people to travel to and from coastal villages and inland villages.	Access will be affected to certain extend. But in the event that access will be affected, public and relevant stakeholder will be informed including public notices and road signage.

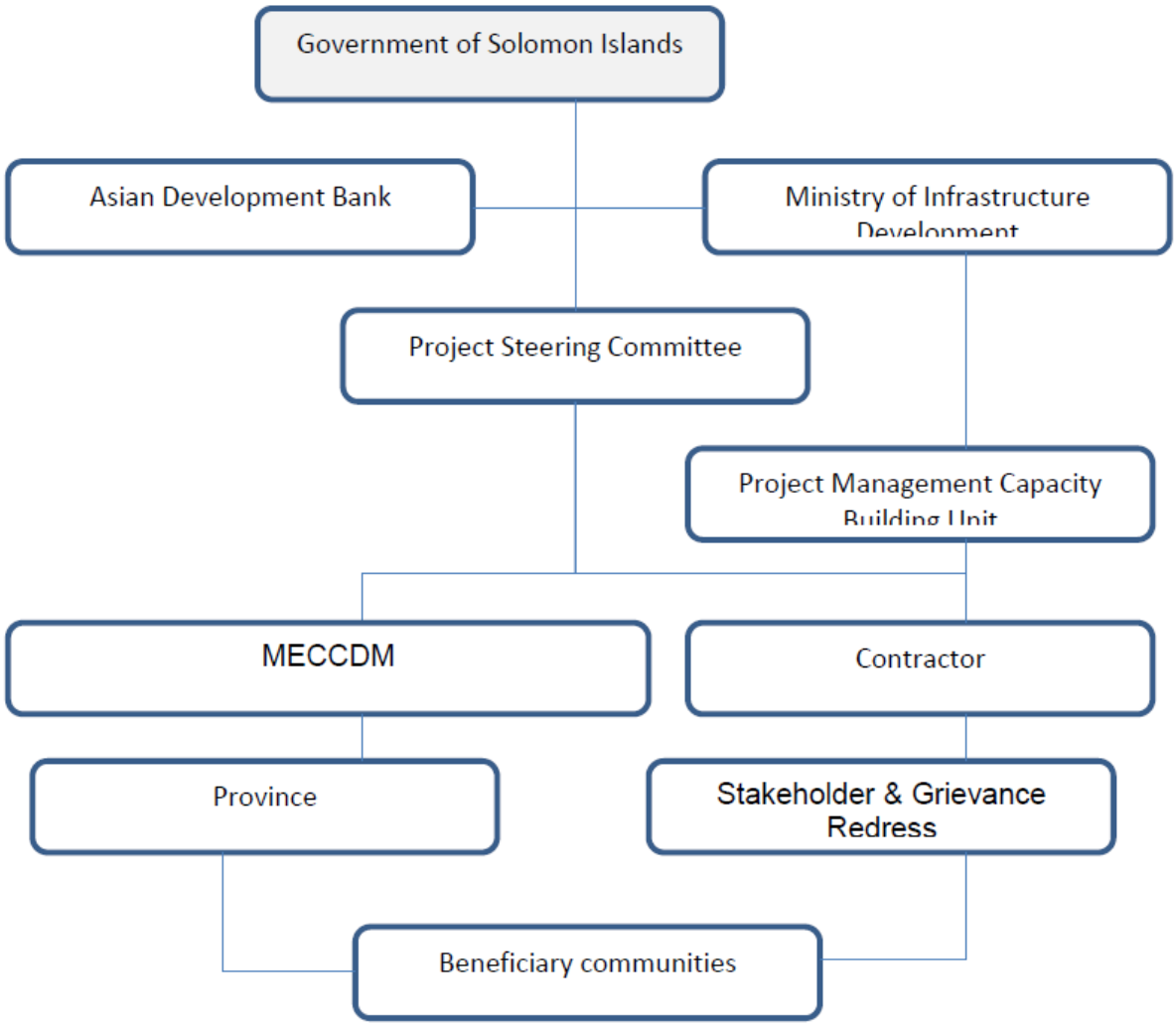
6.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

6.1. Institutional Arrangement

This section identifies mitigation and management measures to avoid, reduce, mitigate or compensate for adverse environmental impacts that have already been identified in the previous sections. A summary of the ESMP is in Table 7.

The overall organizational structure for environmental management for the proposed development is shown in Figure 26.

Figure 26: Organizational Structure for Environmental Management



6.1.1. CPIU

The CPIU will undertake environmental management and oversee inspections and monitoring tasks during the development and delivery of the project. The CPIU specialists will assist in all

aspects of implementation of the environmental assessment and permits as required. The CPIU, supported by the construction supervision consultant (CSC,) will:

- Update the IEE as PER as required to meet the requirements of the Environment Act 1988 and prepare the applications for development consent;
- Ensure the updated EMP and any conditions of the development consent are integrated into the subproject's bid and contract documents;
- Ensure that the contractor has obtained all necessary permits prior to commencement of construction;
- Participate and facilitate, as per the project's CCP, consultations to advise affected communities of the scope and scheduling of the work;
- Depending on the environmental management experience of the contractor, prior to the preparation and submission of the CESMP, provide induction whereby the details of the CESMP are confirmed, and the contractor informs the community of the schedule of works;
- Review the CESMP prepared by the contractor and provide recommendations for revision or strengthening as required. Upon receipt of the CESMP that can be approved, advise the CSC Engineer that approval for commencement of works can be issued;
- Undertake regular site visits to independently inspect and audit the contractor's compliance with the approved CESMP and the CSC's monitoring;
- Should non-compliant work or activities be identified, this will be raised to the CSC Engineer who will issue a defect notice or corrective action request. All notices and requests will be recorded and reported; and
- Prepare and submit i) inputs to quarterly progress reports and ii) semi-annual safeguards monitoring reports.

6.1.2 Construction Supervision Consultant

The CSC will include environmental specialists to work closely with safeguards officers of the CPIU. The CSC will support the CPIU to deliver the subprojects and assist in undertaking all tasks identified above.

The detailed tasks (related to safeguards) of CSC are as follows:

- Regularly undertake project site inspections, oversee contractor's works and guide the contractors on the activities and works, and provide suggestions to the CPIU for improvement if required.
- Undertake quality assurance on materials used in construction for compliance with specifications and standards;
- In conjunction with the designated contractor, supervise and approve the Contractor's Environmental Management Plans (CESMP's) which are to be based on the documentation prepared for the feasibility studies which may include the Public Environment Reports (PER's) (equivalent to Category B IEE in SPS), simple LARP and/or DDR's.
- Regularly monitor CESMP's on the subprojects and prepare the standard construction management system to be followed by contractors at construction sites environmental management, quality management, social interaction including gender awareness and construction of agreed gender interventions, grievance resolution and community liaison, health and safety including STI/HIV/AIDS awareness etc.; and implement the same;

6.1.3 The Contractor

The preparation, implementation and monitoring of the CESMP, once approved, comes under the contractor. This covers all aspects of the required activities including coordination with other agencies that have national responsibilities over some of the tasks. The contractor is responsible for general project execution and with day-to-day project management activities, as well as monitoring. The contractor will submit progress reports to MID and to ECD if required.

The contractor will be responsible for compliance monitoring during construction and will be responsible for updating the ESMP at construction stage whenever additional engineering information is necessary. the contractor will develop a site specific Construction Environment Management Plan (CESMP), Waste management plan, Traffic management, Health and safety management plan and Emergency Response Plan as part of their updated ESMP. The contractor will also be responsible for implementing all environmental, health and safety actions included in the ESMP. They will recruit an environmental safety officer (ESO) who will be responsible for all aspects of CESMP implementation including monthly monitoring and reporting as part of the normal sub- project reporting cycle.

6.1.4. Contractor's Environmental Health & Safety Officer

The ESO is an employee of the company (the contractor) and is supervising all environmental and social aspects of the project with the following responsibilities:

- Coordinating with MID Safeguards/ECD for updating the ESMP;
- Participating in monitoring with MID on behalf of ECD,MEMCD and the contractor when it is required to ensure that environmental management activities are reported as required; and
- Facilitating consultation with the affected stakeholders and ensuring smooth implementation of the project. It is a requirement that the ESMP must be implemented. Hence, the CESMP is tailored to the mitigations from the ESMP with site specific impacts and mitigation measures.

6.1.5. Environment & Conservation Division (ECD)

As the national agency responsible for environment and conservation, the ECD will need to be involved in the various aspects of the environmental management activities. Under the requirements of the Environment Act 1998, the ECD will need to review the PER and monitor the progress of construction activities when consent is given. The ECD when reviewing this PER will be fully informed of the status and description of the project and consequently request for granting the Development Consent.

The ECD will need to be consulted during the construction phase of the project to ensure that all monitoring requirements are adhered to. It is the role of the ECD to assist in auditing the implementation and compliance to the ESMP. MID CPIU safeguards normally carries out this role on behalf of ECD, MEMCD due to budgetary constraints.

6.1.6 Guadalcanal Provincial Government

The Provincial Government is the administrative arm of the province and manages development occurring at the Provincial land. The contractor is responsible for liaising with the Provincial planning division to ensure necessary approvals are granted. A building permit or consent is given when a plan is being approved by the board or assembly.

6.1.7 Royal Solomon Islands Police Force

Solomon Islands and especially Guadalcanal is a scene of bitter fighting during World War II so occurrence of UXO cannot be totally ruled out. It is possible bombs/ammunition were left behind after the war. Since these ammunitions are risks to development, it is important a UXO survey and clearance is carried out before construction commences. Should UXO be

discovered during the construction, the contractor is to immediately cordon off the area, arrange the evacuation of nearby residences and inform the RSIPF of the find.

6.1.8. Communities

The landowners will be consulted and involved in the environmental and social management activities of the proposed project. Village leaders will assist in arranging meetings, facilitating consultation, and providing information about affected communities and environmental and social impacts. An account of the process will be an integral part of the internal monitoring report prepared by the contractor.

6.2. Grievance Redress Mechanism

During the course of the project, it is possible that people may have concerns with the project's environmental performance including the implementation of the ESMP. Issues may occur during construction and again during operation. Any concerns will need to be addressed quickly and transparently, and without retribution to the affected person (AP)[18].

Based on the GRM successfully established and used on other projects, the following process is to be used and commences with an attempt to sort out the problem directly at project level. If this cannot be resolved, then the grievance will be addressed by being referred to the ECD within the MECDM.

6.2.1 During construction

Most complaints arising during construction are expected to be minor complaints concerning disruption to existing bush track, dust, health &safety implications and noise that should be able to be resolved easily. All complaints arriving at the Site Office are to be entered in a Register that is kept at the site by: date, name, contact address and reason for the complaint. A duplicate copy of the entry is given to the AP for their record at the time of registering the complaint. The Register will show who has been directed to deal with the complaint and the date when this was made together with the date when the AP was informed of the decision and how the decision was conveyed to the AP. The Register is then signed off by the person who is responsible for the decision and dated. The Register is to be kept at the front desk of the contractor's Site Office and is a public document. The duplicate copy given to the AP will also show the procedure that will be followed in assessing the complaint, together with a

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

statement affirming the rights of the AP to make a complaint. For anybody making a complaint, no costs will be charged to the AP.

Affected People are in the first place to discuss their complaint directly with the Project Engineer (PE). For straightforward complaints, the PE can make an on-the-spot determination to resolve the issue.

For more complicated complaints, the PE will forward the complaint to the contractor's Management. The Management has a maximum of two days to resolve the complaint and convey a decision to the AP. The AP may if so desired, discuss the complaint directly with the Management. If the complaint of the AP is dismissed, the AP will be informed of their rights in taking it to the next step. A copy of the decision is to be sent to the ECD. Should the AP is not be satisfied, the AP may take the complaint to the Director ECD in the MECDM who will appoint the Officers in ECD to review the complaint. The Director will have 15 days to make a determination.

6.2.2. During Operation

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.

6.3 Consultation and Disclosure

The PER documenting the mitigation measures and consultation process will be submitted to MECDM and will be available for public review. Generally, the affected people and the public expressed support for the proposed project as they clearly saw the overwhelming benefits that proposed bridge will come with. Further consultation and disclosure will be carried out during the implementation through:

- Notices through media and other means (information brochure etc) before construction commences and key elements/stages such as closures, deviations/detours etc;
- Meetings with CAC, communities and stakeholders;
- Uploading documents including monitoring reports to SIG and ADB website; and
- Information regarding the approved project and the proposed environmental management measures will be posted at suitable locations at the project site.

The PER Report will be available to the public from the ECD-MECDM and is also available to the public from the contractor's office after being granted with the Development Consent.

6.4 Environment Monitoring and Reporting

Monitoring is a component of impact assessment purposely to combat 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 project activities (construction and operational phase). The environmental 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 will require preparing a detail environment monitoring plan as part of their CESMP based on Table 11. Through inspections and audits the CPIU and ECD are responsible for monitoring compliance with the approved CESMP, review the company's monthly monitoring report and suggest ways to improve or strengthen mitigation approaches. The CPIU will also prepare semi-annual safeguard monitoring reports (SMR) to SIG and ADB. ADB will disclose the SMR on its website.

The main roles and responsibilities for environmental management and monitoring are shown in the table below.

Table 10: Responsibilities for Environmental Management & Monitoring

Project Stage	Responsible Organization	Responsibilities
Feasibility studies and appointment	CPIU	Preliminary design Prepare PER including overall ESMP (Table 6-1) Submit application for DC
Detailed Design	MID-CPIU	Prepare detailed design and specification Submit design to province for approval Update PER/ESMP based on specifics of detailed design and include in bid document (along with DC and conditions) Submit updated ESMP to ECD for review and approval
Project review and approval	ECD	Review and approval of PER including outline ESMP Issue DC (with or without conditions)
	CPIU-MID, DSC	Review all feasibility study documentation, prepare Board presentation and submit to Steering Committee (as required) Establish monitoring requirements
Construction	Contractor	Develop CESMP and submit to CPIU for review and approval Implementation of CESMP Monitor construction phase and review monitoring data Submission of monthly reports Meetings with CAC Implementation of GRM Provision of awareness/training to workers

Project Stage	Responsible Organization	Responsibilities
	MID-CPIU	Conduct routine inspections and audits of contractor compliance Prepare reports include SMR
	MECDM	Participate in joint missions and inspections Ensure compliance with SIG requirements Review complicated issues arising from the project
Operation	MID, maintenance contractor	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)

Table 11: Environmental and Social Management Plan

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
	PRE-CONSTRUCTION PHASE							
1	Review of preliminary & final designs /site plans / maps and prepare PER/ESMP & gain development consent from ECD MEMCD.		The concept drawings and route are designed to avoid resettlement impacts and disturbance to vegetation and significant wetlands. ESMP is site specific and helps to avoid or minimizes the environment and social impacts of project.	DSC & CPIU	To be funded by NTF	ESMP	Approved ESMP	CPIU Safeguards

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
	Contractor prepares CESMP after the award of the contract	The design prepared by the Design consultant to MID CPIU was the basis for the PER/ ESMP and assesses all the potential impacts and proposes mitigation measures. The CESMP is prepared using the ESMP as guidance and must be approved by CPIU before commencement of the construction.	The contractor, as part of their CESMP, will develop a health and safety plan (HSP) that will address the specific risks associated with the works and activities at the site, adjacent communities and for people using this section of the road. The HSP will outline the contractor's corporate policy and requirements for health and safety, specify the roles of the Environmental, Health & Safety Officer (EHSO) in respect of health and safety, outline the work procedures (working at height, working in excavations, working on roads etc) and need for specific safety and personal protective equipment (PPE) for certain activities, program for training and tool-box talks, and H&S checklists to be completed ruing monitoring. The HSP will link with the emergency response plan (ERP).	Contractor	To be part of the project cost.	CESMP	Approved CESMP	CPIU and DSC
2	UXO Survey	There is a positive impact carrying out the survey before any earth works. This will avoid risks of UXO explosion during the construction.	Provision to allow RSIPF to carry out UXO survey; and Provision to allow specialised firm to undertake the survey	UXO Contractor	To be included in the BOQ	Survey carried out by approved personals	Certificate showing the project area is UXO free	RSIPF and the contractor
3	Design to incorporate Climate Change Adaptions	**Climate Change Planning & Design** Catastrophic flooding increasing with logging in upper catchment	The design consultant proposed an improved climate resilient option with a 35-35m two span option (only one pier in the waterway and two abutments) provided a wider clear span than the one provided by an earlier design and reduces the potential for debris built up particularly in the scenario with logging occurring simultaneously in the upper catchment.	DSC & CPIU	To be included in the BOQ	CPIU Design Review	Confirm & Approve Design	CPIU and DSC

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
4	Biosecurity for import and movement of machinery	**Biosecurity Risk** Invasion of Giant African snail to the local area and riverbanks	Quarantine and spray on arrival at Port for new equipment and Quarantine & Spray before dispatch of used equipment to site	Contractor & SIG Agriculture	To be included in the BOQ	Spray carried out with supervision of approved personnel from SIG Agriculture Biosecurity	Quarantine Certificates	SI Agriculture Biosecurity
5	Identification of Materials Sources, Application for BMP and Development of Gravel Extraction Plan	**Gravel Source Planning** Access & transport of gravel to the site has the potential to cause significant impacts including noise, dust, community health & safety and channel relocation by removal of bedload gravel beds .	Preparation of a gravel extraction plan in accordance with MMERE and MID guidelines as appendix to CESMP. Mapping to show identified route with surrounding land use and population, access to the designated river section & required clen up and rehab of banks. To be integrated into the CESMP	DSC & Contractor	To be included in the BOQ	Identified impacts in GEP	Monthly or as required - consultation and visual observations; Complaints;	CPIU safeguards on behalf of ECD MEMCD
6	Vegetation Clearance in Gazetted Road Corridor	**Inventory of Non Land assets** Non Land assets in the road corridor such as food crops and fruit trees may be damaged or destroyed	Use of negotiated agreement with MOU/MOA	The contractor with CAC & CPIU MID & Provincial Government	To be part of the project cost.	MOU/MOA	MOU/MOA signed , damages paid or received in kind before commencement	CPIU MID & MLH dependent on source of budget
7	Land Access Arrangements on Customary Land	**Short term Land use Change** Temporary Restriction on Use of Customary Land for Camp site, Laydown areas, Access to gravel sources	Use of negotiated agreement with MOU/MOA to have easement - compensation either in kind or cash	Contractor	To be part of the project cost.	MOU/MOA	MOU/MOA signed , compensation paid or received in kind before	CPIU MID & MLH dependent on source of budget

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
							commencement	
CONSTRUCTION PHASE								
8	Operation of construction machinery generating emissions	**Air Quality Impacts** Emission of exhaust from vehicles and machinery;	All Machinery to be maintained	Contractor	to be included in construction cost	Air quality, emissions i.e., observation of vehicular/machineries black smokes	Weekly or after complaint - periodic visual inspection;	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
		Emissions of CO_2 and other gases	Prohibit the use of equipment that causes excessive pollution (e.g. generates smoke).Such equipment includes but not limited to any faulty equipment such as diesel generators, excavators, graders etc. emitting black smoke.				Any particulate matter and smoke	
		Dust caused by construction vehicles running at high velocity,	Thorough watering to avoid dust.			dust, particulate matter;	Weekly or after complaint - periodic visual inspection	
		Degrade air quality/ Increase TSS in the atmosphere				Use of tarpaulins and loading of vehicles; stockpiles		
9	Earthworks & Clearing of Vegetation	**Soils Sedimentation & Erosion Impacts**	The Contractor being solely responsible for repairing the damage and/or paying damages if the Contractor causes damage to agricultural land upstream, productive land or gardens	Contractor	to be included in construction cost	Scour & erosion points	Weekly or after complaint - periodic visual inspection	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
10			Side slopes of embankments, including the river bank areas surrounding bridges and approaches will be protected and designs used that protect soils as included in the project specifications in order to reduce erosion. Geotextile sand-filled bags will be used around bridge abutments to mitigate scouring and erosion					
11			Embankments and in-stream/river activities will be monitored during construction for potential erosion and, if necessary, prevention or permanent measures would be placed as soon as possible					
12			Slope areas needed for access will be revegetated with fast growing species, or other plants in consultation with the land owners and village chiefs, as quickly as possible after work in the slope areas has been completed					
13			Random and uncontrolled tipping of spoil, or any material, will not be permitted, with all spoil to be removed by the Contractors					
14	Earthworks & clearing of vegetation, development of laydown areas	**Impact on Water Quality & Pollution**	Diversion of the main flow for progressive sequential sediment excavation will reduce the risk of substantially increasing turbidity and be subject to an approved site specific sediment extraction plan as part of the CESMP	Contractor	to be included in construction cost	Turbidity by Visual Inspection	Daily inspections by Contractor	Contractor / DSC &CPIU safeguards on behalf of

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
15			Separate, bunded area for storage of POL. The contractor will be required to store chemicals in a secure yard and/or /compound away from the waterway, with a concrete floor, bund wall and weatherproof roof. Only daily storage in the laydown area will be allowed during use of products. Used oils and chemicals will be transported to approved, designated waste disposal site for hazardous material			Bunded area in concrete above bankfull level		ECD MEMCD
16			Sediment control measures including, sedimentation ponds, bunds and silt fences around the work areas whenever required to contain plumes of disturbed water from getting into water bodies. The site will be secured each day with sediment controls in place			Ponds or silt screens in place at end of day		
17		Silt generation.	Keep river 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.		to be included in construction cost	Reduced soil erosion and sedimentation, Vegetation clearance minimized, No dump sites near waterways		

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
18		Accidental release of hydrocarbon from construction machine.	Ensure all construction machines are well maintained; A prestart on construction machine carried out every morning; and Oil/fuel remediation agents, oil pads, oil booms and geo-fabric clothes are procured for usage as part of the emergency response plan.		to be included in construction cost	Construction machineries maintain in good working order, Spot check for visible oil spills	Weekly - visual inspection	
19		Direct discharge to adjacent creeks, ponds or streams.	Development footprint will be provided with effective drainage systems which will avoid direct discharge to creeks, ponds or streams.		to be included in construction cost	No direct discharge to water bodies.		
20	Fuelling construction machines and storage of Hydrocarbons	· Hydrocarbon leakage / spills from construction sites / workshops.	Detailed Emergency Response Plan to be prepared by the contractor (as part of CESMP) to cover hazardous; materials/oil storage, spills and accidents	Contractor	to be included in construction cost	Ensure storage sites are properly bunded.	Weekly inspection	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
			Chemicals will be stored in secure containers away from the water bodies;					

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
			Chemicals stored in area or compound with concrete floor and weatherproof roof and fire extinguishers; Ensure all construction machines are well maintained; and Accidents reported to police within 24 hours.					
21	Vegetation clearing for bridge approaches	**Impact on Terrestrial Flora & Fauna**	Minimize clearance to the construction perimeter; and unnecessary clearance avoided.	Contractor	to be included in construction cost	Area of vegetation; area of felled trees/vegetation removal	During survey and activities - visual inspection before, during and after	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
22	Construction of Pier & Abutments	**Impact on Freshwater Habitat fish & invertebrates**	Construction at low flow only with coffer dams in exposed sections, low flow regime to be diverted to allow dry construction of pier	Contractor	to be included in construction cost	Waterway and location of pylon within channel	Photos taken daily to show location of flow in relation to pylon construction site	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
23			Construction to be suspended when water level reaches agreed height	Contractor				
24	Construction Equipment Transport	**Impact of Invasive Species**	All equipment quarantined & sprayed before transporting to site	Contractor	to be included in construction cost	Quarantine period & spray completed	Certificate from SIG Ag	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
25	Entire Construction works period	**Impact on Public Access & Mobility**	Temporary detour 200 metres upstream	Contractor		Maintenance of detour		Contractor / DSC &CPIU safeguards on behalf of

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
								ECD MEMCD
26	Transport and traffic management	Access and Mobility at several road sections will be prohibited temporarily during the construction.	Tthe contractor to allow sections of the road area to be accessed by affected party; and Signs and other appropriate safety features will be used to indicate construction works are being undertaken.	Contractor	to be included in construction cost	Maintenance of access and safety of people; Signage,Road free of materials and debris; Haulage routes rehabilitated	During activities - Visual inspection; Consultations; Review of traffic management plan	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
27	Entire Construction works period	**Impact on Worker Health & Safety**	Contractor to engage pofessional organisation to deliver COVID 19 & STD Awareness Program	Contractor	to be included in construction cost	Training	Training Delivered	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
			Use of drugs and alcohol by workers at the site camp or office compound etc will be prohibited. Workers will be sanctioned or their employment terminated if they are caught using drugs or alcohol during work hours or are impaired following use of drugs or alcohol;			Employee Health records	Use of alcohol Drugs	
			The contractor to provide the workers, health and safety induction, and on the specific hazards of their work;			Training	Training Delivered	
			Smoking near fuel storage areas and job site proibited &fire extinguishers installed in equipment & lay down areas with training in their use			Smoking on work site	Observation	
			Provision of PPE to all workers including locals			PPE Used	Worker interview	

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
			Provision of safety harnesses forall works at height			Harnesses available	Harnesses being used	
			Garbage eceptacles at all work sites			Garbage bins	Photos taken daily to show construction site	
			All lifting equipment to be regularly checked			Lifting Equipment	Weekly Maintenance Sheets	
			Lifting operations to be planned with DSC			Construction method statement	Statements Cited	
			Installation of barriers and marking of designated work areas			Barriers in Place	Phot record of each work site	
			Workforce training on communty codes of conduct			Training Package	Training delivered	
			Prohibit smoking close to fuel storage areas;			Signs and fire extinguishes	Code of conduct and housekeeping rules being adhered to Verify records of accidents	
			Prohibit subsistence burning near fuel storage area;			Evidence of Burning	Inspection	
			Put up signs of no go smoking zones; and			Signage	Photos	

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
			Provide extinguishers and train workers on their use.			Fire Fighting Equipment on site	Photos & Inspection	
28	Entire Construction works period	**Impact on Community Health & Safety**	Access to site controlled with no entry for children and young adults from community	Contractor & CAC	to be included in construction cost	Access into site	Site Records	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
			MOU to be signed with Community through CAC to understand and enforce community safty requirments and protocols			MOU/MOA	Signed document	
			No locals allowed in worker's camp area			Access into site camp area	Site Records	
			Probition of the employment of children and child trafficking			Ages of workforce	Personnel Records	
29	Entire Construction works period	**Emergency Response Plan**	Tobe detsiled in the CESMP to be prepared as et out in preconstruction phase	Contractor	to be included in construction cost	Document	Document available On site	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
			Issues include: disaster management, containment of spills,and protocols for workforce accidents with procees and structure for handling each contingency					
30	Entire Construction Period	**Social Concerns Affecting community**	Awareness sesioans to be run by CLO of contractor on Grievqance Redress Mechanism and how to iniitiate a claim	Contractor	to be included in construction cost	Training	Community Training delivered	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
	Antisocial Behaviour	· **Other Social Impacts** Increased alcohol and substance abuse.	Workers induction on company policies (rules and regulations).			Equal opportunities for men and women.	the contractor employment records weekly.	CAC, CPIU safeguards on behalf of ECD MEMCD
		· Gender-Based Violence and family desertion.	Ensure respect for culture and local/customary governance in the locality.			Recruitment of locals in the communities .	Grievance Redress Mechanism register weekly.	Contractor, CAC, CPIU safeguards on behalf of ECD MEMCD
		· Continuous disturbance to workers	Conduct awareness and training to workers and communities on gender based violence and impacts.			Ongoing - consultation with public to monitor environmental and social concerns regarding employment.		
			Provide awareness to women and youths regarding their rights according to the Solomon Islands relevant Legislations.					
			Engage the CAC and sure community participation.					
	Presence of construction workers	Waste generated at construction site causing nuisance and potential contamination to adjacent water bodies	Garbage receptacles will be set up at construction sites, which will be regularly cleared by the the contractor.	Contractor	to be included in construction cost	Waste management - visual inspection that solid waste is disposed of as per ESMP;	Monthly, as required and spot checks - visual inspection;	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
			the contractor to prepare waste management plan (as part of ESMP)				Review of waste management plan	
			All wastes from work sites to be disposed of in approved landfill / areas agreed by MECDM and local land owners					
			the contractor will provide sufficient training in appropriate waste disposal methods					
			No wastes to be dumped in waterways			No direct discharges to local streams,	Weekly- visual inspection	

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
						coast or rivers;		
			the contractor will ensure that wastes not discharged to waterways and that all wastes disposed of in proper areas			Regularity of waste removal		
			the contractor to provide adequate and safe drinking water for workers			Availability of potable water supply		
		· Possibility of conflicts or antagonism between the public and the workers.	· Facilitate reconciliation between parties/affected person; and	Contractor	to be included in construction cost	No. concerns raised, and resolutions reached if problems arise;	· Ongoing - consult with public to monitor environmental concerns	Contractor, CAC, CPIU safeguards on behalf of ECD MEMCD
			· Inform the Police once it goes beyond control.					
31	Entire Construction Period	**Impact on Employment**	All Unskilled work to be offered to local villagers	Contractor	to be included in construction cost			Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
		Grievances can arise due to lack of community participation and employment in the project.	the contractor to engage communities along the vicinity of the proposed Mongga Bridge.	Contractor	to be included in construction cost	No. concerns raised and resolutions reached when grievances raised.	Ongoing - consult with public to monitor environmental social concerns.	CAC,the contractor, CPIU,
			Unskilled labour to be sought locally at the project site area.					
			Women's wages and salaries be equal to men.					
			Project neighbourhood communities be given priority in unskilled and skilled labour.					
32	Operation of construction machinery creating noise	**Impacts of Noise and Vibration on communities and schools**	· Construction machine exhaust systems and noisy equipment will be maintained to minimise noise;	Contractor	to be included in	Adherence to agreed schedule;	Weekly or after complaint -	Contractor / DSC &CPIU

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
					construction cost		review schedule	safeguards on behalf of ECD MEMCD
			Agrryement with community through CAC on noise protocols including hours, notice for busy noisy periods (eg pile driving)			Complaints (no. logged with resolution).	Consultation (ensure schedule being adhered to)	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
		Impacts on construction workers	Workers limit of exposure to noise will be strictly below 70 decibels per 8 hour shift;	Contractor	to be included in construction cost	Workers safety equipment.	Weekly	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
			Provide workers with noise abatement equipment (ear-muffs etc); and				Workers are provided with safety equipment	
33	Entire Construction Works	**Accidental discovery of Archeological Resources**	Work to cease immediately	Contractor	to be included in construction cost	construction log for incident	Stop work order	Contractor / DSC &CPIU safeguards on behalf of ECD MEMCD
			Contact SIG Musuem & competent professionals to assess significance & further management			SIG Museum Contact on file	Commiuniation with Museum And Expert	
34	Cut, fill, graveling and compacting and other constructions civil works.	**Chance Find Procedure** 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 RSIPF of the find.	Contractor	to be included in construction cost	Occurrence of UXO at the construction site with archeological Significance	Upon discovery of UXO & surrounding material	RSIPF, CPIU, Museum

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
	OPERATIONAL PHASE							
35	**Natural disasters**	Risk of natural disasters	Risks of impacts on the bridge will be addressed through routine inspections as part of the tasks of the Routine maintenance. There are unforeseen events in the future due to frequent extreme weather events. MID has developed an emergency response plan in response to natural disasters. Future maintenance contractors including communities nearby will be trained on all SOPs associated with disaster management and implementation of the plan.	MID-routine maintenance	NA	Maintenance contractor and nearby communities receive training disaster preparedness.	During disasters.	National Disaster Management Authority & Provincial Govt
36	Operation of the bridge will see increase number of Vehicles.	**The impacts on air quality** during operation will mainly come from vehicles using the road. Therefore increase emissions and level of CO_2, NO_2, CO, POPS etc. However, it is expected that this will be negligible as the road will not be as busy as urban roads with high volume of traffic. This is rural road and the traffic volume will be very minimum.	Burning of vegetative matter or waste will be strictly prohibited; 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; Vehicles in the Mongga area will be advised to do routine mechanical checks to ensure they don't emit black smokes	MID-routine maintenance; the public and Guadalcanal Provincial Govt	NA	Air quality; Particulates and smoke; No. complaints; incidents	Complaints	MID during routine maintenance, Provincial govt, and ECD MEMCD

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
			Provincial Authority to ensure all Vehicles and heavy machines undergo routine mechanical checks so as to prevent emissions of black smokes.			logged with resolutions.		
37	**Surface Run-off from bridge driainage**	Changes in Hydrology impact Aquatic Environment	The design of the bridge has been propsoed to be changed in the review stage. There would be only one pier in the watreway and the and the substructure will be skewed to align with the river flow. This avoids changes in the hydrology as much as possible.	MID & future routine maintenance contractor	Future maintenance contract cost	water quality;	Annually, the contractor-term and post-evaluation. monitoring -	MID during routine maintenanc e, Provincial govt, and ECD MEMCD
			Routine maintenance will be undertaken when necessary.					
38	Run-off from the approach road.	· Use of the bridge by vehicles emitting particulate maters such as POPS to approach road surface, these substances can be washed with surface run-offs and discharged into open environment	Maintenance of erosion control structures, preventing debris build-up and ensuring good vegetation cover on approach road perimeter.	MID; routine maintenance	NA	water quality;	Annually, MID-term and post-evaluation monitoring - visual assessment;	MID; Communiti es, provincial govt.
		· Loss of soils	Awareness of the value of maintaining vegetation cover will be undertaken.			Suspended solids from the road or areas of erosion, if identified.	Consultations or complaints	
39	Improved access to previously inaccessible, or difficult to reach, areas	**Hunting and poaching of flora & fauna**	Significant habitats will be restricted of entry if later identified. However, the whole area has been disturbed and are devoid of significant species.	MID- routine maintenance; east Guadalcanal communities; provincial govt	NA	Increases in hunting activity;	Annually, MID-term and post-evaluation monitoring - visual assessment;	MID; Communiti es; provincial govt; ECD

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
			There are no rare or endangered species that could be affected. Chiefs and community leaders are to be conscious about outsiders who have the intention to poach flora and fauna.			Reduced sightings of fauna	Consultations	
40	**Changes in Community Health and Safety**	Accidents – there will be risks of accident from careless drivers. Good access will increase people mobility and the risk of transmitting STI/HIV	Drunk driving to be monitored and vehicles to slow down approaching bridge & villages Awareness on STI/HIV must continue with help from relevant provincial authority	Public	NA	No accidents STI/HIV awareness undertaken in concerned communities .	Interviewing villagers and the provincial health authority · Annual inspection	· ECD and MID
41	Routine and ongoing maintenance	**Impacts of noise & Vibration** noise nuisance for residents due to maintenance works.	All machineries' exhaust systems and noise generating equipment be maintained in good working order and that annual equipment maintenance will be undertaken; Agree work schedule with communities if necessary; Workers will be provided with noise abatement equipment; and Ongoing community awareness ascertain village concerns regarding aviation management matters.	MID, Local/provincial police	NA	Safety issues discussed in schools and communities	Annually, MID-term and post-evaluation monitoring - consultation and visual observations; Complaints;	MID CPIU Safeguards

S. No.	IMPACT MANAGEMENT					IMPACT MONITORING		
	Project activities	**Potential Environmental & Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitor**	**Means of verification and frequency**	**Responsibility**
	DECOMISSIONNNG PHASE							
42	Decomissioning of the bridge		Should it be removed, then re-planting of indigenous riparian plants is recommended to retain the natural state of the disturbed site.	MID	NA	During decommission	Visual observation	MID
		Storage of waste materials to certain extent can occupy space, unless they are recycled or removed immediately after decommissioning	Storage facilities secured.	MID		After decommissioning.	Approved disposal site, visual observation	MID
		During decommissioning, access and mobility at the project site will have minor impacts.	MID will agree work schedule with communities before decommissioning activities commence.	MID		During decommissioning.	Access provided.	MID
		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 bridge was constructed, 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.	MID		After decommissioning.	Area fully restored	MID

7.0 PUBLIC CONSULTATION AND PARTICIPATION

7.1 Consultation Activities

The major stakeholders for this project include the MID, GPG, MLHS, MECDM and MMERE. All these agencies are important and perhaps they produce approvals and permits that may be relevant for the proposed development. MID had consulted these main stakeholders regarding the proposed project activities. Community consultations were completed by MID for the landowners and communities nearby the project site.

There have been a number community consultations carried out for Mongga communities by CPIU Safeguards on 19th August 2019 and 27th July 2020 (final inventory of non-land assets). SMEC and CPIU also did a major consultation with Mongga and nearby communities on 15 November 2019. The meeting was to inform them about the project for the Construction of Mongga Bridge. There were issues raised and were noted for action. Further, consultation with various parties was held on 3rd June 2020, and also attended the final consultation with the APs on 27th July 2020. Refer to Appendix 8 for the consultation and Appendix 9 for the preparation of Due Diligence Report (DDR).

7.2 Results of Public Consultation

The result of public consultations with the affected communities provide opportunity to understand the current social-environment issues and the need for the proposed development. The main issues at the consultation are summarized below.

Table 12: Issues and Measures suggested during consultation

Issues raised	Measures Suggested During Consultation.
Access	At the preconstruction phase, the contractor will prepare and submit a Traffic Management Plan that will be approved by MID. During construction phase, the contractor will ensure to implement the traffic management plan so access on the main road will not be disturbed. People will still be using the current wet-crossing several meters upstream and safety signs will be put in place to warn people of road works taking place at the site.
Vegetation clearing for this project in particular will require clearance of some commercial crops, fruit trees and subsistence food crops.	MID has undertaken due diligence and have already compensated the APs for their damaged non-land assets based on current market value (SIG compensation rate). The contractor will minimize vegetation clearance and will at the utmost prohibit cutting of trees outside of the project site.
Safety standards.	The design and materials are based on standard specification and Geotech features of the site.

Issues raised	Measures Suggested During Consultation.
Public safety during construction and operation.	the contractor will submit a traffic management plan ensuring safety signs and speed limits. Sunday will be observed as a rest day unless something important requires action and in consultation with the host community.
Casual work during construction.	Unskilled labor will be sourced from the Mongga community and other nearby communities.
Landing site for contractor's machines (Adeade) was still a disputed land and landownership of the site is still unclear- Legacy issue.	Negotiation has been underway and a MOU/MOA was signed to allow for the use of the landing site. Any payment in regards to the use of the site will be withheld until the ownership issue is rectified.
Landownership issue over the proposed site for the bridge construction is also unclear- this is a legacy issue and MID has nothing to do with such issue except for the construction of the bridge.	Several awareness was undertaken by MID for the disputing parties. The current site for the bridge construction is within the alignment of the gazette (declared) road corridor and MID has the right to reconstruct the Mongga Bridge at that same location. An MOU/MOA was signed by the disputing parties allowing MID and its contractor to construct the new high level bridge.

8.0 CONCLUSION

The environmental and social impacts of the project are minor and marginal. The ESMP has described mitigation measures that will ensure all potential negative impacts can be mitigated to environmentally friendly levels. No significant flora or fauna will be affected by the proposed development, nor will any conservation, heritage sites be affected. The more obvious potential negative impact during construction is silt runoffs, and disturbance of bottom sediments that can enhance sediment/silt loads in the water way which can become a social and environmental risk. People living downstream will be affected but this will be temporary only during the construction phase. Alternative water source will be made available. Silts and sediment ponds will be created and other silt and sediment control devises will be installed to minimize the impacts.

The design of the bridge avoids impact on significant cultural sites or avoids encroaching into significant ecosystems as it will constructed at the existing old bridge site. The project will not involve relocation of households. Consultations were carried with the landowners and will be

ongoing during the life of the project. The landowners have agreed to allow their land for this project and are willing to support the contractor to see this proposed project comes into fruition. The MOU between MID and landowners/communities have already been signed.

All operation impacts are of a routine nature and can be dealt with in a proactive manner by implementing the ESMP and more specifically the CESMP. During operation, the contractor will be initially responsible for monitoring and ensuring the bridge is operating well during a one-year defects liability stage. After that, MID will take responsibility for the continuous operation of the bridge and ensure of its routine maintenance.

The PER shows that the proposed development has few negative impacts, none of which are catastrophic. All of the identified negative impacts will be minor, temporary and site specific and can be satisfactorily mitigated to acceptable levels. The ESMP embedded in this report contains practicable and realizable mitigation measures that will be translated into a site specific CESMP that will be implemented by the contractor during the construction stage to mitigate potential environmental and social impacts. Based on the above, it is concluded that there will be no adverse environmental and social impacts that will arise from this project, and a few predicted significant negative impacts will be practically minimized to acceptable levels.

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10.0 APPENDICES

Appendix 1: Monthly Monitoring Checklist

Monitoring Form No	**Locations:**		
Date	Time of Day		
Weather Conditions	Fine & Dry		
	Cloudy & Wet		
	Rain		
Issue	**Mitigating Measure**	**Yes/ No**	**Comments/Corrective measures**
Workforce Health & Safety			
1	Weekly Safety Training completed		
2	All workers have vests		
3	All workers have safety shoes		
4	All workers have safety helmets		
5	All workers have safety mask and eye protection in dusty conditions		
6	First Aid training Completed		
7	Work Site and machinery secure after hours		
Traffic Management			
8	Safety Signboards being used		
9	Stop Go signs in place		

Water Quality			
10	Drainage from working area does not flow directly into water bodies		
11	Use of silt control device e.g. Silt fence, coffer dams, bund		
12	Proper management of oil/fuel and other chemicals		
Air Quality			
13	Dump Trucks loads are covered transporting material		
14	Water being used for dust control		
15	Exhaust of truck generating black smoke		
Storage of Hazardous Material			
16	Is the Storage Area bunded or with perimeter cut-off drain		
Construction Camp			
17	All wastewater treated before discharge		
18	Location of discharge agreed with community		
19	Code of Conduct Prepared & Distributed		

Signed by:

_____ _____

MID Safeguards	the contractor Project Supervisor

Appendix 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.

		○ Article 70: requires the employer to provide medical care at the workplace. ○ 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: ○ Article 3: requires the formation of a Pesticides Registration Advisory Committee. ○ Article 4: Requires a Register of Pesticides to be maintained. ○ 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. ○ 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. ○ 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.

Appendix 3: List of Ratified International and Regional Treaties and Agreements

Name	Status	Purpose/Aim	Solomon Island Agency Responsible
International and Regional Agreements			
Pollution Protocol for Dumping at sea.	Ratified 10/9/98	Prevention of pollution of the South Pacific region by dumping.	MFMR and ECD
Pollution Protocol for Emergencies.	Ratified 10/9/98	Cooperation in combating pollution emergencies in the South Pacific region.	MFMR and ECD
Natural Resources and Environment of South Pacific Region (South Pacific Regional Environment Program - 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
Waigani Convention on Hazardous and Radioactive Wastes (1995).	Ratified 7/10/98	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			
Liability for Oil Pollution Damage.	Ratified	Strict liability of ship owner for pollution damage to a coastal state within a certain amount.	MFMR
Marine Pollution Convention (London).	Ratified	Prevention of marine pollution by dumping of wastes and other matter.	ECD and Foreign Affairs
Desertification (UN Convention to Combat Desertification).	Acceded 16/4/99	Agreement to combat desertification and mitigate the effects of drought in countries experiencing drought or desertification.	Agriculture Division
POP's Convention (Stockholm).	Acceded 28/7/04	Protection of human health and environment from persistent organic pollutants.	ECD and EHD
Biodiversity			
CITES.	Ratification underway	Regulations and restriction of trade in wild animals and plants through a certification system of imports and exports.	ECD
World Heritage Convention.	Ratified 10/6/92	Protection of sites of Outstanding Universal Values. Solomon Islands currently has East Rennelle Island as a World Heritage site.	ECD and National Museum
UN Convention on Biological Diversity.	Acceded 3/10/95	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
Cartagena Protocol on Biosafety.	Acceded 26/10/04	Protection of human health and the environment from possible adverse effects of the products of modern biotechnology, especially living modified organisms while maximizing its benefits.	ECD
Climate Change			
Montreal Protocol.	Acceded 17/6/93	Allows phase out of substances that deplete the ozone layer according to a fixed implementation schedule.	ECD and Energy Division
Ozone Layer Convention.	Acceded 17/6/93	Protection of the ozone layer through intergovernmental cooperation on research, systematic observation of the ozone layer and monitoring of chlorofluorocarbons production.	ECD and Energy Division
Climate Change (UN Framework Convention on Climate Change).	Ratified 28/12/94	Sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change.	Climate Change Division
Kyoto Protocol.	Ratified 13/3/03	Reduce greenhouse gases especially CO2 for the 39 industrial/developed countries by an average of 5.2% by 2012.	Meteorology Division MECDM

Name	Status	Purpose/Aim	Solomon Island Agency Responsible
MFMR = Ministry of Fisheries and Marine Resources. MECDM = Ministry of Environment, Climate Change, Disaster Management and Meteorology. ECD = Environment and Conservation Division – MECDM. EHD = Environmental Health Division – MECDM.			

Appendix 4: List of Terrestrial Protected Areas within the Solomon Islands

Province	Protected Area	Size	Flora Biodiversity	Fauna Biodiversity
Guadalcanal	Lauvi Lake	200 ha	Floating meadows include three species of Cyperaceae. Extensive areas of pandanus, beach side dominated with fu'u Barringtonia asiatica. Other species are also common in the community e.g. Hibiscus tiliaceus. Thus, there are also many other species growing around the areas (Less, 1990).	Outstanding habitat for crocodiles. Wetland birds and the Australian dabchick which was a new record for the Solomon Islands. About 40 bird sp. are found (nine endemic to the Solomon Islands)
	Itina Popomanaseu	30,000 ha	6 species (sp) of pioneer trees located on gravel beds of braided river sites e.g. salu; *Casuarina equisetifolia*. On slightly higher ground, 5 sp. of trees are common e.g. Akwa. Evident at the ultra-basics are mudi; (Dillenia crennata). Common in montane forest are trees of non-flowering plant family, Podocarpaceae including 3 sp and 5 sp of the Myrtle family. The four epiphytic rhododendrons that are uniqiue to Solomon islands are all found on peaks of the proposed protected area and the endemic mountain shrub, Vaccinium (Less, 1990)	Habitat for many animals incl. four bird species endemic to Guadalcanal and the Guadalcanal endemic giant rat (*Uromys imperator*). 1990 mammal survey of Mt Makarakomburu found a new sp. of bat along with nine other bat sp., four frog and eight reptile sp. Thirteen bird sp. were recorded incl. rare Guadalcanal Honeyeater (*Guadalcanaria inexpectata)*. Mt Popomanaseu is only place in the Solomon Islands where terrestrial molluscs have generated endemic montane species. Restricted to these mountains include arboreal *Placostyllus selleersi* and undescribed sp. Helixarion and Trochomorpha. Birds of the Tina River proposal area recorded 44 bird sp., 13 are known to be endemic sp. in the Solomon islands (Less, 1990).
Western	Marovo Lagoon	70,000 ha	5 principle forest types. Lowland forest, small island and barrier island forest, mangrove forest, montane forest and heaths.	52 sp. of land and fresh water birds and 9 species are endemic to the lagoon. 10 species of Sea and shorebirds.
	Kolombangara	All forest above 460m (70,000 ha is the island	12 principle species of forest trees and moss covered montane forest caps (Less, 1990)	Richest avifauana with 80 species recoded. 2 species are confined to montane forest and are unique to the island. (Less, 1990).
	Rendova	The island 40,000 ha	Common Montane forest trees species are Casuarina papuana, lower altitude forest predominance of Camnosperma revipetiolatum, Others include mosses, palms, pometia pinnata, pterocarpus indicus. (Less, 1990).	Support unique white eye species Zosterops rendova. Crocodiles are evident in lakes and lagoon. Two species of frogs have been recorded from Rendova (Less, 1990).
	Faroro Islands - Shortlands	?	Dominated by *akwa Pometia pinnata*, *Vasa*	Best nesting sites for turtles. Presence of Skink Triblonotus

Province	Protected Area	Size	Flora Biodiversity	Fauna Biodiversity
			Vitex cofassus and Canarium salomonense. Smaller trees include Myristica sp., laelae Celtis phillippnensis, Crytocarya Litsea sp (Less, 1990).	ponceleti known from only tree specimen, two from Shorthlands and one from Bougainville (Less, 1990).
Choiseul	Mt. Maetambe	22,500 ha	Dominate tree species akwa and Vasa. These two trees and Laelae are characteristics of valley bottoms, on ridge crest Eugenia sp., buni and kaumau Calophyllum sp. are common. (Less, 1990).	Seven sp. of frogs, one endemic sp., two rare butterfly sp. Presence of three giant rats, two of which are new record, 26 bird species with 6 are endemic (Less, 1990).
	South Choiseul	30,000 ha	Different forest composition from Ysabel and Guadacanal growing on ultra-basic rock. Forest is species poor with an open canopy and straggling emergent trees over dense undergrowth of pandanus, gingers, ferns and climbers. Mangrove forest found Ologholata in the north of the proposed reserve (Less, 1990).	Crocodiles are evident. Has significant nesting beach for turtles. Forest growing on ultra-basic rock noticeably has low bird numbers. 35 bird sp., 11 are endemic (Less, 1990).
	Mt Televodo	?	The features are closely similar to the description given for the limestone forest cover occurring in Mt Maetabe (Less, 1990).	The features are closely similar to the description given for the limestone forest cover occurring in Mt Maetabe (Less, 1990).
Isabel	North western Isabel	120,000 ha	Peninsula dominated with kekete (Campnosperma brevipetiolata) indicating exposed to prevailing high winds and cyclones. Akwa, vasa, andoa, lu usi are also found on ridges that run through the peninsula. Where slopes are fa alo, bamboo, gingers and Macaranga sp. Akwa is common in lowland forest. Smaller trees include Agaia spp, ai aasila (Neoscortchhinia forbesii), laelae, Myristica sp, palms and pandanus. Patches of beach forest containing 5 species of trees (Less, 1990).	Crocodiles were evident. It contains 65% of nesting sites of green andhawksbill turtles. Sea eagles, Brahminy kite, osprey and terns are also evident. Migratory birds use the islands and tidal flats as resting and feeding area during November to January e.g., whimbrel Numenius phaeopus (Less, 1990).
	Mt Kubonitu	?	Supports montane forest with ailumu Dacrydium xanthandrum, akiri Ochrosia sp, koadila pemphis acidula and Eugenia spp. (Less, 1990).	Meeks Iory Charmomosyna meeki, white rumped swiftlet Collocalisa spodiopygia, pigmy parot Micorspitta finschii, Melanisian gray bird Coracina caledonica and the golden whistler Pachycephala pectoralis.(Less, 1990).
	Casuarina swamp	2,500 ha	Dominated with hardy malasalu Casuarina papuana and Dacryduim xanthadrum. On swapy	Is designed for the forest.

Province	Protected Area	Size	Flora Biodiversity	Fauna Biodiversity
			grounds Calophyllum vexans, bou Fagrea gracilipes and gwarogwaro Calophyllum vitiense. Ferns and Savanna (Less, 1990).	
Makira	Central – Bauro highlands	350,000 ha	Akwa dominate lowland forest and lower hill slopes. 8 sp of trees are also common in this zone e.g Rosswood. Above the zone where akwa is predominant 6 sp of trees are common e.g. abalolo. Common small trees are Myritica sp. and aisubu Pimeliodendron amboinicum. Above 700 m 5 sp. of trees are common eg aitootoo (surukakahu) Weinmannia blumei, Cyathea tree ferns and palms are also common. At highest altitude montane forest is found with 8 different spp of trees. Forest floor is covered with moss (Less, 1990).	Several of Makira's endemic sp are restricted to the mossy cloud forest of the highest ridges eg Keea (Makira mountain tail), waisure (Makira ground trash), ghoghoharighi (shade warbler) and the dusky fantail are found in these forest and nowhere else in the world. 49 Birds recorded, 5 endemic to Solomon and 5 endemic to Makira (Less, 1990).
	Western wetlands	2,50 ha	A tall mixed swamp forest featuring dafa Terminalia brassii and rufa Eugenia tierneyana on wet land edges. In the wetted parts of the swamps pandanus, bamboo and ferns form a complete cover one to three meters high (Less, 1990).	No information provided.
Malaita	Central Highlands	12,500 ha	Common in the lowland forests are 4 sp. of trees eg akwa, rosswood and vasa. On lower riverine terraces 3 sp. are alsocommon e.g., lamilami, liki and akwa (Less, 1990).	57 bird sp are recorded, 9 endemic to Solomon islands, 13 endemic to Malaita (Less, 1990).
	Maramasike Ar'are	150,000 ha	Large figs and 11 tree sp e.g. akwa are common at the end of the maramasike passage. The hill forest behind both Maramasike and Are'are commonly features 7 of the species mention above together with 5 other sp e.g. Cryptocarya sp. (Less, 1990).	Excellent habitat for crocodiles. About 60 bird sp. are recorded, 7 endemic to Solomon islands and 10 endemic to Malaita (Less, 1990).
Temotu	Kauir Reserve	200 ha	Kauri Agathis macrophylla in the Solomon islands is found only in Temotu Province (Less, 1990).	

Appendix 5: Red List - Globally Threatened Avifauna in the Solomon Islands.

Avifauna Common Name	Avifauna Species Name	IUCN RED List Category
Becks Petrel	Pseudobulweria becki	CR
Makira Moorhen	Gallinula silvestris	CR
Santa Cruz Ground dove	Gallicolumba sanctaecrucis	EN
Santa Cruz Shrikebill	Clytorhynchus sanctaecrucis	EN
Splendid White eye	Zosterops liteirostris	EN
White-eyed Starling	Aplonis brunneicapillus	EN
Heinroth's Shearwater	Puffinus heinrothi	VU
Sanford's Sea eagle	Haliaeetus sanfordi	VU
Imitator Sparrow hawk	Accipiter imitator	VU
Bristle-thighed Curlew	Numenius tahitiensis	VU
Yellow-legged Pigeon	Columba pallidiceps	VU
Chestnut-bellied Imperial pigeon	Ducula brenchleyi	VU
Palm Lorikeet	Charmosyna palmarum	VU
Fearful Owl	Nesasio solomonensis	VU
Black Faced Pitta	Pitta anerythra	VU
Malaita Fantail	Rhipidura malaitae	VU
Sombre Leaf Warbler	Phylloscopus amoenus	VU
Ranonga White Eye	Zosterops splendidus	VU
Guadalcanal Thrush	Zoothera turipavae	VU

Appendix 6: Screening Checklist for Positive and Negative Impacts.

First, please mark "**X**" for the 5 most likely impacts with description of impacts/reasons.

If you have other concerns, please mark "✔" for the next 5 important impacts to some extent with description of impacts/reasons.

Check List of Likely Impacts

	No.	Likely Impacts	Positive Impacts		Negative Impacts	
			Mark	Description of Impacts/Reasons	Mark	Description of Impacts/Reasons
Pollution	1	Air Pollution			✓	Air pollution from dust will mainly come from earthworks and exhaust fumes of heavy vehicles especially during very dry weather. The impact would however intermittent due to sporadic location of settlements along the road alignment However, this will be minor, temporary and site specific.
	2	Water Pollution			✓	There is potential for causing significant water pollution. However, cumulative impacts due to other existing and past activities has the potential for causing significant impacts in the future
	3	Noise and Vibration			X	The increasing number and use of construction machines shall increase noise and vibration level which may cause nuisance and disturbance. However, this will also be a minor impact and temporary.
	4	Soil Contamination				
	5	Waste				
	6	Ground Subsidence				
	7	Offensive Odor				
	8	Bottom sediment				
Nat	9	Protected Areas				

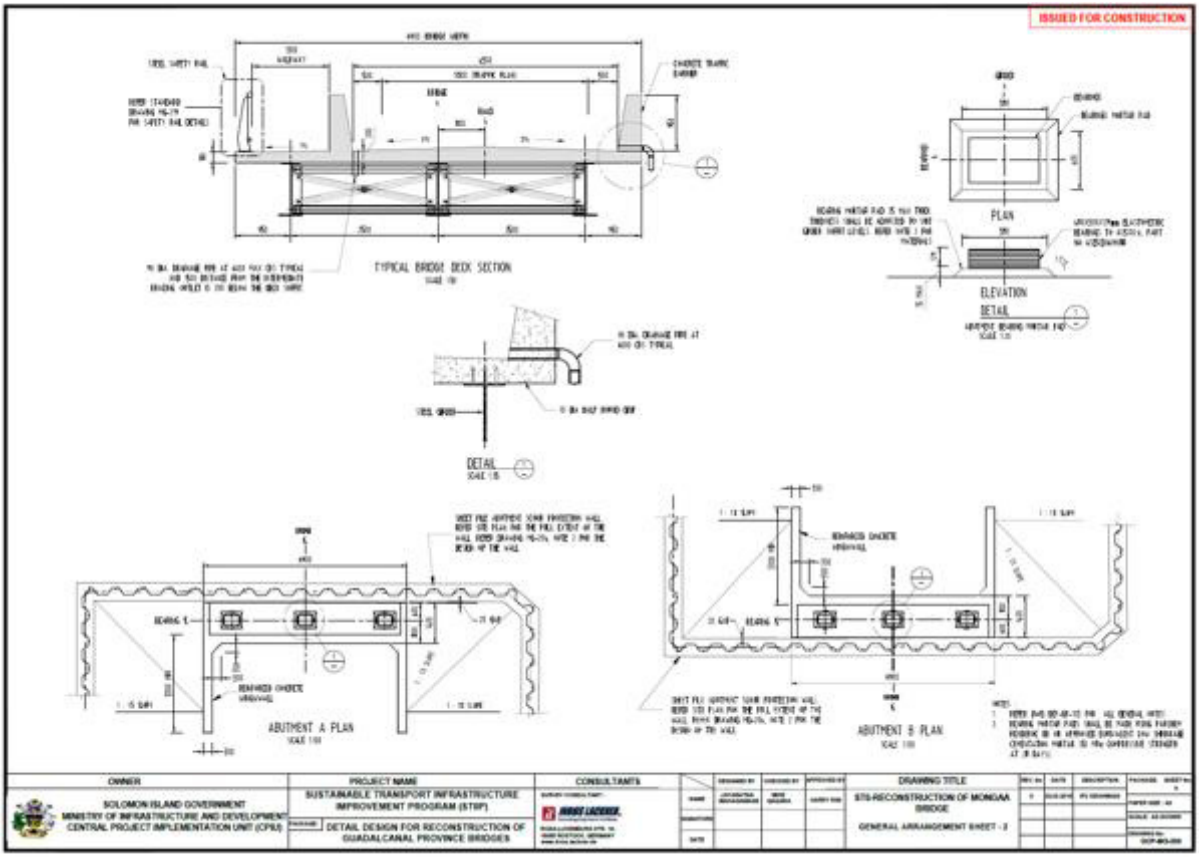
	No.	Likely Impacts	Positive Impacts		Negative Impacts	
			Mark	Description of Impacts/Reasons	Mark	Description of Impacts/Reasons
	10	Flora, Fauna and Biodiversity			✔	The general biodiversity within the project influenced area is already being disturbed by years of anthropogenic influence. There are no flora or fauna throughout the project influence area that are of much concern or with conservation value as can be noted from literally secondary regrowth habitats. Trees have been cut down for household uses, building material, clearance for settlements and shifting cultivation style of farming in the area. Wild animals like pigs, birds etc have been hunted and killed for food and sold for cash. All these have been happening many years back.
	11	Hydrological Situation				
	12	Topography and Geographical features				
Social Environment	13	Involuntary Resettlement				
	14	The poor people	X	The poor people will benefit the more from this bridge as it will allow them proper access to key social services that will enhance their standard of living. The good bridge means better access for the poor people who can easily mobilize to access better services.		
	15	Indigenous and ethnic people				

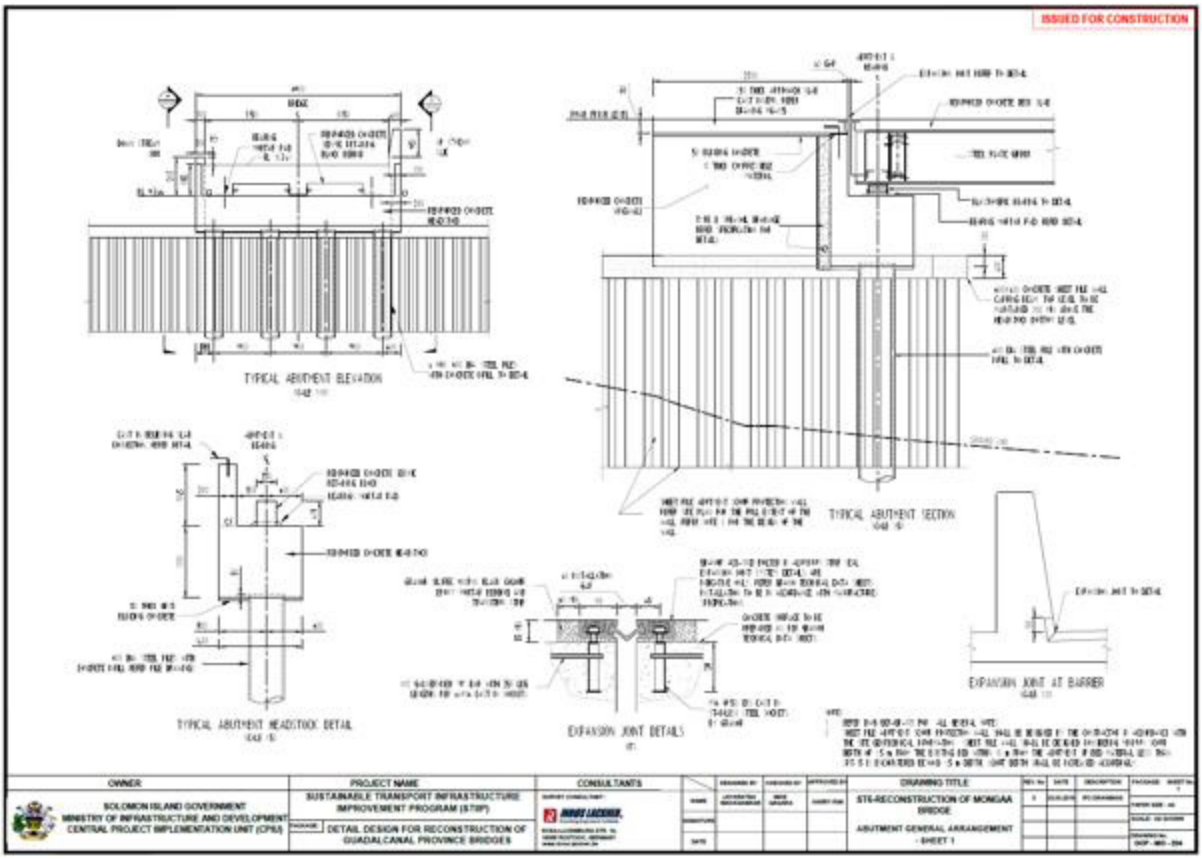
	16	Local economy such as employment and livelihood, etc.	X	The project will have positive impact such as the provision of employment to local labours. This will in turn contribute to improving their livelihood. The completion and operation of this road will contribute hugely to the local economy of Guadalcanal province and consequently the economic development of Solomon Islands.		
	17	Land use and utilization of local resources				
	18	Water Usage or Water Rights and Rights of Common				
	19	Existing social infrastructures and services	✓	There are existing schools in east Guadalcanal. Students have to walk far distance to school and cross the river. Bad weather usually deny students right to everyday education. Hence, this Bridge will help a lot in ensuring students can access good education, which will in turn contribute to shaping their lives for the future.		

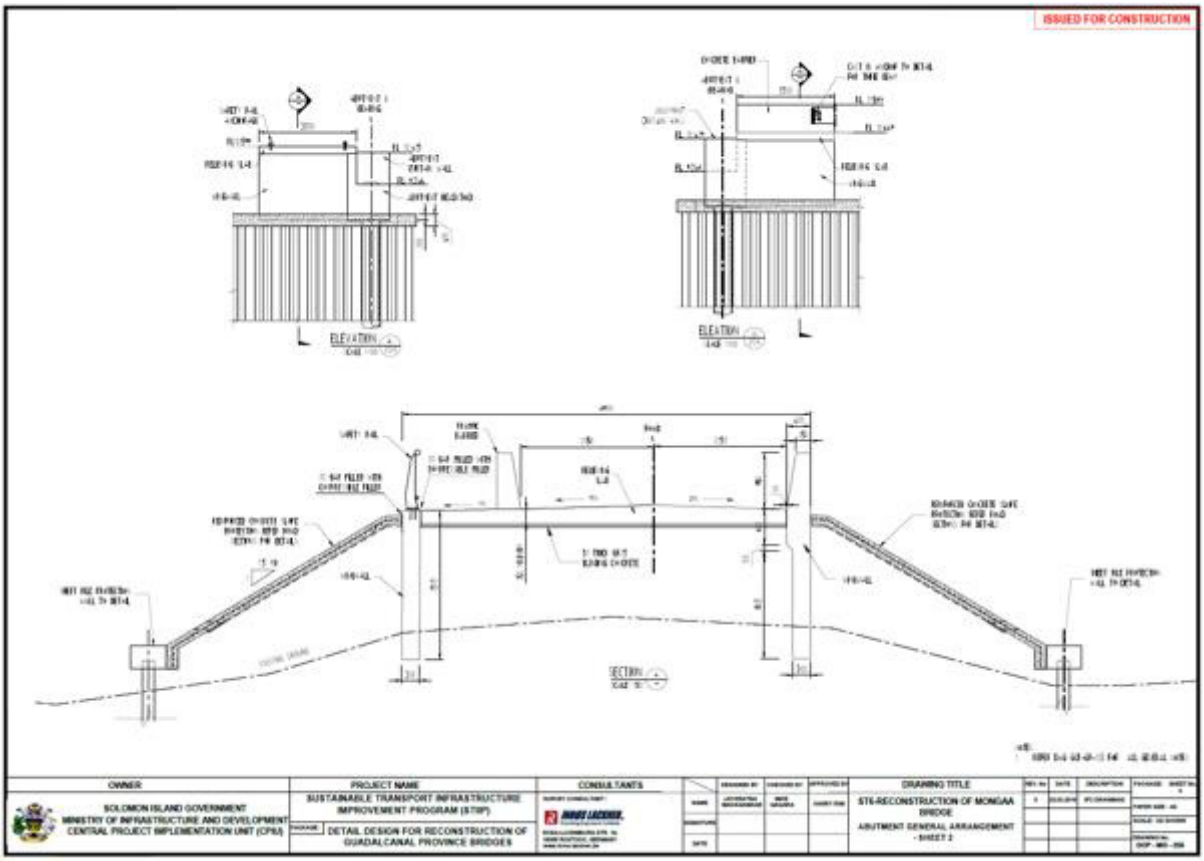
	20	Social institutions such as social infrastructure and local decision-making institutions	X	There will be an opportunity to improve schools and clinics in the rural area due to good access. It is expected that there will be a robust economic activities along the road due to improved infrastructure. The provincial government will also benefit the more from the ease of mobility to the remote communities. There will be a robust movement of goods and people needed to boost the local economy.		
	21	Misdistribution of benefit and damage				
	22	Local conflict of interests				
	23	Cultural heritage				
	24	Landscape				
	25	Gender	✔	There are some qualified women in the construction field in the country and this could be an opportunity to boost their capacity – given employment. The project could contribute to supporting gender equality in the country's construction sector.		
	26	Children's rights	X	This project will finally lead to improving lives of children who have over the years been affected to access proper and better education. The bridge will improve access to schools as there will be good transportation services in the area.		
	27	Hazards (Risk), Infectious diseases such as HIV/AIDS				

	28	Working conditions				
	29	Accidents				
	30	Trans boundary issues, Global Warming				

Appendix 7: Mongga Bridge Drawings



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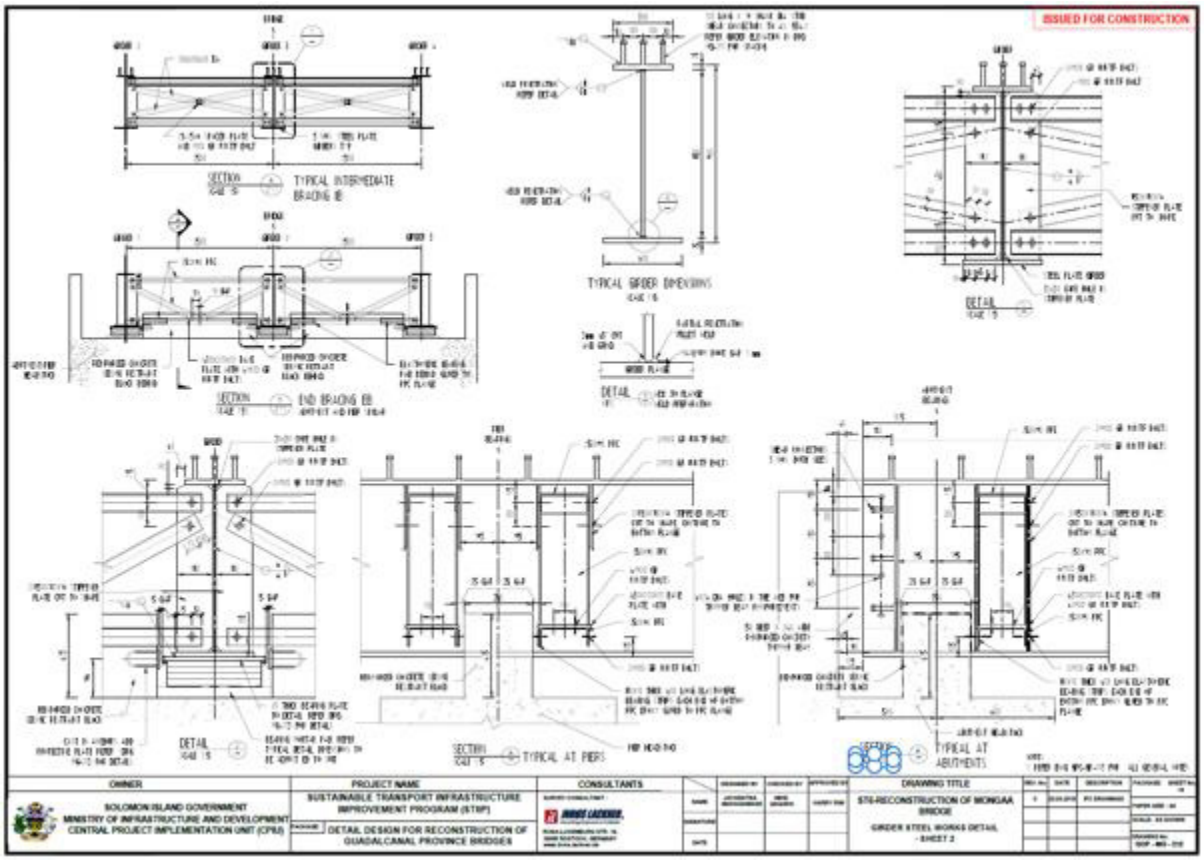
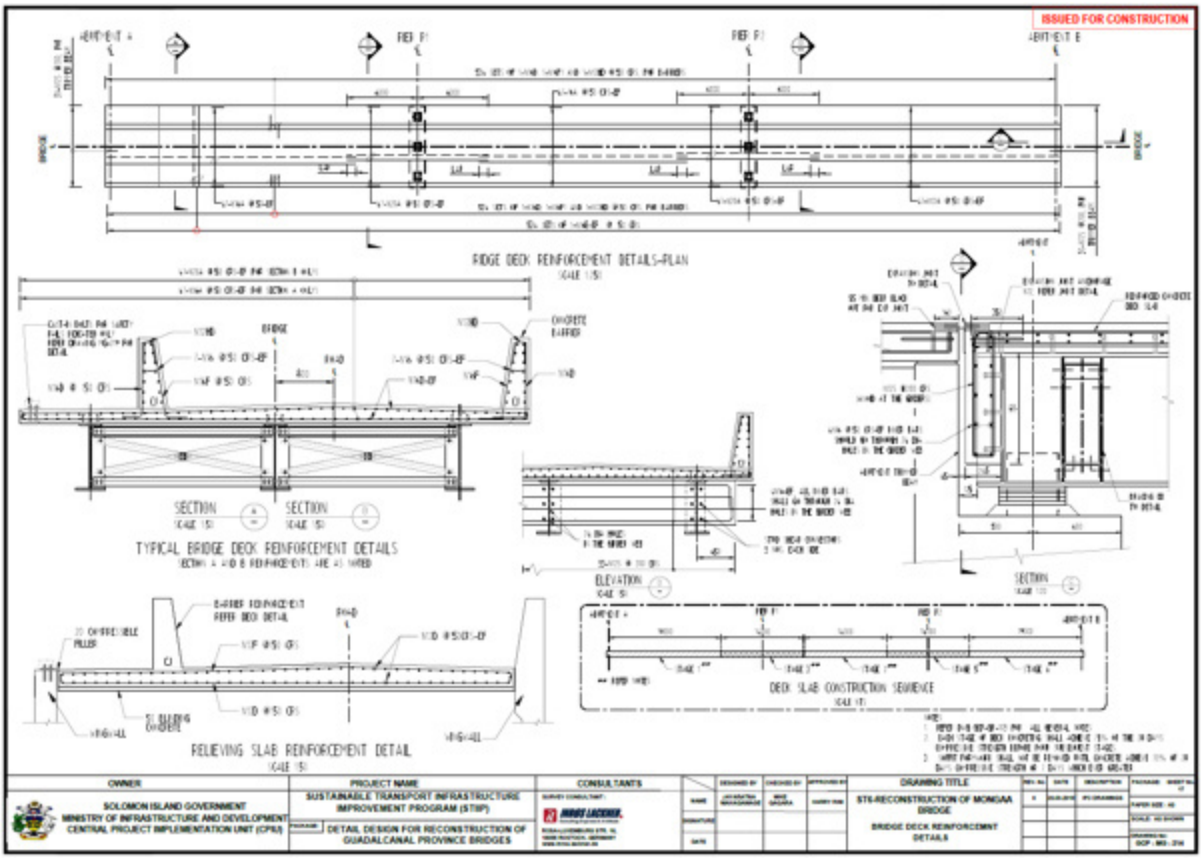
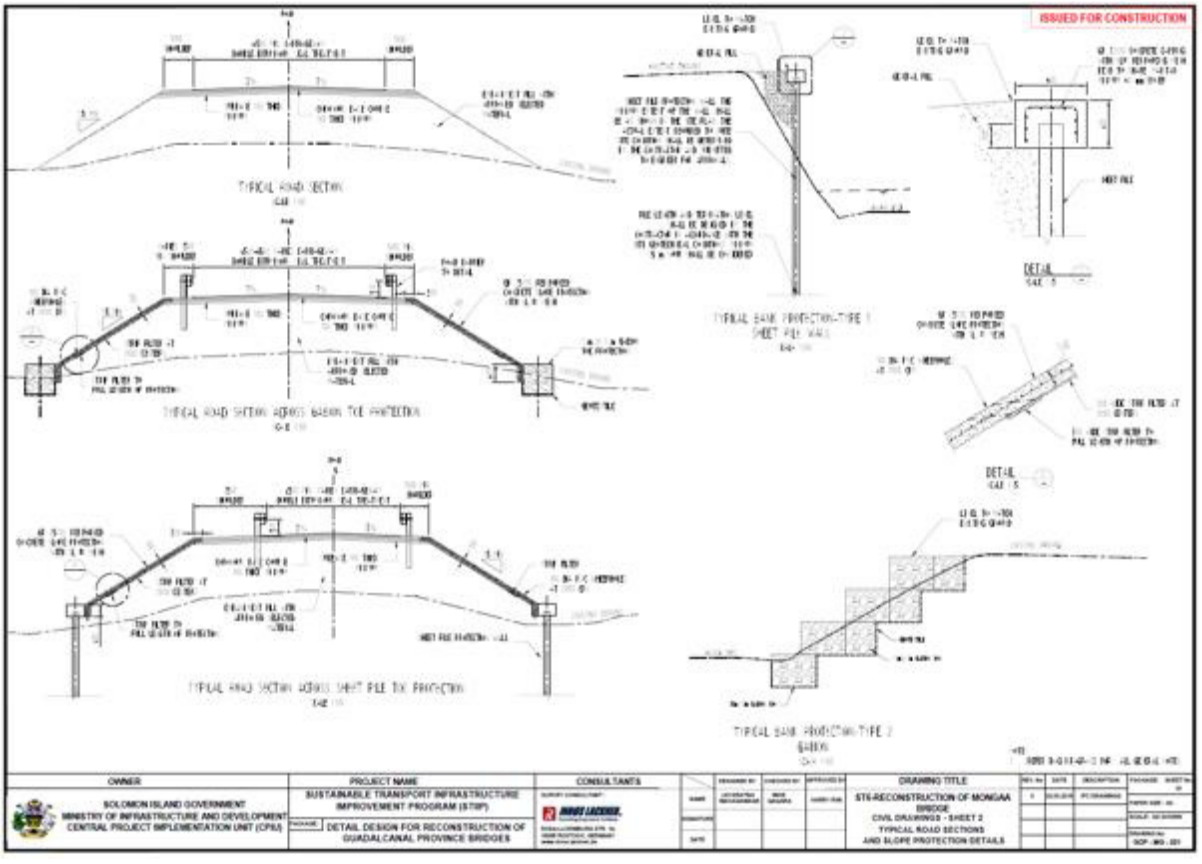
ELEVATION
ELEVATION
SECTION
OWNER
SOLOMON ISLAND GOVERNMENT
MINISTRY OF INFRASTRUCTURE AND DEVELOPMENT
CENTRAL PROJECT IMPLEMENTATION UNIT (CPIU)
PROJECT NAME
SUSTAINABLE TRANSPORT INFRASTRUCTURE IMPROVEMENT PROGRAM (STIP)
DETAIL DESIGN FOR RECONSTRUCTION OF GUADALCANAL PROVINCE BRIDGES
CONSULTANTS
DRAWING TITLE
STE-RECONSTRUCTION OF MONGAA BRIDGE
ABUTMENT GENERAL ARRANGEMENT - SHEET 2


ISSUED FOR CONSTRUCTION
SECTION
TYPICAL INTERMEDIATE BRACING BB
TYPICAL GIRDER DIMENSIONS
DETAIL
SECTION
END BRACING EB
DETAIL
SECTION
TYPICAL AT PIERS
TYPICAL AT ABUTMENTS
OWNER
SOLOMON ISLAND GOVERNMENT
MINISTRY OF INFRASTRUCTURE AND DEVELOPMENT
CENTRAL PROJECT IMPLEMENTATION UNIT (CPIU)
PROJECT NAME
SUSTAINABLE TRANSPORT INFRASTRUCTURE IMPROVEMENT PROGRAM (STIP)
DETAIL DESIGN FOR RECONSTRUCTION OF GUADALCANAL PROVINCE BRIDGES
CONSULTANTS
DRAWING TITLE
STE-RECONSTRUCTION OF MONGAA BRIDGE
GIRDER STEEL WORKS DETAIL - SHEET 2


ISSUED FOR CONSTRUCTION
BRIDGE DECK REINFORCEMENT DETAILS-PLAN
TYPICAL BRIDGE DECK REINFORCEMENT DETAILS
RELIEVING SLAB REINFORCEMENT DETAIL
DECK SLAB CONSTRUCTION SEQUENCE
OWNER
SOLOMON ISLAND GOVERNMENT
MINISTRY OF INFRASTRUCTURE AND DEVELOPMENT
CENTRAL PROJECT IMPLEMENTATION UNIT (CPIU)
PROJECT NAME
SUSTAINABLE TRANSPORT INFRASTRUCTURE IMPROVEMENT PROGRAM (STIP)
DETAIL DESIGN FOR RECONSTRUCTION OF GUADALCANAL PROVINCE BRIDGES
CONSULTANTS
DRAWING TITLE
STG-RECONSTRUCTION OF MONGAA BRIDGE
BRIDGE DECK REINFORCEMENT DETAILS


ISSUED FOR CONSTRUCTION
TYPICAL ROAD SECTION
TYPICAL ROAD SECTION ACROSS BASIN TOE PROTECTION
TYPICAL ROAD SECTION ACROSS SHEET PILE TOE PROTECTION
TYPICAL BANK PROTECTION-TYPE 1
TYPICAL BANK PROTECTION-TYPE 2
DETAIL
OWNER
SOLOMON ISLAND GOVERNMENT
MINISTRY OF INFRASTRUCTURE AND DEVELOPMENT
CENTRAL PROJECT IMPLEMENTATION UNIT (CPIU)
PROJECT NAME
SUSTAINABLE TRANSPORT INFRASTRUCTURE IMPROVEMENT PROGRAM (STIP)
DETAIL DESIGN FOR RECONSTRUCTION OF GUADALCANAL PROVINCE BRIDGES
CONSULTANTS
DRAWING TITLE
STG-RECONSTRUCTION OF MONGAA BRIDGE
CIVIL DRAWINGS - SHEET 2
TYPICAL ROAD SECTIONS AND SLOPE PROTECTION DETAILS

Appendix 8: Minutes of Meeting

Follow up consultation on the approved Mongga bridge project

Venue: Mongga community

Date: Monday 19th August 2019

Time: 1:00 – 3:00pm

Present:

The Consultation Team

1. Hon. Ishmael Avui – Member of Parliament for East Central Guadalcanal Constituency
2. Willy Kosa – Guadalcanal Province Works Officer
3. Primo Chapa – Social Safeguards Local Consultant – MID/CPIU
4. Steven Bunabo – MID/CPIU Community Liaison/Safeguards Officer

Introduction:

Meeting opened with a word of prayer from one Church Leader and also welcomed the four (4) member team and all community members who were present for the meeting.

The Team thanked all community members for attending the important meeting facilitated by MID rep Steven Bunabo.

Objectives (twofold):

1. The aim of the meeting is to inform community members and tribal leaders on updates regarding the tendering process towards the construction of the proposed high level bridge at Mongga River

2. To discuss grievances which might disturb the bridge project and how these issues can be solved collectively through proper avenues.

The Consultation Team then gave a brief awareness on the need for citizens/people to work together with the national government to provide the much needed services in both the urban/rural areas and how internal/tribal issues can hinder these important services which are meant to benefit communities.

Hon. Ishmael Avui

Delighted to be part of the important meeting. As the Member of Parliament (MP) for East Central Guadalcanal Constituency, he really supported the Mogga bridge project. It is aligned with the Constituency goal which is to improve road connectivity to further boost local productions, people's livelihood, standard of living and possible expansion of major development partners like the GPPOL Oil Palm operations. To achieve those, he appealed for his people to work together and settle whatever differences/disputes they have to ensure the implementation of the bridge project is done. He assured community members that his Constituency Office is and will be available to offer support whenever needed. Finally, he called on all constituents for understanding and unity to move forward this important development.

Guadalcanal Provincial Government (GPG)

The representative for Guadalcanal Province thanked Mongga and the surrounding communities for attending the very important meeting. He highlighted that the Guadalcanal Provincial Government (GPG) strongly supports the Mongga bridge Project. It will help to improve the level of development in the Eastern part of the Province. More opportunities will be made available through accessing of the needed services, markets, employment and livelihood. All these can only be achieved by working together. One thing for sure will impede such development is land dispute among tribal groups. He appealed for more cooperation to solve whatever issues through proper channels involving the Chiefly responsibilities. Finally, he assured community members that G Province is available to offer support whenever required on the process leading up to the awarding and constructing of the bridge.

MID

Primo briefly highlighted that MID on behalf of SIG will always make sure to work closely with Mongga community and especially the tribal groups helping with advices to solve internal matters in the form of claim submissions. He emphasized that tribal matters need to be solved according to customary practices and allow MID and its contractor to continue with the bridge project for the benefit of everybody.

Issues:

- A Chief named Alban raised his concern on the need for all tribal groups to be properly informed of every meetings held to discuss issues surrounding the Mogga bridge. He said often some of them always left out during meetings. It is quite unfair on them as they also have ownership connections to the land which accommodate the Mongga bridge
- There is need for all tribal leaders to come together and iron out their long standing disputes to allow the bridge project to continue without disturbances
- Any land dispute should be discussed and solved under the jurisdiction of the Aola House of Chiefs and not by MID
- Employment opportunities should be prioritized for locals and especially youths around Mongga and the surrounding communities whether directly under the Contractor or under any subcontracting arrangement such as on gabion works etc.
- It was highlighted that people have suffered long enough for the past thirty (30) plus years for being without the bridge especially during bad weather, emergencies and accessing of basic services.
- Landowners requested recognition from SIG for using of the temporary access road in a customary land. They claimed it is no longer a temporary but a permanent access road since the destruction of the previous Mongga bridge. Up to the present, the access road has continue to serve the travelling public of East Central Guadalcanal communities.

Way forward – Resolutions

- There was overwhelming support for the idea that all disputing parties should settle themselves through the Aola House of Chiefs to determine ownership, while at the same allow MID and its contractor continue with the construction process of the Mongga bridge. Majority of those attended agreed that this resolution must be upheld by all parties concerned.

- It was also agreed that should/if MID received any letter of dispute from any of the disputing parties, that will have to be returned for the tribal groups to settle. There was strong support for this process to be done.
- Community members who attended have indicated that they are looking forward to work together with MID and the awarded Contractor for the construction of the bridge project.
- Authorities (Hon Ishmael Avui, G Province and MID) appreciated the strong support shown by community members for the go-ahead-attitude towards the construction of the Mongga bridge and are committed to settle their own internal matters.

Meeting was successfully closed at 3:00 pm with a word of Prayer by a Church Leader.

Photos

Crowd who were present during the meeting

Hon. Ishmael Avui presenting his remarks

Mr. Primo speaking on behalf of MID

Mr. Kosa speaking on behalf of G Province


Maria Ngaua commonly known as the 'Iron lady' making her contributions


Another elder contributing during the meeting

ATTENDANCE LIST

Name of Project CONSTRUCTION OF MOLIGA BRIDGE-GUADALCANAL PROVINCE

Type of Meeting: follow up CONSULTATION

Place of Meeting: MOLIGA VILLAGE

Date: MONDAY 19TH AUG-2019

Time Start: 1:30 - 3:00 PM

Time Close- _____

No.	Names	M	F	Village/community Names	Status (eg; farmer, teacher etc...)	Contact (phone number etc....)
1	ROSAH		F	KADAVU		
2	MATILDAH		F	MONG		
3	ISAACH LEWA	M		GHOBUA	CHIEF	
4	PAUL MANEGALA	M		KOLIBI	CHURCH LEADER	
5	JOHN TAHABASOE	M		LASA		
6	JOHN	M		BULOKALAI		
7	REGINALD	M		KOMBI		
8	JOSEPH	M		FATUHA		
9	FRANK LALO	M		FATUHA	CHIEF	
10	GRACE					
11	NGELER DICK		F	BURUNI		
12	JOSEPINE		F	BURUNI		
13	NELSAH		F	BURUN		
14	FRANCISCA		F	NGALIKOLA		
15	MADALENA BOSA		F	BERELOGA		
16	JENNIFER		F	BURUNI		
17	LINDRA		F	MONGA		
18	WEDY		F	SKYLAN		
19	CHRISTINA		F	MONGA		
20	NOEL	M		OGARUKA		
21	SIMON	M		OGARUKA		
22	RACHEAL		F	ADELAIDE		
23	JACOB GALA	M		BEBE		
24	KAONI	M		CHILY		
25	JACK GALA	M		GHOBUA		
26	HARRYSON DICK	M	RR	BURUNI		
27	ROKLY	M		BURUNI		
28	HENRITA KEKU		F	NGALIKOLA		
29	HARRISON TUHA	M		AOLA		
30	LOLIA	M		AOLA		
31	RAMSI TUHA	M		BULOKALAI		
32	PATTSON	M		AOLA		

33	STEVEN JOE	M		BEBE		
34	ANDREW KOMU	M		OGARUKA		
35	COLLEN TAGABASE	M		BURUNI	CHIEF	
36	JOHN DERO	M		BERE		
37	JERRY MATEANA	M		OGARUKU	YOUTH LEADER	
38	GURA PUTEU	M		GHOBUA		
39	STEVEN IROGHO	M		MONGA		
40	BRENSON	M		MONGA		
41	NOEL FOX	M		BERELOGA		
42	OBEN	M		BERELOGA		
43	MOSES UPAINA	M		VUNUTHA		
45	PATRICIA GAMA		F	VUNUTHA		
46	SAGMANE	M		TETINA		
47	BELASIO VOTA	M		MONGA		
48	BRIAN LUSIA	M		KADAVA		
49	VOTA DAVID	M		BEBE		
50	CHARLES	M		AOLA		
51	NATHANIEL BOLI	M		ZION		
52	ROBERT SEPO	M		MONGA		
53	MICHAEL	M		BEBE		
54	JOHN VEKEVANA	M		BURUNI		
55	JOSEPH IROGA	M		BURUNI		
56	KALISTA RUGALE		F	ZION		
57	SILIVIA KITHA		F	KOMIDI		
58	JULIAN .T		F	MONGA		

SUSTAINABLE TRANSPORT INFRASTRUCTURE IMPROVEMENT PROJECT
SMEC International Ltd

Minutes of Meeting

Meeting with Disputing Parties Against MID MOU for Mongga Bridge Project

Date: Wednesday 3rd June 2020
Time: 10:00am
Venue: Tenaru Roadside Market Zone
Purpose of Meeting: To sort out differences between the disputing parties (landowners)

Present:		
	Moses Talau	Landowning Tribe Member/Mongga
	Moses U'upaina	Community Member/ Mongga
	Patricia Ghaua (Maria)	Landowning Tribe Leader/ Mongga
	John Gerea	Landowning Tribe Member/Ghaobata
	James Sikua	Landowning Tribe Member/Mongga
	Moses Vili	Landowning Tribe Member/Mongga
	Luke Mangariiria	Landowning Tribe Member/Mongga
	Joe Kelesi	Environment Specialist/SMEC
	Donald Raka	Safeguards & Gender Specialist/SMEC
	Ambrose Kirei	Asst. Resident Engineer/SMEC

Introductory Note

A Memorandum of Understanding (MOU) was signed between MID and the landowners of the east and west banks of the Mongga River where the proposed Mongga Bridge is to be installed. This MOU was signed on 16th January 2018. **The MOU was later disputed because allegedly, the tribal leaders and lead landowning members were not included.** Furthermore, the disputing party demanded the MOU be amended and must EXCLUDE those community members who are not landowners. A follow up consultation meeting was held on March 8, 2020 (by SMEC, CCECC and MID teams) and resulted in the disputing party allowing those who already signed the MOU to be maintained but still demanding that their names be included. Today's meeting was to request that the initial MOU be upheld and maintained as basis for project site possession by the appointed contractor to begin its mobilization arrangements. The reason is that it was noted at least two of the MOU signatories are members of the lead landowning tribe and it should be deemed as sufficient representation.

The following were discussed and agreed:

No.	Discussion/ Consensus	Action/Due
1	**Landowning tribe leader (Maria)** clarifies that her intention now is not to omit the names of those who initially signed the MOU with MID on Jan 16th 2018. She stated as community members and landowners, they would like the Mongga Bridge project to start as soon as possible but her concern is that she and her relatives were not being included as signatories to the MOU. Maria demanded an explanation from the SMEC team. The SMEC team explained that at least 2 of the lead landowning tribe members namely Felix Kenavia and John Gerea also signed in the MOU. SMEC team asked if these 2 signatories would be sufficient representation.	

2	**MOU without prejudice** – The landowners raised concerns that the MOU might be used by others in court against them in the future. The SMEC team advised that the MOU is only a documentary record verifying that the residents in the immediate surroundings of the proposed bridge construction have given their consent for properties to be removed and are aware of the proposed bridge construction. The MOU does not certify anyone as landowners and may not be useable in court.	
3	**MOA and Other Documents** – The SMEC team explained to the landowners that apart from the MOU, the community, landowners and property owners will likely sign a separate memorandum of agreement (MOA) with the contractor (CCECC). The MOA is internal to the contractor for their access roads, camp site and any other storage areas. The MOU is only for the actual bridge site (working area). The contractor will therefore deal directly with the land and property owners on any related matters such as tree crop payments, rental and so on.	
4	**Plans for Site Visit with CCECC 4th June 2020** – The landowners agreed to accompany the CCECC team, the MID and SMEC teams to visit and witness the contractor's proposed site access road and camp site.	ALL
5	**Agreement to Original MOU as basis for Site Possession** – On behalf of the lead Land Owners, Maria stated her agreement that the MOU signed in 2018 as talked about earlier (point 1 above) can now be applied without need for any amendments. It was stated that they, as landowners now fully understand the purpose of the MOU. Therefore, the MOU and the project site is no longer in dispute. The landowners now look forward to dealing with the contractor for their access, site camps and other matters separately.	
6	**Word of Thanks** – The SMEC team thanked the landowners for their understanding and agreement to the original MOU signed between them and the MID.	

No other business was discussed.

The meeting closed at 11:12am

Signed: _____
For SMEC Team

Signed: _____
For Mongga Landowners

Signed Attendance Sheet is attached to this Minutes of Meeting

03/06/20

ATTENDENCE LIST

NAMES	Sign.
MOSES TALAU	Moses
MOSES U'PAINA	MARIA Gaua
PATRICIA GHAUA	
JOHN KEREA	John Kerea
JAMES SIKUA	
MOSES VILI	Moses
LUKE MANGARIRIA	Luke
Ambrose Kuri (SMEC)	
Donald Raka (SMEC)	
Joe Kelesi (SMEC)	

Appendix 9: Due Diligence Report

Sustainable Transport Infrastructure Improvement Project

(STIIP)

Contract for the Reconstruction of Mongga Bridge in North Guadalcanal, Guadalcanal Province, Solomon Islands

Contract Number: TI-GP 12/19 CTB C44/19

Due DILIGENCE REPORT

Introduction

This due diligence report has been prepared by the safeguards team of SMEC for the Central Project Implementation Unit (CPIU) of the Ministry of Infrastructure Development in order to address social and resettlement issues arising from the Mongga Bridge Reconstruction Project.

The report steps through the various elements of due diligence carried out in order to ensure that the project is ready for transmission to the procurement section and a Safeguards birth certificate can be checked by the Chief Safeguards Officer, CPIU.

The issues discussed are as follows:

- Community Profile
- Consultation

- Signing of Memorandum of Understanding (MOU) and Memorandum of Agreement for Access to Land
- Third party Validation if applicable
- Gender intervention with Community
- Inventory of Non - Land Assets
- Other Issues

1. Community Profile

Population and Demography

The population count for Mongga Community is approximately 300 people. Households is 50-60 approximate

History of the road section from Mbokokimbo to Mongga.

The road reached Mbokokimbo in 1975. In 1976 extension of road began and reached Mongga in 1977. And later in 1978 wooden bridge was constructed at Mongga but soon collapsed in 1980. During those years, gravel materials is free.

Housing

The housing is mostly semi- permanent though very few are corrugated roofing. However, most houses were built with bush materials and sustains livelihood for past generations. Villages were sparsely located. Few houses were located on the downstream side of the bridge.

Education

There is a primary school closest to Adeade Bridge, seaward side approximately 2km from Mongga Bridge.

Economy

Community is mostly engaged in crop farming; while few farmers are engaged in cocoa and copra. Farmers sell products in Honiara which is the only source of income. There was no Canteen operating within the area. This shows that community have less cash and therefore the daily economic activity is low.

2. Consultation

There have been several community consultations carried out for Mongga communities by CPIU Safeguards. SMEC and CPIU arranged a major consultation with Mongga and nearby communities on 15th November 2019. The purpose of the was to meet with the community and inform them about the project for the reconstruction of Mongga Bridge. The issues discussed were noted for action. Payment against standing crop and property was few of the concerns raised. The Meeting was attended by people representing nearby villages including the Mongga village. Further, consultation with the disputing parties was held on 3rd June 2020, and consultation with the APs on 27th July 2020.

3. MOU/MOA For ACCESS TO LAND

The documents are listed as follows:

- Deed of settlement
- MOU for Mongga Bridge
- Access to landing (MOA)
- Access to camp sites (MOA)
- Site Possession

4. Planned Gender intervention

Water supply has been an issue that needs to be addressed. Men, women and children used Mongga River for bathing, washing, cooking and dug river bank for drinking water. The Contractor is committed to build boreholes for Mongga communities to address water issues that women and children are facing .

Also, the Contractor will construct the Gender facility for men, women and children. This is to address the need of the traveling people to and from Honiara.

5. Third Party Validation

Negotiation for use of the landing site and the campsite was done by CPIU and SMEC. The premier of Guadalcanal Province and his executive and the provincial police operation team were involved. Thisled to the successful signing of the MOAs for campsite and landing site. Third party validation is, therefore, not required.

6. INVENTORY OF NON-LAND ASSETS

There are crops at both sides of the bridge approaches . Below is a list of APs, their affected crops and rates based on the Solomon Islands government rate. The assessment was done on 2nd March 2020 by CPIU, SMEC and Guadalcanal Province Agriculture Department.

Table 13: Crops at Western End Approach

Famers Name/Property OWNER	Name of Crop	Crop Status	Number of Crop	Sig Compensation rate	Total Cost
Western End Approach					
1. Rinaldo Manelivu	Cocoa	Bearing	100 Bottoms	$250	$25,000.00
	Breadfruit	Bearing	3	$50/tree	$150.00
				Total	**$25,150.00**
2. Jeffery Ghaua	Cocoa	Bearing	41 Bottom	$250/mature plant	$10,250.00
	Coconut	Bearing	12 bottoms	$150 per palm	$1,800
	Kapok	Mature	2 bottoms	$50 per tree	$100.00
	Cut Nut	Bearing	7 bottoms	$50 per tree	$350.00
	Betel nut	Bearing	3 bottoms	$30 per palm	$60.00
	Pandanus	mature	5 bottoms	$20 per bottom	$100.00
	Pomelo	Bearing	2 bottoms	$30 per tree	$60.00
	Golden apple	Bearing	1 bottom	$20 per tree	$20.00
				Total	***$12,990.00***
Eastern End Approach					
3. Enderlin Ricky	Potato mount	Newly planted	392mounds	$1per cuttings 0 – 2mths old	$392.00
	Banana	Bearing	13bottoms	$15. Per bearing	$195.00
				Total	**$587.00**
4. Belasio Vota	Banana	Bearing	26 bottoms	$15/bearing	$260.00
				Total	**$260.00**

Famers Name/Property OWNER	Name of Crop	Crop Status	Number of Crop	Sig Compensation rate	Total Cost
5. Theresa Ghaokangelea	Banana	Bearing	27bottoms	$15/plant	$405.00
	Potato mount	Bearing /harvest	64 mount	$10/mount	$640.00
				Total	**$1,045.00**
6. Matilda Saburua	Breadfruit	Bearing	14	$50/tree	$700
	Korokua	Bearing	11	$30/leaf	$330.00
				Total	**$1,030.00**
7. Salome Ghaua	Banana	Bearing	2 bottom	$15/bottom	$30.00
	Cassava	Bearing	4	$10/mount	$40.00
	Potato mount	Bearing/harvest	210 mount	$10/mount	$2,100.00
				Total	**$2,170.00**
8. Christina Mane	Potato mount	Bearing/harvest	150	$10/mount	$1,500.00
	Cassava mount	Bearing	20	$10/mount	$200.00
	Sugarcane	Harvest	3	$5/mature plt	$15.00
				Total	**$1,715**
9. Erick Ngelerongoe	House		1	**Total**	**$3,500.00**
				Grand Total	***$48,447.00***

7. Other issues

MID had set aside fund to be paid to property owners for Non-land assets. Payment will be made to property owners when work commences.

8. Appendices

Annex 1: MINUTES OF MEETINGS

Project: Reconstruction of Mongga Bridge.
Project number: O2 TSB CSC (TSB CS8/17)
Attendee: SMEC safeguards and MID safeguards
Date: 27-07-20
Place: Mongga Bridge
Purpose: To finalise the property owner's list for affected crops on both ends of Mongga bridge

Item	Responses
Cut-off date Notice for crop inventory	A formal Cut-off date notice was issued to the property owners on 22nd July at Mongga. The notice was explained and property owners responded positively.
Confirmation of inventory	The process of recording affected crops is done by visual counting with the help of crop owner and confirmed together the total quantity. After recording, the list then read out to the owners one by one. The property owners now confirm the quantity and crop type by owner.
Crop owners and DEED of Settlement	All the property owners have agreed with the recording and confirmation of their crop. They have signed as indicated in the DEED OF SETTLEMENT.

Follow up	1. Finalised property list to be submitted to G/province for revised rates. 2. Revised rate to be submitted to MID. 3. Approved rates for payments to be shared with property owners before actual payment 4. Prepare a consent letter for property owners for which bank account they prefer. 5. Payment to be processed into preferred bank account

Revised List of property Owners
Date: 22 July 2020
Location: Eastern End of Mongga Bridge.
Crop Inventory by: MID/CPIU safeguards- Steve Sae
SMEC safeguards - Joe Kelesi and Donald Raka

N0.	Name	Crop type(Name)	Status	QTY
1	Theresa GHAOKANGELEA	Banana	bearing	27
		Potatoes mount	Bearing	64
2	Enderlin RICKY	Banana	Bearing	13
		Potatoes mount	Bearing	392
3	Matilda SABURUA	Breadfruit Tree	Bearing	14
		Korokua	Bearing	11
4	Salome GAHUA	Banana	Bearing	2
		Cassava mount	Bearing	4
		Potatoes mount	Bearing	210
5	Christina Mane	Potatoes mount	Bearing	150
		Cassava mount	Bearing	20
		Sugar cane	Bearing	3
6	Belasio Vota	Banana	Bearing	26

MONGGA BRIDGE STAKEHOLDERS AND COMMUNITIES MEETING
Sunday 7th March 2021
Mongga Market

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1. Meeting Purpose

This meeting was organized purposely for stakeholders to form a panel and the key objective of this panel is to collectively address any community concern(s) that might be still stands as an obstacle to the progress of the Project. People of different sectors in the Communities and of all ages including women and children attended this meeting. This meeting basically provide an opportunity for them to raise whatever concern they see from their side that still stands as an obstacle to the project.

Figure 27: Stakeholders Meeting

Figure 28: Stakeholders Panel List

Stakeholders Panel List					
No	Stakeholders	Stakeholders Rep	Title	Sex	
				Male	Female
1	Members of Parliament	Hon. Ishmael Avui	MP for East Central Guadalcanal Constituency	Male	
		Hon. Bradley Tovosia	MP for East Guadalcanal Constituency	Male	
2	MID	Primo Chapa	MID (Liaison Officer)	Male	
		Usenio Tadagao	MID (Liaison Officer)	Male	
3	SMEC	Steven Vaji	SMEC Engineer	Male	
		David Esibaea	SMEC Engineer	Male	
4	CCECC	Huang Pengfei	CCECC Country Manager	Male	
		Liu Baodong	CCECC Project Manager	Male	
		Chen bo Ting	CCECC Chief Engineer	Male	
		Ruth Taupiri	CCECC (Liaison Officer)		Female
5	CAC	Frank Lalo	CAC Chairman	Male	
		Alfred Mangale	CAC Vice Chairman	Male	
Total Male and Female				11	1
Total Panel member				12	

2. Welcome Remark

The meeting was chaired by the CAC Chairman Mr. Frank Lalo. In his Welcome remark, he welcomed the two Honorable Members of Parliament for availing themselves to attend the meeting. He also welcomed the stakeholders including MID, SMEC, CCECC, CAC Members and the community members at large, including Church Leaders, Chiefs, Village elders, Women Leaders, youths, and women and children.

3. Members of Parliament Remark

(I) Hon. Ishmael Avui's Remark

In his introduction remark to the meeting, Hon Avui highlighted that his constituency and especially the people around Mongga and Aola area are so privileged to have the Solomon Islands Government through the Ministry of Infrastructure Development and Aid Donors agreed to fund the Mongga Bridge, which once completed will increase the value of Aola Ward and the constituency at large. This means investors, Development Partners and government agencies will be interested to do business and other developments in the area. Therefore, he encourages each and every one in the community to respect the contractor and all other stakeholders concern who will be there to build the bridge.

(ii). Hon. Bradley Tovusia's Remark

Hon Bradley Tovusia highlighted that under his Constituency Development Plan, a 60 km road in his Constituency and Mongga Bridge is very important for the connectivity of road from constituency to Honiara. He also reveals that road connectivity around whole of Guadalcanal Province was raised in Caucus meeting as well as in Parliament Meetings.

4. Points of Discussion

(i) Boreholes

Primo Chapa informed the meeting that the Contractor as budgeted for, will only cater to make two (2) boreholes. Hon. Bradley Tovosia explained that in his capacity as Minister for Mines, Energy and Rural Electrification (MERE) will assist with additional bore holes as requested by the community. He assured the meeting that his Ministry have the machine for drilling borehole, so he will discuss with his Ministry's Permanent Secretary (PS) for an arrangement to undertake this request.

(ii) Employment

The contractor will increase local employment when Bridge construction starts, the number of unskilled worker will not stable but will decrease or increase depending on the need during construction.

Hon. Ishmael Avui as their Member of Parliament highlighted that people should not be so concerned if they did not have an opportunity in this project, because it's only for a short term, looking at the Project Time Frame it's only about ten months left. He emphasized that the most important thing is for the community to provide an enabling environment for the successful completion of the bridge. He assured the community that he will be giving out projects for individuals after Parliament passes the Budget.

(iii) Security and Disturbances

It has been a growing concern for almost six (6) months now for the contractor (CCECC) and other stakeholders (SMEC,MID and CAC) concerning the continuous

disturbances and anti-social behavior at the camp site, the construction site as well as along the way to the project site.

As a result, a resolution (Resolution No. 2) was reached in a Community Advisory Committee (CAC) meeting on 23rd/2/2021, that all illegal beer and Kwaso (locally brewed alcohol) outlets must be reported to the Royal Solomon Islands Police Force (RSIPF) to immediately take necessary action to cease their operation as a way forward to discourage unwanted behavior.

This resolution was also discussed with the whole community in this meeting which received overwhelming support to stop these illegal beer and Kwaso outlets. Hon Ishmael Avui assured the community that he will summit a request to the Police Commissioner (RSIPF) to deploy additional police officers to provide security on site.

(iv) Safety

Community Safety at the Camp and Construction Site is one of the concern raised by SMEC Safeguard Officer (Mr. Donald Raka) during the Community Advisory Committee (CAC)
On 23rd/ 2/2021, as a result a resolution was reached (Resolution No 4), stated that, No market house, canteen, etc. within the area of 100m around the camp and construction sites."

This was also raised in this meeting, the panel informed the community, about the high risk for accident during construction, as heavy machines will be moving to and from the camp site, construction site and gravel site.

With that, the community agreed to relocate the market to a new site, since the current market locates along the road just opposite the camp site. Community Advisory Committee (CAC) and community leaders will identify the new site and the contractor agreed to assist for clearing the new site.

(v) Sports

Hon. Ishmael Avui highlights that engaging youths in sport activities is another way forward to control antisocial behavior. He commended two soccer teams from the area who performed really well in the previous constituency tournament.

Based on this understanding, the meeting jointly agreed to clear two playing field for the communities. Hon. Avui will supply soccer ball, basketball and other sport equipment, the contractor (CCECC), agreed to contribute machines for site clearance and other work that needs machines, Land owners agreed to allocate land for this play grounds.

5. Resolutions.

(I) Contractor to construct two boreholes as catered for in the Project's BOQ, Hon Bradley Tovusia will assist with additional boreholes requested by the community.

(ii) Employment should not be a major concern as from now and on, as a common understanding was established, that the contractor will employ more or less local workers depending on the need for unskilled workers needed during construction. Hon Ishmael Avui through the Constituency Development Plan will give individual projects.

(iii). The MPs will submit a request to the Commissioner of Police to deploy additional police officers to the project site to improve security issues and to take necessary steps to stop all illegal bottle shops and kwaso out lets.

(iv). To improve community Safety around the camp site, the current market will be relocated to a new area, the parties have roles to play as mentioned above.

(v) As an additional way forward to control youth antisocial behavior, two sport fields will be constructed for both boys and girls.

Annex 2: MOU FOR MONGGA BRIDGE

Annex 3: MOAs

1. Campsite
2. Landing site .

Appendix 10: Establishment of Community Advisory Committee

Sustainable Transport Infrastructure Improvement Project
(STIIP)

Contract for the Construction of Mongga Bridge in North Guadalcanal, Guadalcanal Province, Solomon Islands
Contract Number: TI-GP 12/19 CTB C44/19

CAC Establishment Report

Employer: Ministry of Infrastructure Development (MID)
Contractor: China Civil Engineering Construction Corporation (the contractor (Solomon) Ltd)
Engineer: Snowy Mountain Engineering Corporation (SMEC International Pty Ltd)

1. Introduction

This brief CAC establishment report is prepared by SMEC safeguards for the Central Project Implementation Unit (CPIU) of the Ministry of Infrastructure Development as a mechanism for addressing social and environmental issues may arise during the Mongga Bridge Construction Sub- Project.

The CAC was formally established at Tetere Police Station, North East Guadalcanal on 26th of August 2020. The establishment of CAC was done together with CPIU/MID Safeguards and SMEC.

2. The process for CAC establishment

Notification letters have been sent one week earlier to pre-selected members of CAC.

All pre-selected members arrived at meeting site – Tetere Police Station

ESTABLISHMENT

OF

COMMUNITY ADVISORY COMMITTEE (CAC)

Venue: Tetere Police Station Date 26th August 2020

Time Activities Resources

Main Facilitator of the Program: Joshua Kera

10:30 am ------ Opening Prayer --- community Rep

10:40 am ----- Welcome Speeches – Chiefs and MID

10:40 am ------Introduction --------- All

10:45 am ------ Understanding of role of MID. – Primo chapa

11:00 am ----- CAC introduction ----- MID safeguard – Primo Chapa

11: 30 am ----- Formation of the CAC Executive -

12:00 Noon ---- CAC Adaptation

12:30 pm ---- Lunch and Rest

1:30 Pm Scope of work------ Chris or the contractor

2:45 pm --- History of contractor / contract Management/ camp site management/ traffic Management/ sub - contracting - the contractor Rep

2:00 pm ---------- Law and Order - RSIPF

2:30 pm---------- Road act and Road Traffic SAFETY – Primo Chapa

3:00 pm ---------- Leadership and Governance – Primo Chapa

3:30 – Pm -------- Environment – Steve Sae

4:00 – pm ------- The Solomon Island Road act

4;15 Pm - workshop Participants Rap up – Everyone

4:30 pm ---------- Closing

3. Order of CAC establishment program

1. Opening prayer.

2. Welcome & introduction.

3. Election & formation of CAC executives i.e., Chairman, Vice-Chairman & Secretary. The remaining participants become ordinary members of CAC.

4. Presentation of CAC Guideline to all participants.

5. Adoption of the CAC Guideline – all members including Chairman, Vice-Chairman & Secretary signed the adoption form in the CAC Guideline

6. Awareness on Road care and Safety, Community Policing (law & order) and HIV/Aids/STI by MID Safeguards officers, awareness on environmental and social impacts of the bridge construction and the relevant mitigation measures by MID officer.

7. Contractor's presentation on their Plan of work

8. Closing prayer.

4. CAC Members

Gender composition	
Male	**Female**
8	4

8.0 ADOPTION OF THE GUIDELINE

This Guideline was adopted by members of the CAC of Monga Community

Advisory Committee presented at the Inaugural Meeting held

at: Tetere Village on the: 26 day of: August 2020

Signed:

No	Name	Position in Community/Village/Tribe	Signature	Village	Contact
1	Frank Lalo	Chairperson	[signature]	Patima	7509840
2	Alfred Laea	Vice-Chairperson	[signature]	Komarika	8758745
3	Frank Maneka	Secretary	[signature]	Kadavu	7261820
4	Philip Mauka	Member/	[signature]	Goth Sumer	7400675
5	Kalisto Noel	Member/	[signature]	Ruavatu	8648401
6	James Iroga	Member/	[signature]	Burani	8912356
7	Rinaldo M	Member/		Monga	
8	Tenesis Collen	Member/	[signature]	Buruni	7510878
9	Matilda Sahu	Member/	[signature]	Monga	
10	Jumahmoati	Member/	[signature]	Tasiboko	8602554
11	James Mav	Member/	[signature]	RSPF	7761143
12	Regina Gatu Pala	Member/	[signature]	GPPOL	8491008
13		Member/			
14		Member/			
15		Member/			

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Photos

Appendix 11: List of Ratified International and Regional Treaties and Agreements

Name	Status	Purpose/Aim	Solomon Island Agency Responsible
International and Regional Agreements			
Pollution Protocol for Dumping at sea.	Ratified 10/9/98	Prevention of pollution of the South Pacific region by dumping.	MFMR and ECD
Pollution Protocol for Emergencies.	Ratified 10/9/98	Cooperation in combating pollution emergencies in the South Pacific region.	MFMR and ECD
Natural Resources and Environment of South Pacific Region (South Pacific Regional Environment Program - 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
Waigani Convention on Hazardous and Radioactive Wastes (1995).	Ratified 7/10/98	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			
Liability for Oil Pollution Damage.	Ratified	Strict liability of ship owner for pollution damage to a coastal state within a certain amount.	MFMR
Marine Pollution Convention (London).	Ratified	Prevention of marine pollution by dumping of wastes and other matter.	ECD and Foreign Affairs
Desertification (UN Convention to Combat Desertification).	Acceded 16/4/99	Agreement to combat desertification and mitigate the effects of drought in countries experiencing drought or desertification.	Agriculture Division
POP's Convention (Stockholm).	Acceded 28/7/04	Protection of human health and environment from persistent organic pollutants.	ECD and EHD
Biodiversity			
CITES.	Ratification underway	Regulations and restriction of trade in wild animals and plants through a certification system of imports and exports.	ECD
World Heritage Convention.	Ratified 10/6/92	Protection of sites of Outstanding Universal Values. Solomon Islands currently has East Rennell Island as a World Heritage site.	ECD and National Museum
UN Convention on Biological Diversity.	Acceded 3/10/95	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
Cartagena Protocol on Biosafety.	Acceded 26/10/04	Protection of human health and the environment from possible adverse effects of the products of modern biotechnology, especially living modified organisms while maximizing its benefits.	ECD
Climate Change			
Montreal Protocol.	Acceded 17/6/93	Allows phase out of substances that deplete the ozone layer according to a fixed implementation schedule.	ECD and Energy Division
Ozone Layer Convention.	Acceded 17/6/93	Protection of the ozone layer through intergovernmental cooperation on research, systematic observation of the ozone layer and monitoring of chlorofluorocarbons production.	ECD and Energy Division
Climate Change (UN Framework Convention on Climate Change).	Ratified 28/12/94	Sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change.	Climate Change Division
Kyoto Protocol.	Ratified 13/3/03	Reduce greenhouse gases especially CO2 for the 39 industrial/developed countries by an average of 5.2% by 2012.	Meteorology Division MECDM

Name	Status	Purpose/Aim	Solomon Island Agency Responsible
MFMR = Ministry of Fisheries and Marine Resources. MECDM = Ministry of Environment, Climate Change, Disaster Management and Meteorology. ECD = Environment and Conservation Division – MECDM. EHD = Environmental Health Division – MECDM.			

Appendix 12: List of Terrestrial Protected Areas within the Solomon Islands

Province	Protected Area	Size	Flora Biodiversity	Fauna Biodiversity
Guadalcanal	Lauvi Lake	200 ha	Floating meadows include three species of Cyperaceae. Extensive areas of pandanus, beach side dominated with fu'u Barringtonia asiatica. Other species are also common in the community e.g. Hibiscus tiliaceus. Thus, there are also many other species growing around the areas (Less, 1990).	Outstanding habitat for crocodiles. Wetland birds and the Australian dabchick which was a new record for the Solomon Islands. About 40 bird sp. are found (nine endemic to the Solomon Islands)
	Itina Popomanaseu	30,000 ha	6 species (sp) of pioneer trees located on gravel beds of braided river sites e.g. salu; *Casuarina equisetifolia*. On slightly higher ground, 5 sp. of trees are common e.g. Akwa. Evident at the ultra-basics are mudi; (Dillenia crennata). Common in montane forest are trees of non-flowering plant family, Podocarpaceae including 3 sp and 5 sp of the Myrtle family. The four epiphytic rhododendrons that are uniqiue to Solomon islands are all found on peaks of the proposed protected area and the endemic mountain shrub, Vaccinium (Less, 1990)	Habitat for many animals incl. four bird species endemic to Guadalcanal and the Guadalcanal endemic giant rat (*Uromys imperator*). 1990 mammal survey of Mt Makarakomburu found a new sp. of bat along with nine other bat sp., four frog and eight reptile sp. Thirteen bird sp. were recorded incl. rare Guadalcanal Honeyeater (*Guadalcanaria inexpectata)*. Mt Popomanaseu is only place in the Solomon Islands where terrestrial molluscs have generated endemic montane species. Restricted to these mountains include arboreal *Placostyllus selleersi* and undescribed sp. Helixarion and Trochomorpha. Birds of the Tina River proposal area recorded 44 bird sp., 13 are known to be endemic sp. in the Solomon islands (Less, 1990).
Western	Marovo Lagoon	70,000 ha	5 principle forest types. Lowland forest, small island and barrier island forest, mangrove forest, montane forest and heaths.	52 sp. of land and fresh water birds and 9 species are endemic to the lagoon. 10 species of Sea and shorebirds.
	Kolombangara	All forest above 460m (70,000 ha is the island	12 principle species of forest trees and moss covered montane forest caps (Less, 1990)	Richest avifauana with 80 species recoded. 2 species are confined to montane forest and are unique to the island. (Less, 1990).
	Rendova	The island 40,000 ha	Common Montane forest trees species are Casuarina papuana, lower altitude forest predominance of Camnosperma revipetiolatum, Others include mosses, palms, pometia pinnata, pterocarpus indicus. (Less, 1990).	Support unique white eye species Zosterops rendova. Crocodiles are evident in lakes and lagoon. Two species of frogs have been recorded from Rendova (Less, 1990).
	Faroro Islands - Shortlands	?	Dominated by *akwa Pometia pinnata*, *Vasa Vitex cofassus* and	Best nesting sites for turtles. Presence of Skink Triblonotus ponceleti known from only tree

Province	Protected Area	Size	Flora Biodiversity	Fauna Biodiversity
			Canarium salomonense. Smaller trees include Myristica sp., laelae Celtis phillippnensis, Crytocarya Litsea sp (Less, 1990).	specimen, two from Shorthlands and one from Bougainville (Less, 1990).
Choiseul	Mt. Maetambe	22,500 ha	Dominate tree species akwa and Vasa. These two trees and Laelae are characteristics of valley bottoms, on ridge crest Eugenia sp., buni and kaumau Calophyllum sp. are common. (Less, 1990).	Seven sp. of frogs, one endemic sp., two rare butterfly sp. Presence of three giant rats, two of which are new record, 26 bird species with 6 are endemic (Less, 1990).
	South Choiseul	30,000 ha	Different forest composition from Ysabel and Guadacanal growing on ultra-basic rock. Forest is species poor with an open canopy and straggling emergent trees over dense undergrowth of pandanus, gingers, ferns and climbers. Mangrove forest found Ologholata in the north of the proposed reserve (Less, 1990).	Crocodiles are evident. Has significant nesting beach for turtles. Forest growing on ultra-basic rock noticeably has low bird numbers. 35 bird sp., 11 are endemic (Less, 1990).
	Mt Televodo	?	The features are closely similar to the description given for the limestone forest cover occurring in Mt Maetabe (Less, 1990).	The features are closely similar to the description given for the limestone forest cover occurring in Mt Maetabe (Less, 1990).
Isabel	North western Isabel	120,000 ha	Peninsula dominated with kekete (Campnosperma brevipetiolata) indicating exposed to prevailing high winds and cyclones. Akwa, vasa, andoa, lu usi are also found on ridges that run through the peninsula. Where slopes are fa alo, bamboo, gingers and Macaranga sp. Akwa is common in lowland forest. Smaller trees include Agaia spp, ai aasila (Neoscortchhinia forbesii), laelae, Myristica sp, palms and pandanus. Patches of beach forest containing 5 species of trees (Less, 1990).	Crocodiles were evident. It contains 65% of nesting sites of green andhawksbill turtles. Sea eagles, Brahminy kite, osprey and terns are also evident. Migratory birds use the islands and tidal flats as resting and feeding area during November to January e.g., whimbrel Numenius phaeopus (Less, 1990).
	Mt Kubonitu	?	Supports montane forest with ailumu Dacrydium xanthandrum, akiri Ochrosia sp, koadila pemphis acidula and Eugenia spp. (Less, 1990).	Meeks lory Charmomosyna meeki, white rumped swiftlet Collocalisa spodiopygia, pigmy parot Micorspitta finschii, Melanisian gray bird Coracina caledonica and the golden whistler Pachycephala pectoralis.(Less, 1990).
	Casuarina swamp	2,500 ha	Dominated with hardy malasalu Casuarina papuana and Dacryduim xanthadrum. On swapy grounds Calophyllum	Is designed for the forest.

Province	Protected Area	Size	Flora Biodiversity	Fauna Biodiversity
			vexans, bou Fagrea gracilipes and gwarogwaro Calophyllum vitiense. Ferns and Savanna (Less, 1990).	
Makira	Central – Bauro highlands	350,000 ha	Akwa dominate lowland forest and lower hill slopes. 8 sp of trees are also common in this zone e.g Rosswood. Above the zone where akwa is predominant 6 sp of trees are common e.g. abalolo. Common small trees are Myritica sp. and aisubu Pimeliodendron amboinicum. Above 700 m 5 sp. of trees are common eg aitootoo (surukakahu) Weinmannia blumei, Cyathea tree ferns and palms are also common. At highest altitude montane forest is found with 8 different spp of trees. Forest floor is covered with moss (Less, 1990).	Several of Makira's endemic sp are restricted to the mossy cloud forest of the highest ridges eg Keea (Makira mountain tail), waisure (Makira ground trash), ghoghoharighi (shade warbler) and the dusky fantail are found in these forest and nowhere else in the world. 49 Birds recorded, 5 endemic to Solomon and 5 endemic to Makira (Less, 1990).
	Western wetlands	2,50 ha	A tall mixed swamp forest featuring dafa Terminalia brassii and rufa Eugenia tierneyana on wet land edges. In the wetted parts of the swamps pandanus, bamboo and ferns form a complete cover one to three meters high (Less, 1990).	No information provided.
Malaita	Central Highlands	12,500 ha	Common in the lowland forests are 4 sp. of trees eg akwa, rosswood and vasa. On lower riverine terraces 3 sp. are alsocommon e.g., lamilami, liki and akwa (Less, 1990).	57 bird sp are recorded, 9 endemic to Solomon islands, 13 endemic to Malaita (Less, 1990).
	Maramasike Ar'are	150,000 ha	Large figs and 11 tree sp e.g. akwa are common at the end of the maramasike passage. The hill forest behind both Maramasike and Are'are commonly features 7 of the species mention above together with 5 other sp e.g. Cryptocarya sp. (Less, 1990).	Excellent habitat for crocodiles. About 60 bird sp. are recorded, 7 endemic to Solomon islands and 10 endemic to Malaita (Less, 1990).
Temotu	Kauir Reserve	200 ha	Kauri Agathis macrophylla in the Solomon islands is found only in Temotu Province (Less, 1990).	