Environmental Assessment and Review Framework

November 2020

SOL: Urban Water Supply and Sanitation Sector Project (Additional Financing)

Prepared by Solomon Islands Water Authority, trading as Solomon Water, for the Asian Development Bank.

Environmental Assessment and Review Framework

Project No. xxxx

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Solomon Islands: Urban Water Supply and Sanitation Sector Project

Global Environment Facility - Climate Resilient Urban Development in the Pacific:

Honiara Watershed Management Project

Prepared by Solomon Water

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Abbreviations

ADB	Asian Development Bank
BCD	Bid and contract documents (for HWMP components)
CCP	communication and consultation plan (for the UWSSSP)
CMG	catchment management group
COLP	Code of Logging Practice (of Solomon Islands)
CSO	civil society organizations
CSS	country safeguards system
DSC	design and supervision consultant (for the UWSSSP)
ECD	Environment Conservation Department (within MECDM)
EHSG	Environmental, Health, and Safety Guidelines (of the World Bank Group)
EMP	environmental management plan
ESMG	environmental and social management guidelines
GEF	Global Environment Facility
GRM	grievance redress mechanism
HWMP	Honiara Watershed Management Project (this GEF project)
IEE	initial environmental examination
MECDM	Ministry of Environment, Climate Change, Disaster Management and Meteorology
MID	Ministry of Infrastructure Development
MOFR	Ministry of Forestry and Research
MOFT	Ministry of Finance and Treasury
NCCP	National Climate Change Policy 2012 – 2017
NDS	National Development Strategy 2017-2035
NGO	non-governmental organizations
PER	public environment report (under the CSS)
PES	payment for ecosystem services
PMU	Project Management Unit (in SW)
PPP	project participation protocol (key element of HWMP's SEP)
PSC	Project Steering Committee (for the UWSSP and HWMP)
SEMP	site-specific environmental management plan
SEP	stakeholder engagement plan (for the HCMP)
SW	Solomon Islands Water Authority trading as Solomon Water
SPS	Safeguard Policy Statement 2009 (of ADB)
UWSSSP	Urban Water Supply and Sanitation Sector Project (financed by ADB and World Bank)

CURRENCY EQUIVALENTS

(as of Nov 2020)

Currency Unit		Solomon Island Dollar (SBD)
USD 1.00	=	SBD 8.000
SBD 1.00	=	USD 0.120

Executive Summary

1. **Background**. The Solomon Islands is divided into nine provinces: Central, Choiseul, Guadalcanal, Isabel, Makira-Ulawa, Malaita, Rennell and Bellona, Temotu, and Western. Nearly one-fifth of its estimated present total population of 515,870 (2009 Census) lives in urban and peri-urban areas. The country's capital, Honiara City, is situated on the northwestern coast of Guadalcanal. The population growth rate is the highest in Guadalcanal (4.4%) followed by Honiara (2.7%), Western (2%), Central (1.9%) and Malaita (1.2%). Temporary and informal settlers are often not captured in the Census and at any one time the population of Guadalcanal can be closer to 150,000. In 2018, Honiara's municipal population was estimated at over 86,000 while the population of the greater Honiara area (GHA) —including the peri-urban populations of Tandai and Malango—is estimated at around 115,000. On average, GHA residents are both young and relatively poor. Honiara's poverty levels are higher than the national average, in part due to a higher cost of food and non-food goods and services. In GHA, most of the poor live in informal settlements. Making up nearly 25% of GHA's population, informal settlers live on marginal land such as river-banks, steep and unstable slopes, and on the edge of swamps, and therefore tend to be more exposed to natural hazards. Informal settlements also lack centralized urban services, notably water supply and sanitation.

2. The Solomon Islands Water Authority, trading as Solomon Water (SW), a state-owned enterprise, was created and mandated to provide for the proper management and development of urban water resources and wastewater services in Solomon Islands. SW has been guided by its Five-year Action Plan and 30-Year Strategic Plan since 2017. These plans outline the strategy to meet the demand for water and wastewater services up to 2047 for Honiara, including peri-urban areas, as well as meeting the needs of other major urban centers in Solomon Islands. In line with SW's plans, the Asian Development Bank (ADB) together with World Bank (WB), European Development Fund (EDF) and the Government of Solomon Islands (the government), have initiated the Solomon Islands Urban Water Supply and Sanitation Sector Project (UWSSSP) to help improve access to safe water and improved sanitation. To support associated matters including effective protection and management of the wider Honiara catchment, the Global Environment Facility (GEF) is financing the Honiara Catchment Management Project (HCMP) as a project under Climate Resilient Urban Development in the Pacific program. The HCMP fully support the overall objectives of the UWSSSP.

3. **Impact, outcome, and outputs of the UWSSSP**. To be implemented from November 2019 to June 2027, UWSSSP will seek to increase access to safe water and improved sanitation in urban areas increased with the outcome of efficiency, climate change and disaster resiliency, and sustainability of safe water and sanitation in the GHA being improved. The UWSSSP includes four outputs:

- **Output 1: Urban water supplies are continuous and safe**. Including: (i) expanding the surface water intake with additional 5 million liters per day (MLD) and upgrading water treatment plant capacity in Kongulai (15 MLD); (ii) building new 11 km treated water trunk mains in Mataniko and White River areas; and (iii) building three new reservoirs (12 million liters). Additionally, rehabilitating 10km water pipes, expanding 70km of new water pipes, and building 6,000 new metered connections. This output will also seek to reduce non-revenue water.

- **Output 2: Urban sanitation services are effective, efficient, and safe in GHA**. Including: (i) rehabilitating and upgrading three ocean outfalls and building two new ocean outfalls; (ii) building six new sewage pump stations and rehabilitating both King George VI and Point Cruz sewage pump stations; and (iii) building a new septage treatment facility (60 m3/day). The additional subproject will expand sewer systems by 7km to connect 3,000 new households.
- **Output 3: Enhanced and sustained awareness and behavior of hygiene and water conservation in GHA and five towns**. Including delivery of a gender-sensitive education program to raise community awareness about water conservation, environmental protection, and hygiene practices, including in informal settlements.
- **Output 4: Solomon Islands Water Authority is financially and technically sustainable**. Including: (i) preparing and implementing financial management policies, including tariff management framework and tariff review process; (ii) designing and implementing capacity building programs for SW staff, including technical training and on-the-job training; (iii) designing and implementing preventative maintenance programs and asset management; (iv) expanding SW's telemetry system; and (v) introducing and implementing SW personnel incentive schemes. Since SW is responsible for all urban water supply and sewage service, Output 4 will support SW to continue the recovery of its annual operations and maintenance costs, asset depreciation costs, and debt servicing costs.

4. **Catchment-wide issues and context for the GEF project.** Land in the catchments feeding Honiara's water supply has become increasingly degraded through unsustainable land use activities, in particular from commercial logging. Logging activities have increased over the past five years, causing a number of adverse impacts to watersheds, including greater turbidity and sediment loads, higher rates of runoff and landslides during rainstorms, and changes in seasonal flow regulation. Extreme rainfall is the main climate-related cause of worsening flooding and is projected to become more frequent and severe with climate change. Taken together, extreme rainfall and unsustainable logging practices will lead to worsening flooding in GHA's watersheds.

5. The GEF Least Developed Countries Fund will provide the necessary funding for treating turbidity in key rivers feeding the water supply and support improving the management of watershed areas that are vital to Honiara's climate resilience and current and future water supply. The HWMP will develop effective partnerships and build institutional, financial and technical capacity. SW will manage this work, as it has the authority to manage catchment areas for the purpose of protecting Honiara's water quality, per the Solomon Islands Water Authority Act. Improved watershed management, which includes improved forest management, is a key measure proposed to reduce the vulnerability of the water supply, and for safeguarding water quality for future water supplies.

6. **Institutional arrangements**. The Ministry of Finance and Treasury (MOFT) is the executing agency, while SW is the implementing agency for the Project. The project steering committee (PSC), with 11 members, is responsible for oversight and providing guidance and strategic direction to SW with respect to project implementation. SW has established a project management unit (PMU) to prepare and implement the UWSSSP. The PMU is responsible for overall project management, subproject delivery, safeguards implementation, and monitoring.

7. The PMU's organizational structure will eventually have eleven staff including the Project Manager, two environmental specialists (one national and one international), a resettlement specialist and land management officer to implement environmental and social safeguard requirements. The PMU's operation is funded from several sources. The PMU is supported by a design and supervision consultant (DSC) which will also include safeguards specialists.

8. To help manage the HWMP, two additional staff will be added to the PMU. The first is a full-time national consultant who will help SW manage the entire project. The second is an international catchment management/institutional expert who will focus primarily on Component 3 of the project. This person will initially be full-time and will then provide part-time targeted assistance after the second year of the project. The PMU will also be supplemented with additional safeguards resources for 18 months to ensure due diligence is undertaken in compliance with this EARF including screening of activities and components of the HWMP and if required, assessment and development consent application.

9. **Safeguards policy and legal framework**. The policy, legal, and administrative frameworks relevant to the UWSSSP and HWMP include: Environment Act 1998 (and Environment Regulations 2008) which provide the basis for environmental protection and management and establishes the Solomon Islands' environmental impact assessment system which is administered by the Environment Conservation Division (ECD) of the Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM). The Act identifies 'prescribed activities' which are considered to create environmental impacts and for which development consent must be applied for. The HWMP comprises two prescribed activities 9 (d) soil erosion and siltation control and 9 (j) watershed management.

10. **Environmental management requirements**. An environmental assessment and review framework (EARF) has been prepared to guide the screening, assessment and implementation of subprojects under the UWSSSP. This EARF is for the GEF project and establishes the procedures for environmental management that will be implemented to ensure that GEF activities proceed in compliance with the environmental safeguard requirements of the country safeguards system (CSS) and ADB's Safeguard Policy Statement 2009 (SPS) and are aligned with the EARF prepared for the UWSSSP overall. The EARF sets out the procedure for screening, impact assessment and management, and consultations. It contains guidance on: (i) identifying environmental impacts during the design and pre-construction, construction and operation stages, (ii) suggested mitigating measures, (iii) environmental assessment documents preparation, (iv) consultations and information disclosure, (v) grievance redress mechanism, (vi) institutional requirements and capacity development, and (vii) monitoring and reporting.

11. **Environmental risks and impacts**. This EARF covers the activities and works to be implemented through the HWMP. The activities of the HWMP are largely community driven and aimed at improving watershed management and while environmental impacts are expected to be positive overall, there are some risks that need to be managed. Some design stage risks and impacts include potential for benefit capture and risk of non-participation by some stakeholders (including women, people with disabilities and people from vulnerable groups) and impacts during implementation include health and safety, biosecurity risks and need to prevent and control spread of introduced and alien species, .waste management, labor matters and potential for increased access to areas facilitating poaching hunting of threatened and/or vulnerable species.

12. Environmental and social management guidelines (or outline environmental and social management plan (ESMP) included in the environmental assessment if one is required), will be included in bid and contract documentation for the works and activities. The guidelines or ESMP will be provide the details on how the environmental management requirements for specific activities and sites during the implementation phase will be complied with and managed on-site.

13. **Stakeholder engagement.** As with the overall UWSSSP, there is a need to address requirements for stakeholder engagement, consultation and information disclosure in the design and implementation of the GEF project. Information to be disclosed to stakeholders may include project overview, subproject technical details, anticipated implementation schedule, participation opportunities, and potential construction issues. A consultation and communication plan (CCP) has been prepared for the UWSSSP and a stakeholder engagement plan (SEP) has been prepared for the GEF Project. The SEP will guide the information to be communicated to stakeholders and beneficiaries, and the consultations required to be undertaken prior to and during implementation of the GEF activities. The SEP will be updated as the need arises. The SEP also identifies the disclosure requirements for project information including safeguards due diligence documents.

14. **Grievance redress**. The UWSSSP has established a grievance redress mechanism (GRM) to address and resolve any issues and concerns raised and covers all aspects including land access and environmental matters. The GRM is based on traditional methods of settling disputes including the local laws and regulations and ADB and World Bank. The GRM will apply equally to the GEF activities.

15. **Monitoring and reporting**. The requirements and procedures for environmental and social monitoring and reporting are identified in this EARF and will be included in the project administration manual (PAM) prepared for the HWMP. The requirements cover all phases of project implementation. The specific provisions for monitoring will be identified in the: (i) design of activities, (ii) bidding documents, and (iii) implementation/construction contracts. Reporting will include implementer/contractor monthly reports, PMU's quarterly progress reports and semi-annual monitoring requirements.

1 Introduction

1.1 Background

1. **Country location**. The Solomon Islands comprises a double chain of 992 islands (volcanic and coral atolls) that forms an archipelago stretching approximately 1,600 km across the South-western Pacific Ocean between the latitudes of 5 – 12 degrees south and longitude 152 – 170 degrees east (Figure 1.1). The total land area is approximated to be 28,000 km^2 with an exclusive economic zone of 1.6 million km^2 that represents the third largest archipelago in the South Pacific Ocean. The country is bordered to the west by Papua New Guinea, south by Vanuatu, east by Tuvalu, northeast by Nauru and north by the Federated States of Micronesia. The country's unique geography and scattered islands has given rise to a heritage of considerable environmental and ecological diversity.

Figure 1.1: Solomon Islands indicating provincial groupings

2. The country is one of the most vulnerable to the adverse impacts of climate change – ranked among the top 40 most vulnerable global nations in the ND-GAIN 2016 Index. This is due in large part to the fact that the majority of the population lives within 1.5 km of the coastline and the islands are regularly exposed to extreme rainfall events.

3. The economy of Solomon Islands is largely based on services (approximately 40 percent of GDP), agriculture (approximately 15 percent of GDP) and forestry (approximately 15 percent of GDP). The manufacturing sector remains very small. Much of the population depends on subsistence agriculture for their livelihoods. High poverty rates, excessive dependence on foreign aid, and remoteness make the Solomon Islands particularly vulnerable to climate variability and change. The country is officially classified as a least developed country and also a fragile and conflict-affected situations country, with the second lowest GDP per capita in Oceania.[1] An estimated 25% of Solomon Islanders live below the international poverty line of $1.90 per person per day in 2011 purchasing power parity terms. The country has a very high unemployment rate of around 92%, although many find revenue in the informal sector.

4. About one-fifth of estimated present total population of 515,870 (2009 Census) live in urban and peri-urban areas. The capital, Honiara City is situated on the northwestern coast of Guadalcanal. Malaita has the largest population size of 137,596 people, followed by Guadalcanal (93,614), Western (76,649), Honiara city (62,609) and Central (26,051) based on the 2009 census. The population growth rate is the highest in Guadalcanal (4.4%) followed by Honiara (2.7%), Western (2%), Central (1.9%) and Malaita (1.2%). It is known that temporary and informal settlers are often not captured in the Census and at any one time the population of Guadalcanal can be closer to 150,000. This presents challenges in providing potable water supply and sanitation services to the urban and peri-urban areas.

1.2 Overview of the UWSSSP

5. Solomon Islands Water Authority, now trading as Solomon Water (SW), was created by Water Act 1992. SW is a state-owned enterprise mandated to provide for the proper management and development of urban water resources and wastewater services in Solomon Islands. Since 2017, SW has been guided by its Five-year Action Plan and 30-Year Strategic Plan. These plans outline the strategy to meet the demand for water and wastewater services up to 2047 for the Greater Honiara Area (GHA), as well as meeting the needs of other major urban centers in Solomon Islands.

6. To help improve access to safe water and improved sanitation, the Asian Development Bank (ADB), together with the World Bank (WB), European Development Fund (EDF) and Solomon Islands government, (the government) have initiated the Solomon Islands Urban Water Supply and Sanitation Project (UWSSSP). The EDF grant will be administered by ADB. Each financing source will contribute proportionally to the total amount to financing each project output.

7. The UWSSSP aims to improve access to safe water and improved sanitation in urban and peri-urban areas of Solomon Islands by assisting the SW in implementing high priority components identified in its 30-Year Strategic Plan, and a 5-Year Action Plan.

[1] In 2019, GDP per capita was $2,281, and in 2020, it is estimated at $2,131 (contraction of about 6.5%).

8. The UWSSSP outputs include:

- **Project Output 1**: Secure and safe freshwater supplies. SW water supply systems will be improved and expanded to increase access by urban communities to reliable and safe water by : (i) increasing the number of urban households in GHA with access to climate and disaster resilient water supplies; (ii) reducing non-revenue water from its current level of 62 percent to 30 percent or less by 2027; and (iii) increasing SW water production capacity in GHA by up to 3 million liters per day (Ml/d) and improving SW water treatment capacity through the rehabilitation, replacement, or expansion of current sources and water treatment facilities, to meet water demand and ensure full compliance with drinking water guidelines across the city and until 2027. Investments will include: (a) *in GHA*, (i) rehabilitation and expansion of water production and treatment systems, (ii) installation of water supply mains to expand and rehabilitate the water supply system, (iv) additional water storage capacity, (v) leak detection and pipeline repairs, (vi) installing bulk supply metering and expansion of SW's customer meter replacement program to install pre-payment meters, and (vii) expanding SW's water supply networks to an additional 5,700 connections in unserved areas, including in informal settlements; (b) *in Auki, Gizo, Noro and Tulagi*, rehabilitation and expansion of the existing water supply systems; and (c) in *Munda*, development of a new water supply system.
- **Project Output 2**: Effective and efficient sewerage services. SW sewerage systems will be upgraded to minimize the frequency and severity of uncontrolled sewage overflows and to reduce the environmental and health impacts of effluent disposal by (i) preparing septage management regulations, (ii) constructing a septage treatment facility under a five-year design-build-operate (DBO) contract to service GHA, (iii) replacing existing wastewater outfalls in a state disrepair with new ones, (iv) installing sewers mains to expand and rehabilitate the GHA trunk sewer system, and (v) construction of new sewage pumping stations and rehabilitation of existing ones.
- **Project Output 3**: Enhanced awareness of hygiene and water issues and sustained improved hygiene behavior. A hygiene awareness and promotion program to complement other ongoing hygiene awareness and promotion activities in urban areas, will be implemented over the duration of the project. Educational activities will promote good sanitation and hygiene practices that help prevent water- and sanitation-related diseases and increase awareness of water supply issues including water conservation and the cost to deliver safe and reliable water supplies to households.
- **Project Output 4**: SW is financially and technically sustainable. A program will be implemented to assist SW to strengthen its financial, technical, and operational sustainability. The program will (i) develop and implement corporate policies, such as disaster management, catchment management, climate risk, drought management, demand management and climate change adaption planning (ii) strengthen SW water supply and sewerage asset planning and operations; (iii) strengthen data management and financial and technical systems monitoring, and reporting; (iv) preparation of infrastructure designs; and (v) support to the Project Management Unit (PMU), including for construction supervision.

1.3 Catchment-wide Issues and Context for GEF Grant

9. Land in the catchments feeding Honiara's water supply have become increasingly degraded through unsustainable land use activities, in particular from commercial logging. Logging activities have increased over the past five years, causing a number of adverse impacts to watersheds, including greater turbidity and sediment loads, higher rates of runoff and landslides during rainstorms, and changes in seasonal flow regulation. Taken together, extreme rainfall and unsustainable logging practices within the wider catchment will result in more extreme flooding in GHA's watersheds. Furthermore, extreme rainfall, which is the main climate-related cause of worsening flooding is projected to become more frequent and severe with climate change.

10. The Kongulai/Kovi/Kohove area comprises three distinct watersheds covering about 32 km^2 and is located to the south and east of Honiara. It is an important water source area for Solomon Water, with sink holes in the Kovi and Kohove watersheds providing important inflow for the Kongulai Spring. Most of these catchment areas fall on customary land, which is owned and managed under 'informal' customary decision-making by the locally recognized landowners. Logging has been most widespread in the upper Kohove and also in pockets in the lower Kongulai. Logging concessions have been granted in these watershed areas, but logging companies have not adhered to the country's Code of Logging Practice (COLP).

11. In addition to logging, shifting cultivation practices by communities (away from subsistence agriculture and towards cash-cropping and husbandry) also represent a potentially significant current and future stressor on the Honiara watershed. This is especially true given the proximity of Honiara's fast-growing markets. Balancing the rural welfare benefits of agricultural growth and development in these areas with the need to mitigate watershed impacts represents another potential important target for management interventions.

12. The customary landowners of catchment areas are members of two main tribal groups—Kakau and Lakuili. There are three recognized tribes within each of the Kakau and Lakuili landowner groups and each consist of multiple recognized clan groups (approximately 40 clans). The total population of the tribal groups is approximately 2,000 people.

13. The Honiara Watershed Management Project (HWMP), financed under the Global Environment Facility (GEF) grant, will improve catchment management through interventions that provide benefits to incentivise customary landowners to participate in alternative livelihood activities and engage in better land management practices. The HWMP recognizes that effective community engagement is required to inform appropriate and effective project design (e.g. design of incentives) and to mitigate project risks.

1.4 Scope of the Environmental Assessment and Review Framework

14. To comply with the requirements of the country safeguards system (CSS) and the ADB's Safeguard Policy Statement 2009 (SPS) an environmental assessment and review framework (EARF) and resettlement framework (RF) have been prepared to establish the procedures to be followed—from screening through to management guidelines/plan implementation and monitoring—for subprojects and components that will be designed and delivered through the HWMP.

15. The EARF sets out the procedure for screening, consultations, impact assessment, management, information disclosure, grievance redress, and monitoring and reporting. It contains guidance on: (i) identifying environmental impacts during the design and pre-construction, construction, and implementation stages, (ii) suggested mitigating measures, (iii) environmental assessment documents preparation, (iv) consultations and information disclosure, (v) grievance redress mechanism, (vi) institutional requirements and capacity development, and (vii) monitoring and reporting.

16. The EARF is prepared in accordance with the SPS and the CSS for environment which includes (i) Environment Act 1998, (ii) Environment Regulations 2008, and (iii) Environmental Assessment Guidelines (2010) as well as other legislation covering health and safety, biosecurity, water resources management, materials sourcing etc.

17. The environmental assessments prepared for the UWSSSP subprojects are developed separately by SW. For due diligence (screening, assessments and development consent application) required for HWMP components, supplementary safeguards resources will be provided to SW.

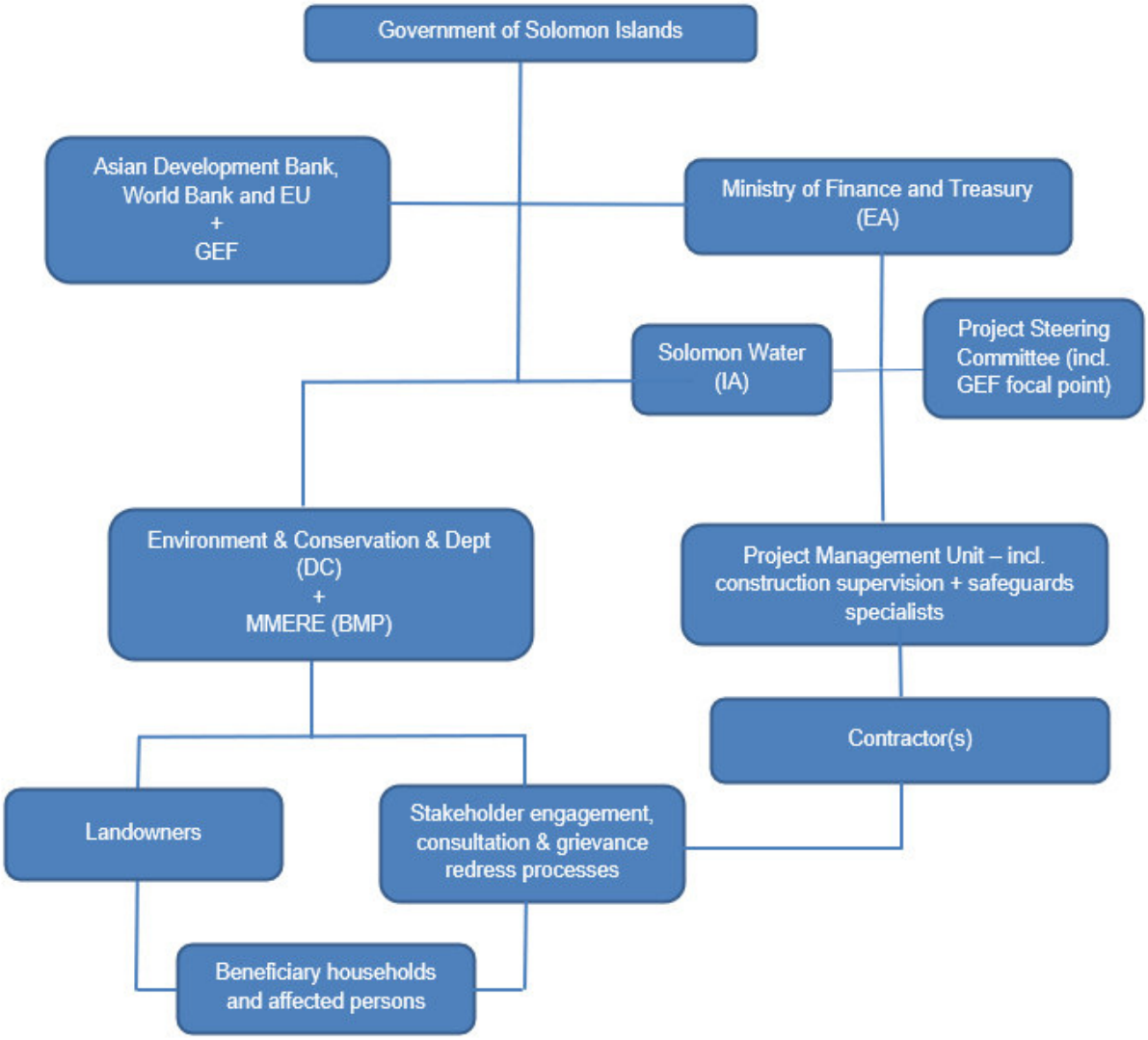
2 Institutional Arrangements and Legal & Policy Framework

2.1 Implementation Arrangements

2.1.1 Institutional arrangements for the UWSSP

18. The Ministry of Finance and Treasury (MOFT) is the executing agency, while SW is the implementing agency for the UWSSSP and HWMP. SW has established a project management unit (PMU) to deliver the project. The PMU will be supported by design and supervision consultants (DSC). The organization chart is provided in Figure 2.1.

Figure 2.1: Organizational chart for UWSSSP and HWMP



19. **Solomon Islands Water Authority**. Created under the Solomon Islands Water Authority Act 1992, SW is a state-owned enterprise with a mandate "to provide for the proper management and development of urban water resources and sewerage services in Solomon Islands". SW's mission is to deliver "reliable and safe water supply and sewerage services" to the urban centres. It currently operates in Auki, Honiara, Noro, Tulagi and is expanding to Gizo and Munda.

20. SW is established under the supervision of the Ministry of Mines, Energy and Rural Electrification (MMERE). In addition, the Water Resources Division (WRD) under MMERE is responsible for water resources assessment and management. The key roles of SW in the UWSSSP are to:

- Act as a secretariat to the Project Steering Committee (PSC);
- Ensure the effective operations and maintenance of the project facilities and all infrastructure provided under the project;
- Provide technical advice on the project scope, facility designs, procurement or others;
- Prepare all draft financial reports and support financial management;
- Ensure that PMU is fully staffed and functional during the entire period of implementation;
- Review consultant reports and ensure the outputs are suitable to the project objectives and the government policies and regulations;
- Administer all consultant and works contracts (instructing the supervision consultant, approving variations, suspending and terminating contracts); and
- Ensure compliance with grant covenants, ADB's guidelines, procedures, and policies, as the main user of the project.

21. **Project Steering Committee**. The Project Steering Committee (PSC) is responsible for oversight and providing guidance and strategic direction to SW for UWSSSP implementation. Established during project development phase, the PSC will meet at critical junctures when major decisions are required. The PSC is chaired by a Board member of SW and its composition is as follows:

- Permanent Secretary of the Ministry of Finance and Treasury (PS MOFT)
- Permanent Secretary of the Ministry of Mines, Energy and Rural Electrification (PS MMERE)
- Permanent Secretary of the Ministry of Development Planning and Aid Coordination (PS MDPAC)
- Permanent Secretary of the Ministry of Environment, Climate Change, Disaster Management and Meteorology (PS MECCDMM)
- Director for RWASH, Ministry of Health and Medical Services
- Clerk to the Honiara City Council
- Provincial Secretary for Guadalcanal Province

- Permanent Secretary for the Ministry of Lands, Housing and Survey
- Board member of Solomon Water (Chairperson)
- General Manager of Solomon Water (GM SW) (non-voting).

22. **Project management unit.** SW established a PMU in April 2018 to prepare and implement the project. The PMU currently consists of an ADB funded strategic projects management advisor supported by a stakeholder/strategy manager, two contract managers, a project manager, a land management officer and a project engineer. A further six specialist staff are to be recruited for key roles to be funded through the project as follows: (i) PMU Project Manager; (ii) international environmental specialist; (ii) international network management specialist; (iii) international communications specialist; (iv) national community liaison officer; (v) international WASH specialist; (vi) national WASH specialist. The PMU will also be supported by the following SW funded personnel on a needs basis: (i) Chief Financial Officer (project accounting); (ii) Head of Procurement; (iii) national resettlement specialist; (iv) national environmental specialist; (v) NRW manager; (vi) national procurement assistant.

23. The PMU is part of SW and is responsible for: (i) overall day-to-day project management; (ii) design and delivery of the project components; (iii) community liaison; (iv) implementation of the project's resettlement and environmental safeguards; (v) project financial management; and (vi) project monitoring (including contract administration and construction oversight) and reporting.

24. The PMU will be headed by a Project Director and it will be staffed by suitably qualified and experienced technical and administrative staff covering the following: pertinent technical and social matters, procurement and contract management, communication, and environmental and social safeguards. Intermittent consultants (individuals and firms) can also be recruited to assist the PMU to design, manage, supervise and monitor the project.

25. **Ministry of Environment, Climate Change, Disaster Management and Meteorology**. The MECDM includes two main departments which will participate in the UWSSSP and HWMP. The Environment and Conservation Department (ECD) xxxx

26. The Climate Change Division of MECDM is responsible for: (i) raising awareness and increasing understanding of policymakers in both government and non-government organizations and the general public about climate change and UNFCCC and build consensus on national responses; (ii) facilitating, coordinating and implementing climate change enabling activities such as preparation and submission of NAPA and the second national communication; (iii) establishing a framework for integrating climate change considerations into national development planning and relevant sectoral policies; (iv) establishing procedures and criteria for identifying and assessing climate change projects that meet national needs and for submitting proposals to climate finance partners.

27. A summary of roles and responsibilities is presented in Annex 1.

2.1.2 Institutional arrangements for the HWMP

28. The overall institutional arrangements for the HWMP have been shown in Figure 2.1. To help manage the HWMP, additional staff/resources will be added to the PMU: (i) a full-time national consultant who will help SW manage the entire project; (ii) an international catchment management/institutional expert who will focus primarily on Component 3 of the HWMP (this person will initially be full-time and then provide part-time targeted assistance after the second year of the HWMP); and (iii) additional safeguards resources for 18 months to ensure due diligence is undertaken in compliance with this EARF including screening of activities and components of the HCMP and if required, assessment, and development consent application.

29. In addition to the PMU arrangements, other parties will be engaged to provide services to the HWMP components as follows:

- Component 1 - capacity strengthening will be implemented by a third-party service provider(s) with the requisite scientific capacity, ideally a research institute or centre within academia, which would be guided by SW and work in consultation with key ministries (e.g. Ministry of Forestry and Research and Ministry of Lands, Housing and Survey).
- Component 2 – community-driven catchment management and protection will be led by collaboration of the non-government and private sectors to form a "project development team". A civil society organization (CSO)/non-government organization (NGO) with significant donor experience will be engaged to lead this component. To complete the project development team, a locally-based NGO will be hired to support community organization and livelihood activities (i.e. empowering communities as key watershed stewards) and lead implementation of restoration works. A separate regional or international NGO (or private sector project developer) subcontracted to provide more specialized expertise in developing and implementing forest carbon finance projects.
- Component 3 – inter-agency coordination will include the formation of a catchment management group (CMG). This will serve to more closely integrate the water supply and sanitation infrastructure investments within Honiara being delivered through UWSSSP with upstream nature-based investments in an overall planning framework.

30. The exact composition of the CMG will be determined via its process of establishment. However, it is envisioned that it will include representatives of many of the same government agencies as those on the PSC. It could also include further representation from development partners, private sector and CSO with activities in the catchments. It will also include key representatives of the upper watershed and Honiara communities. Candidate organizations include the landowner focal point groups (established under component 2), relevant tribal leadership / governance groups for lands in the target watersheds (e.g. the Tandai house of chiefs), as well as other appropriate community groups and women's organizations, with an eye towards ensuring that governance and decision-making for catchment management and planning is inclusive, broad-based and transparent.

2.2 Legal and Policy Framework

2.2.1 Country safeguard system

31. The CSS for environment includes legislation (laws and regulations) governing management and protection of the environment, various supporting legislation, and procedures established to implement the CSS. The ECD within MECDM implements the Environment Act and Environment Regulations, which stipulate the 'prescribed activities' for which development consent must be sought and for which environmental assessment may be required. The ECD is also the government agency responsible for reviewing and clearing development consent applications and environmental assessments on behalf of the government and is the agency responsible to manage the environmental compliance of all projects.

32. **Environment Act**. The Environment Act 1998 provides for the protection and conservation of the environment. The core objectives of the Act are to provide for and establish integrated systems of development control, environmental impact assessment (EIA) and pollution control, including:

- Prevention, control and monitor pollution;
- Reducing risks to human health and prevent degradation of the environment by all practical means, including the following;
- Regulating the discharge of pollution to the air, water and land;
- Regulating the transport, collection, treatment, storage and disposal of wastes;
- Promoting recycling, re-use and recovery of materials in an economically viable manner; and
- To comply with and give effect to regional and international conventions and obligations relating to the environment.

33. The Act is divided into four sections. Part I provide the Act with considerable power and states that in the event of conflict between the Environment Act and other legislation, the Environment Act shall prevail. Part II establishes and defines the powers and role of the ECD. Part III establishes the requirements for environmental assessment, review and monitoring. This provides for an environmental assessment to consist of either a public environmental report (PER)[2] or if the development is shown to be of such a nature as to cause more serious impacts then the developer is required to prepare and submit an environmental impact statement (EIS). Part IV details requirements for pollution control and emissions (noise, odor and electromagnetic radiation) and requirements to permits for the discharge of waste. Noise (restrictions on emitting unreasonable noise) is covered in Article 51(1).

[2] Consultations with ECD undertaken for UWSSSP confirms that the PER is mor or less equivalent to the initial environmental examination (IEE) required for projects determined as category B under the ADB's Safeguard Policy Statement 2009.

34. The HWMP triggers the need to apply for development consent under the Act by including two activities included in the Schedule of Prescribed Activities being:

- 9. Public works including: (d) soil erosion and siltation control; and
- 9. Public works including: (j) watershed management.

35. **Environment Regulations**. The Environment Regulations 2008 establish the procedures for undertaking the environmental assessment of any projects categorized as 'prescribed activities'. The proponent is required to first submit a "development application" which is reviewed by the ECD to determine the likely significance of impact and whether an environmental assessment may be required. The decision resulting from the review may include that:

- No further assessment is required, as such the development application is accepted, and development consent is issued;
- A PER is required; or
- Where major projects are considered such as logging, large agricultural developments, mining and large-scale tourism developments and infrastructure projects, an EIS is required which includes technical, economic, environmental and social investigations.

36. Both the PER and EIS require public consultation. Following review and approval by the MECDM the development consent is issued either with or without conditions.

37. **EIA Guidelines**. The Environmental Impact Assessment Guidelines 2010 were developed by ECD to administer the second schedule of the Environment Act 1998. The guidelines comprise the procedure, stakeholders in the EIA process, fees required for development type and provide basic advice and guidance to government officers, planners, developers, resource owners on the EIA process.

2.2.2 Other legislation supporting the CSS

38. **Protected areas**. The Protected Areas Act 2010 and Protected Areas Regulations 2012 establish procedures for the establishment and management of protected areas and to conserve and regulate biological diversity. Key objectives of the legislation are to:

- Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;
- Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity;
- Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use;
- Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings;
- Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of the protected areas; and

- Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, such as, through the development and implementation of plans or other management strategies.

39. Specifically, Part 3 of the Act allows for the declaration, registration and management of Protected Areas (PA), Part 5 of the Act prohibits any unauthorized bio-prospecting research in these areas except if given permission by the Advisory Committee and Part 6 provides for the appointment of inspectors to enforce the provision of the Act.

40. **Wildlife protection**. The Wildlife Protection and Management Act 1998 regulates the international trade of flora and fauna to protect and conserve the country's biological diversity. The Act was developed to meet obligations under Convention on International Trade in Endangered Species (CITES) signed by the government in 2007.

41. Section 26 of the Act deals with possession of illegally obtained species of animals, plants and individual from marine and terrestrial environment in the country. Schedule I (Section 11) lists prohibited exports.

42. The objective of the Wild Birds Act 1978 is to provide protection of selected bird species throughout by providing a mechanism for the establishment of bird sanctuaries and the management of hunting of several species.

43. **Fisheries**. The Fisheries Act 2015 provides the framework for marine, brackish and freshwater fisheries management, protection and development, including licensing of fishing vessels and fish processing plants. It lists prohibited fishing methods, provides for establishment of Marine Protected Areas (MPA's) and preparation of coastal management plans. The Act regulates the utilization and conservation of marine resource and includes resources associated with estuarine and freshwater coastal river systems.

44. **Land**. 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.

45. **Provincial government**. The Provincial Government Act 1997 gives power to the provinces to make their own legislation and pass ordinances including for protection and conservation of environment, culture, wildlife and coastal and lagoon shipping.

46. **Town and country planning**. The Town and Country Planning Act 1979 applies to all urban areas (Honiara and provincial towns) and includes the management of land (all types of ownership) and management and planning functions for urban and rural areas including development.

47. **Mines and minerals**. The Mines and Minerals Act 1996 establishes the regulatory system for all mining applications and licensing and provides the system to regulate and manage mining activities including the management and permitting process required for all alluvial mining (rock, gravel and sand extraction). Construction materials must be sourced by the contractor, in accordance with the guidelines and processes outlined in this Act. For new sources, the contractor will be required to apply for a Building Material Permit (BMP) from Department of Mines and Minerals (DMM), see also section 2.1.3. The use of existing permitted quarries is preferred to the use of new locations.

48. **Forest resources**. The Forest Act 1999 provides for the sustainable harvesting and management of forest resources and repeals the Forest and Timber Utilization Act. A Forestry Bill to govern licensing of felling trees and sawmills, timber agreements on customary land, establishes State Forests and Forest Reserves and provides for the conservation of forest and its management was prepared in 2004 but has not been passed by Parliament.

49. **Water resources**. The River Waters Act 1973 provides the legal mechanism to manage and control river water for the equitable and benefit use for all and includes specific activities that manages (through acquisition of permits) construction (e.g. bridges) and the removal of key environmental habitats and biological resources. In addition, the act provides a specific order for the management of the use of water and activities associated with six specific rivers systems located on Guadalcanal including; the Mataniko, White, Mbalasuna, Ngalimbui, Lungga and Mamara rivers.

50. **Health and safety**. 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.

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

52. **Biosecurity**. 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.

53. **International agreements**. Solomon Islands are a signatory to a number of international environmental agreements, conventions and treaties including those for regional agreements on chemicals, waste, pollution, biodiversity and climate. The names, purpose and the date of ratification of these agreements are provided in Annex 2.

2.2.3 National strategies and plans

54. **National Development Strategy**. The National Development Strategy 2016-2035 (NDS) provides a longer-term framework for planning. The NDS is a vision and plan for all the people of Solomon Islands. It sets out a framework for development policies, priorities and programs, providing a single reference point and common direction over the next twenty years.

55. The overarching theme of the NDS is to '*build better lives for all Solomon Islanders'* and its mission is to: *"create a modern, united and vibrant Solomon Islands founded on mutual respect, trust and peaceful co-existence in a diverse yet secure and prosperous community where tolerance and gender equality are encouraged and natural resources are sustainably managed; and enable all Solomon Islanders to achieve better quality of life and standard of living for themselves and their families through constructive partnership for social, economic, political and spiritual development".*

56. The HWMP is guided by the NDS' long-term NDS objectives, including Objective 4: *Resilient and environmentally sustainable development with effective disaster risk management, response and recovery* and Objective 7 which is to effectively respond to climate change and manage the environment and risks of natural disasters. The NDS includes the following medium term strategies to help achieve Objective 4:

- Medium Term Strategy 10: Improve disaster and climate risk management, including prevention, risk reduction, preparedness, response and recovery as well as adaptation as part of resilient development.
- Medium Term Strategy 11: Manage the environment in a sustainable resilient way and contribute to climate change mitigation.

57. Key initiatives that stem from the above strategies include: increasing risk awareness and knowledge; integration of risk management into public and private sector development planning; supporting community disaster and climate preparedness, protection and adaptation; strengthening preparedness for disaster response, recovery and reconstruction; improving programs to support environmental sustainability in the long term; and increasing support for climate change mitigation.

58. In line with national policy, the Ministry of Lands, Housing and Survey completed the Greater Honiara Urban Development Strategy and Action Plan (GHUDS) in 2018. Supported by ADB, GHUDS has six strategic goals, including improving climate resiliency. One of the key strategies under this goal (Goal 2) is to promote an integrated watershed management approach to development. The GHUDS also identifies water supply and sanitation as a leading challenge and top priority for Greater Honiara and identifies that this challenge will be exacerbated by climate change. To meet this challenge, GHUDS recommends the implementation of the Solomon Water 30 Year Strategic Plan, 2017 – 2047. The HWMP is central to supporting delivery of the UWSSSP and implementing SW's strategic plan.

59. **Forestry strategies and plans**. There have recently been greater calls to find alternatives to unsustainable logging. Round log exports are increasingly seen to be an industry in decline due to unsustainable practices, underscoring the need to look at alternative industries to diversify the economy. This commitment is spelled out in various national-level strategies and policies.

60. The Forest Resources and Timber Utilization Act 2000 provides for the control and regulation of timber industries. Alongside the River Waters Act 1996, the Act provide the legal basis for integrated water resources management and integrated forest management in the Solomon Islands. The code of logging practice (2002) sets 13 priorities for regulation of logging activities. Its aim is 'to ensure ecological and cultural functions including ecosystem services are maintained to its utmost effect. The priorities include:

- Environmental protection and sustainable forest developments;
- Protection of cultural, historical sites and spiritual significant areas;
- Proper harvesting, removing, scaling and grading of timbers and maximizing of benefits while minimizing waste;
- Ensuring that resources owners have received a fair return from their forest resources; and

- Ensuring compliance enforcements and monitoring as well as capacity building for local communities.

61. In addition, relevant sections of the Solomon Islands Reducing Emissions from Deforestation and Forest Degradation (REDD+) Roadmap 2014-2020 (sections 5-11) deal with: watershed protection; conservation of forest carbon stocks; customary rights; REDD+ safeguards; stakeholder engagement; financial management and benefit sharing; national forest monitoring; Reference Emissions Levels; and pilot activities.

62. The Solomon Islands Biodiversity Strategy and Action Plan 2016-2020 also includes the following relevant targets:

- Target 8: By 2020, reduce the current deforestation rate of native forest by industrial logging and agricultural development by 50%, restore 15% of fragmented logged areas and protect 10% of the remaining virgin forests, thereby enhancing the Solomon Islands forest ecology.
- Target 14: By 2020, ecosystems that provide essential services, particularly services related to water, its contribution to human health, livelihood and well-being, are restored and safeguarded, taking into account the needs of women, landowners, local communities, and the poor and vulnerable.

63. **Climate change strategies and commitments**. In response to the increasing knowledge associated with climate change and the need for climate adaptation and mitigation planning, the SIG has developed a National Climate Change Policy 2012 – 2017 (NCCP). The Policy recognized that climate change is a sustainable development issue that threatens the successful implementation and achievement of the NDS and places added burden on government resources. It also identified water supply and sanitation as a priority vulnerable area and stated that water resources are likely to be seriously affected by climate change.

64. The NCCP is the guiding framework to integrate climate considerations and support the implementation and achievement of the NDS and other policies and frameworks, and to guide the government and its partners' efforts in ensuring that; (i) the people, natural environment, and economy of the country are able to adapt to the predicted impacts of climate change; and (ii) the country benefits from clean and renewable energy, energy efficiency, and mitigation technologies that improve people's livelihoods and the national economy.

65. The Solomon Islands Nationally Determined Contributions 2015 focusses mostly on climate change mitigation and reducing greenhouse gas emissions and the following is specifically noted:

> "In the area around the capital city of Honiara a general decline per decade is occurring while the population is growing at a rate of approximately 6% per annum. To ensure adequate water supply for the growing population of the city, a robust and well enforced integrated water resource management strategy and programme needs to be put in place. Conservation and effective management of the forests surrounding Honiara is essential and increasing numbers of bore holes will need to be established over the coming years to supplement the Kongulai water source in the longer term. The proportion of annual rainfall from extreme rainfall has increased significantly which could result in longer drought periods in the dry season and more severe flooding."

66. The National Adaptation Programme of Action 2008 identifies water supply and sanitation as one of five priority vulnerable areas. It also notes a lack of coordination and cooperation in the forestry sector. It calls for the following specific actions:

- Current forestry activities must be followed by reforestation and afforestation;
- Develop policy frameworks to protect mature forests to maintain carbon sinks;
- Utilize existing support projects to address climate change issues;
- Incorporate into the forestry licensing procedures the requirement that is in the Environment Act for all timber enterprises to comply with requirements to obtain 'development consent';
- Develop a database on all environmental issues (past and present reports, studies and data) that are relevant to the Forest Sector;
- Liaise with the Ministry of Education to provide scholarships to study forestry and climate change impacts; and
- Incorporate climate change into relevant forestry courses in the School of Natural Resources.

67. **Water resources strategies and plans**. The Solomon Islands Water Authority Act established SW and outlined its management, such as the establishment of its Board of Directors and its functions and powers. Such functions and powers include the declaration of its area of operation, powers of entry to carry out works and the declaration of catchment areas.

68. SW Catchment Areas Regulations were subsequently developed to protect water quality within some water supply catchments. The regulation prohibits certain undertakings within designated controlled catchment areas through such means as the control of pollution, wastes, pesticides, stock and other activities. This regulation applies to all catchment areas or parts thereof as identified in the corresponding schedule. The regulations have been poorly enforced and there are now many areas where there has been substantial development in contravention of the regulations. SW is now trying to improve its management of the catchment areas. However, in some cases, there has been too much development and the government is unlikely to support or enforce removal of the settlers in these areas.

69. SW's 30-Year Strategic Plan 2017-2047 further stresses the importance of improved catchment management, including forest management, as a key measure to reduce the vulnerability of the water supply from Kongulai, and for safeguarding water quality for future water supplies, including from the Lungga catchment.

2.3 Safeguard Policy Statement

2.3.1 Scope and objectives of the SPS

70. The Safeguard Policy Statement 2009 (SPS) consists of three safeguard requirements (SR): SR1: environment; SR2: involuntary resettlement; and SR3: indigenous peoples. The objectives of ADB's safeguards are to: (i) avoid adverse impacts of projects on the environment and affected people, where possible; (ii) 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 CSS and develop the capacity to manage risks.

71. Through the SPS ADB establishes policy objectives, scope and triggers, and principles for the three safeguards. The SPS sets out the process to be applied from screening, through due diligence and assessment to monitoring and reporting. The objective of SR1 is to ensure the environment soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process. To help achieve the desired outcomes, ADB adopts a set of specific safeguard requirements that need to be achieved during the processing and implementation of projects financed or administered by ADB. The environment safeguard requires due diligence which entails addressing environmental concerns, if any, of a proposed activity. This commences with screening a project to determine its category of impact. The SPS categorizes potential projects or activities into A (most significant), B or C (least significant) to determine the level and depth of environmental assessment required to address the potential impacts.

2.3.2 Environmental assessment and review

72. This EARF has been prepared for the HWMP to guide the procedures for screening, assessment, review and monitoring of each project to ensure compliance with environmental safeguards requirements of both the CSS and SPS. In accordance with the EARF, each component or set of activities of the HWMP will be screened and categorized, with the screening reviewed by ADB and ECD to determine the appropriate level of due diligence (in case an environmental assessment is required). If works are sufficiently minor and do not trigger the need for environmental assessment under the CSS, in accordance with the EARF, an assessment may still need to be prepared so as to comply with the SPS. Through a process of screening, ADB categorizes projects by their potential risk or level of impact, and the category of a project will determine the level of assessment required:

- Category A. A proposed project is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA) including an EMP is required.
- Category B. The proposed project's potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for Category A projects. An initial environmental examination (IEE) including an EMP is required.
- Category C. A proposed project is likely to have minimal or no adverse environmental impacts. An assessment is not required, although environmental implications are still reviewed and in some cases management guidelines may be required to be included in bid documents.
- Category FI. A proposed project involves the investment of ADB funds to or through a financial intermediary. The financial intermediary must apply and maintain an environmental and social management system unless all of the financial intermediary's business activities have minimal or no environmental impacts or risks.

73. Screening will be based on location and potential risks and impacts based on the types of works and activities with regard to the environmental conditions. Each component or set of activities of the HWMP will be scrutinized as to its type, location, scale, environmental sensitivity, and the magnitude of potential environmental impacts.

74. The level of detail and comprehensiveness of the environmental assessment will be commensurate with the significance of the potential impacts and risks. A categorization form and rapid environmental assessment checklist can be used to assist with the screening (Annex 3) of each component. The screening will identify level of risk identified (low, medium or high) and what level of due diligence is required i.e. environmental and social management guidelines (outline EMP) to be included in the bid documents and works contracts or environmental assessment and development of an EMP.

2.3.3 Health and safety

75. 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. Implementation of occupational and community health and safety measures, as laid out in the EHSG, is required under the SPS.

76. The HWMP will comply with the World Bank Group's Environmental Health and Safety Guidelines (EHSG).[3] Amongst other things, the EHSG require that workers be provided with a safe and healthy working environment, considering inherent risks, any hazards in the work areas, including physical, chemical, biological, and radiological hazards. In addition, SW as the implementing agency, will be required to take steps to prevent accidents, injury, and diseases arising from, associated with, or occurring during the work.

77. The EHSG are technical reference documents with general and industry-specific examples of Good International Industry Practice. When one or more members of the World Bank Group are involved in a project, these EHSG apply; in addition, the SPS requires compliance with the EHSG. The General EHSG are designed to be used together with the relevant Industry Sector EHSG which provide guidance to users on EHS issues in specific sectors. The EHSG contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. The applicability of the EHSG should be tailored to the hazards and risks established for each sub-project on the basis of the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are taken into account. The applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons. When host country regulations differ from the levels and measures presented in the EHSG , projects are expected to achieve whichever is more stringent.

78. The General and Industry Sector EHSG are available at the following link - http://www.ifc.org/ehsguidelines.

[3] World Bank Group. 2007. *Environmental, Health, and Safety General Guidelines.* Washington, DC.

3 Description of Baseline Conditions

79. A brief description of the existing environmental and socio-economic conditions of the project area are presented in the following subsections.

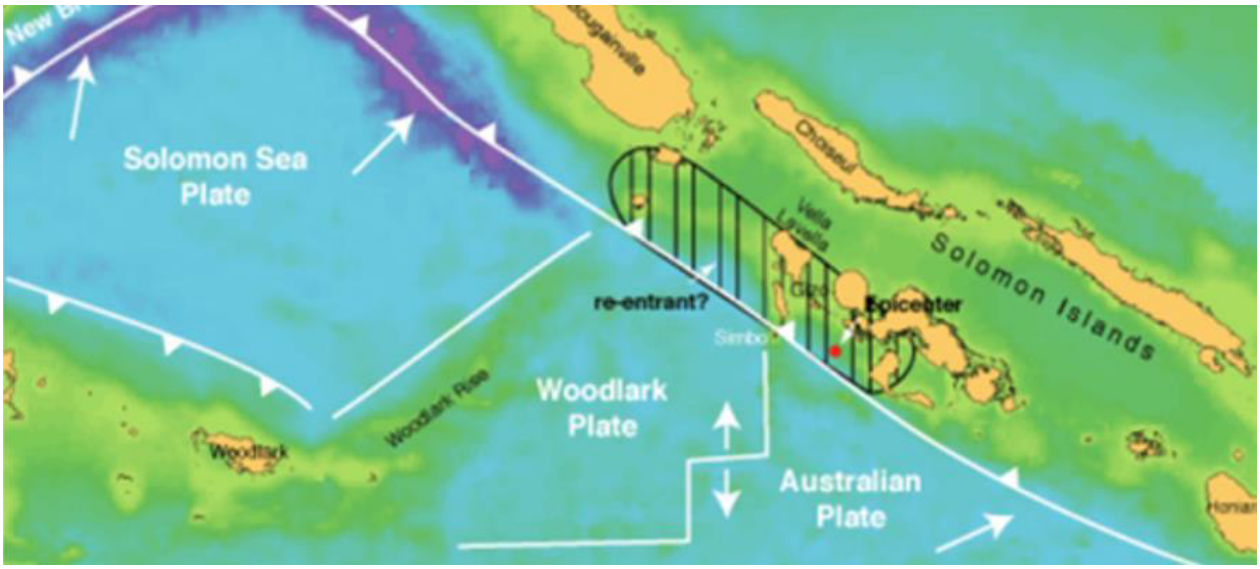
3.1 Physical Resources

3.1.1 Topography, geology, soils, and water resources

80. **Topography**. The island of Guadalcanal is approximately 148 km long and 50 km wide with a northwest-southeast orientation. The island's topography and physical environment is marked by extremes, with rugged mountainous terrain including the country's two highest peaks; Mount Popomanaseu (2,335 m) at the eastern end of the island and Mount Makarakomburu (2,310 m) approximately 32 km south of Honiara, flanked by hills, narrow coastal terrace with interspersed swamps, valleys, significant river catchments and highly productive area in the north, known as the Guadalcanal Plains.

81. **Geology**. Solomon Islands lies at the boundary of three major tectonic plates which form part of the Solomon Islands Subduction Zone, which include the Pacific, Australian and the Woodlark plates. Northwest of the Solomon Islands is the Solomon Sea plate, which is the source of most of the volcanoes in the Solomon Islands (Figure 3.1). The uplift of the Pacific plate along with intermittent volcanic and seismic activity has contributed to the island masses that now form the Solomon Islands. The islands are, geologically speaking relatively young, and the larger islands are almost entirely volcanic in origin and consist of basalt surrounded by uplifted coral terraces.

Figure 3.1: Tectonic plates associated with the Solomon Islands



Source: www.walrus.wr.usgs.gov/tsunami/solomon07

82. The geology of Guadalcanal is dominated by extrusive igneous rocks generated by volcanism during the Oligocene to Pleistocene periods (as shown in Table 3.1). These mostly comprise basaltic and andesitic lavas and ash deposits, with the Tiaro tuff Breccias and Gallego Andesites the most common rocks within the project areas. The area also has significant alluvial deposits along the coast and along the river valleys.

Table 3.1: Geological succession associated with northern coastal area of Guadalcanal

Age	Rock Type	Thickness (m)	Name
Recent	Coral Reefs		
	Alluvial and littoral deposits	100	
Upper Miocene-Pliocene	Volcaniclastic wackes, pyroclasts, lavas, lutite and limestones	400-600	Lungga Beds
	Lavas, pyroclasts including some wackes, lutites and limestones; Vesicular augite basalt	1000	Gellego Volcanics and Tiaro Tuff Breccias
Unknown	Hornblende Microdiorite	Unknown	Vaturanga Microdiorite

Source: Geological Survey Division (1977)

83. The alluvial deposits are the predominant riverbed material with bed load sediment ranges in size from silts and sands in low flow areas, to large boulders in very high flow areas. The depth of alluvium varies between river systems and is estimated to be between 10 – 25 m thick within the river channel. It is these resources that are quarried and used for road and construction material. Alluvial terraces occur adjacent to most of the larger river systems and can vary from 1.5 m to 5m above the current river level. The structural geology of the area is dominated by three sets of major faults of Pliocene to Pleistocene age and trend northeast to southwest.

84. **Soils**. There are 27 soil groups identified in Solomon Islands. Depending on parent material and land use, soils exhibit a range of fertility. The basalt volcanic derived soils are generally rich in nitrogen, phosphorous and organic carbon, but poor in potassium. The alluvially deposited soils are deep, freely drained yellowish brown to red humus-rich medium to coarse textured soils with limited profile development and reasonable natural fertility. The hill soils are older and have weathered to well-structured clays with somewhat poorer internal drainage. These soils have inclusions of limestone within their profiles and may overlie weathered coralline rock materials. Such soils have limited use and where they are retained in forests, are used for subsistence gardens, otherwise, these areas have reverted to extensive areas of grassland and have limited agricultural use.

85. There are a variety of soils in the project area, reflecting the geology, different rock types and diversity of landforms. Soils in the project area in general are deep, intensely weathered and leached, free draining and relatively porous. Soils within the floodplain are either organic accumulations or consolidated alluvium. Commercial logging and land clearing during World War II have altered the natural environment. Aggregate mining from large rivers has occurred throughout the subproject sites previously.

86. **Water Resources.** Water resources in the Solomon Islands range from sizable rivers to small streams from high mountainous and dense rainforests to rainwater harvesting and thin freshwater lends of groundwater aquifer of the small low-lying atolls and islets (IWCM diagnostic report).

87. With adequate rainfall and large infiltration area, considerable freshwater resources are available in the provinces. Drinking and household use in both urban and rural centers account for the largest water withdrawal in the country. There is limited agricultural water demand as most crops are rainfed. The industrial sector withdraws water for fish processing, cannery, palm oil factory, mining operations and some small manufacturing industries.

88. On the larger Islands, surface water in the form of streams, springs and rivers is the main source of drinking water. Some communities on the higher volcanic islands also use groundwater for domestic purposes. In areas where surface water supply is not available for farming, groundwater is used if available. In urban areas, piped water accounts for 75% of total water withdrawal, rain water tanks account for 22 % bore hole/spring/wells account for 1% , and other sources account for 2%.

3.1.2 Air quality, climate, and climate change

89. **Air quality**. There are no available air quality and noise levels data for Solomon Islands. There are also no environmental standards being implemented for air quality and noise levels. The ECD has confirmed that environmental standards for Solomon Islands are still being developed.

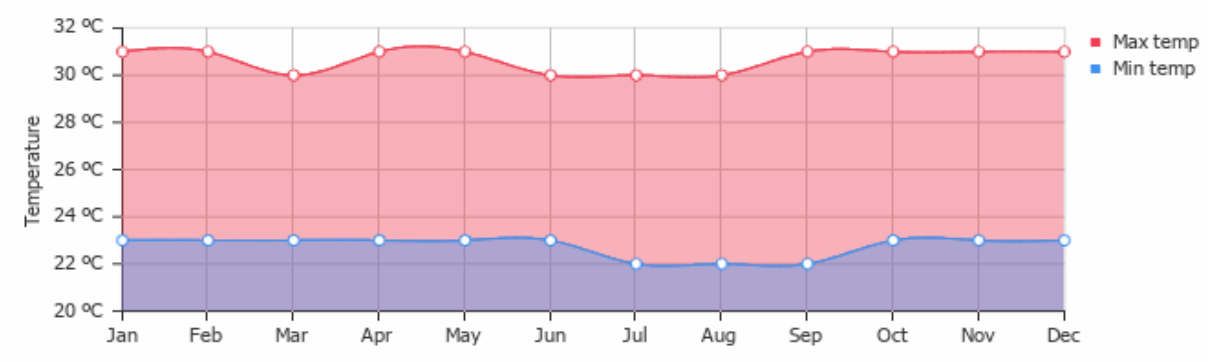
90. In general, the peri-urban areas of Solomon Islands, where proposed components of some subprojects will be located, have no major sources of anthropogenic emissions. For these areas, it is therefore expected that the average ground level concentrations of sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and particulate matter (PM_{10}) will not exceed the values in IFC's guidelines (EHS Guidelines of April 2007) which are 20 ug/Ncm, 40 ug/Ncm, and 20 ug/Ncm, respectively.

91. **Climate.** The Solomon Islands has a typical tropical oceanic climate (high temperature and high humidity) throughout the year with a pronounced wet season from November to March and a dry season from April to October. The southeast trade winds are usually established in April and continues until the end of October. During this season, more than 75%of the winds are easterly, and 60% are from east to southeast. The trade wind is steadier and stronger over the southern part of the group of islands. From November to April, the winds blow predominantly between the northeast and northwest, though great variability marks this season, and appreciable percentages of east and south winds occur (US National Geospatial-Intelligence Agency. 2017).

92. **Humidity**. Relative humidity throughout the nation shows little seasonal variation however it does have a marked diurnal fluctuation. Humidity is highest in the morning and frequently reaches 90 percent.

93. **Temperature**. Solomon Islands has a relatively uniform temperature ranging from 22 degrees Celsius (°C) to 31°C throughout the year. The monthly average maximum temperatures are 30-31ºC and the monthly average minimum temperatures range from 22 to 23ºC. Guadalcanal ranges from lows of 19ºC Jul-Sep to 21ºC Jan-Mar and highs of 29ºC Nov-Dec. The monthly average maximum and minimum temperatures observed in Honiara are given in Figure 3.2.

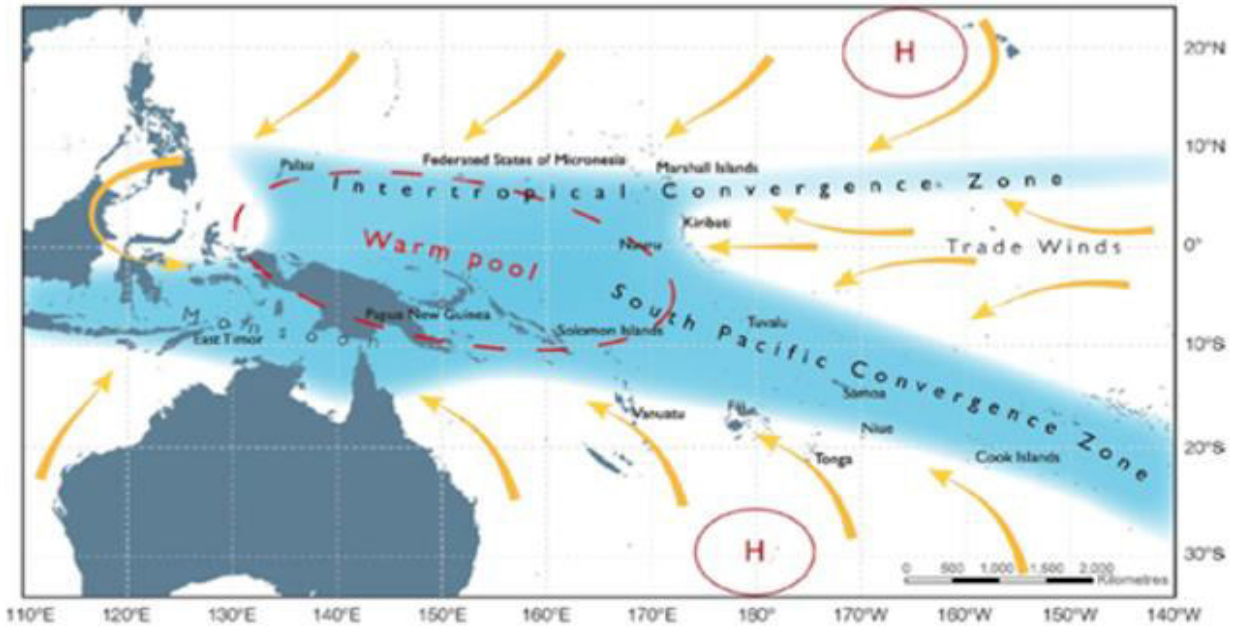
Figure 3.2: 2016 average annual minimum and maximum temperature for Honiara



Source: www.weather-and-climate.com

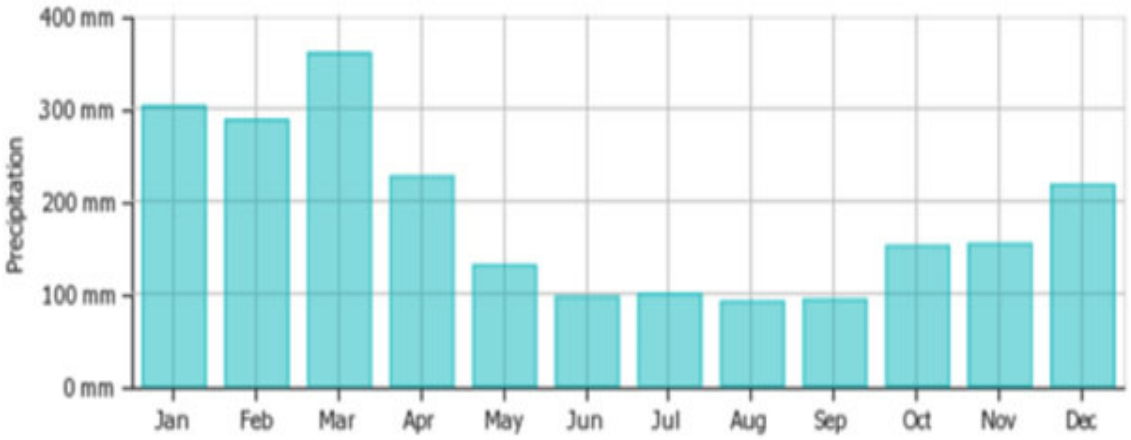
94. The country is subjected to tropical cyclones that are associated with the southeasterly trade winds (November to March) and is also vulnerable to the effects of tsunamis generated from volcanic activity in the Asia-Pacific region. The most important driver of global climate is the El Nino Southern Oscillation (ENSO), the ocean-atmosphere mechanisms of which impact the equatorial Pacific. ENSO oscillates with a period of 2-7 years between El Nino, which brings lower than normal sea levels, weaker trade winds, cooler ocean temperatures and higher barometric pressures across the western equatorial Pacific, and La Nina, which brings the opposite conditions (Figure 3.3). Predominant trade winds and easterlies are shown with yellow arrows, convergence zones with rainfall are shown in blue. The warm pool of near surface water that oscillates in depth and extent across the equator during ENSO is shown in red along with high pressure systems indicated with 'H'.

Figure 3.3: El Nino Southern Oscillation



95. **Precipitation**. The average annual rainfall is mostly within the range 3000 to 5000 mm with most monthly rainfall amounts in excess of 200 mm. In most of the Solomon Islands, the wettest months are during the northwest monsoon season (January to March averaging 380 mm), with a tendency for reduced amounts during February when the equatorial trough is normally furthest south. Locations on the southern sides of the larger islands (e.g. Guadalcanal) tend to have rainfall maximums between June and September. In Honiara, on average, March has the most days with rain (23) followed by Jan, Feb, Apr and Dec which have about 18-20 days of rain. The months with the least number of days with rain are Jun, Aug and Sep with 10-12 days. The average monthly rainfall per month for 2016 for Honiara is given in Figure 3.4.

Figure 3.4: 2016 average annual monthly rainfall for Honiara



Source: www.weather-and-climate.com

96. **Seawater temperature and salinity**. Seawater temperature is almost constant in time and depth between the surface and at -50m WD around the Solomon Islands (NOAA. 2006): (i) at surface: 29°C as annual value, varying between 28.5°C (July-Sept.) and 29.5°C (Jan.-Mar.); (ii) at -50m: 28.5°C as annual value, varying between 28.0°C (July-Sept.) and 28.5°C; and (iii) at -100m: 26.5°C as annual value, varying between 26.0°C (July-Sept.) and 28.5°C. Similarly, seawater salinity is also almost constant in time and depth between the surface and at -50m WD around Solomon Islands: (i) at surface: 34.6psu with seasonal variations lower than 0.2psu; (ii) at -50m: 34.8psu with seasonal variations lower than 0.2psu; and (iii) at -100m: 35.4psu with seasonal variations lower than 0.1psu.

97. **Climate change**. Wave climate and climate change trends around the Solomon Islands are affected by processes occurring over large areas of the Pacific Ocean, from the northern to the southern subtropical zones (35° north to 35° south). Climate change projection scenarios are typically divided into four representative concentration pathways, based on a range of emissions output scenarios. These were developed by others and refined for the Pacific by the Pacific-Australia Climate Change Science and Adaptation Planning Science Program (PCCSP) supported by the Australian Government using global climate modeling experiments. The climate change risk and vulnerability assessment for the UWSSSP, using PCCSP data and projections, concluded that by 2030, annual temperatures are projected to increase by approximately 0.7°C, irrespective of the emissions trajectory over the next decade and a half, while by 2090.

98. The 'business as usual' high emissions scenario could result in as much as a 4.0°C annual temperature increase and that there is very high confidence that both sea surface and air temperatures will continue to increase across the Solomon Islands (PCCSP 2014). Extreme rainfall events, however, are expected to increase in frequency and intensity, with a current 1-in-20-year daily rainfall event increasing by 9mm by 2030. This increases to an additional 43mm by 2090, under a worst-case, very high emissions scenario. It is projected that the intensity and frequency of days of extreme heat will increase over the course of the 21st century. As greenhouse gas concentrations increase, so will the intensity and frequency of days of extreme heat. Extreme rainfall, with lower drought incidence, and a decline in the number of tropical cyclones in the south-west Pacific Ocean are the key weather projections.

99. Satellite data indicates the sea level has risen near the Solomon Islands by about 8 mm per year since 1993, more than double the global average of 2.8–3.6 mm per year and is expected to continue to rise (PCCSP 2013). The tide gauge at Honiara installed in 1994 records sea level and other meteorological data at hourly intervals. The ocean around the Solomon Islands is increasing in acidity, impacting corals and reef ecosystems (PCCSP 2013). Ocean acidification is projected to continue (very high confidence). Projections from all analyzed CMIP3 models indicate that the annual maximum aragonite saturation state will reach values below 3.5 by about 2045 and continue to decline thereafter.

100. The projected climate changes for some key variables are shown in Table 3.2. In summary the key projections suggest: (i) increase in average annual rainfall, intensity of extreme rainfall event and changes in average recurrence interval for 24-hour rainfall event; (ii) sea level rise; (iii) storm surge; (iv) increased temperatures; and (v) changes in wind and wave climate and increases in extreme wave heights and ocean acidity.

Table 3.2: Projected changes in annual and seasonal mean climate for Solomon Islands

Variable	Return or time period	20-year period and emissions scenario									Confidence
		2020-2039			2046-2065			2080-2099			
		B1	A1B	A2	B1	A1B	A2	B1	A1B	A2	
Surface air temp (°C)	Annual	0.4-0.6	0.4-0.8	0.3-0.7	0.4-1.1	0.5-1.4	0.4-1.4	0.6-1.5	0.8-2.3	0.6-2.7	High
Max. temp (°C)	1-in 20-years	NA			0.5-1.0	0.6-1.4	0.4-1.5	0.6-1.3	1.0-2.1	1.2-2.7	Low
Min. temp (°C)	1-in 20-years	NA			1..2-1.8	1.5-1.9	1.6-1.7	1.6-1.7	1.9-2.2	1.8-2.5	Low
Total rainfall (%)	Annual	1-9	2-9	2-6	4-8	5-10	4-9	6-9	9-11	9-12	Moderate
Wet season rainfall (%)	Nov-Apr	2-9	2-9	2-7	5-8	6-11	4-7	6-7	9-11	9-11	Moderate
Dry season rainfall (%)	May-Oct	0-11	2-13	2-9	3-11	4-12	5-15	6-14	9-16	10-18	Moderate
Sea surface temp (°C)	Annual	0.4-0.6	0.3-0.7	0.4-0.7	0.3-0.9	0.3-1.2	0.5-1.3	0.5-1.3	0.6-2.0	0.6-2.5	High
Mean sea level (cm)	Annual	4-14	5-14	4-15	10-26	8-30	8-30	17-45	19-58	29-60	Moderate

Notes: B1 – low emissions scenario; A1B – medium emissions scenario; A2 – high emissions scenario

Source: Pacific-Australia Climate Change Science and Adaptation Planning (2011)

101. The climate change risk and vulnerability assessment undertaken for the UWSSSP adopted the worst-case (business-as-usual) scenario. To include climate change and uncertainty in the design criteria the allowances presented in Table 3.3 were incorporated into the design. A 20% increase in rainfall intensity has been included in the hydrology calculations for the design of the subprojects.

Table 3.3: Climate change criteria for UWSSSP design consideration

Variable	Return or time period	20-year period and emissions scenario									Confidence
		2020-2039			2046-2065			2080-2099			
		B1	A1B	A2	B1	A1B	A2	B1	A1B	A2	
Surface air temp (°C)	Annual	0.4-0.6	0.4-0.8	0.3-0.7	0.4-1.1	0.5-1.4	0.4-1.4	0.6-1.5	0.8-2.3	0.6-2.7	High
Max. temp (°C)	1-in 20-years	NA			0.5-1.0	0.6-1.4	0.4-1.5	0.6-1.3	1.0-2.1	1.2-2.7	Low
Min. temp (°C)	1-in 20-years	NA			1..2-1.8	1.5-1.9	1.6-1.7	1.6-1.7	1.9-2.2	1.8-2.5	Low
Total rainfall (%)	Annual	1-9	2-9	2-6	4-8	5-10	4-9	6-9	9-11	9-12	Moderate
Wet season rainfall (%)	Nov-Apr	2-9	2-9	2-7	5-8	6-11	4-7	6-7	9-11	9-11	Moderate
Dry season rainfall (%)	May-Oct	0-11	2-13	2-9	3-11	4-12	5-15	6-14	9-16	10-18	Moderate
Sea surface temp (°C)	Annual	0.4-0.6	0.3-0.7	0.4-0.7	0.3-0.9	0.3-1.2	0.5-1.3	0.5-1.3	0.6-2.0	0.6-2.5	High
Mean sea level (cm)	Annual	4-14	5-14	4-15	10-26	8-30	8-30	17-45	19-58	29-60	Moderate

Notes: B1 – low emissions scenario; A1B – medium emissions scenario; A2 – high emissions scenario

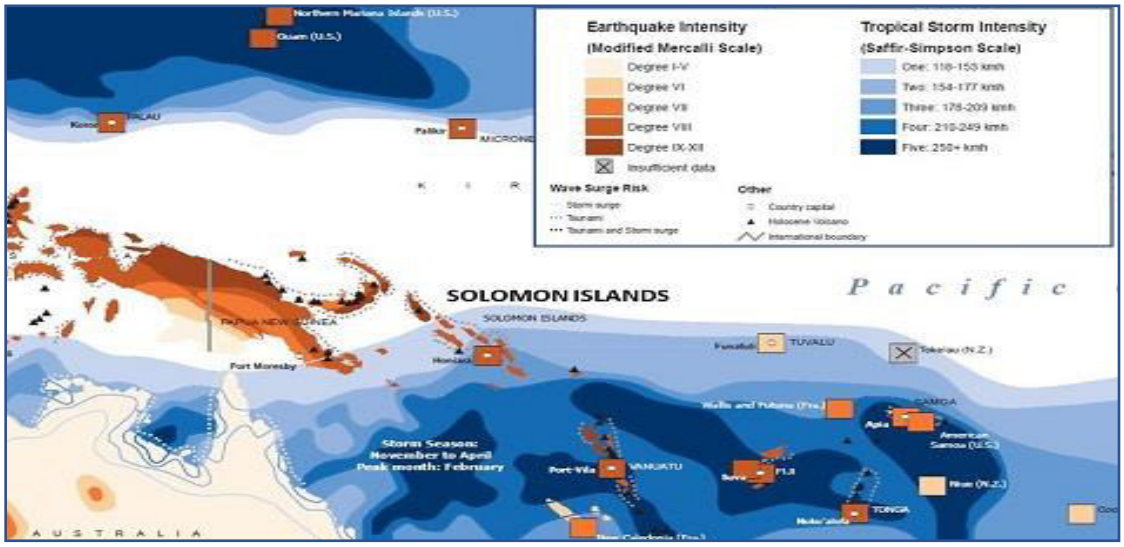
Source: Pacific-Australia Climate Change Science and Adaptation Planning (2011)

3.1.1 Natural hazards and extreme weather

102. **Natural Hazards**. Solomon Islands has been identified by a World Bank study as one of the top 15 countries exposed to multiple hazards (Dilley, M and others. 2005). Based on the map for major natural hazards (Figure 3.5) in the Pacific (OCHA. 2016), the project area is within a tropical storm intensity zone 3 (178-209 km/h on the Saffir-Simpson Scale). These storms can cause some structural damage to small residences and buildings. A large number of trees can be uprooted by storms of this category. In addition, the project area is in the earthquake zone of intensity VIII of the Modified Mercalli Scale (OCHA. March 2016). This intensity is considered "severe" and can cause considerable damage in ordinary substantial buildings with partial collapse. It can also cause great damage in poorly built structures.

103. The threat from tsunamis is real in Solomon Islands due to the occurrence of strong earthquakes and several tsunamis hit the area in the past. The tsunami that was triggered by a magnitude 8.1 earthquake on April 1, 2007, in the Solomon Islands caused significant damage and loss of life (PCMSC. 2016). On February 6, 2013, an 8.0-magnitude undersea earthquake hit Solomon Islands and generated a tsunami that hit Santa Cruz and other islands, causing damages. Threats of volcanic eruption is low for GHA since the nearest known volcano to the area is considered dormant.

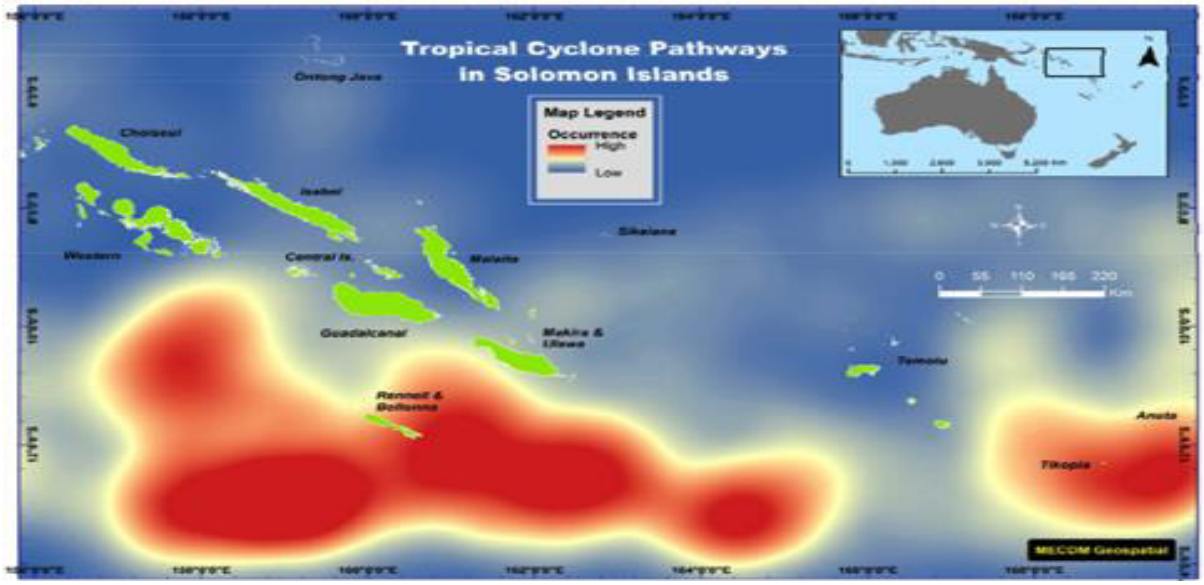
Figure 3.5: Major natural hazards in the Pacific



Source: OCHA (2016)

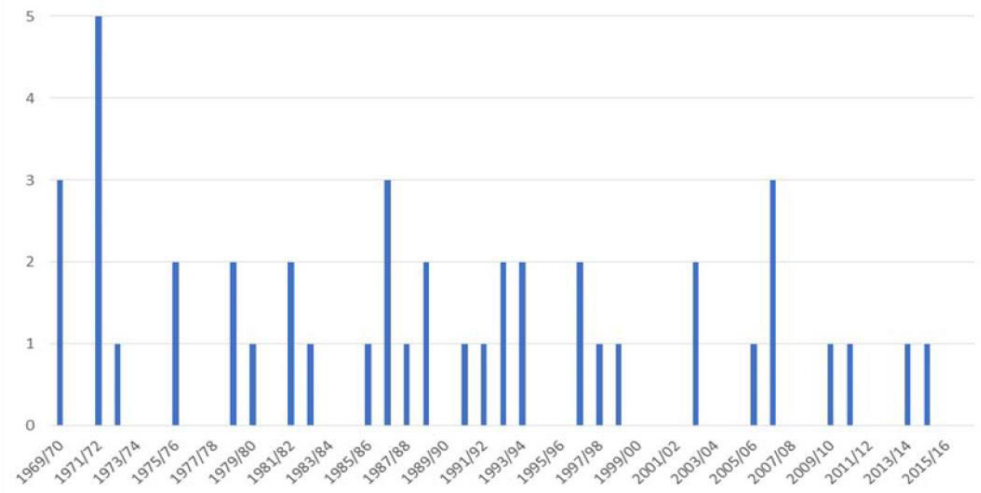
104. **Cyclones and extreme weather**. Tropical low-pressure systems occur each year over the Solomon Islands when the equatorial trough is in the vicinity. The average frequency of tropical cyclones is between one and two per year, tending to increase southwards (Figure 3.6). Tropical cyclones affecting Solomon Islands are usually relatively small but can result in serious damage due to strong winds and heavy rainfall. In addition, tropical cyclones will result in abnormally high ocean tides that may rise 3-6 m above the regular tide. This is due to the pooling of seawater by the frictional effect of very strong winds persistently gusting on shore as the cyclone approaches a shallow coastline. This can result in inundation of low-lying coastal plains and impacts on the shoreline and beach on beach profiles. Honiara has been affected by an average of 13 tropical cyclones per decade, with most occurring between November and April, the tropical cyclone season in the Solomon Islands. Only rarely are occurrences reported outside this period.

Figure 3.6: Tropical cyclone pathway in the Solomon Islands



105. Tropical cyclones are most frequent in El Niño years and least frequent in La Niña years. The ENSO-neutral average is nine cyclones per decade. Tropical cyclones result in flooding and wind damage in the Solomon Islands. There have been severe floods on Guadalcanal, Malaita, Makira and Isabel in recent years, with lives lost, and severe damage to agriculture and infrastructure. Tropical cyclones passing within 400 km of Honiara per season are shown in Figure 3.7.

Figure 3.7: Tropical cyclones passing within 400 km of Honiara per season



Source: Pacific-Australia Climate Change Science and Adaptation Planning (2011)

106. **Impacts of extreme rainfall.** The Solomon Islands has a typical tropical island climate. Air temperatures in the Solomon Islands show very little seasonal variation and are closely linked to sea-surface temperatures. Rainfall in the Solomon Islands is typically high and is affected by

the West Pacific Monsoon (WPM), the South Pacific Convergence Zone (SPCZ) and the Intertropical Convergence Zone (ITCZ). Further, rainfall experiences significant year-to-year variations, due mainly to the influence of the ENSO.

107. **Loss of property and life.** Extreme rainfall events already contribute to both flash flooding and riverine flooding across Honiara. The steep terrain that flank the streams around Honiara means that localized flash flooding can occur during high intensity events. Rainfall has also been associated with the risk of landslips in the steeper areas of the city. The large catchment areas that lie upstream of the city contribute to severe riverine flooding. Since 1966, flood events occur roughly every 3.5 years with the frequency increasing in recent years. Flooding occurs as a result of both cyclones and excessively heavy wet season rainfall.

- Tropical cyclones (TC) that have reportedly caused city flooding include TC Angela (1966), TC Glenda (1967), TC Carlotta (1972), TC Kerry (1979), TC Bernie (1982), TC Namu (1986), TC Ului (2010), TC Yasi (2011), and TC Harold (2020).
- Recent flooding caused by heavy rainfall (non-TC events) have occurred in 2008, 2009, and 2010, 2012, 2014, and 2019.

108. The most extreme rainfall event on recent record was the April 2014 floods, a result of extreme rainfall caused by a slow moving tropical depression. Over a three day period, 613 mm of rainfall was recorded, with the highest one day total recorded at 318 mm. Roughly 240 houses were destroyed, and 22 people lost their lives in flooding along the Mataniko River, where residences were located on dangerously low ground. The flooding combined with riverbank erosion impacted urban infrastructure, such as roads, bridges, and water supply infrastructure. Access to clean drinking water was a major concern following the event for at least half of the 50,000 people estimated to have been affected by the flood.[4] In addition, the flooding precipitated a nationwide epidemic of diarrhea that spread to regions unaffected by the flooding, causing more than 6,000 cases and 27 deaths.[5]

Plate 3.1: Scene form 2014 flooding

109. The total economic value of the flooding's impact was estimated at nearly $108 million. This was equivalent to 9.2 percent of the GDP of Solomon Islands at the time.[6] The total cost to water and sanitation infrastructure from this flooding was estimated to be approximately US$1 million, with 70% of the cost due to loss and 30% due to damage. Most notably, SW needed to duplicate the Kongulai gravity main at White River at a cost approximately US$1.75 million. In

[4] Trundle and McEvoy (2016): The Honiara Urban Resilience and Climate Action Plan, UN-Habitat's Cities and Climate Change Initiative, Honiara, Solomon Islands.

[5] Jones, et al. 2016. 'Increased Rotavirus Prevalence in Diarrheal Outbreak Precipitated by Localized Flooding in Solomon Islands' in *Emerging Infectious Diseases* 22, 875--879.

[6] World Bank. 2014. Rapid Assessment of the Macro and Sectoral Impacts of Flash Floods in the Solomon Islands.

addition, the replacement cost of water meters and distribution pipes was estimated at $72,000 (US$300 per destroyed house).[7]

110. SW also incurred additional operating costs due to a variety of repairs to the water and sewerage infrastructure, higher electricity consumption, additional chemical dosing, and additional labor costs. These costs amounted to an estimated SBD$1 million, equivalent to US$125,000.

111. More recently, TC Harold impacted the Solomon Islands in early April 2020. It brought strong winds accompanied by heavy rains, river flooding, rough seas, high oceans waves and coastal flooding including storm surges. In GHA, the Mataniko and Lungga rivers were swollen, and roads and even bridge segments were washed out.

112. **Impacts on water supply.** Flooding also leads to frequent water interruptions in Honiara, mainly due to high turbidity caused by suspended chemical and biological particles. At the three springs, turbidity increases significantly after heavy rainfall events, which at the moment can only be solved by disconnecting the affected sources to maintain minimum water quality requirements for the health of the community. This leads to down time, loss of revenue, and additional costs in managing the disconnection and reconnection.

113. While all three spring sources are affected, turbidity is the worst at Kongulai Spring, which is influenced by surface water[8] and currently untreated other than dosing of chlorine (sodium hypochlorite) for disinfection. Kongulai Spring is shut down if the turbidity exceeds nominally 20 Nephelometric Turbidity Units (NTUs), and a boil water notice is issued at above 5 NTU. Historically, shutdowns occurred approximately 20 days per year over 3-5 instances, with instances lasting up to a week, and boil water notices were issued for a total of two months out of a typical year.

114. However, turbidity at Kongulai has rapidly escalated over the past few years, causing substantial degradation in water quality. This has resulted in more frequent and longer shutdowns of the supply. In recent years, the pump station has been shut down as much as ten times per month, causing significant impacts to the reliability of Honiara water supply and creating additional costs and revenue losses to SW.[9] Since logging has commenced, peak turbidity levels of up to 150 NTU have been recorded.

3.2 Ecological Conditions

3.2.1 Marine and coastal habitats

115. **Overview**. The marine and coastal ecosystems of Solomon Islands are part of the Western Pacific center of marine biodiversity. The coastal zones are characterized by highly variable patchy ecosystems that include estuaries, lagoons, beaches, mangroves, coral reefs, sea grass beds,

[7] Government of the Solomon Islands. 2014. Rapid Assessment of the Macro and Sectoral Impacts of Flash Floods in the Solomon Islands, April 2014. World Bank, Washington, DC.

[8] The primary source of water is understood to be from the Kovi Sinkhole, approximately 2 km upstream from the spring, where a moderate percentage of the river leaves the stream and enters the groundwater system.

[9] Solomon Water's revenue stream is directly linked to usage, meaning any limitations on supply directly impacts revenue and business performance.

algal beds and small volcanic and atoll islands. Coral reefs are narrow, fringing, and intermittently distributed around the high islands, with barrier reefs and expansive inter-tidal reefs not common. The coral reefs are most often associated with either uplifted shores attached to volcanic coastlines or seaward elevated coral limestone beaches.

116. The dominant marine ecosystems of Guadalcanal adjacent to the project road sections include coastal foreshore beaches and extensive coastal fringing reef systems that vary in width, depth and resources it contains. Extensive areas of sea grass are recorded inshore, coral reefs further offshore and small patches of sandy lagoon habitats occur where the reef interacts with outflow from streams and small coastal lagoons have formed at the mouth of many of the rivers.

117. The reef systems adjacent to the subproject areas are associated with urban (Honiara end), semi-rural, rural activities and village communities. Human activities resulting in land and shoreline clearing have degraded the natural system impacting ecosystem functions in these areas. More recently the coastal foreshore areas, including the shallow intertidal reefs, have been reclaimed and backfilled further reducing coastal biodiversity. The subproject areas of influence area adjacent to but do directly impinger on coastal shoreline, coral reef or associated resources.

118. **Coral reefs**. The marine fauna and flora of the Solomon Islands is considered highly diverse. According to a 2007 study conducted by Coral Reef Initiatives for the Pacific, the Solomon Islands have one of the highest coral diversities in the world. 494 species were recorded (485 known species and nine unknown species which may be new species). These reef systems support one of the richest concentrations of reef fishes in the world with a total of 1,019 fish species identified. The coral reefs are mainly fringing and intermittent around islands and occur along mostly shallow coastlines where the water is clear and warm and maintains a constant level of salinity. Coral reefs support extraordinary diversity of species by providing food, shelter, nursery and feeding grounds for many fish species and crustaceans. The reefs protect coastal areas from storms and erosion by forming natural breakwaters, whilst providing a wide range of services to the nations citizens.

119. **Fisheries**. Solomon Islands has an open marine tenure system that allows anyone to fish the inshore waters (from high water mark to 12 nautical miles offshore) and which is managed by the national government, although both historically and currently, communities claim some authority over adjacent community marine and coastal areas with respect to resource ownership and extraction. Solomon Islands' fisheries include five zones: i) freshwater streams and rivers and associated wet lands; ii) shallow fringing coastal reef or intertidal zone; iii) sub-tidal areas and reef slope including fissures or canyons in the reef slope (to about 25 m depth); iv) deep reef and near-shore deep-water areas below 25 m; and v) open ocean or pelagic fishery. All of which are of critical subsistence importance, as well as local income generation. zones i) to iv) are usually considered to be part of the "inshore fishery" whilst v) is referred to as the "offshore fishery".

120. **Mangroves**. Mangroves are important ecosystems for aquatic organisms and provide critical breeding habitats for a wide variety of reef and coastal invertebrate and vertebrate species. They provide structural protection to coastlines and act as a buffer between land and sea and act as a sink for sediments, nutrients and other contaminants to maintain coastal water quality, and promote the growth of coral reefs and sea grass. The Nature Conservancy reported 20 species and two hybrids of mangroves in the Solomon Islands. They include: *Heritiera littoralis*, *Aegiceras corniculatum*, *Sonneratia alba*, *S. caseolaris*, *S. gulngai*, *Osbornia octodonata*, *Lumnitzera littorea*, *Rhizophora apiculata*, *R. stylosa*, *R. lamarckii*, *R mucronata*, *Bruguiera gymnorrhiza*, *B. parviflora*, *B. sexangula*, *Ceriops tagal*, *Excoecaria agallocha*, *Xylocarpus granatum*, *X. mekongensis*, *Avicennia alba*, *A. marina*, *Scyphiphora hydrophyllacea* and *Nypa fruticans*.

121. **Seagrass**. Seagrass meadows are a significant coastal habitat and contain high biodiversity value and are the main diet for species such as the endangered green sea turtle (*Chelonia mydas*) and dugongs (*Dugong dugon*) and are found throughout the Solomon Islands.

122. Seagrasses grow in soft bottom estuarine and marine environments and can be found extending from the intertidal zone to sub-tidal, along mangrove coastlines, estuaries, shallow bays, coral reefs, inter-reef and offshore islands. In Solomon Islands there are ten species of seagrass (in two families), which represents 80% of the known seagrass species in the Indo-Pacific Region. Malaita Province has the most extensive meadows within Solomon Islands (Table 3.4), including one that is more than 1,000 ha in size.

Table 3.4: Areas of seagrass by province

Province	Area of seagrass (ha)	No. of seagrass meadows
Guadalcanal	101.3	31
Makira	229.1	52
Central	651.5	56
Western	754.4	134
Isabel	535.9	99
Choiseul	753.8	49
Malaita	3,607.6	59
Total	**6,633.8**	**480**

Source: The Nature Conservancy - Solomon Islands Marine Assessment (2006)

123. From a survey conducted in 2004, some 101 ha of seagrass were mapped in 31 meadows in Guadalcanal. Some 76 percent of seagrass meadows in the Province were of continuous cover and restricted to the calmer bays and fringing reefs along the northwestern shores and the extensive reef complexes at the island's most easterly extent. Seagrasses were observed in four localities (Figure 3.8); in moderate wave action localities, such as Mamara and Kukum (west and east of Honiara respectively); Visale Village west of Cape Esperance (northwest Guadalcanal); Marau Sound and nearby islands e.g., Marapa, Beura, Henera Islands, on the eastern tip of Guadalcanal (the island's largest expanse of fringing reef and seagrass meadows). There are no meadows or smaller patches of seagrass within the four subproject areas of influence that will be impacted by the proposed works or activities.

Figure 3.8: Location of seagrass meadows on Guadalcanal

3.2.2 Terrestrial habitats

124. **Overview**. Solomon Islands has a high level of plant biodiversity including 3,210 species of vascular plants; it is likely that could be 4,500 plant species when those that are unrecorded are included. While diversity is high, endemism is low, with no endemic families and only three endemic genera. Endemism of species is not accurately known but is thought to range from ten per cent of fern species to 80% of Pandanus species. The islands with the highest rate of endemism are Santa Cruz (Temotu) and Guadalcanal.

125. **Flora**. The main groups of flora include 340 species of ferns, 277 species of orchids, 33 species of palms, 26 species of other nuts (e.g. ngali nut, cut nut and alite nut), 20 species of pandanus, 14 species of *Eleocarpacae* trees, and 11 species of shrubs. The terrestrial ecosystems of Solomon Islands include tropical moist forests, montane forest and secondary vegetation, grassland and savanna, swamps, lowland rain forest, and cropland. Forest makes up 86% of the country's vegetation communities with low altitude forest accounting for the vast proportion of this, while cropland and bush account for 10% of the vegetation communities.

126. There are several different vegetation zones, based on altitude. Along the coast is either a rocky or sandy beach, where pandanus, coconuts, and vines predominate, or a swamp, supporting mangrove and sago palms. Terminalia grows in some drier areas. The lower slopes, up to about 2,500 feet (760 m), have a hardwood forest of banyans, Canarium, Indo-Malayan hardwoods, and, at higher altitudes, bamboo. In forested groves, there is relatively little undergrowth. In this zone is also the most intense human cultivation, which, when abandoned, a dense secondary forest grows, which is nearly impassibly thick with shrubs and softwoods. Above about 2,500 feet (760 m) is a cloud forest, with a dense carpeting of mosses, lichens, and liverworts, with cycads as the dominant tall plant.

127. **Fauna.** The terrestrial fauna of the Solomon Islands is extremely diverse and includes 223 species of birds (173 residential terrestrial species and 50 other species of shore/sea bird and

migratory), 52 mammals (all of which belong to the bat and rat family), 61 species of reptiles (25 are endemic) and 17 species of frog.[10]

128. Solomon Islands has a high level of bird diversity and is recognised for the degree of speciation and population variation between islands. Birds are by far the most studied animal group in the Solomon Islands with Malaita being home to three species which are endemic to that island.

129. There is only once species of crocodile in the Solomon Islands, the salt water crocodile (*Crocodylus prosus*). The ban on hunting crocodile in the early nineties has resulted in a significant increase in the crocodile population throughout the country with increasing reports of attacks.

130. In terms of distribution, there is a relatively high level of island endemism. While Western Province records the largest number of species (41), Choiseul and Guadalcanal Provinces have the highest rate of island endemism with six species being found on these islands. Most endemics species are restricted to montane forests or undisturbed natural areas of the largely untouched central mountainous areas and the Weather Coast.

3.2.3 Freshwater habitats

131. **Overview**. Most river systems discharging to the northern coastline of Guadalcanal appear to remain in relatively good condition, maintain natural flow and ecosystems functions. Increased anthropogenic disturbance associated with the lower reaches of river systems impacted by resource extraction (e.g. gravel for construction), agriculture (e.g. sedimentation, nutrient, pesticides) and household (e.g. sewage, grey water) runoff, and pollution (near village areas) is apparent throughout the subproject resulting in degraded water quality parameters.

132. **River fauna**. In Solomon Islands, Gobioid fishes are the dominant freshwater fauna and mainly represented by *Gobiidae, Eleotridae* and *Rhyacichthidae* families. Fauna includes 43 species of fish belonging to 26 genera and 14 families but no endemic species. Inland freshwater fish are migratory 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 other aquatic species, such as Gobioids, are amphidromous. Spawning occurs in rivers and larvae drift to the ocean before migrating back as juveniles to the freshwater system to mature. Visual observations undertaken identified no vertebrates in the streams and rivers crossed by the road. It is noted that due to the limited scope of works associated with freshwater systems detailed biodiversity surveying was not required.

133. **Biodiversity**. The freshwater resources of the Solomon Islands show a high level of biodiversity and endemism throughout the nation, especially among the aquatic insects. A countrywide assessment of freshwater river systems recorded 93 species of Heteroptera representing 28 genera in 12 families of which 60% are endemic at species level and at least 31 species being new to science (Polhemus et al 2008). Sixty-three species of Odonata representing 37 genera and 12 families were recorded of which 44% are endemic at species level and at least one new species was discovered. Nine species of Gyrinidae representing two genera and ten

[10] Ibid.

species of Simuliidae representing two genera were recorded of which 90% of both are endemic at species level.

3.2.4 Threatened species and protected areas

134. **Threatened and vulnerable species**. The International Union for Conservation of Nature and Natural Resources (IUCN) undertakes a global assessment to classify species at risk of global extinction. The 2015 IUCN Solomon Islands Red List identifies 234 threatened species in total; 20 mammals, 21 bird species, five reptiles, two amphibians, 18 fishes, two mollusks, 149 other invertebrates and 17 plants. Two species of bird have been declared extinct in the Solomon Islands; the Thick-billed Ground Dove, *Gallicolumba salamonis* and the Choiseul Pigeon, *Microgoura meeki*. The IUCN's Critical Ecosystem Partnership Fund (CEPF) work has identified three critically endangered species and one endangered within the Guadalcanal Watersheds KBA; *Pteralopex pulchra* (Montane monkey-faced bat), *Uromys imperator* (emperor rat), *Uromys porculus* (Guadalcanal rat) and *Tiradelphe schneideri* (Schneider's Surprise – butterfly), respectively. These are also Alliance for Zero Extinction (AZE)[11] trigger species.

135. Five turtle species found in Solomon Islands are listed as protected on the Red List including: critically endangered Hawksbill turtle (*Eretmochelys imbricate*); endangered Green turtle (*Chelonia mydas*), Olive Ridley turtle (*Lepidochelys olivacea*) and Loggerhead turtle (*Caretta carreta*); and vulnerable Leatherback turtle *(Dermochelys coriacea*). None of these species are recorded as nesting on the beaches along the northern and western coastlines of Guadalcanal.[12] Other protected species include cetacean (whales and dolphin species), dugong (*Dugong dugon*), crocodiles (*Crocodylus porosus)* none of which will be impacted by the subproject works.

136. Of the 308 globally threatened species in the east Melanesian hotspot 225 (73 percent) occur in the Solomon Islands key biodiversity areas (KBA), including 40 not found elsewhere. Annex 4 is a summary of these species in classes by status for the whole hotspot and by country distribution. As part of the east Melanesian hotspot, Solomon Islands has a high level of endemism (Table 3.5), predominately associated with fauna. This includes 19 mammals (14 bats and 5 rats), 67 birds, 19 reptiles, three amphibians (frogs), two butterflies and one vascular plant.

Table 3.5: Endemism in East Melanesian Hotspot and Solomon Islands

Class	East Melanesian Islands Hotspot					Solomon Islands KBA
	Resident & breeding species	Hotspot endemics	Threatened hotspot endemics	Endemism (%)	Threatened endemics (%)	
Mammals	81	42	21	51	51	19
Birds	288	148	34	51	23	67
Amphibians	49	45	5	92	11	3

[11] Launched globally in 2005, the AZE engages 88 non-governmental biodiversity conservation organizations working to prevent species extinctions by identifying and safeguarding places that are habitat for species evaluated to be endangered or critically endangered under IUCN criteria.

[12] Identified nesting sites include the following islands Arnavon (Isabel/Choiseul) Vacho, Sasamunga (Choiseul), Litoghahira (Isabel), Ramos (Malaita), Russell (Central) and Rendova, Tetepare Island (Western).

Total	**418**	**235**	**60**	**65**	**28**	**89**

Source: CEPF – Ecosystem Profile of East Melanesian Hotspot (2012)

137. For Malaita Province, the IUCN Red List of endangered species lists three bird species as critically endangered, along with six threatened bird species and three endemic at the provincial level. The GHA does not have a recognized protected area as confirmed by ECD; there are marine reserves at either end of Guadalcanal. While the IUCN Red List identifies five marine turtle species as protected species in Solomon Islands, there are no available information that these species have nested on GHA's beaches or the northern shores of Guadalcanal in general, apart from some nesting beaches on islands off the coast of Marau Sound.

138. **Marine protected areas**. There are in the order of 90 marine protected areas in the Solomon Islands and one designated marine conservation area (Arnavon Marine Conservation Area), a significant increase in the 63 marine protected areas recorded in 2008. Most are designated as no take zones and are managed as custom resource and three have a national designation. The marine protected areas account for 956 km^2 or 0.06% of the exclusive economic zone.

139. There is also one marine managed area registered on Guadalcanal, located at the eastern end of the island and a small community-based area is located on the western coastline of the island, adjacent to Naro village. The Naro community-based marine protected area is located at Naro Peninsula within Naro bay. The area is managed by the Naro community and has received considerable support from the Ministry of Fisheries and Marine Resources and The Nature Conservancy. The marine protected area encompasses the intertidal reef ecosystems within the bay extending from the low water mark out to the reef edge.

140. **Terrestrial protected areas**. There are 17 terrestrial protected areas in the Solomon Islands, two of which are located on Guadalcanal (Table 3.6), Mt. Popomanaseu (30,000 ha) and Lake Lauvi (200 ha) both located on the Weather Coast and well outside the subprojects influenced areas. These are detailed in Annex 5.

Table 3.6: Terrestrial protected areas

Province	No. of protected areas
Guadalcanal	2
Western	4
Choiseul	3
Isabel	3
Makira	2
Malaita	2
Temotu	1
Total	**17**

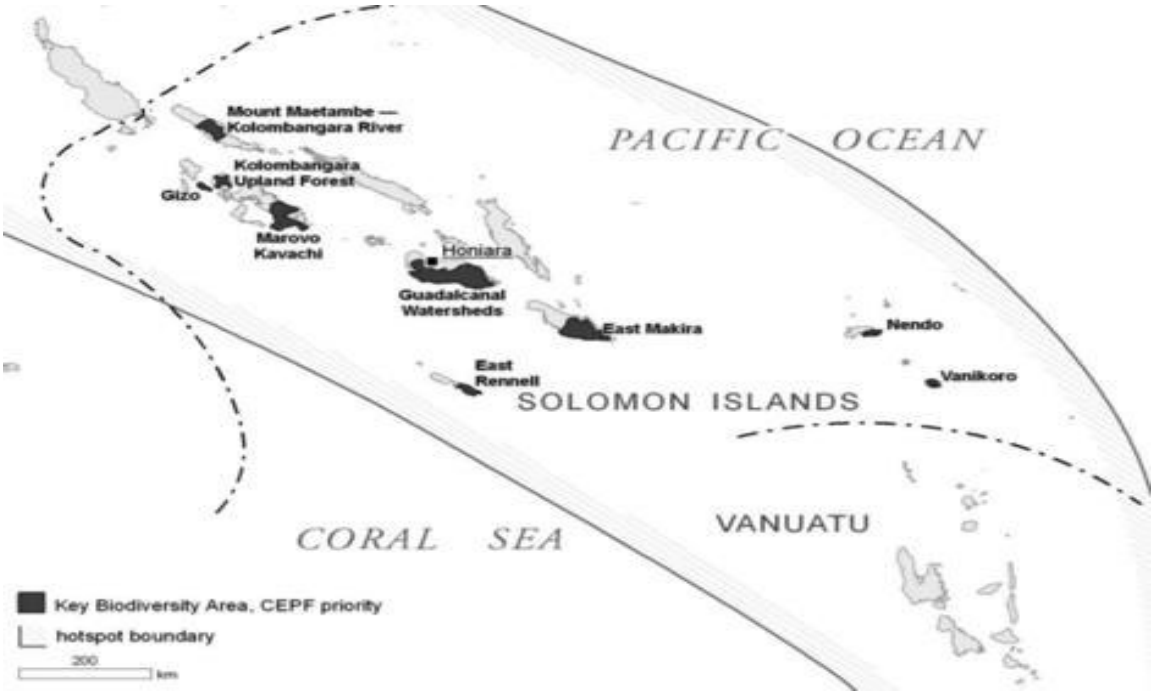
Source: MECDM (2009)

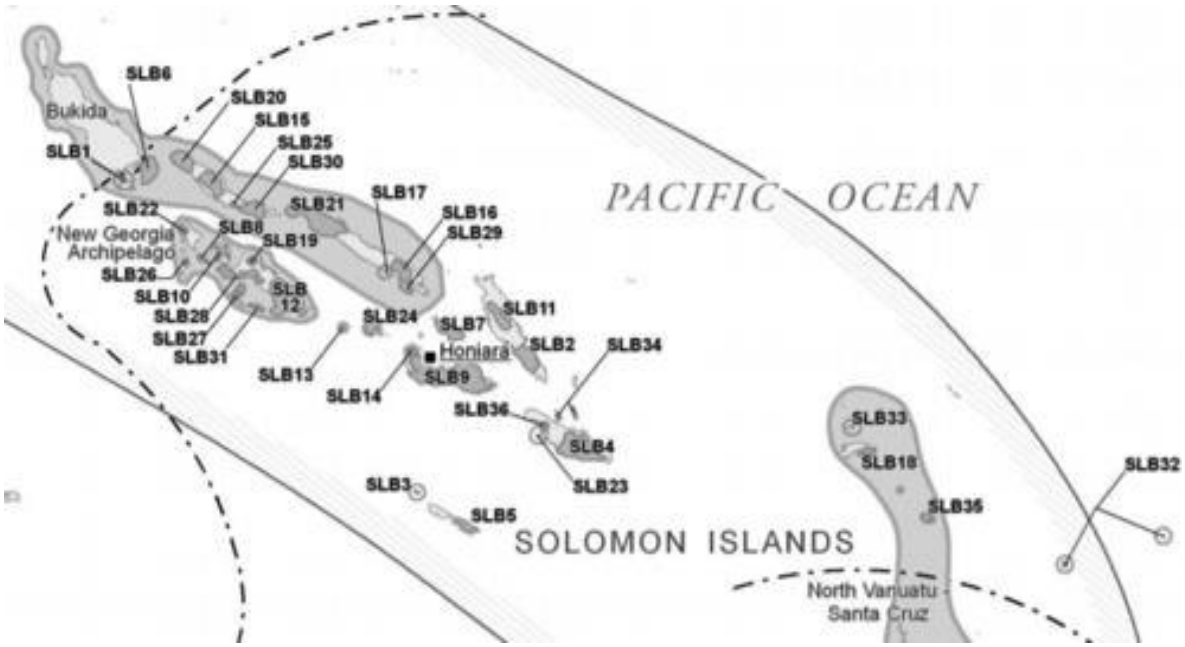
141. **Biodiversity areas**. In July 2013 the IUCN launched the CEPF a $9 million, eight-year investment program to conserve globally important biodiversity found in 20 KBA, approximately

1.5 million ha within the east Melanesian hotspot in Solomon Islands, Vanuatu and east Papua New Guinea. The hotspot is also part of the Coral Triangle, a region defined by areas with more than 500 coral species and high alpha diversity of fish and marine invertebrates. Notable endemic species include the Solomon's sea eagle (*Haliaeetus sanfordi*) and many species of flying-fox (*Pteropus sp.*). The east Melanesian hotspot also harbor a diverse and unique group of flora and fauna including: 3,000 endemic vascular plants species, 41 endemic mammals, 148 endemic birds, 54 endemic reptiles, 45 endemic amphibians and three endemic freshwater fishes.

142. The hotspot is a conservation priority, and habitats include coastal vegetation, mangrove forests, freshwater swamp forests, lowland rainforests, seasonally dry forests and grasslands, and montane rainforests. Not only do species have importance at the global scale due to endemism and the threatened status of many species but also in the patterns and processes that have underpinned the development of theories of evolutionary biology. Moreover, the natural environment still has extremely high local importance to the people of the islands, due to its role in their traditional practices and cultural identity. Of the 36 KBA identified in Solomon Islands (Figure 3.9), two are on Guadalcanal; SLB 9 Guadalcanal Watersheds an expansive area of inland forest (376, 146 ha) and SLB 14 Mt Gallego (14, 763 ha) at the north-western end of the island.

Figure 3.9: Priority Biodiversity Sites Identified by the CEPF





Source: CEPF – Ecosystem Profile of East Melanesian Hotspot (2012)

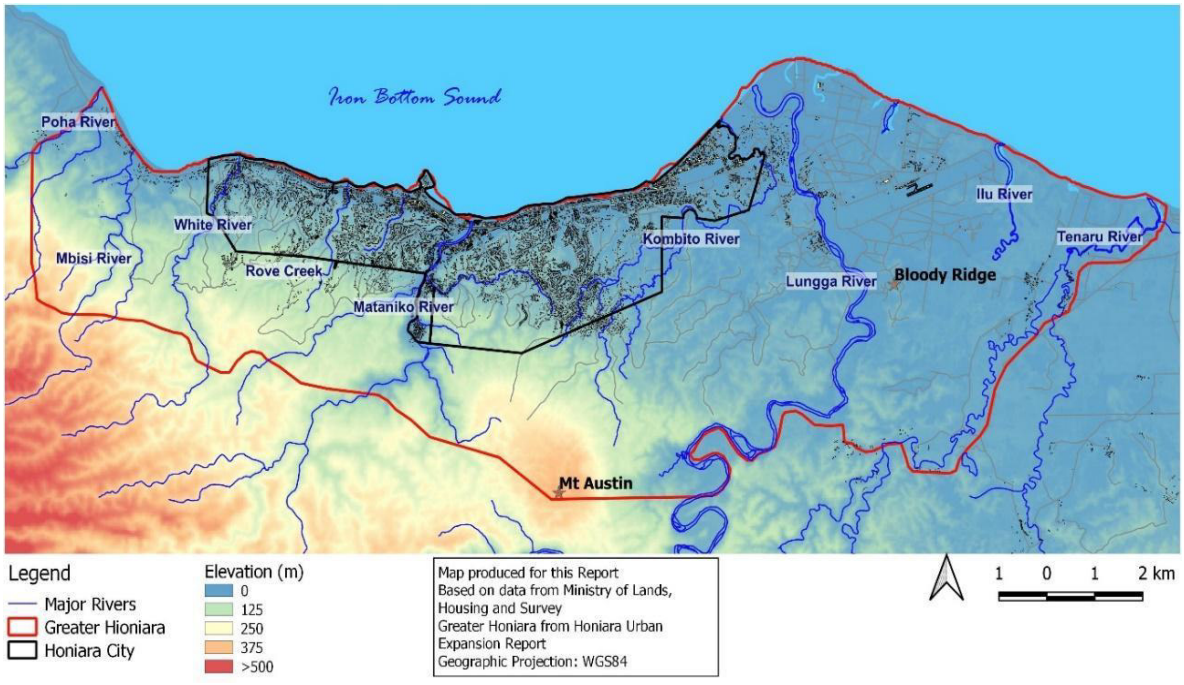
3.3 Socio-Economic Conditions

3.3.1 Administration areas, land-use, and demography

143. **Administration areas**. Honiara is the capital city and largest urban area of the Solomon Islands. The city is located on the northern coastline of Guadalcanal Island, amidst rugged mountains and valleys. Administered by the Honiara City Council, it covers approximately 23 km^2 and is divided into 12 wards. Honiara lies within the GHA, which covers 133 square kilometers and includes portions of Tandai Ward and Malango Ward in Guadalcanal Province.

144. As shown in Figure 3.10, GHA can be divided into two general geographical zones. The first zone, located in the south and west, is characterized by hilly grasslands incised by narrow forested valleys. The elevation rises along the southern border of GHA. In this zone, residences are located on ridges and along valleys, and many are at risk from landslips and flash floods. The second zone is an alluvial plain, which varies in width from 200 m in parts of central and western GHA to roughly 2 km in eastern GHA. The central business district, the majority of national and city administrative buildings, and almost all major commercial developments are located within this zone. To the east, a central feature is the Lungga River, which comes down from the hills and crosses large stretches of flat land before reaching the coast. The area to the east of the Lungga River, known as Henderson (where the airport is located), is particularly low-lying and prone to flooding.

Figure 3.10: Map of Honiara City and Greater Honiara Area



145. **Land ownership and use**. Landowners have significant influence and rights over the use of the catchment areas, as their land ownership pre-dates urban development in Honiara. Hence, they have reasonable grounds to be compensated for adapting their land use practices (or, conversely, to be rewarded for providing ecosystem services to other residents of Honiara). Therefore, any project that seeks to improve management of the catchment areas must engage with landowners as beneficiaries.

146. Most of the Kongulai and Kohove catchment areas fall on customary land, which is owned and managed under 'informal' customary decision-making by the locally recognized landowners. Much of the Lungga catchment area is now 'Registered land,' which is a form of perpetual estate where ownership is provided to registered Trustees. The Trustees are selected by the customary landowners, but once selected may act on their behalf. The registered land within the Lungga catchment was formerly customary land and includes land that was registered for a proposed hydroelectricity scheme.

147. The customary landowners of the catchment areas are comprised of members of two main tribal groups, the Kakau and Lakuili. There are three recognized tribes within the Kakau landowner group and three under the Lakuili, and each consist of multiple recognized clan groups (approximately 40 clans). The total population of the tribal groups is approximately 2,000 people. The landowners no longer reside in the middle and upper catchment areas but do utilize the area for gardening, hunting and for logging. Most landowners reside in the coastal per-urban and urban areas of Honiara, including Kakabona and Belaha, and within Barana village in the upper catchment of the Mataniko River.

148. **Shifting cultivation practices**. In addition to logging, shifting cultivation practices by communities (away from subsistence agriculture and towards cash-cropping and husbandry) also represent a potentially significant current and future stressor on the watershed areas near Honiara This is especially true given the proximity of Honiara's fast-growing markets. Balancing the rural welfare benefits of agricultural growth and development in these areas with the need to mitigate watershed impacts thus could represent another potential important target for management interventions.

149. **Population**. Solomon Islands has around 19.8% (or 102,030) of its estimated present total population of 515,870 living in urban and peri-urban areas (2009 Census).[13] The country is divided into 10 are provinces namely Central, Choiseul, Guadalcanal, Isabel, Makira-Ulawa, Malaita, Rennell and Bellona, Temotu, Western and the capital, Honiara City which is situated on the northwestern coast of Guadalcanal. Malaita has the largest population size of 137,596 people, followed by Guadalcanal (93,614), Western (76,649) and Honiara city (62,609) based on the 2009 census. The population growth rate is the highest in Guadalcanal (4.4%) followed by Choiseul (2.8%), Honiara (2.7%), Makira-Ulawa (2.6%) Western (2%).

150. A summary of the main demographic indicators is reproduced in Table 3.7 while the projected population to 2025 per province is presented in Table 3.8.

[13] Data from the 2019 Population and Housing Census is not yet available.

Table 3.7: Summary of main demographic indicators (Solomon Islands Population Census)

Indicator	Total	Urban	Rural
Total population	515870	102030	413840
Males	264455	53596	210859
Females	251415	48434	202981
Average annual population growth rate,1999-2009 (%)	2.3	4.7	1.8
Urban population	102030	-	-
Per cent urban (%)	19.8	-	-
Average annual Urban growth rate,1999-2009 (%)	4.7	-	-

Source: Solomon Islands Population Census (SINSO 2009)

Table 3.8: Population projections 2010 – 2025 by province

Year	Choiseul	Western	Isabel	Central	Rennel	Guadalcanal	Malaita	Makira	Temotu	Honiara	Total
2010	28,480	82,187	28,150	27,852	3,274	103,059	146,143	43,627	22,679	70,002	555,453
2011	29,293	83,931	28,876	28,392	3,361	107,979	147,905	44,832	22,970	72,079	569,620
2012	30,106	85,650	29,597	28,912	3,449	112,988	149,573	46,020	23,250	74,168	583,714
2013	30918	87,344	30,311	29,415	3,539	118,078	151,152	47,190	23,520	76,260	597,726
2014	31,731	89,015	31,020	29,902	3,632	123,239	152,647	48,344	23,779	78,346	611,656
2015	32,548	90,673	31,728	30,375	3,726	128,479	154,079	49,489	24,032	80,424	625,554
2016	33,370	92,319	32,434	30,837	3,823	133,790	155,457	50,625	24,278	82,485	639,418
2017	34,197	93,953	33,139	31,289	3,923	139,164	156,787	51,755	24,520	84,522	653,248
2018	35,030	95,579	33,843	31,732	4,026	144,592	158,076	52,880	24,757	86,529	667,044
2019	35,869	97,197	34,548	32,168	4,131	150,067	159,333	54,001	24,991	88,501	680,806
2020	36,719	98,820	35,257	32,603	4,239	155,605	160,583	55,126	25,227	90,441	694,619
2021	37,581	100,448	35,970	33,039	4,351	161,197	161,832	56,257	25,463	92,344	708,482
2022	38,453	102,083	36,688	33,476	4,465	166,838	163,085	57,396	25,701	94,206	722,392
2023	39,336	103,724	37,410	33,915	4,582	172,520	164,345	58,545	25,940	96,026	736,343
2024	40,227	105,367	38,135	34,358	4,701	178,237	165,613	59,705	26,180	97,802	750,325
2025	41,131	107,023	38,866	34,809	4,822	184,002	166,908	60,886	26,422	99,544	764,412

Source: SINSO. 2009

151. In 2018, Honiara's municipal population was estimated at over 86,000.[14] Including the peri-urban populations of Tandai and Malango, the overall population of GHA is estimated at around 115,000. On average, GHA residents are both young[15] and relatively poor. Honiara's poverty levels are even higher than the national average, in part due to a higher cost of food and non-food goods and services.[16]

152. In GHA, most of the poor live in informal settlements. Making up nearly 25% of GHA's population, informal settlers live on marginal land such as on riverbanks, steep and unstable slopes, and on the edge of swamps, and therefore tend to be more exposed to natural hazard risks. Informal settlements also lack centralized urban services, notably water supply and sanitation.

3.3.2 Social and economic infrastructure

153. **Health**. The Ministry of Health and Medical Services is the key health provider in the Solomon Islands. Health services are concentrated in the urban centers with a hierarchy of facilities available ranging from nurse aide posts and rural clinics to National Referral Hospital. Of the nine provinces in the Solomon Islands, eight have a public hospital. There are approximately 22 doctors per 100,000 of population and 205 midwifes and nurses per 100,000. In general, malaria and tuberculosis are the major public health concerns in Solomon Islands, along with sexually transmitted infections, acute respiratory tract infections, diarrhea, viral hepatitis, dengue fever, and measles (SINSO and MHMS. 2017).

154. **Education**. As per the 2009 census data the highest level of education completed, 15 % of males and 9% of females 12 years and older responded that they attended secondary education; 59% and 51% of males and females completed only primary level, and 19% of males and 35% females had no schooling completed. 3% of males and 1% of females had tertiary education. GHA, as the center of education in country, has schools that include the Solomon Islands National University, University of the South Pacific (USP), and Woodford International School. Solomon Islands National University was initiated in 2012 from the Solomon Islands College of Higher Education which was basically pooled from all the existing government schools in 1984, namely, the Solomon Islands Teachers College, Public Administration Training School, Ranadi Marine Training School, Honiara Nursing Training school, and Honiara Technical Institute.

155. The University of the South Pacific (USP) Solomon Islands Campus at Honiara provides tertiary education to students of the South Pacific. The Woodford International School offers the International Baccalaureate Primary Program from early childhood to Year 5 and then the Cambridge International Middle Years and High School Program up to the Cambridge Advanced Level Program in Year 12.

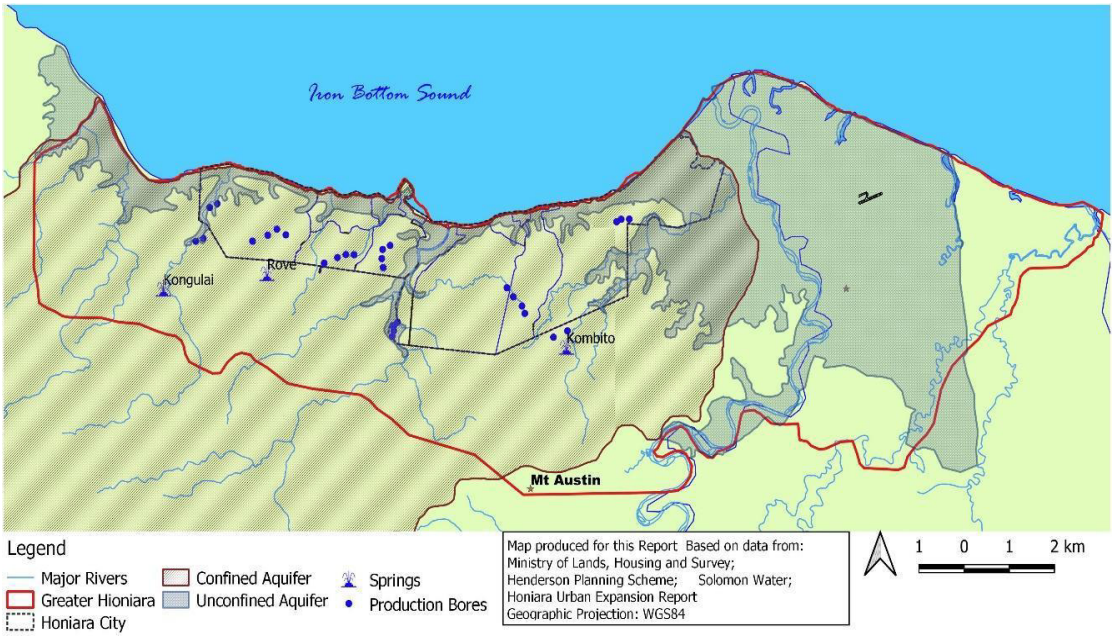
[14] Solomon Islands National Statistics Office (NSO).

[15] Some 58% of the city's population is less than 25 years old and a third of the population is less than 15 (Solomon Islands Government, 2017).

[16] The basic needs poverty line in Honiara is estimated at $2.49 per person per day.

156. **Current water supply.** The hydrology around GHA is dominated by one large river (Lungga), a series of small rivers, and significant groundwater resources. As shown in Figure 3.11 there are also two types of freshwater aquifers – a deep, confined fractured rock aquifer and a shallower, unconfined unconsolidated sedimentary aquifer. The rivers and groundwater are likely to be connected in a complex manner. Springs from groundwater are a source to many local, small rivers and water courses. In addition, lying below the rivers, water may flow in underground rivers, some of which may also enter the groundwater aquifers or may rise to the surface elsewhere.[17] These complex connections have not yet been mapped.

Figure 3.11: Boundaries of aquifers in Greater Honiara Area



157. The SW water distribution system provides drinking water to approximately 60% of GHA households. The current upper limit of water supply production is estimated at 32.5 MLD, with another 10 MLD to be added in the next few years. This supply of water is only enough to serve average daily demands until around 2027.[18] SW currently extracts water from three spring-fed surface water sources (Kongulai, Rove, and Kombito) and operates 25 bores across seven bore fields. About 60% of the supply comes from the springs, mostly from Kongulai, which is the single largest source of GHA's water supply (accounting for 40% of the total). Since Kongulai Spring is Honiara's most elevated source, it enables a sizable portion of the city's water supply to be fed by gravity, which reduces pumping to high-level zones. With the high costs of energy in Honiara, this significantly reduces, SW's cost of operation and aids the economic sustainability of the water supply.

[17] Solomon Water. 2018. Vulnerability of current and future groundwater sources.

[18] It is assumed that the required source capacity will be in line with average day demands in the short term, while future source capacity will eventually need to be in line with peak day demands.

158. Water is provided to roughly 10,000 households and 3,000 commercial properties through a reticulated network into six independent supply zones across GHA.[19] This supply system includes many inadequately sized trunk mains and reticulation pipes, which contribute to poor water pressure across most of the supply system. The system also includes several storage reservoirs and pumps. For those households serviced by SW in Honiara, water is available for 22 hours a day on average. The water supply gap is primarily due to high non-revenue water of 58% of water production, down from 62% in 2018.[20]

159. The 40% of households in GHA that are not provided water through the reticulated system get their drinking water from a number of sources, including public taps, standpipes, tube wells, boreholes, springs, and collected rainwater. The long-term strategy is to connect these customers to the centralized system, but this process will be gradual.

160. **Future water supply.** SW's 30 Year Strategic Plan (2017–2047) focuses on two water supply components: (i) upgrading the existing network, which will lead to reduction of non-revenue water, optimization of network operations, modernization, and improved service in areas already covered by SW's centralized service, and (ii) expanding the network to all areas of GHA, including informal settlements that are not currently covered. The plan acknowledges the increasing challenge of climate change but does not explicitly consider any potential impacts of flooding and climate change on infrastructure.

161. In the near term, SW will implement a number of capital works investments that have already been identified in the Strategic Plan, thereby boosting production to around 40 MLD. It is likely that some existing sources will continue to be used in the medium to long-term, including the major spring source (Kongulai) and several groundwater bore-fields (at least as backup supply sources).

162. In the medium-term, the target is to achieve coverage of 95% of all properties within the service area. The Strategic Plan estimates that this will require increasing future source capacity to around 100 MLD over the next 20 years to cater to population growth. To achieve this goal, the Strategic Plan identifies the Lungga River as the preferred source. As the largest river in Guadalcanal and with a mean flow of around 3,300 MLD, it has long been considered a long-term supply source for Honiara, but as discussed below, there are growing threats to this potential future water source. Developing the Lungga River as Honiara's main water source will require the construction of a river intake and pump station, raw water rising mains from the river intake to the water treatment plant located adjacent to the intake, water pump station and trunk mains to deliver treated water into the existing water supply system.

[19] SW also provides sewerage services in GHA to approximately 10% of the residents.

[20] SW. 2018. *Non-Revenue Water Reduction Strategy Report*. Honiara.

3.3.3 Economy

163. **Overview.** Solomon Islands' per-capita gross domestic product of USD$600 ranks it as a lesser developed nation, and more than 75% of its labour force is engaged in subsistence and fishing. Most manufactured goods and petroleum products must be imported. Until 1998, when world prices for tropical timber fell steeply, timber was Solomon Islands' main export product and, in recent years, Solomon Islands forests were dangerously overexploited. Other important cash crops and exports include copra and palm oil.

164. The GHA has been the economic center of Solomon Islands. Since it is the main commercial and administrative center, its economic base has been dominated by the services sector which include whole-sale businesses, retail stores, banks, tourism services shops, restaurants, and hotels. The economy is growing, and the government has forecasted that the construction, manufacturing, and utilities sectors will contribute more to the country's gross domestic product.

165. **Logging in Solomon Islands.** Around 78% of the Solomon Islands is covered by forests, down from 82% in 1990, with half of these classified as primary forests.[21] Logging remains the largest export for the Solomon Islands, contributing around 65% of the country's export earnings in 2016 and 2017, mainly through the sale of round logs, accounting for 20% of the state revenue.[22] Around 82% of the timber is exported to China.[23] Log exports reached a peak in 2017 of more than 3.4 million cubic meters, a 21% increase from the previous year and in line with a trend that began in 2000. Round log exports were already above 1 million cubic meters by 2005, more than four times the estimated sustainable rate of 250,000 cubic meters per annum.[24]

166. Global Witness predicts that at current rates of forest harvesting, stocks of natural forests may be completely exhausted by the year 2036. The report also estimates that current forest harvesting rates are at around 19 times what is sustainable. The importance of the logging industry for the economy has raised concerns that this has locked the country into a "race to the bottom" of environmentally-extractive economic growth. Such concerns have motivated some provincial leaders not to issue new business licenses to logging and mining companies.[25]

167. **Logging in GHA.** Land degradation in the catchments feeding Honiara's water supply have become increasingly degraded through unsustainable land use activities, in particular from commercial logging. Logging activities have increased over the past five years, causing a number of adverse impacts to watersheds, including greater turbidity and sediment loads, higher rates of runoff and landslides during rainstorms, and changes in seasonal flow regulation. This Kongulai/Kovi/Kohove area, comprising three distinct watersheds, covers about 32 km^2 and is located to the south and east of Honiara. It is an important water source area for SW, with sink holes in the Kovi and Kohove watersheds providing important inflow for the Kongulai Spring.

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21 FAO. *Forest futures – Sustainable pathways for forests, landscapes and people in the Asia-Pacific region. Asia-Pacific Forest Sector Outlook Study III*, 2019

22 CBSI. 2017: Annual Report, 2017.

23 Global Witness, *Paradise Lost: How China can help the Solomon Islands protect its forests,* 2018.

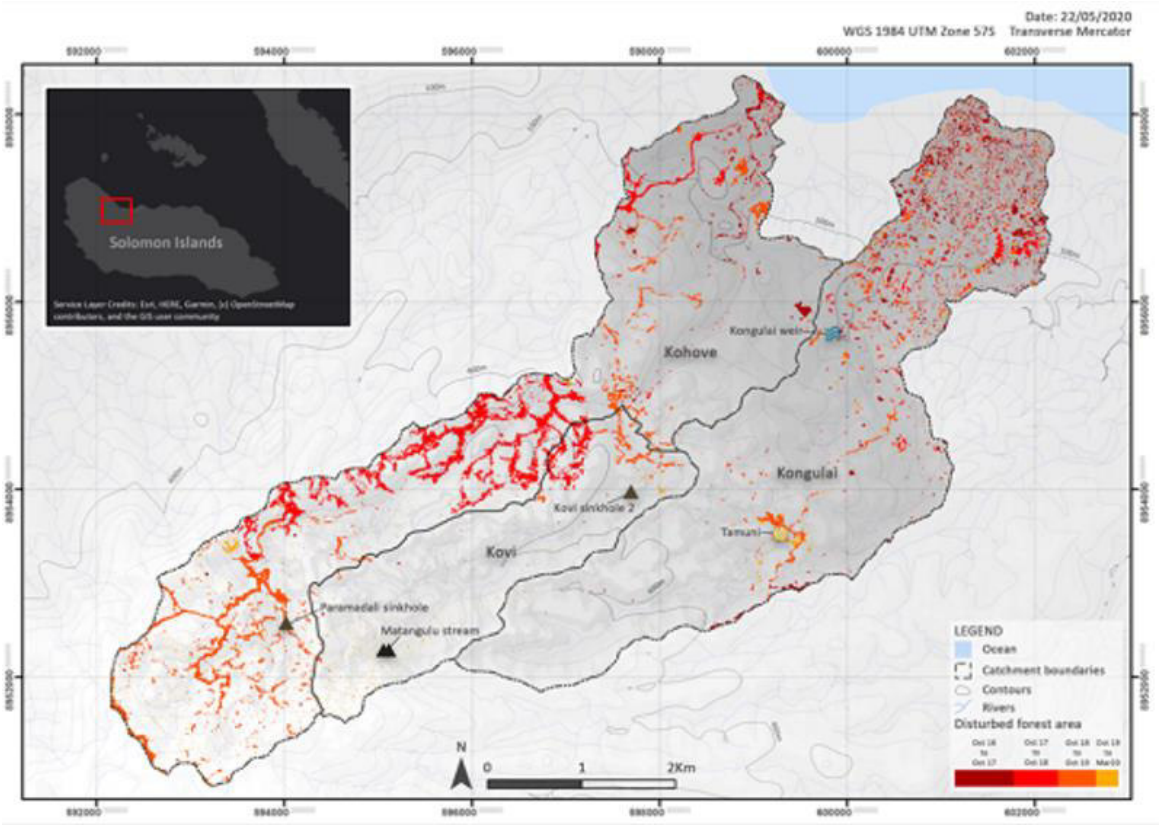
24 Solomon Islands Government. *Logging Sustainability Report- Background Information*. 2018.

25 Mongabay. *Solomon Islands province bans logging in bid to protect the environment*. January 21, 2019.

168. As shown in Figure 3.12, logging has been most widespread in the upper Kohove and also in pockets in the lower Kongulai. Logging concessions have been granted in these watershed areas, but logging companies have not adhered to the country's Code of Logging Practice.[26] Remote sensing data (2016-2020) reveals the following:

- 7.3% of total disturbance was on slopes above 30 degrees (against COLP);
- 25% of total disturbance was within 25m of streams (against COLP) and 42% was within 50m of streams; and
- 50% of total disturbance was above 400m elevation (against COLP and specific consent conditions).

Figure 3.12: Disturbed areas in vegetative cover in Kongulai/Kovi/Kohove 2016-2020



[26] Ministry of Forests, Environment and Conservation, The revised Solomon Islands code of logging practice, May 2002, available from: https://theredddesk.org/countries/laws/code-logging-practice

169. The Lungga River is the longest river in the Solomons, with a length of 50 km. The catchment area is 377 km^2, nearly twelve times the size of the Kongulai/Kovi/Kohove area (Figure 3.13). Several logging concessions are in operation in areas along the middle Lungga River, with levels of riparian zone degradation likely similar to the Kongulai/Kovi/Kohove watersheds (although there is currently no remote sensing data to confirm this).

Figure 3.13: Lungga River watershed

Source: Catalogue of Rivers for Pacific islands - Secretariat of the Pacific Community (2012)

170. Some of the Lungga catchment area is now 'registered land,' which is a form of perpetual estate where ownership is provided to registered Trustees. Trustees are selected by the customary landowners, but once selected may act on their behalf. The registered land within the catchment was formerly customary land. This is the case in the Komarindi sub-catchment, which is located at the upper area of the Lungga River and covers about a third of the Lungga catchment.

171. No logging has yet occurred in the Komarindi, since it was previously an informal protected area—Komarindi Conservation Catchment Area—and managed under customary estates. Established in the early 1990s and associated with the now abandoned Lungga River hydropower development, it included a community-based ecotourism development program which functioned between 1997 and 1999 and was then terminated due to ethnic tensions. Support for the conservation project came principally from the (then) Solomon Islands Department of Forests, Environment and Conservation, the South Pacific Biodiversity Conservation Programme, and the South Pacific Regional Environment Programme.

4 GEF Project Components and Activities

172. The HWMP clearly contributes to the regional program—Climate Resilient Urban Development in the Pacific—which is intended to help cities in four Pacific countries address specific urban development challenges exacerbated by climate change. The regional program supports two main components:

- Component 1: Facilitating climate resilient urban planning and development – This includes activities to create the enabling framework, to establish the foundation and to build capacity so that there is the desire and the ability to integrate climate resilience and climate proofing into urban development, into urban services and into water supply and sanitation systems. Note, this is aligned with the GEF Climate Change Objective 2 - mainstream climate change adaptation and resilience for systemic impact.
- Component 2: Demonstrating climate resilient urban services (water supply and sanitation) and disaster reduction – This includes activities and investments to achieve climate resilience and/or climate proofing, thereby demonstrating how to achieve this, how it is feasible, and the benefits. This will notably be in water supply and sanitation but also in other urban service sub-sectors as prioritized. Infrastructure is central to this component. Note, this is aligned with the GEF Climate Change Objective 1 - reduce vulnerability and increase resilience through innovation and technology transfer for climate change adaptation.

173. The GEF funds will complement the UWSSSP financing the expansion of Honiara's reticulated network (e.g. pumping stations, transmission pipes, short-term storage) and climate proofing measures. The GEF funds could be used to help support the UWSSSP, as there are still firm plans for Lungga River to be developed as Honiara's main future water source, protecting the Lungga River catchment is still important to protect this future water source and also reduce the risks of flooding and landslides.

174. The UWSSSP design represents a technically viable approach to improve access to water supply and sanitation services in GHA. Engineering designs are built on past studies, including the SW 30-Year Strategic Plan and the Five-Year Action Plan. Until the implementation of a new major water production system (Lungga), recommended by the 30-Year Strategic Plan in the mid-2020s, the additional water demand from SW's customers will be met by reducing non-revenue water, enhancing water conservation management (including installing prepayment meters), and upgrading the existing water production and treatment capacity. As shown in Table 4.1, these measures will be financed under Output 1 of the UWSSSP.

Table 4.1: Summary of cost estimates

Output	Amount (US$ million)	
	UWSSSP	GEF LDCF
1: Continuous and safe urban water supplies	53.15	1.26
2: Effective, efficient, and safe urban sanitation services	20.58	
3: Enhanced and sustained awareness of hygiene and water conservation in GHA and five other towns	2.53	
4: SIWA is financially and technically sustainable	3.48	
5: Ecosystem services provided by Honiara's catchment areas are improved*		3.33

Note: For the baseline project, an additional $13.08 million is set aside for contingencies and financial charges during implementation.

* Includes enhancement of water quality, regulation of water flow, control of erosion and sedimentation, and reduction of risks from flooding and landslides.

4.1.1 Honiara watershed management project

175. The main objective of the HWMP is to improve the ecosystem services provided by Honiara's catchment areas, including enhancement of water quality and regulation of water flow. However, the objectives will extend beyond water supply and quality, including control of erosion and sedimentation and reduction of risks from flooding and landslides. The HWMP will consist of three interrelated components:

- Component 1 (C1) - will strengthen capacity for planning and informed decision making by gaining an improved understanding of watershed biophysical and social boundaries, resources, and processes. Watershed data, mapping, hydrological modeling and information sharing will help build a more comprehensive understanding of the watersheds.
- Component 2 (C2) - will empower communities to implement solutions for effective management, protection, and restoration of the forest and riparian habitats of the watershed. The focus will be on building lasting and effective partnerships through sustainably financed community-based projects that address the drivers of forest degradation.[27]
- Component 3 (C3) - will help facilitate interagency and inter-sectoral coordination and governance and support development of integrated catchment management plans to provide for long-term management of Honiara's catchments.

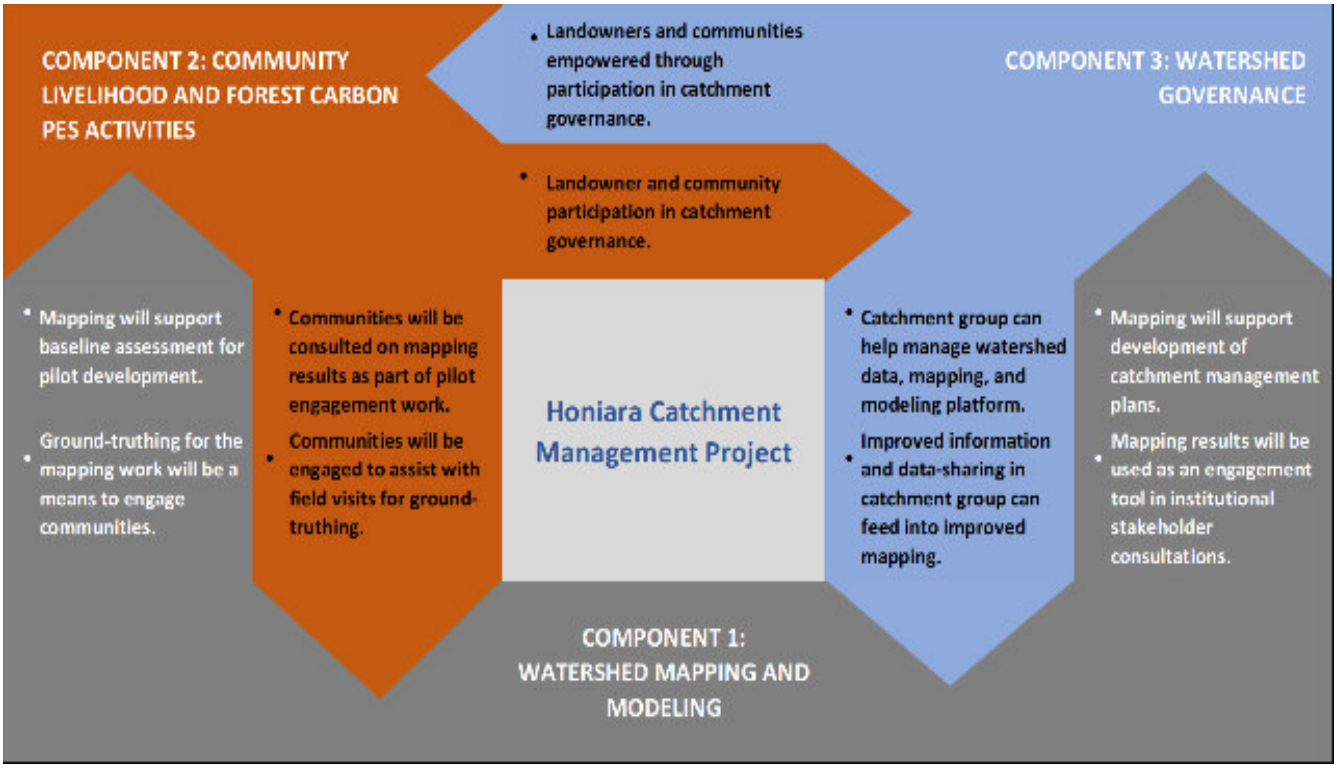
176. Given the large geographical scale of the watersheds surrounding Honiara, the HWMP will initially focus on the areas that pose the most immediate challenges and also on communities that show a willingness to engage in project activities.

[27] Approach to engagement and participation of landowners to be based on Nakau Programme (refer also Section 6) which has designed a methodology for forest carbon PES that has been successfully implemented in Melanesia, including in the Solomon Islands.

177. The Kongulai/Kovi/Kohove catchments are identified as initial priority areas due to their connection with the immediate water quality issues impacting Honiara's present water supply. Furthermore, consultation and analysis undertaken during project design phase suggests they offer an easier pathway for project development with respect to land ownership and landowner participation. As such, these areas are best placed to demonstrate the 'proof of concept' to other potential participants. The Lungga is the next priority area, as it a site for future water supply development.

178. As shown in Figure 4.1, the three HWMP components will be mutually reinforcing. C1 activities will focus on improving the understanding of Kongulai/Kovi/Kohove and Lungga catchments and will enable better decision-making and planning of any activity or intervention taking place in the catchments. This will be of particular value as a pre-cursor to C3, which will focus on improving inter-sectoral coordination and catchment management planning.

Figure 4.1: Linkages across project components



179. The data, mapping and modelling work under C1 will also provide many of the baseline data requirements for C2, which will support forest protection, reforestation, and restoration activities by providing landowners with opportunities to earn revenue. This will include forest carbon payment for ecosystem services (PES)[28] projects in strategic locations, alternative livelihood activities, and education and training to reduce dependence on extractive industries (i.e. logging) for income generation. C3 activities will focus on establishing effective inter-sectoral knowledge sharing, coordination, and planning for better catchment management. This will build on the mapping and community-based work delivered through C1 and C2. The main phases of this work will include inclusive education to build understanding and buy-in, establishment of governance and institutional arrangements to facilitate coordination, and development of catchment management plans to guide improved land management and decision-making within the catchments.

180. Details of activities under each component may be found in Annex 6 and a summary in Table 4.2.

181. **C1 - develop watershed maps and hydrological models.** This component will focus on comprehensively mapping and modelling the watersheds and also providing training and capacity building to relevant government and community stakeholders to facilitate uptake and field visits to ground-truth mapping work.

182. A third-party service provider (or providers) with the requisite scientific capacity will be identified and recruited for this work. The preferred choice is a research institute or centre within academia, since such an organization would be incentivized – through the potential research opportunities afforded by such work – to produce high quality outputs beyond a simple pay-for-services contract. Furthermore, the possibility of obtaining co-financing via research funding is greater with such an organization and would strengthen outputs. A research institute would also be well-placed to assist in building research linkages and technical capacity with Solomon Islands government agencies, personnel, and academia, which is an important co-benefit envisioned of this work. Guided by SW and in consultation with key ministries (e.g. Ministry of Forestry, MLHS), the service provider will help implement this component in four activity areas (described below), thereby supporting several key aspects of project development and improved watershed management. These are as follows:

- *Develop a more detailed understanding of the biophysical environment of the targeted watersheds.* Remote sensing data, mapping technologies and hydrological modelling approaches, combined with ground-truthing of mapping and modelling results, will provide a more accurate picture of the watersheds. Mapping will include core baseline data, including: watershed boundaries and topography; description of hydrological system (including surface and ground water interaction); underlying geology and soils (e.g. erosion risks); land use; forest types, and biodiversity assessment.

[28] PES involves provision of payments to landowners in return for delivery of catchment protection and/or restoration outcomes. A core feature of PES financing is the ability to use the private sector to cover project implementation costs (including land management activities) and opportunity costs to landowners (e.g. for giving up logging). The aim is to provide long-term finance for watershed management activities and incentivize sustainable land use.

- *Identify priority areas.* Assessment of land-use change (e.g. forest disturbance through logging) and impacts of changes on hydrological functionality will help identify priority areas for conservation and restoration activities (e.g. identification of priority riparian zone restoration areas).
- *Support communication and collaboration on data collection and sharing, joint decision-making and planning with relevant government agencies*. This will be achieved by involving relevant agencies in data collection and analysis via sharing and discussing mapping and hydrological modelling results.

183. **C2 - support community livelihood and forest carbon PES activities.** Landowning communities are key stakeholders in the upper watershed areas critical for Honiara's water supply and climate resiliency. These communities play a central role in land use decisions, including partnering with logging companies on logging license applications through government channels.

- Pursuing alternatives to logging must therefore involve helping communities delink their livelihoods from the logging sector. To accomplish this, the HWMP will focus on building effective watershed-protection partnerships with communities to develop improved, diversified and climate-resilient non-timber-based livelihoods that leverage nature-based finance opportunities through three main types of community interventions: (i) providing employment to landowner communities through forest and riparian zone restoration works; (ii)
- Developing forest carbon PES projects (for the international voluntary carbon market), which will target protection of key threatened forest areas in the watershed; and
- Supporting employment and development of alternative sustainable livelihood activities (including job readiness) that are consistent with watershed protection and sustainable land use.

184. This component will be led by collaboration of the non-government and private sectors to form a "project development team" (as mentioned throughout this section). A non-government organization (NGO) with significant donor experience will be engaged to lead this C2 team, with a separate regional or international NGO (or private sector project developer) subcontracted to provide more specialized expertise in developing and implementing forest carbon finance projects. To complete the project development team, a locally-based NGO will be hired to support community organization and livelihood activities (i.e. empowering communities as key watershed stewards) and lead implementation of restoration works. As discussed in Section 6, there will be a strong commitment to two-way learning and "informed participation", whereby both project proponents and participants learn from each other.

185. HWMP will 'bundle' multiple impacts by using forest carbon financing to incentivize catchment protection. Using climate change mitigation financing to achieve adaptation and watershed management outcomes is recognized internationally.[29]

[29] Lozatelli, B. Fedele, G., Fayolle, V. and Baglee, A. 2016. "Synergies between adaptation and mitigation in climate change finance" in *International Journal of Climate Change Strategies and Management*, Vol. 8 - 1, pp.112-128

186. The FAO suggests that carbon balance is a powerful indicator to appraise the impact of watershed projects.[30] Carbon offset standards allow projects to measure and report various 'co-benefits' (e.g. watershed protection, biodiversity conservation and social outcomes) that can increase the price of carbon credits sold in the market. In practice, the livelihood activities may include assistance to individual, family-run or community groups. Opportunities for education and training will include a focus on increasing landowners' capacity to find employment in Honiara, noting that most landowners reside in the peri-urban areas around the city and are not necessarily living and working on their customary land. Also, employment and livelihood activities provide an opportunity to address gender inequalities within the catchment communities.

187. **C3 - improve watershed governance**. This component will facilitate improved watershed governance by supporting improved interagency, intersectoral and community-inclusive communication, joint decision-making, and information-sharing. It will also explore options to strengthen finance by leveraging pre-existing government, development partner and private sector funding streams (via either pooling or better aligning them). The aim is to address gaps in institutional cohesion, coordination, and funding that have all contributed to unsustainable upper watershed land-uses, which have in turn led to Honiara's decreasing resilience to climate change impacts (increased flood risk and severity, increasing water supply costs).

188. In particular, the HWMP will create a multi-stakeholder coordination group to support integrated catchment management in key upper watershed areas over the long-term; a catchment management group (CMG). For this purpose, the project will hire a catchment management/institutional expert that will be placed in SW's PMU.

189. This component will include four activities:

- *Stakeholder engagement and problem analysis* - SW, led by the catchment management/institutional expert, will engage with government, other institutional stakeholders, and catchment communities to raise awareness and build support for improved catchment planning, management and governance. The main focus of this activity is educative and designed to increase inter-sectoral understanding and collaboration. The current problems impacting water supply and climate resilience in the catchment are complex, being influenced by a broad range of factors and involving multiple stakeholders. Consultations will thus focus on building a systematic understanding of how various activities interact to impact on land use, water management, and water security for the GHA. This 'systems approach' will assist the project proponents and stakeholders to understand the complex issues and the role various actors play in the system. The outcome of this activity is to build support for the establishment of an inclusive governance approach and institutional arrangements for improving catchment planning and management.

[30] Bernoux et.al. 2011. Carbon sequestration as an integral part of watershed management strategies to address climate change issues; Policy brief.

- *Catchment governance and coordination* – SW will engage stakeholders in a planning process to design an interagency and inter-sectoral group to coordinate activities that affect the catchment, catchment communities and water security for the greater Honiara area. Various models will be examined, such as a 'water fund' arrangement and catchment management or catchment advisory committees. The preferred arrangement will consider existing institutional arrangements and the solution most likely to be effective and sustainable within the local context (e.g. within resourcing and capacity limitations, and sensitive to government needs and community expectations). An appropriate host agency will be selected to provide executive support to the catchment group (e.g. MECDM or SW).
- *Facilitate catchment management planning* – SW will facilitate development of a catchment management plan and will work closely with the catchment planning group (see activity 2 above). This may result in a single catchment management plan for all Honiara catchments or separate catchment plans subject to preferences from the coordinating group. A key focus of the activity will be building ownership of the catchment management plan with stakeholders to facilitate broader ownership in the plan and hence commitment to its implementation.
- *Explore the creation of a catchment management fund* - exploring options to catalyze additional sources of finance via a trust fund mechanism and/or by better leveraging pre-existing government, donor and private sector funding streams (via either pooling or better aligning them). This fund could draw upon multiple sources of funding to ensure its sustainability.

Table 4.2: Summary of HWMP component activities and results

Activity area	Input	Output
C1 - develop watershed maps and hydrological models		
1: Formulate mapping strategy and collect remote sensing data	Based on previous mapping and hydrological modelling work done for watersheds, service provider will make recommendations on mapping strategy and indicators. Additional activities will be proposed, as required to confirm results – such as site visits or on-site collection of hydrological data – and cost estimates for these. The service provider will then focus on collecting and collating available remote sensing data covering the target watershed areas	Mapping, data layers - watershed boundaries, forest and vegetative cover, forest structure, forest and vegetation disturbance (various time periods based on available data), topology (slope & altitude), geology and soils, available cadastral layers, including logging and other land-use licenses, and measures of soil erosivity. Hydrological modelling - SWAT modelling, with priority on developing climate change scenarios regarding turbidity and flood risk.
2: Collect hydrological data and conduct site visits	A service provider will install hydrological monitoring equipment in select locations in the targeted watersheds to collect sufficient data to contribute to meaningful modelling and assessment of the water system.	Conduct the site selection, installation, and maintenance as part of community-partnerships building, which could involve creating several community-based positions to manage hydrological monitoring equipment. The service provider will conduct site visits to ground-truth the remote-sensing data that is collected.
3: Develop watershed model	After collection of remote-sensing and hydrological data, it will develop a model of the target watersheds; following the community and government stakeholder consultations, the service provider will develop a final set of maps and hydrological modelling results	Better identification of priority areas for restoration or protection (i.e. those that provide important watershed ecosystem services such as flood mitigation). preliminary mapping and modelling results are developed, they will be shared with watershed communities and government stakeholders as part of consultations and engagement for piloting work. This will allow communities and stakeholders to examine mapping results, identify the need for refinements or additional mapping outputs, and determine the need for additional data or site visits for calibration. Initial results will be used to discuss with communities on strategy for near-term riparian zone restoration work.
4: Create data, mapping, and modelling platform	creation of a watershed data, mapping, and modelling platform, which will be based on the model developed in the previous stage	Regular updating of land-use data via remote sensing applications. This component will also include training of key technical staff in select government agencies and SW to facilitate uptake.
C2 - support community livelihood and forest carbon PES activities		
1: Provide landowner employment through forest and riparian zone restoration works	Start restoration works as early as possible in the project cycle. Works will focus on high priority degraded sites that are directly impacting turbidity levels and affecting current water supply (identified through C1 activities). The GEF grant will finance restoration activities during the first three years of the project.	Repair of erosion hotspots on roads and streams caused by logging tracks and direct seeding and replanting riparian areas in proximity to potable water sources. Includes: (i) provision of institutional support; (ii) use of landowner labor; and (iii) production or acquisition of seedlings.

Activity area	Input	Output
2: Develop forest carbon PES projects	Employ or adapt a model for landowner engagement derived from Nakau Programme (refer Section 6). Forest carbon PES activities will be delivered using a 'grouped project approach' which will commence with one or two inception projects in the Kongulai/ Kovi/ Kohove catchments. During the first 2-3 years of the project, the inception projects will be fully developed to 'market stage.' Under the grouped project approach, different sites in Kongulai/Kovi/Kohove or in Lungga can then be developed as 'sub-projects' without the need to undertake every project development step required for the inception projects. In this manner, C2 projects are designed to enable effective expansion or replication from the outset.	Prepare forest carbon PES projects – allowing projects to be registered with a carbon PES standard. Includes: (i) establish forest baseline;(ii) describe social baseline; (iii) develop plan for women's empowerment and participation; (iv) empower landowner participation and education for free, prior and informed consent (FPIC); (v) establish community engagement focal point; (vi) develop transparent financing plan; and (vii) based on UWSSSP process, design project grievance redress system. Develop forest carbon PES projects - design the required elements of forest carbon project (carbon standard validation; protected area declaration and completion of land recording).; Execution of forest carbon PES projects including – execution, implementation of monitoring, reporting, and verification regime and conservation management plans and governance, management and benefits-sharing system.
3: Support employment and alternative livelihood activities	Interventions that increase landowners' economic participation and reduce poverty address a main driver for logging, which is the need for income. This intervention will provide access to business and employment education and training, networking and partnership development with the private sector, and provide access to start-up capital for small enterprise development. Working with landowners co-design a benefit sharing mechanism (for PES income) that targets re-investment of PES finance into sustainable alternative livelihood activities and employment.	PES investment to support livelihoods and employment - produce a landowner community livelihood, education and training plan to guide investment of PES funds for community benefit. Facilitate sustainable enterprise development - facilitate access to training and support and provide seed funding for the development of new micro-enterprises (e.g. at family scale), targeting watershed landowner communities. The nature of these activities will depend on the needs and interests expressed by participants during consultation and joint planning, but possibilities include high-value non-timber forest products (NTFPs), tree nurseries, apiculture and eco-tourism. Support education and training for employment - funds will be made available from the HWMP initially and then from PES financing to establish and maintain a fund to provide education and training opportunities for watershed landowner communities. The activity will focus on establishing, administering and establishing institutional (governance) arrangements for this fund.
C3 - improve watershed governance		
1: Stakeholder engagement and problem analysis	SW will engage with government, other institutional stakeholders, and catchment communities to raise awareness and build support for improved catchment planning, management and governance. This 'systems approach' will assist the project proponents and stakeholders to understand the complex issues and the role various actors play in the system.	Education, awareness raising and design for increased inter-sectoral understanding and collaboration. Consultations will focus on building a systematic understanding of how various activities interact to impact on land use, water management, and water security for the GHA. The outcome of this activity is to build support for the establishment of an inclusive governance approach and institutional arrangements for improving catchment planning and management.

Activity area	Input	Output
2: Catchment governance and coordination	SW will engage stakeholders in a planning process to design an interagency and inter-sectoral group to coordinate activities that affect the catchment, catchment communities and water security for the greater Honiara area.	Various models will be examined, such as a 'water fund' arrangement and catchment management or catchment advisory committees. The preferred arrangement will consider existing institutional arrangements and the solution most likely to be effective and sustainable within the local context (e.g. within resourcing and capacity limitations, and sensitive to government needs and community expectations). An appropriate host agency will be selected to provide executive support to the catchment group (e.g. MECDM or SW). Preparation of TOR for, and establishment of, catchment management group (CMG).
3: Facilitate catchment management planning	Facilitate development of a catchment management plan and work closely with the CMG (Activity 2 above). This may result in a single catchment management plan for all Honiara catchments or separate catchment plans subject to preferences of the CMG.	Based on plan included in SW's 30-Year Strategic Plan and through a participatory and consultative process development with stakeholders, and ownership-build for, catchment management plan. Facilitate broad ownership of the plan and hence commitment to its implementation.
4: Explore the creation of a catchment management fund	Exploring options to catalyze additional sources of finance via a trust fund mechanism and/or by better leveraging pre-existing government, development partner and private sector funding streams (via either pooling or better aligning them).	Multiple sources of funding to ensure sustainability. Fund sources to be explored include: (i) beneficiary pays/ water surcharges – SW has indicated a willingness to increase tariffs to directly support upper watershed nature-based investments;[31] (ii) beneficiary pays/ private sector support - water fund development, once more fully developed, will be used to approach key private sector beneficiaries of watershed ecosystem services in Honiara to promote the case for making additional financial contributions to the fund to mitigate their business risk associated with water supply and climate risk; and (iii) development partner support - donors and related initiatives will also be approached to identify potential synergies and joint fund-raising opportunities to support water fund and watershed management activities and development.

[31] SIWA. 2017. Based on the Medium-growth scenario from Hunter H_2O. 2017. *30 Year Strategic Plan – Main Report*. A surcharge of SBD 10-15 cents/m3 to the water tariff would generate around SBD 788,000 to SBD 1,340,000 per year (~US$94,000-US$161,000 per year).

4.1.2 Turbidity treatment at Kongulai Spring

190. The UWSSSP will fund the construction of the Kongulai Spring water treatment plant (WTP), which will have a maximum daily treated water capacity of 15,000 m3/d. The objective is to supply treated water 365 days per year to the existing water network. In the baseline, roughly $18 million will be used to fund a spring intake, pipelines, and pumping stations for raw and treated water, filtration, chlorine dosing, and a treated water reservoir, among others.

191. An additional $1.26 million from GEF will provide the necessary equipment to remove turbidity through coagulation, flocculation, and clarification, which are essential components of the overall suite of water treatment processes (see below). These technologies will ideally be consistent with the future Lungga plant, as this will aid in the efficient operation and maintenance of both plants.

192. At Kongulai, and eventually at Lungga, the goal will be to keep turbidity levels lower than 5 NTU, with an operational target of 1 NTU, consistent with WHO guidelines.[32] It should be noted that even 5 NTU will not be possible without controlling turbidity at the source, which is why turbidity removal must be accompanied by significant measures to reduce turbidity through watershed protection, as covered in the next section.

193. **Coagulant Dosing.** Coagulation is a primary and cost-effective process to effectively remove turbidity in water treatment plants. Aluminium chlorohydrate (ACH) is proposed as the coagulant, and the delivery method and required dose rates will be confirmed by bench-scale testing to be carried out during more detailed design. ACH will be stored in two bulk tanks located in the WTP building, with the dose point and a static mixer to provide rapid mixing located in the raw water pump station.

194. **Flocculation.** Flocculation is required following coagulation to provide mixing, which causes collisions between coagulated particles. This causes particles to grow into larger flocs, which improve settlement in the following clarification process. Flocculation will be achieved using hydraulic flocculation, which avoids the use of electric mixers commonly used, and hence simplifies the process, improving reliability and energy efficiency.

195. **Clarification.** Lamella plate clarifiers will be used, providing separation of the flocculated material from the water. These are placed at an angle that minimizes sludge accumulation on the plates and increase the effective settlement area of the clarifier, reducing the physical size of the process tanks. Sludge will accumulate in a hopper in the base of the clarifier and will discharge on a timer. Sludge is discharged to ponds, where the solids are separated, and supernatant discharged back to the stream.

[32] While this will be a marked improvement in Honiara's water quality, this level does not compare favorably to turbidity targets in the developed world. To guard against pathogen contamination, many water utilities are committed to consistently producing treated water turbidities of less than 0.1 NTU.

4.1.3 Adaptation benefits

196. The HWMP will put in place the conditions to achieve long-term sustainable restoration, protection and management of Honiara's key upper watershed areas in the Kovi/Kohove/Kongulai watersheds and replication in the Lungga watershed. In the long-run, establishing these conditions will mean that Honiara will face reduced risk of infrastructural damage and human fatalities due to extreme flood events caused by climate change. This is due to the important flood-mitigation functions of healthy upper watershed forests and riparian zone ecosystems, much of which have been degraded due to unsustainable logging practices.

197. Honiara will also benefit from improved long-term stable and sustainable delivery of potable water, as turbidity and extreme turbidity events are reduced. In the near term, SW and their customers will benefit from reduced water treatment costs. Based on global averages, for each 2 million ha of reforestation, or 10.5 million ha of riparian zone restoration, erosion is reduced by 10%.[33] In addition, seasonal water flow is better regulated, aquifer recharge is improved, and land cover is restored and maintained.

198. The HWMP will also deliver improved, diversified, sustainable and resilient livelihoods for participating communities, allowing them to better adapt to climate change impacts. The HWMP is expected to contribute to achievement of the following Sustainable Development Goals that are relevant for building resilience of landscapes and communities: 1: Reduction of poverty; 4: Quality education; 5: Gender equality; 6: Clean water and sanitation; 8: Decent work and economic growth; 9: Industry, innovation and Infrastructure; 11: Sustainable cities and communities: 13: Climate action; 14: Life below water; and 15: Life on land.

199. The HWMP will also contribute to climate change mitigation. The forest carbon PES projects (C2) will likely be of similar or larger size to the Drawa project in Fiji that covers 1,500 Ha. The Fiji project produces annual emissions savings of 18,800 t/CO2. Hence, the emissions reductions from the project would be of a similar order and estimated to exceed 500,000 tons of CO_2 over the life of the project.

[33] The Nature Conservancy, McDonald, R.I. and D. Shemie. 2014. Urban Water Blueprint: Mapping conservation solutions to the global water challenge. Washington D.C.

5 Stakeholder Engagement, Consultation, Information Disclosure and Grievance Redress

5.1 Stakeholder Identification

200. For the HWMP, stakeholders include individuals or groups that have an interest in the outcome of the HWMP or who could be affected by it. HWMP stakeholders include local communities, customary landowners, existing leases/land users, CSO/NGO, government agencies, and private sector entities.

201. Participation fostering locally-informed implementation is a crosscutting requirement spanning the HWMP. The project will facilitate a process of local participation using highly engaging techniques (such as participatory rural appraisal) and consultative techniques as required. The HWMP will also help ensure that participation includes an appropriate cross-section of project participants and reflects community diversity, such as clan group, age, gender and role (e.g. leaders, church representatives). This will include people living or reliant on the project site who do not have secure resource user rights relevant to the project and also people living away from their customary land / project site (e.g. in Honiara), but who still have interests or rights to the land and resources.

202. Institutional stakeholders include those with interests in policies, regulation or other activities that intersect with HWMP components and activities as well as the UWSSSP. These include key government agencies, proponents of other projects that may influence the HWMP (e.g. through projects that have overlapping or compatible objectives), development partners or organizations providing development assistance. Community stakeholders are the landowners and communities affected include those holding rights or interests in land or those who will otherwise be affected in specific areas of the Kongulai, Kohove, Kovi, and Lungga catchments, all water users in the GHA will be positively impacted by increased climate resilience through a protected and enhanced watershed, improved water supply, and increased health benefits. Community stakeholders also include locally-based CSO/NGO and clients of SW.

203. The analysis of stakeholders undertaken help develop the HCMP stakeholder engagement plan (SEP) is presented in Table 5.1.

Table 5.1: Stakeholder analysis

Stakeholder	Organisation type	Roles and objectives	Linkage/opportunities
Internal institutional stakeholders			
Ministry of Forestry and Research (MOFR)	Government agency	Responsible for regulation of timber harvesting. Focus increasingly shifting to sustainable use as over exploitation has led to decline in the logging sector. MOFR also responsible for REDD+	• Lead agency that determines logging licensing, regulation and enforcement. Could assist to remove logging pressure from project sites. • Support from MOFR is required for signing off on Protected Area declarations. Have signaled support for REDD+ initiatives. • Gateway to access data on logging, timber inventory, mapping
MOFR - REDD+ Unit	Work unit within government agency	Development of national REDD+ program. Funding provided by government (staff) and operational work supported by SPC/GIZ, UNDP- CB2 and GEF-FAO. Currently activities focused on Institutional Strengthening, Stakeholder awareness and Engagement, Forest Cover/Land-use change assessment, Preparation for the submission of a National Forest Reference Level and REDD+ pilot activities. These components provide key outcomes of the REDD+ program in the SI REDD+ Readiness Roadmap. Currently, SI REDD+ program is still in an initial stage, focused on phase 1 of REDD+ readiness.	• SIG REDD+ lead. National REDD+ policies could impact on project scale activities. • Have signaled support for collaboration with voluntary market REDD+ projects, such as Nakau through MFAT. Can potentially provide access to relevant data or technical capabilities from MOFR (e.g. forest inventory / monitoring) • Potential for collaboration on pilot activities (REDD+ unit are still in the process of site selection) • Provide opportunity for the MFAT projects to have a positive influence on national policy / approach to REDD+
MECDM	Government agency	Responsibilities include sustainable environment management, climate change adaptation and mitigation, disaster risk management. Lead agency for protected areas implementation under the Protected Areas Act 2010 & Protected Areas Regulations, 2012. Key agency for determining implementation of GEF 6 and design of GEF 7 (terrestrial areas conservation).	• Lead agency for Protected Areas / PA Act 2010. • Lead SIG agency for GEF implementation • PS has signaled support for the GEF project • Support for biodiversity assessment or data. • PS expect to be informed of project development, and wants to receive drafts • PS supports interventions in the catchments that do not interfere with customary land rights
MECDM - Climate Change Division	Work unit within government agency	Responsible for developing Solomon Islands nationally determined contribution (NDC)	• Design of the NDC will impact options for design of carbon financed catchment management activities. There is a need to engage with MECDM on policy to work towards alignment and harmonization of approaches • Important stakeholder for nesting project scale carbon financed activities in national program • Interest in project outcomes for climate change adaptation

Stakeholder	Organisation type	Roles and objectives	Linkage/opportunities
Solomon Islands Water Authority (SIWA) trading as SW	State owned enterprise	Aims to provide reliable and safe water supply and sewerage services within particular areas of operations (e.g. urban areas) in the Solomon Islands	• Poor water quality impacts service provision, increases costs and reduces profitability • Poor water quality is driving large investments in water treatment infrastructure • Beneficiary of improved catchment management • Exploring business case for investment in 'green' / ecological infrastructure (i.e. catchment management) • Interested in 'replicatable' solutions for water quality and catchment issues
External institutional stakeholders			
MFAT Project: Carbon Financed Forest Conservation Project	Development partner	Long term objective to help the government achieve a stable, resilient, and socially cohesive society; an economy that enables prosperity and more equitable distribution of benefits; and deliver for all citizens and engage constructively in the region	• Project implemented by Live & Learn to develop projects under the Nakau Programme. This project could assist with development of an enabling policy and financing environment that could benefit the HWMP
GIZ Project: REDD+ Forest Conservation in Pacific Island Countries Phase 2	Development partner	Main work is to support the SIG REDD+ Unit (see above). Focus includes pilot activities	• Has signaled support for piloting forest carbon projects • Project has provided funding support to the Nakau Programme for the past five years • Potential support for GIS / data access; technical support for forest inventory work
FAO/GEF Project: Integrated Forest Management Project	Development partner	Aims to support biodiversity conservation through expansion, enhanced management and financial sustainability of the country's developing protected area network; sustainable and integrated landscape management; improved forest and natural resource management by local communities (e.g. including gender dimensions of non-timber forest product harvesting), and; the restoration and enhancement of carbon stocks in forest and non-forest lands.	Personnel have signaled willingness to support the HWMP objectives that are closely aligned - significant potential for collaboration. Specific opportunities include: • PA establishment • Biodiversity surveys • Sustainable Financing (forest carbon) • Sustainable land use planning and livelihood
JICA Project: Capacity Development for sustainable Forest Resource Management in Solomon Islands	Development partner	Project targets capacity building and support for MOFR. Implements pilot activities to promote sustainable forest management. Activities include: • Supporting good governance and collaboration in the forest sector • Forest status baseline survey by drone • Participatory land use assessment and planning • Participatory forest inventory pilot • Training for participatory activity planning • Participatory value chain analysis	• Facilitates Forest Sector – Technical Working Group (FS TWG). Key opportunity for coordination / generating support for the HWMP • Has technical expertise that crosses over with HWMP (e.g. GIS monitoring / participatory land use assessment) • Could potentially provide resources, data and other relevant information

Stakeholder	Organisation type	Roles and objectives	Linkage/opportunities
SPREP Project: Pacific Ecosystems Based Adaptation to Climate Change funded under International Climate Initiative	Regional organization (environmental management & policy)	SPREP was involved in establishment of the 5,000 Ha Barana Heritage and Nature Park, involving the Barana village community in the upper catchment of the Mataniko River	• SPREP is a trusted SIG partner and respected regionally. SPREP support for the project is useful for enhancing its reputation. • Potential to assist with ecosystem service valuations • Potential for collaboration on alternative livelihood options for people living in the Honiara catchment (e.g. eco-tourism), which could take lessons learned from the Barana Heritage and Nature Park example.
Community stakeholders			
Catchment landowners	Includes registered land owners (trustees), and other recognized landowners under custom	Most of the catchment areas fall within customary land, or registered land that is perpetual estate over customary land. The landowners have a central role in decisions about land use. Land use and rights is central to the social, cultural and economic wellbeing of landowners. Most landowners reside away from their customary land in urban or peri-urban areas of Honiara.	• Hold rights to make decisions regarding land use • Have the power to decide to move away from logging to more sustainable alternatives • Decisions by landowners to undertake logging provides them with benefits but causes downstream impacts. • May suffer opportunity costs from giving up logging activities • Have an interest in sustainable use and economic development of their land • Value catchment forest for custom / cultural purposes
Galego Resources Ltd; Komarindi Resources Ltd; and Central Resources Ltd	Landowner companies	Landowner companies are established to undertake business activities on registered land (e.g. GRL, KRL) or customary land (e.g. CRL). These are primarily involved in logging. The directors of the companies consist of some of the Trustees, but also include developers who are not landowners.	• Have interests in logging, which may be conflicting with the objectives for sustainable catchment management • There may be opportunities to redirect the interests of the companies to other ways to create value from forests (e.g. generate income through conservation and PES rather than logging).
Major SIWA customers - Sol Tuna Ltd - Solomon Breweries Ltd - Solomon Islands National University - Solomon Islands Airport Corp.	Private Sector	Profit driven / commercial focus Require reliable water supply for their operation	• Potential source of 'downstream' private sector finance to improve upstream watershed management and water quality
Solomon Islands Community Conservation Partnership	Local NGO	Vision is to develop and strengthen local capacity to manage conservation networks, enhance policy roles, and expand support and empowerment of community-driven conservation actions in the Solomon Islands	• Objectives align with the HWMP objectives • Specific opportunities to collaborate still to be explored and identified

Stakeholder	Organisation type	Roles and objectives	Linkage/opportunities
Ecological Solutions Solomon Islands	Local NGO	Environmental organization made up of a team of local environment experts supporting grassroots conservation and management initiatives. Provider of ecological and scientific services. Main activities include: Environmental audits and professional environmental assessment services; Filling on site environmental management roles.	• Have capacity to conduct biodiversity survey and scientific research • Potential provider of baseline data
Live & Learn Solomon Islands	Regional & local NGO	Operates environmental management and sustainable development projects, including disaster risk reduction, climate change mitigation and adaptation, gender and women's empowerment. Has a strong focus on good governance, and livelihoods at grassroots levels.	• Local partner in MFAT's carbon financed forest conservation project • Has expertise in PES schemes • Potential provider of services to engage landowner participation in the GEF project
VSA	NZ government volunteer program	VSA provides volunteer support for projects. Australian or New Zealand volunteers available. Volunteers should be based in Honiara.	• Could increase capacity of HWMP partners through volunteer personnel who provide technical support / mentoring

5.2 Consultations Undertaken

204. Following general good practice and the requirements of the SPS and Access to Information Policy 2018, initial consultations have been undertaken during the course of the concept and proposal development for the HWMP.

205. Initial consultations presented information to participants about the land management and catchment issues that impact Honiara's water supply and received information about possible solutions. This enabled participants to provide informed feedback regarding the HWMP concept.

206. **Institutional stakeholder consultations**. Face-to-face meetings with institutional stakeholders were conducted during a mission to Honiara 28-Jan-20 – 02-Feb-20. These meetings were with the following organizations:

- Solomon Islands Water Authority
- Ministry of Environment, Climate Change, Disaster Management & Meteorology
- Ministry of Forestry and Research
- Ministry of Lands, Housing and Survey
- Ministry of Mines, Energy and Rural Electrification
- New Zealand Ministry of Foreign Affairs and Trade
- UN Food and Agriculture Organization – Integrated Forest Management Project
- JICA – Capacity Development for Sustainable Forest Resource Management
- GIZ - Forest Conservation in Pacific Island Countries
- Live and Learn Environmental Education Solomon Islands
- Nakau Programme

207. **Community stakeholder consultations**. The initial consultations consisted of four participatory workshops, with men and women participating separately (three workshops for men and one workshop for women). In addition, semi-structured interviews were conducted with seven landowners (four women and three men), who were selected to provide a synopsis of community and landowner perspectives. The workshop sessions and interviews were designed to collect qualitative and quantitative data through key research questions supported by a facilitation guide designed specifically for the HWMP.

208. Two rounds of landowner consultations were held to engage with customary landowners from the Kongulai, Kohove and Lungga catchments. The first round was held during the first consultation mission (28-Jan-20 – 02-Feb-20), which aimed to introduce landowners to the broad concept of the project, including the rationale for why the project was proposed.

209. The first workshop was organized by SW and included a presentation and question and answer workshop attended by 24 customary landowners from the target catchments. Presentations were delivered by Payment for Ecosystem Services experts Dr Michael Bennett and Mr Robbie Henderson (CEO of Nakau Programme – see Section 5.3.3). The presentations focused on possible alternative land management and livelihood scenarios that are proposed as potential project interventions. Questions and discussion comments were taken from landowner participants and answers provided.

210. The more extensive second round of landowner engagement, held during 20 - 23-Apr-20, was organized and conducted by SW with support from Live & Learn Solomon Islands and the Nakau Programme. The consultations used an approach based on a participatory research and education process used to examine community perceptions and knowledge of land use, drivers of land use decisions, livelihoods, local governance, and development aspirations, and also to explore the project concept from environmental, cultural, social and economic perspectives. The feedback from landowners was used to identify key project interventions and project risks at the community level.

5.3 Stakeholder Engagement

5.3.1 Approach to engaging with stakeholders

211. Stakeholder engagement will seek to achieve the following objectives, developed in line with the general principles for engagement adopted by the GEF:

- Engagement will be constructive, responsive, accountable and transparent.
- Stakeholder engagement will support fair, balanced, and inclusive participation in project design and execution.
- In order to be effective and meaningful, stakeholder engagement will involve sustained commitment and action, including the appropriate allocation of resources, throughout the design, implementation, monitoring and evaluation of the project.
- Effective stakeholder engagement in the project will be supported by appropriate documentation and easy and timely access to relevant information.

212. The HWMP interventions will facilitate changes in land use, and as such, it will require close engagement with stakeholders who own the resources and those involved in policies, regulation and activities that affect current and alternative land use activities. Furthermore, custom landowners own the majority of land in the catchment under customary land rights and are therefore central to the engagement approach.

213. As discussed below, stakeholder engagement will be applied across three main phases of the HWMP:

- Design phase – including consultation that feeds into the design and resourcing of the proposed interventions and components.
- Implementation phase – focusing on how key stakeholder groups will be involved in HWMP implementation and be kept informed.
- Monitoring and evaluation – determining how feedback from stakeholders will be gathered and used to change or improve project implementation, and to ensure stakeholder perspectives are gathered to inform plans for replication or scaling.

214. The first stage of the HWMP will involve developing a gender-disaggregated social impact baseline that addresses a broad range of wellbeing indicators. Activities that aim to improve conditions for marginalized community members will then be implemented against these indicators. Strategies to improve the quality of data from the social baseline could include:

- Ensuring that the sample group interviewed is balanced between migrant communities and traditional landowners;
- Seeking to use either local dialect or Pijin for all interviews, keeping questions simple and quantitative;
- Designing field work so that female staff are interviewing female respondents;
- Ensuring that female respondents are interviewed in privacy, preferably without children present to encourage open responses; and
- Guaranteeing anonymity when producing results of surveys.

215. Informed by the social baseline, the HWMP will pursue a voluntary and participatory planning process by means of the project participation protocol (PPP). The PPP prescribes a participatory and transparent process of project development and management and is considered a minimum requirement for project engagement. It offers a means of reducing internal risk and enabling project participants to participate in decisions concerning project development, implementation, and management, consistent with the principles of free, prior and informed consent (FPIC).

216. The PPP will be applied to:

- Enable participants to grant or withhold their FPIC for key aspects of project design, development and implementation, in particular for decisions that create continuing commitments, responsibilities or have potential for future impacts on local livelihoods and land use.
- Enable participants to develop ownership of and meaningful input into project design, implementation, and management.
- Ensure that representatives of participant groups have a mandate from group members, including people who may be disadvantaged based upon gender, age, income or social status.
- Ensure that the process of undertaking community projects is transparent, empowering, and community-building.
- Ensure that costs associated with project development and on-going management are transparently understood and agreed.
- Ensure that the benefits of community projects are equitably and transparently distributed.
- Ensure that project design, development, implementation and monitoring are undertaken with due adherence to necessary safeguards associated with community project development as required by the standard/s applied and as stated in international good practice.

217. In respect of C2 of HWMP, a national NGO will be recruited to co-lead landowner engagement, coordination and implementation of planning and project development activities. In the case of PES activities, the NGO will perform the role of local 'project coordinator,' and will receive a portion of the value of PES unit sales to provide ongoing support to communities. An international organization with expertise in PES, alternative livelihoods and community development will work closely with this national NGO to provide technical support, training and capacity building. In this way, the NGO will be a service provider but also a beneficiary of capacity building that will support project sustainability and opportunities for replication. Women's saving clubs and other women groups (e.g. church groups) could also be engaged in the development of livelihood activities and benefit sharing plans for distribution of PES benefits.

218. Other NGOs will be engaged, as appropriate, to provide support services relevant for alternative livelihood and employment activities (from Component 2). This will include groups with expertise relevant to the livelihood activities selected (e.g. Kastom Gaden Association, ADRA cocao program, International Women's Development Agency).

5.3.2 Developing the stakeholder engagement plan

219. The PPP is a fundamental approach and key element of the SEP. The HWMP will engage institutional stakeholders in regular project updates by means of face-to-face meetings and through collaboration on project activity delivery where relevant. Furthermore, project progress reports will be provided to key stakeholders.

220. The objective of the SEP is to facilitate and maintain support from, for and between the government agencies, community stakeholders, private sector and NGOs, identify opportunities for cooperation, and mitigate risks of activities (e.g. logging) that could continue to degrade the catchment areas targeted under the HWMP.

221. To help facilitate stakeholder engagement, the HWMP will join the national Forest Sector Technical Working Group (FS-TWG). The FS-TWG is facilitated by JICA (under the Capacity Development for Sustainable Forest Resource Management in Solomon Islands Project) and meets 3-4 times each year to foster networking and cooperation on projects and other matters related to sustainable forest management.

222. Table 5.2 provides a general work plan for ongoing engagement with institutional stakeholders.

Table 5.2: General work plan for engagement with institutional stakeholders

Mechanism/activity	Target audience	Frequency
C3 - CMG	• SW • Ministries (MOFR, MECDM, MEMERE, MLHS) • Major SW clients (businesses) • CSO and NGO • Landowner representatives	3 – 4 meetings annually
FS-TWG	• Government agencies • Development partners • CSO, NGO • Industry stakeholders in the forest sector	3 – 4 meetings annually
Face-to-face briefings targeting non-forest sector stakeholders in Solomon Islands	• MECDM • NGOs • Other interested parties	Bi-annually
Provision of annual progress reports	• MOFR • MMERE • MOFT • MECDM • FS-TAG members	Annually
Development and implementation of a communication plan (stories for local, regional and international mainstream media)	• Local, regional and international news readership • Development partners • Private sector • All key stakeholders	2 stories per year (can be included in SW's "Water stori" stakeholder newsletter, produced 3 x per year)

223. A SEP has been prepared for the HWMP and will be further developed as required and implemented during delivery of HWMP components.

5.3.3 Nakau programme approach

224. **Nakau program approach**. The Nakau methodology framework defines a voluntary and participatory planning process, which enables project participants to participate in decisions concerning project development, implementation, and management, consistent with the principles of FPIC. The Nakau Programme also offers potential for co-financing through private sector investment, which will ideally include 'off-take agreements' for purchase of PES credits produced by the project.

225. The HWMP will adopt a collaborative style, which will involve partnering with participants in each aspect of decision making, including developing alternatives and identifying preferred solutions. The project will look to landowners for direct advice in formulating solutions and incorporating recommendations into the decisions to the maximum extent possible. More specifically, the HWMP will employ a model for landowner engagement derived from the Nakau Programme, a regional PES program designed specifically for Pacific island countries.

226. Under this model, landowners are referred to as participants, which is taken to mean those people who hold legitimate interests in land selected as the project sites (e.g. as land or resource owners), or who are identified as having secondary rights (e.g. through relationship or other agreement) or have interests that are recognized by the resource owners. Landowners will be engaged through a mandated representative group established such as the CMG (refer to C2 activities).

5.3.4 Information disclosure

227. SW, supported by implementors and CSO/NGO etc, will carry out various activities concerning information disclosure, public consultation, and public participation. Information may include: project overview, component design and implementation details, anticipated implementation schedule, and potential construction issues. A CCP has been developed for the UWSSSP and a SEP for the HWMP, both require information disclosure as per the SPS and Access to Information Policy 2018 in addition to any requirements under the CSS.

5.4 Grievance Redress Mechanism

228. SW has established a grievance redress mechanism (GRM) for the UWSSSP which is based on traditional/custom conflict resolution practices and GRM established and implemented successfully for other projects. The GRM requires that any complaints and concerns of affected people must be addressed promptly at no costs to the complainant and without retribution.

229. The GRM that will handle any project-related complaints as well as safeguard concerns or issues. The GRM is also set out in RF. The GRM requires a register of issues/complaints to be kept by the PMU and contractor(s) including who made the complaint, the nature of the complaint, how and when the complaint was resolved.

230. The GRM will receive, evaluate, and facilitate the resolution of the affected people's concerns, complaints, and grievances about environmental and social performance at the subproject level. It will aim to resolve grievances and complaints in a timely and satisfactory manner. The GRM detailed procedures shall be disclosed to the public in the consultation meetings during the design phase of the subprojects and before the start of construction activities.

231. Based on GRM established and implemented for other projects, and as established in the UWSSSP EARF and RF, the following process is to be used. The first step is to attempt to sort out the problem directly at local level. If it cannot be resolved at this level, then the grievance will be addressed by being referred to the PMU, who will then involve SW and other agencies, if required.

232. **During implementation**. Most complaints arising during construction/implementation of physical works and activities are expected to be minor, concerning dust, noise or accidental damage to property (trees, crops etc) and should be able to be resolved at the local level. All complaints are to be entered in a register that is kept by the implementor/contractor by: date, name, contact address and reason for the complaint. A duplicate copy of the entry is given to the complainant 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 the complaint was made together with the date when the complainant was informed of the decision and how the decision was conveyed to the complainant. The register is then signed off by the person who is responsible for the decision (action taken to resolve the grievance) and date of closeout.

233. The register is a public document. The duplicate copy given to the complainant will also show the procedure that will be followed in assessing the complaint, together with a statement affirming the rights of the complainant to make a complaint. For anybody making a complaint, no costs will be charged to the complainant.

234. In the first instance, the complainant will raise the issue or grievance with the contractor and, if required, community advisory or grievance redress committee or local council whomever is the preferred party by the complainant.

235. If the implementor/contractor cannot resolve the issue or the response is not to the satisfaction of the complainant, the grievance will be raised to the UWSSSP DSC who will copy the PMU. For straightforward complaints, the DSC can make an on-the-spot determination to resolve the issue at the agreement of all. For more complicated complaints, the DSC will forward the complaint to the PMU (which will get SW involved as necessary). The PMU will respond and resolve the complaint within five days and convey the action or decision to the complainant. The complainant and any community representative they request as support may, if so desired, discuss the complaint directly with the DSC and implementor/contractor. If the grievance of the complainant is dismissed, the complainant 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.

236. Should the complainant not be satisfied, the complainant may take the grievance to the SW and copied to lead ministry (depending on the nature of the complaint) each of which will appoint a sufficiently senior staff to review the complaint. SW will have 15 days to make a determination based on information from the staff. The SW-CEO is to be copied in on any complaint made to MECDM or MLHS and is to be informed of the decision made.

237. If the complainant is dissatisfied with the determination from the SW-CEO, the complainant may appeal to the National Court. This will be at the complainant's cost but if the court shows that the SW, PMU or DSC have been negligent in making their determination the complainant will be able to seek costs.

238. **Post physical works**. Implementation of the GRM by the implementor/contractor ceases will be taken over by SW once the physical works/activities are completed. The same procedure is followed except that the complaint is now directed to the HWMP manager and PMU in the first instance. Post physical works, the same conditions apply; i.e., there are no fees attached to the complainant for making a grievance, the complainant is free to make the complaint, which will be treated in a transparent manner and the complainant will not be subject to retribution for making the complaint.

6 Anticipated Impacts of Components and Activities

239. This section provides a generic assessment of the types of activities and works included in the three HWMP components and their likely impacts on the physical, biological, and socio-economic resources and identifies measures to ensure potential environment impacts will be avoided or managed/reduced to acceptable levels.

240. The level of significance of potential impacts is based on impact screening which identifies i) no or negligible impact; ii) minor impact; iii) moderate impact; iv) major impact; and v) unknown impact. The duration of impacts is assessed based on the component and activities concept and design, scope of activities and works, and the conditions in the project influence area. Determination of the significance of the impacts is based on:

- Spatial scale of the impacts (site, local, regional, or national/international);
- Time horizon of the impact (short, medium, or long term);
- Magnitude of the change in the environmental component brought about by the project activities (small, moderate, large);
- Importance to communities;
- Compliance with international, regional, and national environmental protection laws, and regulations; and
- Compliance with policies of the Solomon Islands and ADB (including this EARF and the UWSSSP EARF and any stipulated standards).

241. Direct, indirect, and cumulative impacts will be assessed and where required; mitigation measures proposed.

242. For the most part the HWMP will generate positive impacts and benefits for the environment and communities within the catchment. There will be some risks and negative impacts that will need to be mitigated and managed as identified below. Most risks and impacts will be generated during the implementation phase and relate to physical activities and how they need to be managed on site.

6.1 Design and Pre-implementation Considerations

243. **Environmental management system and environmentally responsible procurement**. Throughout the HWMP as an overarching support activity to UWSSSP, for implementation of environmental safeguards to be effective, a robust environmental management and monitoring system will need to be established. The PMU has established an environmental management system for UWSSSP which will be applied to the HWMP as far as is relevant. Amongst other things, this will require that the environmental and social management guidelines (ESMG) or outline EMP (included in the assessment if one is required) is incorporated into the bid and contract documents (BCD). Outline ESMG are included in Table 6.1 – this will be developed further as EMP during environmental assessments for those components /activities requiring IEE/PER based on the screening.

244. The BCD will also specify other environmental management requirements such as: (i) requirements to comply with applicable standards; (ii) the need to prepare a site-specific environmental management plan (SEMP); (iii) the identification of a community group or implementor/contractor team member as environmental, health and safety officer (EHSO) and the reporting/communication lines and channels; (iv) the monitoring and reporting requirements; and (v) delivery of induction, training and awareness sessions for workers and the community.

245. If, as set out in Section 7, an assessment has been prepared for a component (or set of activities under a component), the assessment will include an EMP. Prior to works commencing at each subproject site, the implementer/contractor will prepare and submit a site-specific EMP (SEMP) to the PMU, the SEMP will be based on the EMP included in the assessment and detail the approach, methodology and program to be undertaken at each site, identify the risks associated with that approach and activities and detail mitigation measures to avoid or reduce the risks. The PMU and DSC will review and clear the SEMP and advise the HWMP manager that the SEMP may be approved and no objection to commencement of physical activities/works given.

246. Once activities commence, the EHSO will conduct monitoring of compliance of activities with the approved SEMP and/or ESMG and the DSC and PMU will undertake inspections and audits of the effectiveness of the implementor/contractor's implementation of the approved SEMP.

247. The DSC will devise the checklist to be used for monitoring by the EHSO and the inspections and audits to be completed by the PMU and will consolidate the inspection/audit findings along with summaries of the implementor/contractor's monthly reporting. ADB and GEF will undertake review missions which will report on, inter alia, overall implementation of environmental safeguard requirements. All workers, participants and implementors/contractors will be inducted to the site and this will include awareness and training on the provisions and requirements of the ESMG or SEMP and how it is to be implemented.

248. As early as practicable after commencement, the HWMP will establish the procedures for complying with the UWSSSP grievance redress mechanism (GRM) to address concerns and resolve complaints and issues raised on any aspect of HWMP implementation. Any safeguards-related concerns will be addressed through the GRM. The SEMP will also link with the HWMP's stakeholder engagement plan (SEP) and overall UWSSSP communications and consultation plan (CCP) as required, particularly when information and notices are required to be sent to communities about commencement of activities and works.

249. **Land access arrangements.** A resettlement framework (RF) has been prepared for the HWMP. Any requirements for access to land will be governed by the RF and due diligence reports subsequently prepared. Arrangements for access will be agreed with landowners and the process will be documented as set out in the RF. The HWMP will avoid, as far as possible, need for any permanent access requirements.

250. **Communications, participation and avoiding 'elite capture'**. The HWMP recognizes that effective community engagement is required to inform appropriate and effective component and activity design (e.g. incentives for participation etc), and also to mitigate project risks. If not mitigated, such risks could impact the HWMP development process and outcomes. The SEP includes an approach based on an established successful model – Nakau Programme as well as establishing the PPP.

251. Avoiding 'elite capture' of decision making or benefit sharing by accessible or educated people in participating communities will be important in order that the HWMP supports and does not undermine customary governance systems, and also ensures that marginalized people are not excluded from participatory opportunities overall and the PES activities in particular.

252. Avoiding unrealistic community expectations and ensuring the expectation that are established can be met (for example timing of receiving benefits) generating income). Meeting expectations is important for maintaining trust and commitment and reducing the risk of landowners pursuing logging opportunities and this is a fundamental element of the SEP and participatory approach to be developed and implemented for the HWMP.

6.2 Implementation Risks and Impacts

253. There are a number of typical 'construction' related impacts which are not considered to be issues for the HWMP due to the community-driven and small-scale nature of the works and because activities are aimed at restoration, protection and enhancement of the catchment that supports the UWSSSP water sources. These include: removal of structures or houses and land acquisition; noise and vibration; air quality and dust; access issues; disruption to facilities and utilities; traffic safety concerns; and, influx of labor or trafficking issues.

254. Implementation/construction of HWMP components and activities have potential to create minor-moderate environmental impacts including: (i) biosecurity; (ii) erosion and sedimentation at and near physical activity sites, (iii) water quality issues and management of run-off, (iv) waste and spoil handling and disposal, (v) materials (including earth/soil, trees) haulage, (vi) health and safety at and adjacent to sites, (vii) damage to chance finds, and (viii) remediation and clean-up at sites post activities.

255. In the event that the implementor/contractor causes damage to agricultural land, productive land or gardens, they will be solely responsible for repairing the damage and/or paying compensation.

256. **Biosecurity and introduction of alien or invasive species**. The mobilization of machinery/equipment and materials from outside of the project area (including other areas of Solomon Islands or other countries) may result in the accidental introduction of soil-borne weeds, pests and pathogens becoming established in the project area and adjacent river/stream and coastal environments. Any machinery and equipment must be steam cleaned and all organic material must be removed prior to deployment to the sites. To prevent spread of alien and/or invasive species, imported plant, equipment and materials and the vessels that import them will be subject to clearance procedures under the Biosecurity Act and Regulations and may require issue of phytosanitary certificates from Biosecurity Solomon Islands.

257. The catchment restoration and PES programs and activities will include alien and/or invasive species prevention and control measures.

258. The environmental assessments conducted for components will be required to conduct a risk assessment and prepare a plan demonstrating outlining how the HWMP will follow the procedures and requirements identified in National Strategy on Aquatic Biosecurity for Solomon Islands 2018-2023 and IUCN Guidelines for Invasive Species management on Islands 2018.

259. **Materials sourcing**. Should any materials be required for gabions, small retaining walls and such to assist with riverbank stabilization for example, they will be sourced locally (i.e. sand or aggregate), the implementor/contractor must seek approval (including obtaining the BPM) and agreement from, including payment of royalties to, the land/resource owner.

260. All required materials will be sourced in strict accordance with government guidelines, project provisions including the materials sourcing guidelines, and the ESMG or EMP. Any sand or aggregate extraction required for the project will only be undertaken in accordance with a plan reviewed and cleared by the PMU and DSC. Vehicles transporting loose materials, from an extraction area to the subproject site, will be covered and secured with tarpaulin to prevent dust or spillage.

261. **Soil erosion and sedimentation**. The HWMP is aimed at restoration and management of watersheds and will implement measures (PES, compacting, drainage and reforestation and re-vegetation) will provide long-term environmental benefits by reducing soil erosion and sedimentation of surface waters. During actual activities some works may create localized erosion and/or sedimentation.

262. The side slopes of any embankments created for works, including any river bank areas will be protected and designs used that protect soils in order to reduce erosion. Gabion baskets or rip-rap will be used to reduce scour and erosion where required. Re-vegetation of the slope areas with fast growing species, or other plants in consultation with the land owners and village chiefs and in line with wider restoration plans, as quickly as possible after work in the slope areas has been completed.

263. **Waste and spoil handling and disposal**. Waste disposal will not be permitted on the rivers, or on garden land or in areas used for livelihood production by business and villagers. Random and uncontrolled dumping of spoil, or any material, will not be permitted. Suitable permitted waste disposal sites within the project areas will be designated as required in consultation with landowners and village chiefs, any off-site disposal will be approved by HCC, ECD, local landowners and PMU.

264. Measures included in the ESMG and to be developed in EMP as part of IEE/ PER as required include: suitable permitted waste disposal sites will be designated in consultation with landowners, village chiefs and government were required; no wastes will be dumped in waterways or close to the coast; and at all times, road and access to sites will be kept free of material and rubbish.

265. **Water quality**. In order to avoid adverse impact from silt runoff that has potential to degrade water quality the implementor/contractor will be required to use sediment control approaches including, bunds and silt barriers/fences around the work areas whenever required to contain plumes of disturbed water from getting into water bodies or discharging further downstream.

266. Measures to be implemented include: activities adjacent to or in waterways, streams/rivers and drainage channels will be undertaken with extreme care; minimize interference with natural water flow in rivers/streams or watercourses within or adjacent to the activity/work sites; use of silt control devices and sediment traps/fences during all extraction and construction activities within and/or adjacent to streams and rivers, which are to be cleaned and dewatered regularly; and any stockpiles of materials will be at designated areas and will be located at least 50 m from waterways or the coast.

267. **Socio-economic impacts due to type of PES selected.** If not selected appropriately and in context of existing land and resource ownership and use or household subsistence/income generation requirements a PES scheme can lead to unintended adverse effects including: targeted biodiversity protection having no detectable effect on livelihoods; pressure on household income if capital assets required to partake in PES program; and restriction on households' ability to expand and/or diversify agriculture. The design of the PES will need to be undertaken through engagement with the beneficiaries and participants. The SEP includes some specific approaches, based on other programs implemented in Solomon Islands where PES has been successful.

268. **Health and safety of workers and community.** Any construction activities pose risks for workers and communities adjacent to work sites. As HWMP components focus on catchment restoration and PES, communities and it is likely that workers will be local and from within the three land-owning tribes, therefore the HWMP is very unlikely to create issues around influx of labor or trafficking.

269. Measures to protect health and safety of workers and communities include: as required the UWSSSP Worker Code of Conduct be included in HWMP contracts; this will require prior agreement between implementor/contractor, CMG and village leaders; workers implement code at all times (sanctions and penalties); implementation of solid waste management measures; application, as necessary, of UWSSSP measures for communicable diseases (incl. COVID-19, STIs and HIV) awareness and prevention; provision of equipped first aid kit on site at all times, workers provided with potable water, adequate sanitation facilities, clean eating areas, and personal protective equipment (PPE) relevant to the types of activities they are undertaking, and, implement good practice and standard health and safety measures.

270. **Tambu sites and physical cultural resources**. Any work or site clearance, excavation or vegetation clearance activities undertaken in areas not previously cleared have the potential to unearth physical cultural sites or resources (including Tambu sites and other historic/archaeological sites or resources). In the event this occurs, work shall cease immediately and the authorities (National Museum Tambu Register, Ministry of Culture and MECDM) shall be informed of the find. Activities shall not re-commence until the authorities have signed-off that the site/resources have been dealt with appropriately and that work may continue.

271. During the environmental assessment consultations will try and determine the likelihood of presence of Tambu sites and the Tambu Register will be checked against areas where works/activities are proposed. The SEMP will contain a chance find procedure based on that developed for projects under the UWSSSP, based on the measures set out in the EMP. The chance find procedure will be elaborated following consultation with the National Museum.

272. Table 6.1 summarizes the risks and impacts, and mitigation and management measures proposed.

Table 6.1: Potential HWMP risks and impacts – outline ESMG

Activity or works	Anticipated risk or potential environmental impact	Proposed mitigation measure
Design and pre-implementation impacts		
Environmental management, development consent application and BCD preparation	Non-compliance with CSS and SPS as specified in the HWMP EARF BCD prepared and tendered without requisite safeguards	Due diligence and consultations undertaken and Development consents applied for and integrated in BCD as required Implementor/contractor to implement ESMG and/or prepare and implement SEMP Monitoring and reporting of compliance with ESMG and SEMP
Land access	Need to avoid permanent access requirements without land access negotiated as per RF Custom rights inadvertently marginalized	HWMP's RF to be implemented, including preparation of DDR as required; Access arrangements negotiated and agreed as per RF, process being documented
Communications, participation and design of components	Potential for 'elite capture'; Marginalized and/or vulnerable people and groups not able to participate in HWMP or PES	Implementation of UWSSSP CCP Further development and implementation of the SEP (including PPP) Support to establishment and functioning of the CMG
Site preparation	Damage to waterway, river-bed or river-banks; siltation	Activities designed to minimize impacts on waterway; No disposal of waste on river-banks or in downstream waterway; Minimize river-bank disturbance; Consult with landowners; Implement RF for any tree or vegetation removal
Implementation impacts		
Site access and activities	Accidental damage to land, crops or gardens	Implementor/contractor to repair the damage and/or pay compensation as per the HWMP RF
Import (including local) of materials, plant	Introduction and/or spread of alien and/or invasive species	Any machinery and equipment must be steam cleaned and all organic material must be removed prior to deployment to the sites. Any imported plant, equipment and materials (and vessels that import them) will be subject to clearance procedures under the Biosecurity Act and Regulations and may require issue of phytosanitary certificates from Biosecurity Solomon Islands; Catchment restoration and PES programs and activities will include alien and/or invasive species prevention and control measures; The environmental assessments conducted for components will be required to conduct a risk assessment; HWMP plan outlining how components will follow the procedures and requirements identified in National Strategy on Biosecurity for Solomon Islands 2018-2023 and IUCN Guidelines for Invasive Species Management on Islands 2018.

Activity or works	Anticipated risk or potential environmental impact	Proposed mitigation measure
Materials sourcing	Materials no sources sustainably CSS for material sourcing and use not followed Materials extracted without resource owner permission/agreement	Application for BPM and preparation of an extraction management plan Any new sources to follow permit requirements Landowners agreements and payments verified
Spoil and waste handling and disposal	Damage to vegetation and siltation of waterways form unplanned spoil disposal;	Suitable permitted waste disposal sites will be designated in consultation with landowners, village chiefs and government were required; Waste disposal will not be permitted by roadside, streams/channels, garden land or in areas used for livelihood production; No wastes will be dumped in waterways or close to the coast; At all works sites and office compound, the contractor will ensure safe and clean facilities including sanitation. Work site(s) and office compound will have portable and sanitary latrines respectively; and At all times, roads and access ways will be kept free of material and rubbish
Clearing drains and waterways	Damage to vegetation and trees and siltation due to unplanned spoil disposal; Temporary impact on water quality from damage to river-banks or disposal of soldi waste	Store spoil in selected place (agreed with DSC); Protect spoil and materials by covering; Direct water flow, runoff discharge etc to vegetated areas before discharge to water; No disposal of solid waste to rivers or stream or riverbanks. Disposal as per waste management measures; Works and activities designed to minimize impacts on waterway
Activities and works	Soil erosion and sediments	Earthworks and area to be exposed carefully planned Total exposed area shall be minimized; divert storm water flows away from the exposed areas and sediment controls using small interceptor dikes, pipe slope drains, grass bale barriers, silt fences/curtains, sediment traps, and temporary sediment basins; isolation barrier for raw water intake
Works in or adjacent to rivers	Water quality impacts, temporary turbidity	Erosion and sediment control plan prepared; Erosion and sediment control measures implemented; Spill kit available, workers trained in its use; If required, depending on works, silt curtains, sediment geotextiles to be used to prevent and/or minimize turbidity
Socio-economic impacts due to type of PES selected	Targeted biodiversity protection has no detectable effect on livelihoods; Pressure on income if households require capital assets to partake in PES program; Restriction on households' ability to expand and diversify agriculture	PES schemes proposed/designed and implemented appropriate to landowners, existing and future use and community; Ensure household/land-owner participation is voluntary; Implementation of SEP including PPP

Activity or works	Anticipated risk or potential environmental impact	Proposed mitigation measure
General activities and works	Health and safety hazards and risks to workers and communities close to sites	Contractor to prepare and implement labor influx management plan No use of trafficked or underage labor on any project activities/facilities Code of conduct agreed between contractor and village leaders Workers implement code at all times (sanctions and penalties) Proper camp sanitation; installation of sanitary facilities; solid waste management; surface runoffs control Application , as necessary, of UWSSSP communicable diseases (incl. COVID-19, STIs and HIV) awareness and prevention Implement construction health and safety management plan, provision of equipped first aid station at all times, workers provided with potable water, adequate sanitation facilities, clean eating areas, and personal protective equipment to minimize exposure to a variety of hazards Implement good practices and standard health and safety measures
Unearthing of tambu (or other important) sites	Accidental discovery and/or damage to 'tambu' sites, historic, archaeological and cultural assets	EMP to include chance finds protocols Contractors shall stop immediately the activities upon discovery of any historic, archaeological and cultural relics; local government and Solomon Islands National Museum will be informed promptly
Completion of physical activities and works	Improper closure and clean-up sites	Removal of all construction wastes and implement surface restoration; proper disposal of surplus soil to suitable sites; DSC to review and "clear" site remediation through issue of certificate

7 Environmental Assessment and Review Procedures

7.1 Screening and Site Selection

273. **Site selection**. The HWMP will require "greenfield" sites will for the components to implement the watershed protection (soil erosion and turbidity reduction), PES, and carbon projects. In selection of component and activity locations and sites, unless discussed and agreed between stakeholders, communities, SW, and ADB, the following areas are excluded from consideration:

- Tambu and/or cultural heritage sites;
- Protected area (informal or formal) or key biodiversity area (including important bird area);
- Wetland or mangrove area;
- Buffer zone of a formal or informal protected area; and
- Any special area for protecting biodiversity.

274. If tree cutting or vegetation removal cannot be avoided for some activities (provision of access or drainage/channel clearance etc), a replacement program will be developed and implemented as part of component activities that focus on replanting and erosion control.

275. **Screening and categorization**. Each of the components (and activities) will be screened when sites have been selected for implementation and components and activities have been designed. Screening for environmental classification of components for specific sites will be based on the categorization form which requires a description of the site and activities as well as completion of the REA checklist for forestry as presented in Annex 3. The checklists and categorization forms proposing the environment category for each site-specific component (and activities) will be submitted to ADB for review and confirmation. This will confirm the level of due diligence and subsequent process required.

7.2 Assessment, Mitigation and Management

276. **Environmental assessment**. Once sites have been selected and screened, the environmental assessment for each component will be carried out in accordance with the CSS requirements with additional elements to ensure compliance with the SPS and this EARF. Irrespective of whether a development consent application or environmental assessment is required under the CSS, to comply with the SPS any site-specific components screened as category B for environment, a determination on the focus and level of assessment required for the initial environmental examination (IEE) will be made by ADB. For components that will be largely positive in nature and require small-scale activity guidance, the IEE can focus on elaborating the ESMG/EMP to be included in the BCD, implementation requirements, and monitoring.

277. For components that will require development consent application and assessment under the CSS, the assessment will be to a level equivalent to an IEE and can be prepared as a PER[34] as per the CSS (with any gaps between CSS and SPS being filled). SW will submit the IEE and/or PER to ADB for review and clearance prior to disclosure or submitting to ECD as part of the development consent application for those components which require clearance also under the CSS. The IEE or PER (and ESMG or EMP) along with any conditions of the development consent will be integrated into the BCD.

278. **General requirements for ESMG and SEMP**. The BCD will also include the environmental management provisions and requirements the component implementer(s) including contractors will need to comply with as part of the contract. The BCD should include: (i) the cleared IEE or PER (including ESMG or EMP); (ii) requirement for the implementer/contractor to prepare and submit their construction EMP (SEMP) within a specified time period (usually 30 days) prior to start of any physical works (including clearing and grubbing) for review and clearance by the PMU and DSC; (iii) TOR for the contractor's EHSO; (iv) the conditions of the development consent; (v) general approach to environmental management; and (vi) organizational arrangements and set up of environmental management (reporting and communication channels etc). Table 6.1 is an outline ESMG which can be further developed and included in the BCD and/or be used as the basis for developing EMP for components/activities which require environmental assessment.

279. **Site-specific environmental management plan**. During the pre-implementation phase, the environmental assessment (including EMP) or ESMG will have been reviewed and cleared and, as required, the development consent application will have been made and any conditions of consent, along with the IEE or PER (and ESMG. EMP) will be included in the BCD. Prior to commencement of physical activities and works on site, including site preparation, the implementor/contractor will be required to prepare, and submit for review and clearance, the SEMP. The SEMP is a component and site-specific document to be prepared by the implementor/contractor with details on how the environmental management requirements during the implementation phase will be implemented and managed on-site. It shall be designed to ensure that appropriate environmental management practices are applied throughout the construction period. The DSC will review and require revision of, or approve, the SEMP and indicate this to the HMP manager. Prior to clearance, ADB will also review the SEMP and provide any comments to strengthen it. The ESMG and/or SEMP will form part of the contract and will be binding on the implementor/contractor for the duration of the contract.

280. The implementor/contractor's SEMP will: (i) state the approach to compliance with safeguard requirements and environmental management; (ii) identify the designated EHSO and reporting and communication channels; (iii) plan on how to implement the relevant elements of the SEP and GRM; (iv) clearly indicate how implementation of activities at sites will meet the targets specific in the EMP and how/where and when the mitigation measures will be implemented; (v) if required, materials procurement plan with information on the sources of materials, permit applications as required, transporting modes to sites, stockpiling schemes, and schedules of deliveries; (vi) descriptions of general construction good practices to be used; and (vii) monitoring and reporting system (included use of checklists to be devised by the DSC).

[34] A standard rider can be included on the title page to clearly explain that the PER is equivalent to an assessment of a category B project as per the SPS.

7.3 Monitoring and Reporting

281. Environmental monitoring is required across all phases of HWMP implementation. The monitoring meets two objectives to ensure: (i) that mitigation measures are effective in reducing/managing risks and impacts, and identify corrective actions as required; and (ii) that safeguard requirements are being complied with by the implementor/contractor (including community groups and/or NGO/CSO) and SW as the overall implementing agency (on behalf of government).

282. The environmental monitoring plan is based on the potential impacts, significance of the impacts and mitigation approaches identified during the environmental assessment. The plan comprises parameters to be monitored, frequency of monitoring, responsible authorities, and cost estimates. The implementor/contractor will be required to outline their monitoring plan based on the EMP and as set out in the contract documents.

283. Quarterly progress reports will be issued by the DSC to SW, MOFT, and ADB. These will report on all aspects of the UWSSP and HWMP, including those documented in the implementor/contractor's monthly reports and monitoring reports prepared by the DSC and implementor/contractor.

284. The monitoring and reporting required under the HWMP includes:

- Review of the implementor/contractor's monitoring plan as part of their SEMP, based on contract documents and grant approval when requirements are met;
- Implementor/contractor monthly reports including status of implementation of the approved SEMP (completed checklists) and corrective action requests;
- SW-PMU and DSC inspection and audit reports of compliance of the implementor/contractor with the approved SEMP;
- Preparation of quarterly progress reports by DSC and PMU for submission to SW, MOFT and ADB; and
- Preparation of semi-annual safeguards monitoring reports by SW rolling up the information contained in the reports listed above.

Annex 1: Roles and Responsibilities

Project implementation agency	Roles and responsibilities
Ministry of Finance and Treasury (executing agency)	Guide and monitor overall project execution Financial and procurement oversight Ensure flow of funds to the implementing agency and the timely availability of counterpart funding Review and coordinate bid evaluations
Project Steering Committee (PSC)	Responsible for oversight and providing guidance and strategic direction to SW with respect to project implementation Ensure that the PMU is provided with the necessary resources to effectively carry out its duties and responsibilities.
Solomon Islands Water Authority (SW) - implementing agency	Responsible for overall project implementation and monitoring at the implementing agency level Ensure adequate funding available for the PMU Submit semi-annual and annual monitoring reports to ADB/WB Assist in resolving complaints brought through the GRM that have not been resolved at lower levels Participate in PSC, FS-TWG and other groups as required for successful implementation of UWSSSP and HWMP
SW Project Management Unit	Responsible for overall project management, implementation, monitoring Responsible for supervision of construction supervision consultants Responsible for SW's application for a Development Consent Prepare/update as required the IEEs and EMPs based on the detailed design and submit to ADB/WB for clearance. Assist SW in applying for development consents Ensure environmental safeguard concerns are incorporated in the detailed engineering design Ensure updated environmental assessments and EMPS and development consent conditions are integrated into bid documents Disclose safeguard documents, as appropriate Conduct awareness and consultations as per the CCP Submit monthly, quarterly, semi-annual, and annual progress and/or monitoring report to SW Management Review and clear the SEMP of contractors Review contractor's monthly reports Implement the GRM and maintain records of complaints/grievances Ensure the contractor observes the GRM requirements Ensure contractor compliance with required resources for mitigation measures as reflected in the SEMP and prepare monitoring reports as required
UWSSSP design and supervision consultant	Responsible for overall construction supervision and monitoring Assist the PMU in updating the IEEs and EMPs based on the detailed designs and integrating into the bd documents As require, support contractors in preparation of their SEMP, evaluate the CEMPs and recommend to PMU for approval Evaluate the contractors' overall work schedules relative to the requirements of the approved CEMPs Undertake site inspections prior to execution of construction activities to ensure contractors' compliance to EMP/SEMP requirements Ensure contractor's implementation of EMP/SEMP. Support the Resident Engineer in issue of corrective action requests/instructions to contractors for non-conformances or breaches of the contract or SEMP Assist the PMU in GRM implementation Submit monthly, quarterly, semi-annual, annual monitoring reports to PMU Submit a report to PMU on project's environmental compliance performance upon completion of the construction activities

Project implementation agency	Roles and responsibilities
HWMP support to SW-PMU	Further develop as required, and implement, the SEP Establish and work with the CMG Ensure UWSSSP GRM includes, and is applied to, HWMP components and activities Undertake screening and prepare categorization/screening forms for components for specific sites and share with ADB for concurrence Undertake consultations as required and prepare necessary due diligence documents (IEE, PER, ESMG, DDR etc) Assist SW in preparing development consent applications for HWMP components triggering CSS requirements Disclose safeguard documents, as appropriate Submit progress and monitoring reports to SW, ADB and GEF
Civil works contractor	Prepare and submit prior to construction the SEMP for review by DSC's environment specialist and for approval by PMU Understand the EMP requirements and allocate necessary resources (budget and staff) for implementation Designate and maintain a full-time Environmental Health and Safety Officer (EHSO) to ensure compliance with all requirements concerning environmental, health and safety, and labor regulations during construction Implement construction activities with the required mitigation measures Conduct environmental monitoring as required by EMP and approved SEMP Act promptly on complaints and grievances concerning the construction activities in accordance with the project's GRM and ensure that the contractor's GRM register is kept up to date Submit monthly progress reports on SEMP/EMP implementation to PMU
HWMP implementor/contractor	Prepare and submit prior to start of works/activities plan for ESMG implementation or the SEMP for review by DSC and ADB and for approval by PMU Designate a team member as EHSO to ensure compliance with all requirements concerning environmental, health and safety, and labor matters during implementation of physical works and activities Implement activities with the required mitigation measures Conduct environmental monitoring as required by EMP and approved SEMP Act promptly on complaints and grievances concerning the construction activities in accordance with the project's GRM and ensure that the GRM register is kept up to date Submit monthly progress reports on SEMP/EMP implementation to PMU
ECD-MECDM	Processing SW's application for development consent Monitors construction progress for compliance with the terms of the issued development consent Monitors implementation of the mitigation measures in ESMG, EMP and approved SEMP in general
MMERE	Responsible for processing of contractor's application for a building material permits (BMP) in regard to mining and extraction of aggregates or gravel from rivers or land Monitors contractor's compliance with the terms of the issued BMP
Asian Development Bank & GEF	Review and clear IEEs/EMPs Review bidding documents and SEMPs Review executing agency and implementing agency's submissions for procurement of goods, equipment, works and services Conducts project review missions, midterm review mission and project completion review mission to assess project implementation progress of all outputs, compliance of project to covenants including safeguards requirements Review and disclose semi-annual monitoring reports

Annex 2: List of Ratified International Treaties and Agreements

Name	Status	Purpose/aim	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

Name	Status	Purpose/aim	Agency responsible
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
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.			

Annex 3: Categorization Form and REA Checklist

ENVIRONMENT CATEGORIZATION

Date: _____

A. Instructions

(i) The project team completes and submits the form to the Safeguards Division (SDSS) for endorsement by SDSS Director, and for approval by the Chief Compliance Officer (CCO). OM F1/OP on *Safeguard Review Procedures* (paras. 4–7) provides the requirements on environment categorization.

(ii) The classification of a project is a continuing process. If there is a change in the project components or/and site that may result in category change, the Sector Division submits a new form and requests for recategorization, and endorsement by SDSS Director and by the CCO. The old form is attached for reference.

(iii) In addition, the project team may propose in the comments section that the project is highly complex and sensitive (HCS), for approval by the CCO. HCS projects are a subset of Category A projects that ADB deems to be highly risky or contentious or involve serious and multidimensional and generally interrelated potential social and/or environmental impacts.

B. Project Data

Country/Project No./Project Title : _____
Department/ Division : _____
Processing Stage : _____
Modality : _____

[ ] Project Loan [ ] Program Loan [ ] Financial Intermediary [ ] General Corporate Finance
[ ] Sector Loan [ ] MFF [ ] Emergency Assistance [ ] Grant
[ ] Results-based lending[1] [ ] Other financing modalities

C. Environment Category [please tick one category based on the set of criteria in OMF1 (paras. 6–7)]

[ ] New [ ] Recategorization — Previous Category [ ]

Category A	Category B	Category C	Category FI
☐	☐	☐	☐

D. Basis for Categorization/ Recategorization (please. attach supporting documents):

[ ] REA Checklist
[ ] Project and/or Site Description
[ ] Other: _____

E. Comments

Project Team Comments	SDSS Comments

F. Approval

Proposed by:	**Endorsed by**:
Project Team Leader, {Department/Division} Date:	Director, SDSS Date:
Endorsed by:	**Approved by**:
Director, {Division} Date:	Chief Compliance Officer Date:

☐ Highly Complex and Sensitive Project

Rapid Environmental Assessment (REA) Checklist

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Safeguards Division (SDSS) for endorsement by Director, SDSS and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's: (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	
Sector Division:	

Screening Questions	Yes	No	Remarks
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site			
▪ Protected Area			
▪ Wetland			
▪ Mangrove			
▪ Estuarine			
▪ Buffer zone of protected area			
▪ Special area for protecting biodiversity			
B. Potential Environmental Impacts Will the Project cause…			
▪ increase in soil erosion and siltation?			
▪ increase in peak and flood flows?			
▪ loss of downstream beneficial uses (water supply or fisheries)?			
▪ impairment of ecological and recreational opportunities?			
▪ impairment of beneficial uses of traditional forests?			
▪ any loss of precious ecology?			
▪ possible conflicts with established management policies?			
▪ dislocation or involuntary resettlement of people?			
▪ loss of downstream ecological and economic functions due to any construction of social infrastructure (e.g., road, training or information center, office or housing)?			
▪ displacement of people or reduce their access to forest resources?			

Screening Questions	Yes	No	Remarks
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?			
▪ uncontrolled in-migration, including the influx of workers and their followers, with opening of roads to forest area and overloading of social infrastructure?			
▪ unnecessary loss of ecological value and decreased biodiversity by replacement of natural forest with plantation with limited number of species?			
▪ technology or land use modification that may change present social and economic activities?			
▪ ecological problems as well as community health and safety hazards due to land clearance prior to reforestation (e.g., soil erosion, disruption of hydrological cycle, loss of nutrients, decline in soil fertility)?			
▪ other ecological problems as well as community health and safety hazards (e.g., pollution of water bodies from fertilizers, pesticides, and herbicides used in the plantation)?			
▪ dangers to a safe and healthy working environment due to physical, chemical and biological hazards during project construction and operation?			
▪ social problems and conflicts related to land tenure and resource use rights?			
▪ social conflicts if workers from other regions or countries are hired?			
▪ risks to community health and safety due to the transport, storage and/or disposal of materials such as explosives, fuel, pesticide and other chemicals during construction and operation?			

A Checklist for Preliminary Climate Risk Screening

Country/Project Title:

Sector:

Subsector:

Division/Department:

Screening Questions		Score	Remarks[35]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?		
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?		
Materials and Maintenance	Would weather, current, and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?		
	Would weather, current, and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?		
Performance of project outputs	Would weather, climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design lifetime?		

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1–4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

[35] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Result of Initial Screening (Low, Medium, High):

Other Comments:

Prepared by:

Annex 4: 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

Annex 5: List of Terrestrial Protected Areas in Solomon Islands

Province	Protected Area	Area	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*.	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)
	Mt. Popomanaseu	30,000 ha	Six 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 avifauna 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 – Shortland Islands	?	Dominated by *akwa Pometia pinnata*, *Vasa Vitex cofassus* and *Canarium salomonense*. Smaller trees include Myristica sp.*, laelae Celtis phillippnensis*, *Crytocarya Litsea* sp (Less, 1990).	Best nesting sites for turtles. Presence of Skink *Triblonotus ponceleti* known from only tree specimen, two from Shorthland Islands and one from Bougainville (Less, 1990).

Province	Protected Area	Area	Flora Biodiversity	Fauna Biodiversity
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 Isabel 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 vexans, bou Fagrea gracilipes and gwarogwaro Calophyllum vitiense. Ferns and Savanna (Less, 1990).	Is designed for the forest.
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).

Province	Protected Area	Area	Flora Biodiversity	Fauna Biodiversity
	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).
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 wetland 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.
Temotu	Kauir Reserve	200 ha	Kauri Agathis macrophylla in the Solomon Islands is found only in Temotu Province (Less, 1990).	

Annex 6: Details of HWMP Component Activities

C1 - develop watershed maps and hydrological models

This component will focus on comprehensively mapping and modelling the watersheds and also providing training and capacity building to relevant government and community stakeholders to facilitate uptake and field visits to ground-truth mapping work.

A third-party service provider (or providers) with the requisite scientific capacity will be identified and recruited for this work. The preferred choice is a research institute or centre within academia, since such an organization would be incentivized – through the potential research opportunities afforded by such work – to produce high quality outputs beyond a simple pay-for-services contract. Furthermore, the possibility of obtaining co-financing via research funding is greater with such an organization and would strengthen outputs. A research institute would also be well-placed to assist in building research linkages and technical capacity with Solomon Islands government agencies, personnel, and academia, which is an important co-benefit envisioned of this work.

Guided by SW and in consultation with key ministries (e.g. Ministry of Forestry, Ministry of Lands), the service provider will help implement this component in four activity areas (described below), thereby supporting several key aspects of project development and improved watershed management. These are as follows:

- *Develop a more detailed understanding of the biophysical environment of the targeted watersheds.* Remote sensing data, mapping technologies and hydrological modelling approaches, combined with ground-truthing of mapping and modelling results, will provide a more accurate picture of the watersheds. Mapping will include core baseline data, including: watershed boundaries and topography; description of hydrological system (including surface and ground water interaction); underlying geology and soils (e.g. erosion risks); land use; forest types, and biodiversity assessment.
- *Identify priority areas.* Assessment of land-use change (e.g. forest disturbance through logging) and impacts of changes on hydrological functionality will help identify priority areas for conservation and restoration activities (e.g. identification of priority riparian zone restoration areas).
- *Support communication and collaboration on data collection and sharing, joint decision-making and planning with relevant government agencies*. This will be achieved by involving relevant agencies in data collection and analysis via sharing and discussing mapping and hydrological modelling results.

C2 - support community livelihood and forest carbon PES activities

Landowning communities are key stakeholders in the upper watershed areas critical for Honiara's water supply and climate resiliency. These communities play a central role in land use decisions, including partnering with logging companies on logging license applications through government channels. Pursuing alternatives to logging must therefore involve helping communities delink their livelihoods from the logging sector. To accomplish this, the HWMP will focus on building effective watershed-protection partnerships with communities to develop improved, diversified and climate-

resilient non-timber-based livelihoods that leverage nature-based finance opportunities through three main types of community interventions:

- Providing employment to landowner communities through forest and riparian zone restoration works;
- Developing forest carbon PES projects (for the international voluntary carbon market), which will target protection of key threatened forest areas in the watershed; and
- Supporting employment and development of alternative sustainable livelihood activities (including job readiness) that are consistent with watershed protection and sustainable land use.

This component will be led by collaboration of the non-government and private sectors to form a "project development team" (as mentioned throughout this section). A non-government organization (NGO) with significant donor experience will be engaged to lead this C2 team, with a separate regional or international NGO (or private sector project developer) subcontracted to provide more specialized expertise in developing and implementing forest carbon finance projects. To complete the project development team, a locally-based NGO will be hired to support community organization and livelihood activities (i.e. empowering communities as key watershed stewards) and lead implementation of restoration works. There will be a strong commitment to two-way learning and "informed participation", whereby both project proponents and participants learn from each other.

HWMP will 'bundle' multiple impacts by using forest carbon financing to incentivize catchment protection. Using climate change mitigation financing to achieve adaptation and watershed management outcomes is recognized internationally.[36] The FAO suggests that carbon balance is a powerful indicator to appraise the impact of watershed projects.[37] Carbon offset standards allow projects to measure and report various 'co-benefits' (e.g. watershed protection, biodiversity conservation and social outcomes) that can increase the price of carbon credits sold in the market.

The first group of activities under C2 include:

Provide institutional support - locally-based NGO, with support from an international forest restoration expert (if necessary), will administer employment of landowners or other watershed community members. The organization and experts engaged to administer the activity will be selected based upon their capacity to; (a) recruit, administer and supervise employment of local people; (b) train and build capacity of workers; (c) plan and implement effective (best practice) restoration activities, and (d) ensure appropriate workplace health and safety standards are met.

Mobilize landowner labor – HWMP will recruit landowner and other members of watershed communities to provide labor for restoration activities. This model is preferred to an approach that relies on use of machinery (e.g. earth moving equipment) because it will achieve complimentary

[36] Lozatelli, B. Fedele, G., Fayolle, V. and Baglee, A. 2016. "Synergies between adaptation and mitigation in climate change finance" in *International Journal of Climate Change Strategies and Management*, Vol. 8 - 1, pp.112-128

[37] Bernoux et.al. 2011. Carbon sequestration as an integral part of watershed management strategies to address climate change issues; Policy brief.

objectives of delivering direct benefits to landowners, while building their capacity, knowledge and trust in project interventions. Employment tasks undertaken will include site preparation, weeding, fencing, planting, and maintenance of restoration sites.

Produce or acquire seedlings - HWMP will engage a local service provider to supply appropriate species for replanting. The service provider could be from the private sector, NGO or an existing government agency (e.g. Department of Forestry or Botanic Gardens). In general, the plant species used will be local natives. However, exotic species (e.g. grasses) suitable to address erosion may be used, subject to appropriate environmental safeguards to prevent introduction of invasive weeds.

The second activity area under C2 includes the following:

Prepare forest carbon PES projects. A Project Idea Note (PIN) document will be a key output of this activity area. The PIN describes the project and provides an overview of how the projects will operate. It allows a project to be registered with a carbon PES standard as a 'project in development.' This activity will consist of seven distinct steps, as follows:

1) Establish forest baseline. The project development team will complete a detailed forest inventory and forest change analysis to describe the baseline conditions for the forest against which project impacts can be measured. The assessment will focus specifically on areas to be included in forest carbon PES projects (at high resolution) and will complement the general forest mapping exercise from C1.

2) Describe social baseline. The team will then complete a social baseline to gain an improved understanding of social factors in communities, which will enable effective engagement and ensure appropriate targeting, design and implementation of project activities. The social baseline data will also support monitoring and evaluation of project impact. This activity includes an anthropological assessment to determine status of land tenure, tribal structure, and membership.

3) Plan for women's empowerment and participation. A gender expert will be engaged as part of the team to develop women's empowerment and participation plan to guide women's engagement in aspects of the project. Catchment women are marginalized in decision-making but are disproportionately impacted by watershed degradation and unsustainable developments. Women's participation is a key strategy for developing fair benefit distribution arrangements from alternative livelihoods.

4) Empower landowner participation and education for FPIC. An FPIC process will be developed and applied to key decision points in the project. Initially, this will involve investment in education to ensure landowner participants are able to make informed decisions. The education effort will be tailored to the audience. Key community representatives and leaders will have a deeper engagement in education for climate change adaptation, improved land management and participation in PES. The broader catchment population will gain increased awareness via their leaders and project representatives and will be reached through more generalized awareness actions, such as videos, posters, and media.

5) Establish community engagement focal point. The project development team will work with the landowner communities to establish a representative group that will act as a focal point for engagement and participation in project development. This will include ensuring the

group has a broad mandate from community members and fairly and transparently represents community interests.

6) Develop financing plan. Next, the project development team will develop a financing plan targeting the private sector. The plan will include access to PES markets, sales and marketing of PES units, and strategy to enable future private capital investment (for project replicating and scaling). The plan aims to secure sustainable financing for project activities beyond the GEF funded period and provide opportunities to replicate / scale the projects.

7) Design project grievance redress mechanism (GRM). The GRM system developed will form part of a broader safeguards approach (including FPIC activities) that enables participant landowner communities to safely raise concerns or seek redress for project related issues of concern.

Develop forest carbon PES project. The project development stage will build on the activities above to design the required elements of forest carbon project. The main outputs from this activity area will include: Project Description Document (PDD) suitable for carbon standard validation; Protected Area declaration under the Protected Areas Act (2010) (or equivalent protection under another instrument); and completion of land recording. This activity will consist of nine steps, as follows:

1) Formulate Benefit Sharing Plan (BSP). The BSP is required to ensure income received from PES sales is provided to participant communities in a fair, timely and transparent manner. An effective BSP will translate PES benefits into sustainable community development outcomes, cover landowner opportunity costs, and maintain a strong incentive for participant communities to maintain commitment to conservation activities.

2) Land use planning. The project development team will employ a participatory process to develop a land use plan (at project scale) to strategically select areas of the catchment to be protected and / or restored. Land use planning will safeguard important resources for landowners (e.g. garden areas), while ensuring that protected areas will contribute to watershed management objectives.

3) Conservation / land management planning. The plan developed will guide work by landowners (forest rangers / wardens) to protect forest and water resources. It will include management objectives, management zones, management rules or by-laws, and actions to increase enforcement of forest protection rules.

4) Establish Protected Area. A legal instrument to protect project areas is required to support 'project permanence,' and in particular to protect important forest areas against logging, mining or land clearing. Implementation of this activity will involve assessment of available instruments and application of the instrument in consultation with landowners and stakeholders.

5) PES accounting. A technical specialist will be engaged by the project team to apply existing PES accounting methodologies to quantify PES outcomes (e.g. annual tons of CO_2 reductions from the project). PES accounting requires application of a methodology that compares a baseline (business as usual) scenario where there is no intervention with the outcome caused by the project intervention.

6) Develop project-monitoring plan. A project-monitoring plan is required to demonstrate achievement of PES outcomes for emissions abatement and associated watershed protection outcomes. Ecological and social dimensions of the project (e.g. governance) will be monitored.

7) Establish landowner participants' business entity. Prior to this point, landowners' participation will be focused through a mandated landowner representative group. This will transition to establishment of a legally constituted group (e.g. association or landowner company) that can hold carbon rights, sign PES contracts, receive carbon payments, and hold liabilities.

8) Implement FPIC process. The FPIC process is a key safeguard to ensure landowner participation in projects is fully informed and voluntary. The FPIC process will apply a methodology developed for other PES programs in the region.

9) Execute financing plan. The project team will implement the financing plan developed above. This includes a significant focus on sales and marketing of PES units. Execution of the financing plan occurs prior to other execution activities because of the lead-time required to establish purchase agreements with buyers prior to production of PES units.

Execute forest carbon PES projects. This stage involves executing project agreements, submitting project documents or standard certification, and putting project plans into action (e.g. monitoring plan, conservation management plan, benefit sharing plan etc.). During the implementation of community projects, the project development team will monitor, support, and build landowner capacity for good governance, financial management, and land management actions. Landowners will also be supported to re-invest PES finance into development of further sustainable livelihood activities, as described under C2 activity area 3. Upon implementation, sales of forest carbon credits will be transacted, which will allow the project to realize financial gains. This activity will consist of five steps:

1) Execute project agreements. The project development team will work with participant communities to execute project agreements, including PES agreements and emissions reduction (sales) agreements, allowing for due FPIC process. This will also involve appointment of a PES sales and registry agent to act on the landowners behalf.

2) Implement monitoring, reporting, and verification regime and conservation management plans. The project development team will work with communities to develop monitoring reports so that the project can undergo independent audit to validate the methodology and verify ecosystem service outcomes. The audit services will be outsourced to a certified body approved by the applicable PES standard.

3) Implement governance, management and benefits-sharing system. The project development team will support landowner participants to establish a monitoring and reporting regime (for land management, benefit sharing and governance) tied to disbursement of PES payments. The SOP will ensure that payments are tied to project implementation performance and allow provision of targeted support to landowners to build their capacity.

4) Provide technical support for land management. Support and training will be provided to assist landowners to undertake community ranger or watershed warden positions. The role

of rangers is to implement activities under the conservation management plans, including monitoring activities and enforcement. Ranger work will also contribute to the restoration works started in activity area 1.

5) Facilitate project replication and scale. The inception PES projects will be designed using a 'grouped project approach' that will allow for further projects to be added to the group at reduced cost. The output of this activity will be integration of the grouped approach in the project design and a report on opportunities for project replication.

The third activity area under C2 will support employment and alternative livelihood activities. Interventions that increase landowners' economic participation and reduce poverty address a main driver for logging, which is the need for income. This intervention will thus provide access to business and employment education and training, networking and partnership development with the private sector, and provide access to start-up capital for small enterprise development.

In practice, the livelihood activities may include assistance to individual, family-run or community groups. Opportunities for education and training will include a focus on increasing landowners' capacity to find employment in Honiara, noting that most landowners reside in the peri-urban areas around the city and are not necessarily living and working on their customary land. Also, as discussed in the Gender Equality and Women's Empowerment section, employment and livelihood activities provide an opportunity to address gender inequalities within the catchment communities.

The activity areas include:

PES investment to support livelihoods and employment. The project team will work with landowners to co-design a benefit sharing mechanism (for PES income) that targets re-investment of PES finance into sustainable alternative livelihood activities and employment. The focus of this activity is to produce a landowner community livelihood, education and training plan that will guide investment of PES funds that are earmarked for community benefit. This will contribute to sustainably financing livelihood development and employment initiatives beyond the GEF grant funded period for the duration of the PES project (> 30 years).

Facilitate sustainable enterprise development. The project development team will facilitate access to training and support and provide seed funding for the development of new micro-enterprises (e.g. at family scale), targeting watershed landowner communities. The nature of these activities will depend on the needs and interests expressed by participants during consultation and joint planning, but possibilities include high-value non-timber forest products (NTFPs), tree nurseries, apiculture and eco-tourism. The project will provide assistance to beneficiaries to design project ideas and will develop a selection criteria and process to determine projects that will receive support. Where possible, partners with relevant industry expertise will be engaged to provide support for new enterprise development. For example, if communities decide cocoa is a priority, the project would then seek to engage cocoa industry expertise for support.

Support education and training for employment. Funds will be made available from the GEF project (initially) and then from PES financing to establish and maintain a fund to provide education and training opportunities for watershed landowner communities. The activity will focus on establishing, administering and establishing institutional (governance) arrangements for this fund.

The scope of education and training activities supported will be decided in consultation with beneficiaries, but may include school fee support, technical and vocational training, and higher

education. Existing education and training service providers will be engaged to deliver the education and training, and where possible an existing provider may be engaged to manage scholarships.

C3 - improve watershed governance

C3 will facilitate improved watershed governance by supporting improved interagency, intersectoral and community-inclusive communication, joint decision-making, and information-sharing. It will also explore options to strengthen finance by leveraging pre-existing government, donor and private sector funding streams (via either pooling or better aligning them). The aim is to address gaps in institutional cohesion, coordination, and funding that have all contributed to unsustainable upper watershed land-uses, which have in turn led to Honiara's decreasing resilience to climate change impacts (increased flood risk and severity, increasing water supply costs).

In particular, the project will create a multi-stakeholder coordination group to support integrated catchment management in key upper watershed areas over the long-term. For this purpose, the project will hire a catchment management/institutional expert that will be placed in the PMU of Solomon Water (SW). This expert will initially be full-time and will then provide part-time targeted assistance after the second year of the project.

The activities for C3 include:

Stakeholder engagement and problem analysis. SW, led by the catchment management/institutional expert, will engage with government, other institutional stakeholders, and catchment communities to raise awareness and build support for improved catchment planning, management and governance. The main focus of this activity is educative and designed to increase inter-sectoral understanding and collaboration. The current problems impacting water supply and climate resilience in the catchment are complex, being influenced by a broad range of factors and involving multiple stakeholders.

Consultations will thus focus on building a systematic understanding of how various activities interact to impact on land use, water management, and water security for the GHA. This 'systems approach' will assist the project proponents and stakeholders to understand the complex issues and the role various actors play in the system. The outcome of this activity is to build support for the establishment of an inclusive governance approach and institutional arrangements for improving catchment planning and management.

Catchment governance and coordination. The catchment management/institutional expert will engage stakeholders in a planning process to design an interagency and inter-sectoral group to coordinate activities that affect the catchment, catchment communities and water security for the greater Honiara area. Various models will be examined, such as a 'water fund' arrangement and catchment management or catchment advisory committees.

The preferred arrangement will consider existing institutional arrangements and the solution most likely to be effective and sustainable within the local context (e.g. within resourcing and capacity limitations, and sensitive to government needs and community expectations). An appropriate host agency will be selected to provide executive support to the catchment group (e.g. MECDM or SW).

The terms of reference of this 'catchment group' will be determined by its members. However, its role is expected to include:

- Information sharing and awareness raising on catchment issues
- Sharing of data relevant for catchment management (e.g. maps, cadaster, land capability, forest resources, population demographics)
- Coordination of government and non-government projects and activities
- Coordination on issues relating to legislation, regulation, compliance and enforcement
- Providing a forum for multiple stakeholder participation in catchment planning (e.g. for development of catchment management plans)
- Contribution to governance of a catchment protection trust fund (see below)

Facilitate catchment management planning. The catchment management/ institutional expert will also facilitate development of a catchment management plan and will work closely with the catchment planning group (see Activity 2 above). This may result in a single catchment management plan for all Honiara catchments or separate catchment plans subject to preferences from the coordinating group.

A key focus of the activity will be building ownership of the catchment management plan with stakeholders, and hence its development will proceed through a participatory and consultative process. SW have already identified development of a catchment management plan in their 30-year strategic plan.[38] However, it may be of strategic value to facilitate broader ownership in the plan and hence commitment to its implementation.

The content of the plan will be determined through the development process, but it will likely include the following elements:

- Catchment description (natural resources and processes, population, land use and tenure etc)
- Identification of threatening processes, hazards or issues impacting the catchment
- Relationship with relevant legislation and policy
- Stakeholder description, coordination & engagement
- Financing (to ensure resourcing for plan implementation)
- Objectives, activities and outputs for implementation
- Key areas for enforcement / enforcement plan
- Coordination with other government activities or plans (e.g. disaster planning)
- Activities for monitoring performance, plan improvement and review

[38] Solomon Islands Water Authority (2017) 30 year Strategic Plan 2017 – 2047, Main Report

Explore the creation of a catchment management fund. A final activity will focus on exploring options to catalyze additional sources of finance via a trust fund mechanism and/or by better leveraging pre-existing government, donor and private sector funding streams (via either pooling or better aligning them). This fund could draw upon multiple sources of funding to ensure its sustainability. Current envisioned sources of funds are as follows:

- Beneficiary Pays (water surcharges): Solomon Water has indicated a willingness to increase tariffs to directly support upper watershed nature-based investments. This increase could be included in the proposal to be submitted to Ministry of Finance and Treasury and Ministry of Mines, Energy and Rural Electricity in August 2020. A surcharge of SBD 10-15 cents/m^3 to the water tariff would generate around SBD 788,000 to SBD 1,340,000 per year (~US$94,000-US$161,000 per year).[39]
- Beneficiary Pays (private sector support): The business case for water fund development, once more fully developed, will be used to approach key private sector beneficiaries of watershed ecosystem services in Honiara to promote the case for making additional financial contributions to the fund to mitigate their business risk associated with water supply and climate risk.
- Donor Support: International donors and related initiatives will also be approached to identify potential synergies and joint fund-raising opportunities to support water fund and watershed management activities and development.

[39] Based on the Medium-growth scenario from Hunter H_2O. 2017. *30 Year Strategic Plan – Main Report.* Honiara: Solomon Islands Water Authority.