

Initial Environmental Examination
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SOLOMON ISLANDS URBAN WATER SUPPLY AND SANITATION SECTOR PROJECT

HONIARA CITY URBAN WATER SUPPLY SUBPROJECTS – Kongulai Water Treatment Plant and Pipeline Project

Prepared by Solomon Water, Solomon Islands for the Asian Development Bank

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
ADWF	Average Dry Weather Flow
AUD	Australian Dollar
BCD	Bid and contract documents
BMP	Building materials permit (issued by Dept. of Minerals - Ministry of Mines, Minerals and Rural Energy)
BOD	Biochemical oxygen demand
BOQ	Bill of quantities (in the contract)
CAC	Community Advisory Committee
CCP	Communications and consultation plan (of the Project)
CD	Chart datum
CEMP	Construction environmental management plan (of the contractor)
COD	Chemical oxygen demand
CSS	Country safeguard system
EA	Environmental assessment
EARF	Environmental Assessment and Review Framework
ECD	Environment Conservation Division (in MECDM)
EHSG	Environmental, Health, and Safety Guidelines (of World Bank Group)
EMP	Environmental management plan
ESO	Environmental safeguards officer (in the PMU)
FGD	Focus group discussion
GRM	Grievance Redress Mechanism
HDPE	High Density Polyethylene
HSP	Health and Safety Plan (part of the CEMP)
IA	Impact assessment
IEE	Initial environmental examination
IES	International environment specialist
ISS	International social specialist
MDAPC	Ministry of Development Planning and Aid Coordination
MECDM	Ministry of Environment, Climate Change, Disaster Management and Meteorology
MID	Ministry of Infrastructure Development
ML/d	Million liters per day
NTU	Nephelometric turbidity units
PACI	Poly aluminum chloride
PCCSP	Pacific Climate Change Science Program
PER	Public Environment Report (under the CSS)
PMU	Project Management Unit (in SW)
PDWF	Peak Dry Weather Flow
PWWF	Peak Wet Weather Flow
RF	Resettlement Framework
RAP	Resettlement Action Plan
ROW	Right of Way
SBD	Solomon Islands Dollar (code)
SPS	Safeguard Policy Statement 2009 (of ADB)
SW	Solomon Islands Water Authority trading as Solomon Water
TOR	Terms of Reference
TSS	Total suspended solids
UNDP	United Nations Development Program
UWSSSP	Urban water supply & sanitation sector project
USD	United States Dollar
WB	World Bank
WBSP	World Bank Safeguard Policies
WHO	World Health Organization
WTP	Water Treatment Plant

CURRENCY EQUIVALENTS

USD 1.00 = SBD 8.30

(as of January 2020)

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1 EXECUTIVE SUMMARY

The Project. The Asian Development Bank (ADB), World Bank (WB) and Solomon Islands government (the government) have established the Solomon Islands Urban Water Supply and Sanitation Sector Project (UWSSSP). The Project aims to improve access to continuous safe water for the city of Honiara from the upgraded water treatment plant at Kongulai Spring offtake and 1.65 km water pipeline from the water treatment pump station to the existing Tasahe Reservoir, by implementing high priority components identified in Solomon Water's 30-Year Strategic Plan and 5-Year Action Plan.

Safeguard Policies. This IEE was conducted in accordance with ADB's Safeguard Policy Statement 2009 (SPS), with WB Safeguards Policies (WBSP) and the requirements of the Solomon Islands Environmental Act (1998), Environment Regulations (2008) and Environmental Impact Assessment Guidelines (2010). The IEE was prepared as per the environmental assessment and review framework (EARF) to guide the process for screening, assessment, review and monitoring of components that are designed and implemented following approval. The Project is deemed Category B for environment per ADB's environmental screening, because physical impacts are involved, with site specific, manageable impacts related to the construction phase and can be readily mitigated and/or managed. This category is also appropriate under the WBSP. This proposed project, is screened as a Category B project under ADB's social safeguards policy as it requires a resettlement plan that addresses involuntary resettlement impacts, but where impacts are not deemed significant. The project has also been developed to comply with World Bank social safeguards policies, OP 4.12, for involuntary resettlement. It has been designed to avoid involuntary resettlement where feasible, and the small number of displaced persons (41 people) will be provided with new improved housing on an adjoining site, and compensation for loss of assets to improve their livelihoods and standards of living to pre-displacement levels. (WB Operational Policy 4.12, paragraph 2).

Outcomes. The IEE found no significant negative social or environmental impacts or risks that could not be mitigated. It was determined that a full environmental impact assessment was not warranted. Since the detailed assessment has been completed, the IEE will serve as the Project's final social and environmental assessment.

Anticipated impacts. Scoping and assessment of the project has identified social and environmental considerations for the Project's pre-construction, construction and operational phases.

- Pre-construction considerations include resettlement, climate change vulnerability; integration of the IEE and EMP and development consent conditions in the bid and contract documents; update of the Project's communications and consultation plan (CCP); grievance redress and management; disruption of utilities and services; identification of materials sources, materials extraction and application for building materials permits; land access arrangements. Actions necessary to address pre-construction considerations will be included in tender documents and construction contracts.
- The construction phase impacts are site access and clearance; soil erosion and sedimentation control; haulage and stockpiling of construction materials; dust control and on-site air pollution; solid waste management; construction noise and vibration; traffic management; community and occupational health and safety. Contractors will be required to prepare construction environmental management plans (CEMPs) based on the EMP included as part of the environmental assessment and reflecting their construction approach and methodology to ensure appropriate environmental management during the construction period.
- Operational considerations include measures to reduce the operational risk and safety of the WTP. SW will implement its updated water safety plan as advocated by the WHO to: (i) prevent contamination of the water sources, (ii) treat the water to reduce or remove contamination that could be present and meet the water quality targets, and (iii) prevent re-contamination during storage, distribution and handling of drinking water. Workers will be trained on health and safety aspects of operating a WTP; a facility health and safety manual will be prepared to address the prevention, reduction and control of occupational injury

and illness. The manual will clearly identify conditions that may cause acute worker's health and safety problems, specify requirements that all workers should comply during normal operations and emergency situations, specify training requirements for health and safety and reduce the risks associated with the use of chlorine gas as disinfectant.

Environmental and Social Management Plan. Based on the Project's ESMP, contractors will be required to prepare their construction EMP (CEMP) to ensure appropriate environmental management during the construction period. In responding to the Project's EMP, the CEMP is to be site and activity specific reflecting the contractor's construction methodology and approach and include all sub-plans (health and safety plan, traffic management plan, erosion and sediment control plan, waste management plan, hazardous substances management plan) as required.

Climate change adaptation. The Project will address the critical need for climate change resilience, given Honiara's vulnerability to the effects of intense rainfall, engineering assessment of potential site erosion will determine appropriate erosion protection.

Institutional arrangements and capacity building. The Ministry of Finance and Treasury is the executing agency and Solomon Water (SW) is the implementing agency for this Project. SW's Project Management Unit (PMU), will supervise the construction contractors and ensure that CEMPs are properly implemented and monitored. The PMU is in the process of appointing both an environment officer¹ and one national land management/resettlement specialist who will work with the international environmental specialist and international social development/resettlement specialist to implement and monitor land acquisition, resettlement impacts, and gender issues. In addition, there will be training and capacity building whilst supporting PMU's environmental and resettlement management.

Consultation and participation. SW conducted consultations during project preparation and will continue to do so during the construction phase following the guidance set out in the Project's CCP.

Grievance redress mechanism. The Project will use the SW grievance redress mechanism (GRM). This ensures procedures meet the requirements of Solomon Water infrastructure projects, ADB SPS and WBSP.

Conclusion and recommendations. The findings of the IEE are that, no further environmental or social assessment is required. The recommendations are:

- specific mitigation and/or design specifications of the project ESMP (Kongulai WTP and 1.6 km water supply pipeline to Tasahe Reservoir) will be included in the design process and integrated into the bid document along with any conditions of the development consent(s).
- It will be a requirement of the contract that the contractor (s) will submit a CEMP for SW approval prior to any physical works commencing.
- The construction contract will also require the contractor to respond to the Project's CCP and GRM in their CEMP.
- Improved and strengthened operation stage monitoring of health and safety is required to reduce risks to the public and SW personnel.
- SW will continue the process of public consultation and information disclosure during detailed pre-construction, construction and operation phases as guided by the Project's CCP.

¹ Exact designation will be confirmed by PMU in due course

2 INTRODUCTION

1. The Asian Development Bank (ADB) and World Bank (WB) are supporting the Government of Solomon Islands (the government) to develop the Solomon Islands Urban Water Supply and Sanitation Development Sector Project (the Project). The Project aims to improve access to safe water and improved sanitation in urban and peri-urban areas by implementing high priority components of the Solomon Water (SW) 30-Year Strategic Plan and 5-Year Action Plan. Project outputs include: secure and safe urban water supplies; effective, efficient and safe urban sanitation services; enhanced awareness of hygiene and water issues and sustained improved hygiene behavior; and the financial and technical sustainability of SW, the state-owned enterprise responsible for the management and development of urban water resources and sewerage services in Solomon Islands.
2. The Project will be implemented by SW and the Ministry of Finance and Treasury (MOFT) will be the executing agency. SW has established a project management unit (PMU) which will be augmented to include safeguard specialists who will provide training and capacity building to PMU and contractors as required. There will be two environmental specialists: one national supported by one international, as well as one national land management/resettlement specialist working with one international social development/resettlement specialist to implement and monitor land acquisition, resettlement impacts, and gender issues.
3. The sector Project Safeguards approach encompasses a larger project which comprises capacity building, a water awareness sanitation and health (WASH) component, and physical works—upgrading existing water supply transmission and distribution and sewerage networks (including sewer outfalls) and installing new water supply and sewage treatment facilities—in Honiara and other provincial towns. An environmental assessment and review framework (EARF) has been prepared to guide the process for screening, assessment, review and monitoring of components that are designed and implemented following approval. This initial environmental examination (IEE) is the assessment of the components that have been defined during project preparation for the Kongulai Water Treatment Plant and the 1.6 km pipeline project to Tasahe Reservoir.
4. This IEE has been prepared in accordance with the requirements of the country safeguards system (CSS), WB’s Safeguard Policies (WBSP) and the ADB’s Safeguard Policy Statement 2009 (SPS). The Project has been screened as Category B for environment due to the significance of its environmental impacts and risks which are largely site-specific, mainly related to the construction phase and many of which can be readily managed or mitigated through implementation of the measures identified in the environmental management plan (EMP).
5. The UWSSP project, including resettlement at the Kongulai Water Treatment Plant site has an approved resettlement plan, June 2019¹. Consultation with the Kongulai community by SW is ongoing.
6. This IEE provides an assessment of the social and environmental impacts and risks associated with the Kongulai Water Treatment Plant and the 1.6km pipeline to Tasahe Reservoir during pre-construction, construction, operations and maintenance. It is based on detailed engineering designs, factual site investigations, field visits to the proposed areas; review of available information; and discussions with government agencies and communities in the relevant locations.

¹ Solomon Islands Urban Water Supply & Sanitation Sector Project Resettlement Plan Final 02 - Ref slb_87028rww, June 2019.

3 POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

7. The environmental safeguards requirements of the Project will be implemented to comply with Solomon Islands' laws and regulations and the SPS and WBSP.

3.1 Country Safeguards System

8. Environmental Laws and Regulations. The Environment Act (1998) provides the legal basis for environmental protection and management. It provides the foundation of the Solomon Islands' environmental impacts assessment (EIA) system, under the jurisdiction of the Environment Conservation Division (ECD) of the Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM).
9. This project is a prescribed development under the second schedule of the Environment Act 1998. As a result, SW is required to produce Public Environment Report (PER) and management plans for the project. PER's are undertaken for activities that are likely to have impact on the environment and are subjected to decision of the national authority, the Environment Conservation Division (ECD) under the Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM). The PER will be approved by the Director ECD who will then issue a development consent for the project to proceed.
10. A Public Environment Report (PER) assesses the social and environmental impacts associated with the project and identifies mitigation measures to minimize and avoid the impacts, including restitution for any damage to by those effects through replacement, restoration and compensation.
11. ECD furthermore confirmed during consultation, that the level of assessment conducted and reported as IEE for a category B project (according to ADB's SPS) is equivalent to a PER of the Solomon Islands' Environment Act of 1998.
12. The IEE concludes that majority of the environmental impacts are minor and marginal, all of which can be satisfactorily managed and mitigated. There is no need for further studies or an Environment Impact Statement (EIS).
13. Environmental standards for the Solomon Islands are still being developed. However, ECD generally advises project proponents to follow internationally recognized standards such as those of the World Health Organization (WHO). In addition, the Project will comply with World Bank Group's Environmental Health and Safety Guidelines (EHSg).

3.2 Other Relevant Laws

14. The Environmental Health Act (1980) provides for the management and control of public health in the Solomon Islands. It defines local authority responsibilities in relation to the construction, operation, and management of sewerage systems, including sewage disposal works. It also provides penalties for the willful pollution of a water supply source.
15. The Town and Country Planning Act (1997) provides for the administration of town and country planning in Solomon Islands; preparation of local planning schemes; and control and development of land. It applies to all urban areas.
16. The Mines and Minerals Act (2008) regulates the mining and extraction of aggregate or gravels from rivers. It requires that building material permits (BMP) be applied for prior to any extraction of construction or building materials. The application for BMP may require a PER and will require

preparation of an extraction plan.

17. The Safety at Work act (1982) This Act protects the health, safety and welfare of people at work. This protection covers the employee and employer as well as self-employed people.
18. International conventions. Solomon Islands is a signatory to a number of international agreements (treaties and conventions) with environmental and conservation implications as well as for the protection, promotion and safeguarding of cultural heritage and traditional knowledge. These are listed in Appendix A.
19. Lands and Titles Act deals with the purchase or lease of customary land in sections 60-70 and sections 71-77. There are two main types of title registration or legal ownership described in Part X of the LTA: Perpetual Estate (PE), the equivalent of freehold land); and Fixed Term Estate (FTE) where the Commissioner of Lands, as holder of PE title, grants FTE title to individuals or companies for 50-70 years, with certain conditions (i.e. leasehold land). There is also provision for a Temporary Occupation Licence for up to three years. The LTA governs both the acquisition of both alienated and customary land.
20. Solomon Islands has a number of employment related acts that apply to work and employment in the Solomon Islands. The law governing the contract is the Law of the Solomon Islands and notable employment related legislation includes the Minimum Wages Rate Order 2019, Employment Act 1996 and the Labour Act 1996.

3.3 ADB Safeguard Policy Statement

21. Any investment funded or administered by ADB must comply with the requirements of the SPS. The SPS promotes the sustainability of project outcomes by protecting the environment and people from potential adverse impacts. The SPS comprises three safeguards—environment, involuntary resettlement, and indigenous peoples—which aim to avoid adverse impacts on the environment and people and if it is not possible to avoid then to minimize, mitigate, and/or compensate for adverse impacts; and to help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks. The IEE was prepared as per the environmental assessment and review framework (EARF) to guide the process for screening, assessment, review and monitoring of components that are designed and implemented following approval.
22. In accordance with the SPS, screening and categorization of a project (including its subprojects and/or components) is undertaken to reflect the significance of potential project impacts or risks; to identify the level of assessment and institutional resources required for the safeguard measures; and determine disclosure requirements. Consequently, the SPS categorizes potential projects or activities into categories of impact (A, B, C or FI) to determine the level of environmental assessment required. This section of the UWSSSP has been deemed category B for environment based on the low significance of its potential environmental impacts and risks. This proposed project, includes involuntary resettlement impacts that are not deemed significant, and is screened as a Category B project for social impacts requiring a resettlement plan. An IEE and Resettlement Action Plan WB (RAP) or Land acquisition and Resettlement Plan (ADB LARP) is the appropriate level of assessment for a category B project. The WB OP4.10 policy is triggered for the project, to be consistent with the Integrated Safeguards Data Sheet (ISDS, p.16, May 2018). However, the preparation of separate Indigenous People instruments is not required as the beneficiaries are all indigenous people and the IP aspects have been integrated into the Project Design. Appropriate measures will also encompass vulnerable groups and include measures outlined in the project's Gender Action Plan. This will ensure prior informed consultation is undertaken, and there is broad community support for the project. The RF was prepared in 2018 and approved by the ADB in March 2019 and the RAP approved by ADB June 2019.
23. The SPS is comparable to the World Bank Environmental, Health, and Safety Guidelines (EHSB).

3.4 World Bank Safeguards Policies

24. The WBSP aim to prevent and mitigate potential damage to the environment and communities generated in the development process. The WBSP provide the environmental and social safeguard requirements that must be complied with during the identification, preparation and implementation of WB-financed programs and projects.
 25. The WBSP applying to the Project include ten safeguard policies established to inform decision making, ensuring that projects financed by the WB are environmentally and socially sustainable. The Project triggers five of these policies: Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), OP 4.10 Indigenous Peoples, Physical Cultural Resources (OP/BP 4.11), and Involuntary Resettlement (OP/BP 4.12). Table 1 presents these policies and their applicability to the Project.²
 26. 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 are applied as required by their respective policies and standards. The General EHSg are designed to be used together with the relevant industry sector EHSg which provide guidance on issues in specific industry sectors.
 27. 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, where possible, are expected to achieve whichever is more stringent.
 28. The General and Industry Sector EHSg are available at the following link - <http://www.ifc.org/ehsguidelines>. Contractors, as part of their construction environmental management plan (CEMP), will be required to prepare an occupational and community health and safety plan.
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² The Project preparation commenced in early 2018 and therefore the WB's new Environmental Safeguard Framework (ESF) does not apply. The ESF applies to projects and programs developed from October 2018.

Table 1: World Bank Safeguard Policies: Main Objectives, Applicability and Triggered by the Project

Safeguard Policies	Main Objective	Applicability	Application to the Project
OP 4.01 Environmental Assessment	The objective of this policy is to ensure that projects financed by the World Bank are environmentally sound and sustainable, and that decision making is improved through adequate analysis of actions and their possible risks and environmental impacts in the natural environment (air, water and soils); human health & security; physical-cultural resources; and global and transboundary and global environmental aspects.	<p>This policy is applicable when a project or sub-project has potential to cause negative environmental impacts in its area of influence.</p> <p>Depending on the project and the nature of its impacts, various instruments can be used. An ESMF (equivalent to EARF) is required for projects that comprise several sub- projects which will be fully defined only during project implementation. An ESIA/ESMP (equivalent to IEE) is required for projects that are fully defined during preparation.</p>	<p>Triggered</p> <p>Environmental risks associated with the project include temporary noise, waste and air quality impacts associated with construction, potential limited vegetation clearing for the purpose of creating access to new water supply sources or pipelines, constructing the water treatment plants, etc.</p> <p>An Initial Environmental Examination (IEE (equivalent to WB ESIA/ESMP), the EARF (equivalent to WB ESMF) and Resettlement Framework (RF) (equivalent to WB RPF) and Resettlement Plan (RP) establish the process to mitigate these impacts. Consultations with stakeholders and affected communities are used to inform the decision-making process. ADB approved the RF in February 2019 and the RP in June 2019.</p>
OP 4.04 Natural Habitats	<p>This policy recognizes that the preservation of natural habitats is essential to protect original bio-diversity; for the preservation of environmental services and products for human society and for long term sustainable development.</p> <p>Therefore, the Bank supports the protection, management and restoration of natural habitats by funding projects as well as via political dialogue, sector work and the economic sector.</p>	<p>This policy is used by any Project or sub-projects considered as potential originator of significant changes (loss) or degradation of natural habitats, be it directly (through the construction) or indirectly (with the human activities caused by the project).</p> <p>OP4.04 defines a natural habitat as land and water areas where (i) the ecosystems' biological communities are formed largely by native plant and animal species, and (ii) human activity</p>	<p>Triggered</p> <p>The policy OP4.04 was triggered for the project to be consistent with the ISDS. The IEE established that the project is not located in areas where there will significant changes (loss) or degradation of natural habitats, be it directly (through the construction) or indirectly (with the human activities caused by the project).</p> <p>Construction will occur in areas of highly modified ecosystems and impacts during operations on environmental and socioeconomic values will be minor.</p>

Safeguard Policies	Main Objective	Applicability	Application to the Project
	By funding projects, the Bank expects the proponents to apply the precautionary principle in the management of natural resources, in order to ensure opportunities for sustainable environmental development.	has not essentially modified the area's primary ecological functions."	
OP 4.10 Indigenous Peoples	<p>For all projects proposed Bank funding that affect indigenous peoples, the Bank requires the borrower to undertake free, prior and informed consultation with affected Indigenous Peoples to ascertain their broad community support for projects affecting them. The project financed by the Bank must include measures to: (a) avoid adverse effects on indigenous populations; or (b) when it is not possible to avoid the effects, minimizes, mitigates, or compensates for such purposes.</p> <p>The projects financed by the Bank are designed with the assurance that indigenous people receive social and economic benefits that are culturally appropriate and adequate gender and inter-generations.</p>	This policy is applied when the Project affects direct or indirectly indigenous people.	<p>Triggered</p> <p>The OP4.10 policy is triggered for the project to be consistent with the World Bank Integrated Safeguards Data Sheet (ISDS, p.16 May 2018). However, the project is located in areas where Indigenous Peoples are the sole or the overwhelming majority of direct project beneficiaries. They are not a discriminated, marginalized group, but part of the majority population, sharing the same culture, identity, and characteristics. IP aspects have been integrated into the Project Design ensuring FPIC principles, and broad community support for the project.</p> <p>The project will focus on rehabilitating failed water supply and sanitation infrastructure or providing new infrastructure, this will benefit the community.</p> <p>An RF will be prepared which sets out the methodology for land acquisition / access for the project, if needed. Once land access is required, the process will include consultations with local government, local communities and various community groups (i.e. youth and women groups). The IEE/EARF will ensure free and prior informed consultation is undertaken and broad community support is achieved for the project.</p>
OP 4.11 Physical Cultural Resources	The objective of this policy is to assist countries to avoid or mitigate adverse impacts on physical cultural resources from	This policy is used by any Project or sub-projects considered as potential to cause changes (loss) or degradation of physical cultural resources.	<p>Triggered</p> <p>The project involves construction works in modified urban and peri-urban areas, where it is unlikely that</p>

Safeguard Policies	Main Objective	Applicability	Application to the Project
	<p>development projects that it finances.</p> <p>Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people’s cultural identity and practices.</p>	<p>OP 4.11 defines physical cultural resources as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance.</p> <p>Depending on the project and the nature of its impacts, various instruments can be used. An Environmental Assessment capturing impacts on physical cultural resources is required for the project and sub-projects.</p>	<p>unknown physical cultural resources will be encountered.</p> <p>However, a Chance Find procedure is to be included in the CEMP to ensure appropriate measures are taken in the event cultural resources are encountered. The chance find procedure is a project-specific procedure that outlines what will happen if previously unknown heritage resources, particularly archaeological resources, are encountered during project construction or operation. The procedure includes record keeping and expert verification procedures, chain of custody instructions for movable finds, and clear criteria for potential temporary work stoppages that could be required for rapid disposition of issues related to the finds. It is important that this procedure outlines the roles and responsibilities and the response times required from both project staff, and any relevant heritage authority, as well as any agreed consultation procedures.³</p> <p>There are several graves of cultural importance, within the perimeter of the SW land where the WTP is being developed. Grave sites will be kept outside of the permanent fencing, but within the SW leasehold land. This will prevent development by other parties. Existing road access has and will be maintained to the graves. It is unlikely that SIG will create a legal, gazette road here, although existing use is recognized and maintained. SW will provide written guarantees to families, regarding on-going access to the graves.</p>

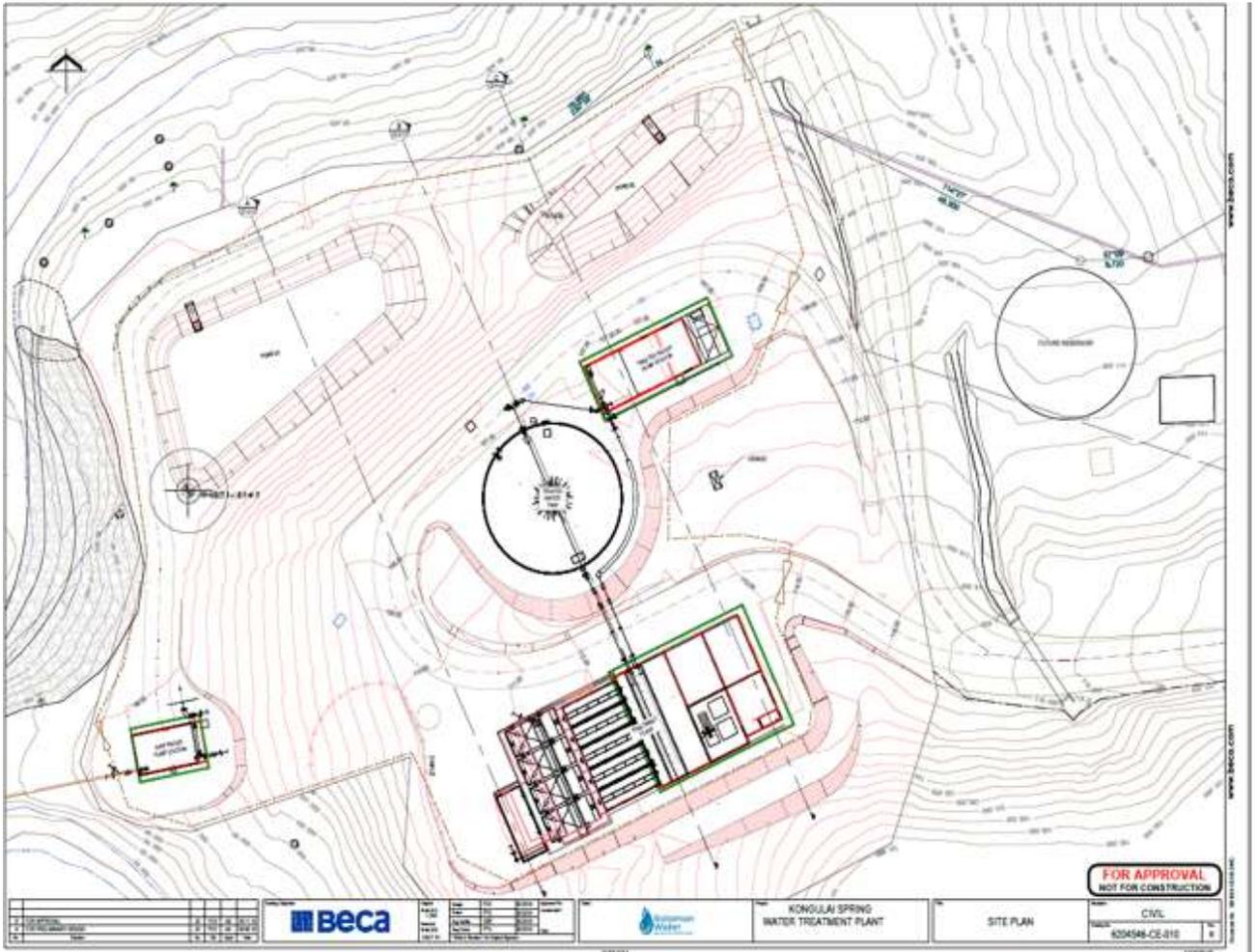
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<p>OP 4.12 Involuntary Resettlement</p>	<p>The objective of this policy is to (i) avoid or minimize involuntary resettlement, where feasible and explore all viable alternative project designs; (ii) assist displaced people in improving their former living standards, income earning capacity, and production levels, or at let in restoring them; (iii) encourage community participation in planning and implementing resettlement; and (iv) provide assistance to affected people regardless of the legality of land tenure.</p>	<p>This policy does not cover only physical relocation but any loss of income sources resulting in: (i) relocation or loss of shelter; (ii) loss of assets or means of livelihood; (iii) loss of income sources or means of subsistence, whether or not the affected people must move to another location. This policy also applies to the involuntary restriction of access to legally designated parks and protected areas, resulting in adverse impacts on the livelihood of the displaced persons.</p> <p>In these cases, the World Bank requires the establishment of a Resettlement Action Plan (RAP), based on the Resettlement Policy Framework (RPF) for any project or sub-project.</p>	<p>Triggered</p> <p>The project involves the development of new water supply and upgraded pipeline infrastructure. Involuntary resettlement will take place at a limited scale.</p> <p>A Resettlement Policy Framework (RPF) has been prepared to assess potential impacts and outline measures to avoid, mitigate or manage these impacts. Since land access is required and a limited number of people are displaced, a Resettlement Action Plan (RAP) has been developed, based on the RPF. Communities will be consulted to ensure there are no pending issues. A formal grievance redress mechanism has been established to channel and manage potential grievances arising during project implementation.</p>
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4 PROJECT DESCRIPTION

4.1 Project Objectives

29. Honiara City is the capital of Solomon Islands situated on Guadalcanal Province. It has been growing rapidly over the recent decades with a total population of 64,606 from 2009 census with an average annual population growth rate of 2.7% and the current population is expected to double in the next 15-20 years.
30. Current water production in Honiara is 32ML and the Kongulai water source supplies 15 ML/d or 40% of this demand. This same abstraction of water will continue to occur when the upgrade to the Water Treatment Plant has been completed. The supply is currently untreated other than dosing with chlorine (sodium hypochlorite) for disinfection.
31. The completion of the Water Treatment Plant (WTP) and the 1.65km pipeline upgrade to the Tasahe Reservoir in 2023 will enable the continuous supply of treated water in all weather conditions. This project is part of Solomon Water's obligation to provide a better service to its customers in the Honiara City including WHO drinking water quality to the City's population.
32. Turbidity in Kongulai Spring, during flood events can peak at 500 NTU (Nephelometric Turbidity Unit), and 20 NTU can be exceeded for around 20 days per year. At these turbidity levels, supply is shut down resulting in no water supply being available to consumers. Solomon Water's revenue stream is directly linked to usage; meaning any limitations on supply directly impacts revenue and business performance as well as loss of supply impacting consumers and their access to a healthy water supply.
33. The objective of the project is to enable continuous supply from the Kongulai water source throughout the year, in association, with improved water quality treatment to meet WHO Water Quality Guidelines for potable water. This will be achieved by building a water treatment/filtration plant at Kongulai and upgrade a 1.65 km pipeline to the Tasahe Reservoir.
34. The project site is at the existing Kongulai water source (see Appendix B – site photos) The land is held as Perpetual Estate (PE) by Michael Hanikouna (one of the Trustees for the land) and is designated Kongulai water source area. The location and aerial photo of the proposed Kongulai Water Treatment Plant Project site is shown in Figure 1. A schematic of the proposed water treatment plant is shown in . The current Solomon Water Pump station site is shown in



, a schematic detailed design plan in Figure 4 and a site plan shown in Figure 5. The upgraded 1.65 km pipeline route to Tasahe Reservoir is shown in Figure 6.



Figure 1: Location of proposed Kongulai WTP and Tasahe Reservoir

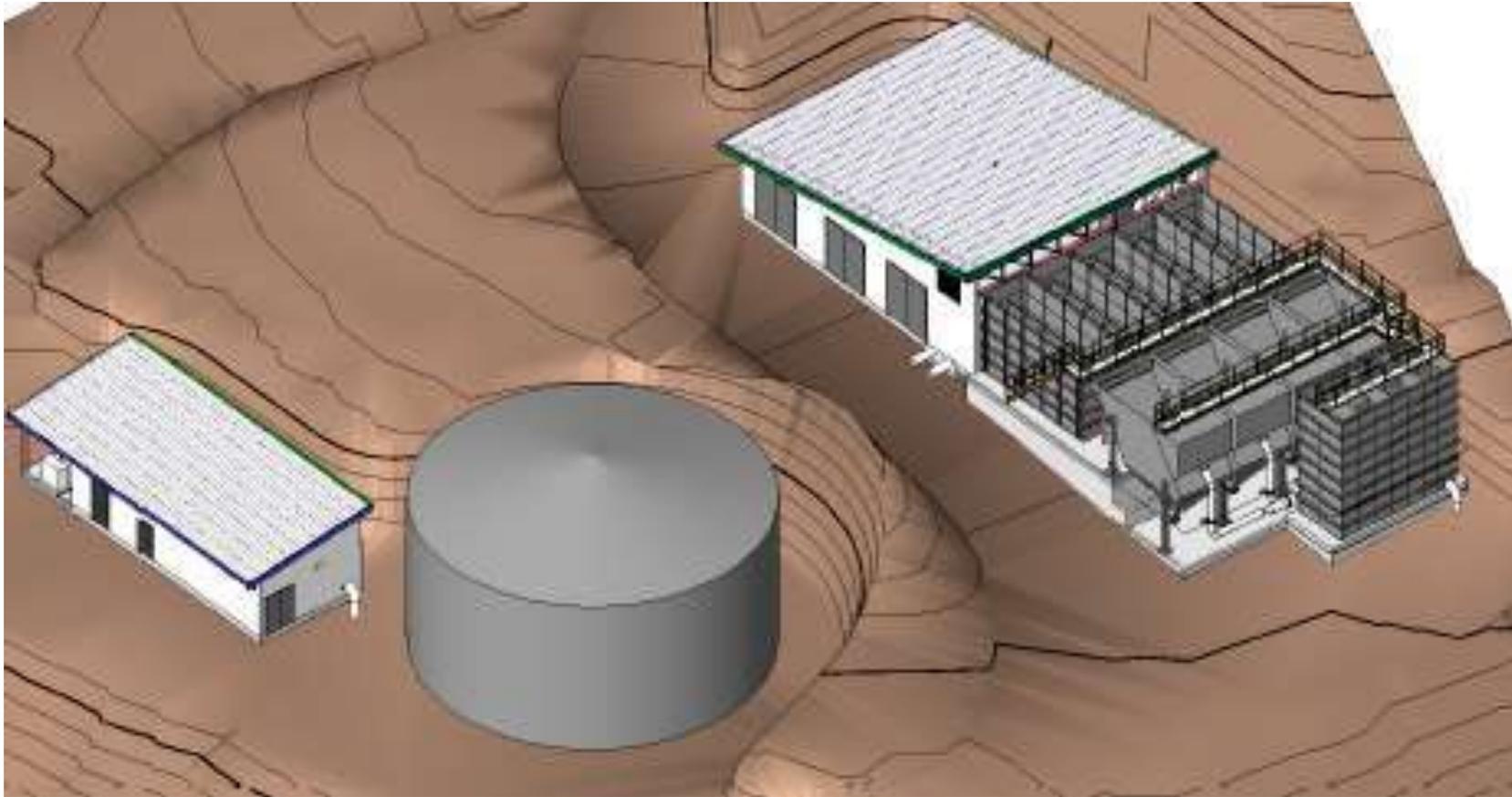


Figure 2: Schematic of the proposed Kongulai Water Treatment Plant Project

4.2 Site Information

35. The Site is located South-West of central Honiara in the Tandai ward of Guadalcanal Province. The location of the proposed project based on project base point is as follows:
N = 956477.5409m
E = 599872.159m
36. The Site is accessed from Tavioa Ridge.
37. There will be compensation for local gardens, fruit trees and crops in the vicinity of the proposed project site. Compensation and easement rights will be pursued as a negotiated agreement between SW and the affected party. Any land and easement agreement process to be followed by the project will be guided by the related process as described under the Land and Titles Act and ADB Safeguard Policy Statement: Safeguard Requirements 2 - Involuntary Resettlement for negotiated agreements and the WB OP 4.12 Resettlement guidelines.
38. SW are in the process of finalizing a detailed budget incorporating all costs related to: i) consultations and negotiations, ii) cash compensations, iii) any related costs of land easement, access and ROW requirements. An initial estimate for all items related to Resettlement Plan implementation has been documented.
39. The RPF for the project was approved in March 2019 and the RAP in June 2019. Consultation with the Kongulai community is ongoing. A Grievance Redress Mechanism (GRM) and process has been established to address grievances at all levels. The GRM process is detailed in Section 8.
40. As outlined in the RPF SW have appointed a national person for land/resettlement issues within the PMU, and recruited an international social/resettlement specialist who together, will coordinate with the Ministry of Lands, Housing and Survey (MOLHS), Ministry of Agriculture and Livestock (MoA&L), local provincial government and other relevant agencies to support the safeguards work. ToR for the national land management/resettlement officer are provided in Annex 4 of the RPF. Implementation and impact of the RP will be monitored by SW and monitoring reports will be submitted on an agreed timeframe to the ECD, WB and the ADB.



Figure 3: The current Solomon Water Pump Station Site at Kongulai Spring

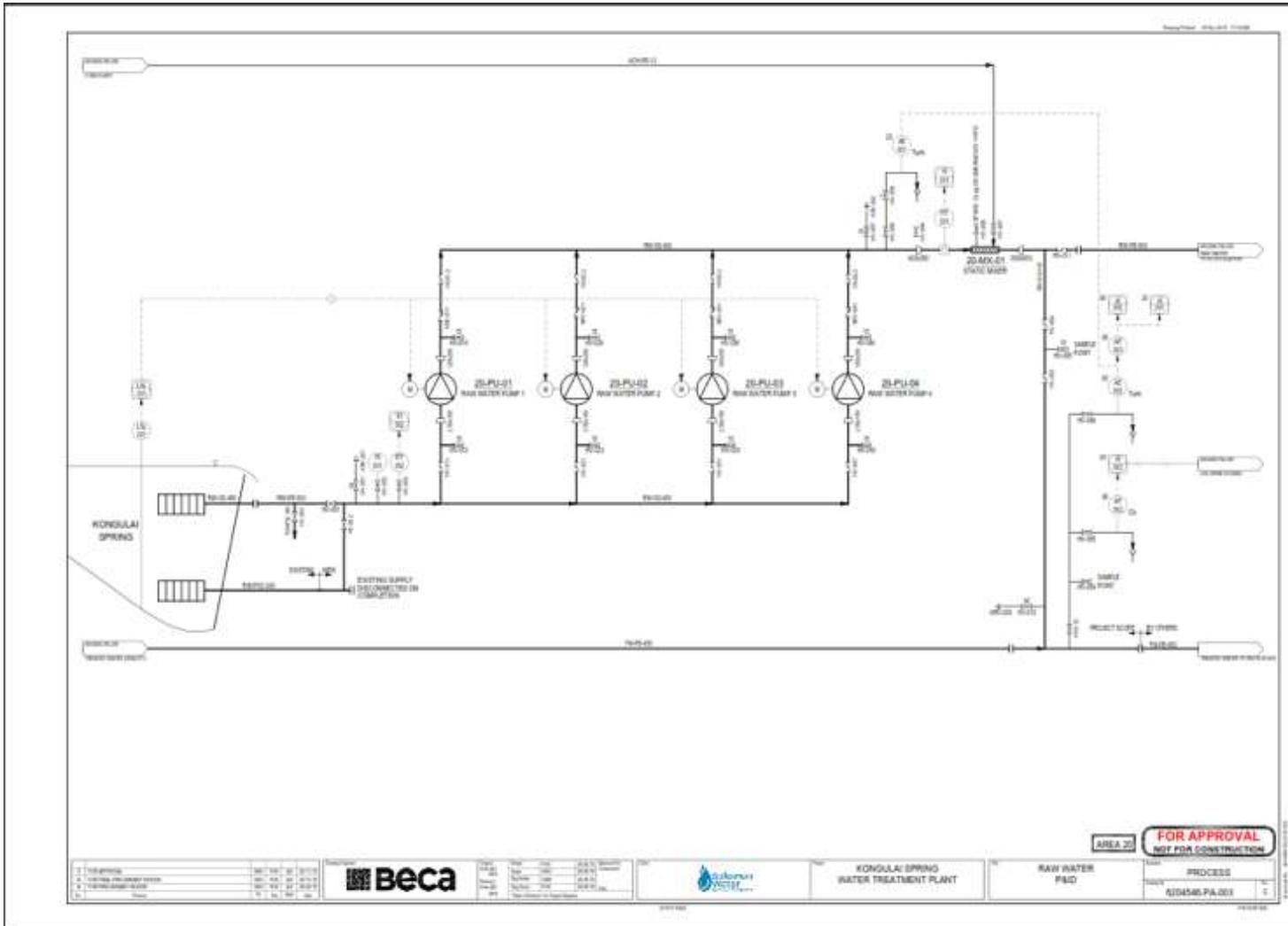


Figure 4: Detailed Design of the Treatment Process

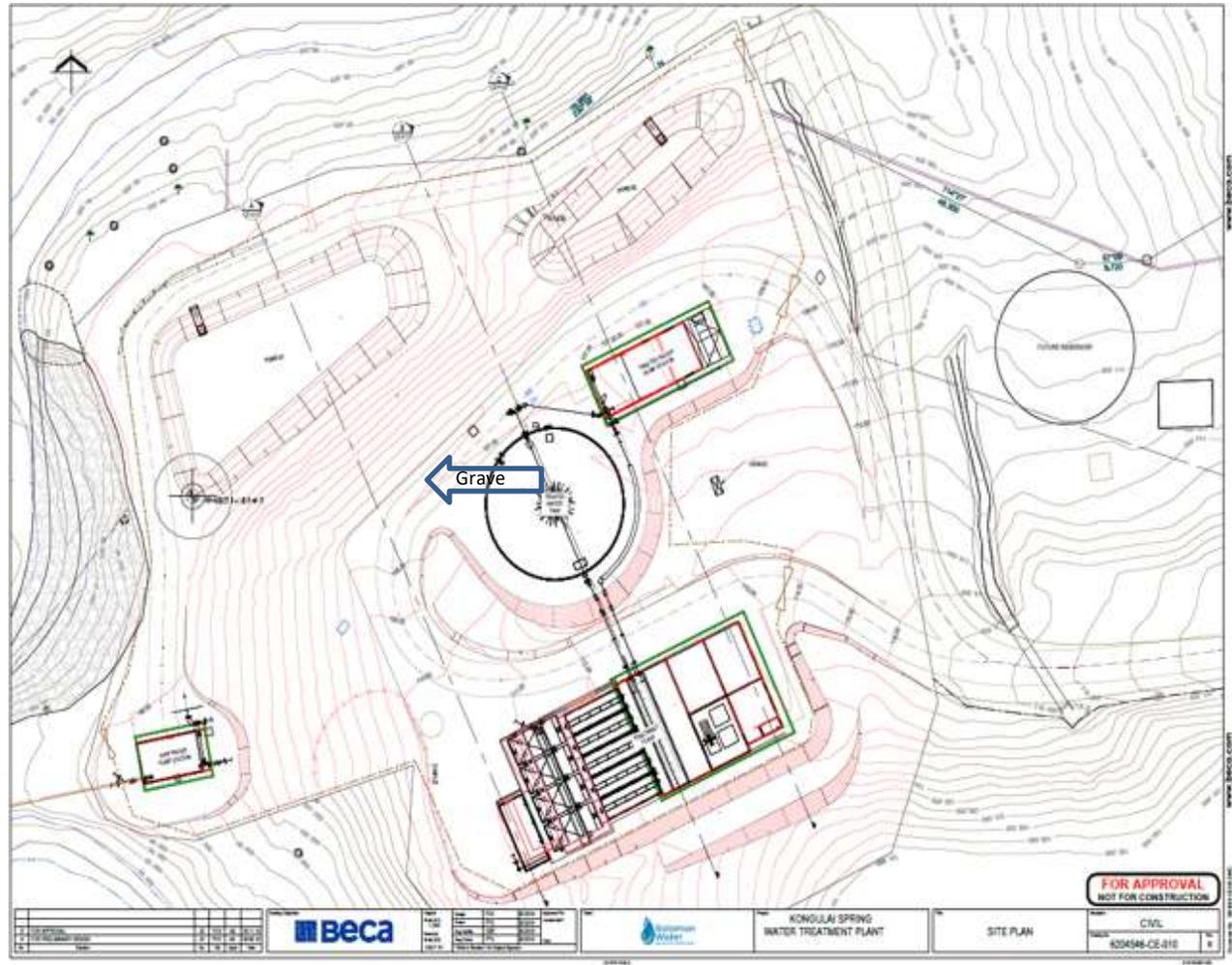


Figure 5: A site plan of the proposed upgraded water treatment plant

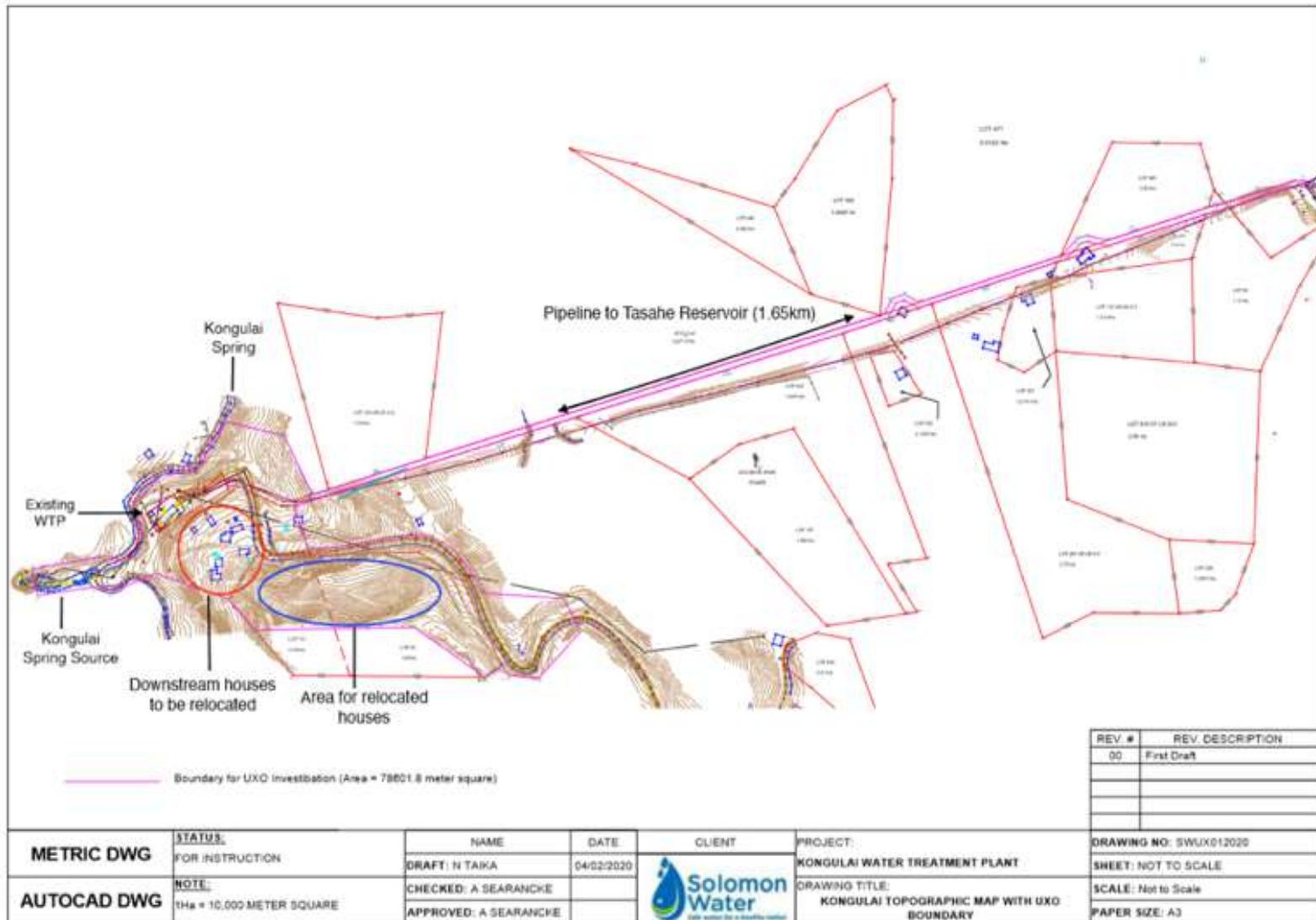


Figure 6: The pipeline route (1.65km) from the Kongulai WTP to Tasahe Reservoir

4.3 Existing Condition

41. The current Kongulai Spring source is untreated and SW utilizes dosing of chlorine (sodium hypochlorite) for disinfection. Surface water inflows to the limestone cave network influence the water quality of the Spring, and during high rainfall periods turbidity increases, and the supply has to be shut down to maintain minimum water quality requirements for the health of the community.
42. The feasibility study and detailed design undertaken by BECA International Consultants Ltd has recommended the treatment process which consists of:
 - Coagulation with PACl (Poly-aluminum chloride);
 - Optional poly dosing as a flocculant aid when required;
 - Clarification using lamella plate clarification;
 - Media filtration using deep bed dual media filtration;
 - Chlorine Disinfection (Chlorine Gas);
 - Chlorine Contact/Reservoir Storage; and
 - Pond separation of solids from clarifier sludge and filter backwash.
43. Four by 920 kg gas cylinders will be on site at any one time. These are contained within a building compliant with AS/NZS2129, with only 2 cylinders connected to the system at any time in a duty/standby configuration set up for automatic switch over. Preliminary consumption based on a dose rate of 1.2g/m³ estimates 6500kg per annum will be consumed.
44. This process is recommended due to the following attributes:
 - Will provide appropriate treated water quality, meeting World Health Organization Drinking Water Quality Guidelines.
 - Relatively low complexity, being the lowest complexity available technology to meet performance requirements. This will aid the future operation and maintenance of the plant;
 - Low energy use; and
 - Expected to be similar treatment process to the proposed future Lungga water source.

4.4 Site Selection for the Construction of Water Treatment Plant

45. Several alternative sites were investigated by Solomon Water with the support of BECA International Consultants Ltd, for ease of constructing a conventional WTP.
46. The existing Kongulai Spring Pump Station Site was selected as local landowners are actively liaising with Solomon Water to make additional land available, including resettlement of existing households to cater for the construction of the Plant. A land area of 14,882 m² to be put aside for the expanded WTP, and 1500m² for resettlement housing has been negotiated with the landowners.⁴ While the sellers of the land had a meaningful choice to refuse any sale, they were, in fact, actively looking to sell land, and happy that SW wanted to buy the land. The absentee owner (perpetual title holder) of the resettlement site who resides in New Zealand, negotiated the sale for market valuation. The site was vacant, so no persons were displaced. No one else has rights to that parcel of land, so there were no social impacts. A copy of the contract for the sale of land between SW and Alice Luaseuta, can be found in Annex 1(b) of the RAP/LARP, confirming that the land is sold by one owner, free of encumbrances with vacant possession. Figures 7 and 8 are maps showing the escarpment area is vacant, where new houses are proposed to be built. The current land users of the WTP site are one extended family, who have only squatters' rights and are living on land that is in Perpetual Estate tenure with one of the paramount leaders of the area. The displaced family of eight households (41 people) had formerly no legal land rights, but with resettlement, to SW

⁴ The RAP/LARP contains a list of consultations undertaken with landowners, in Annex 4.

acquired land (in Perpetual Estate) they will be issued with a Fixed Term Estate title to the land, improving their status. SW after purchasing land from Alice Luaseuta (current owner of the resettlement land), will get PE title, then will further subdivide the parcel 191-074-10 to accommodate the access road, and the plots for the displaced family. Resettlement agreements with details of compensation payments can be found in Annex 7 of the RAP/LARP. Arrangements are being made (at the request of the whole family), to issue title in the name of the father and eldest son, as is customary, and in order to maintain a culturally acceptable concept of 'communal' ownership, where elders hold the title in trust for the wider family. SW will then arrange for the land to be surveyed and subdivided. CoL will be requested to give FTE leases to the resettled family.

47. The environmental values of the site are low as the site is highly modified with crops and housing as the dominant land use. Sensitive receptors during the construction phase will be nearby relocated households or a small number of households downstream of the site, however any impacts will be mitigated by works being undertaken during day time with well documented environmental controls for noise, air and sediment control amongst others.
48. The existing site with houses to be relocated is shown in Figure 7. Eight houses and 41 residents are to be relocated to houses within 100 m of the existing households (see Figure 8) to maintain proximity to existing unaffected garden land and hunting grounds. The environmental values of this new site are also low with the existing vegetation highly modified dominated by extensive introduced grasslands. The land is of equivalent size and quality to the residential plots of current users. During operations, there will be little or no impact on these or downstream communities. Contractors will be required to restore temporarily used land to original conditions before returning it. The PMU will ensure that the contractor has operated within the land area boundaries agree with the landowners.



Figure 7: Proposed WTP site area with houses to be re-located marked with an X.

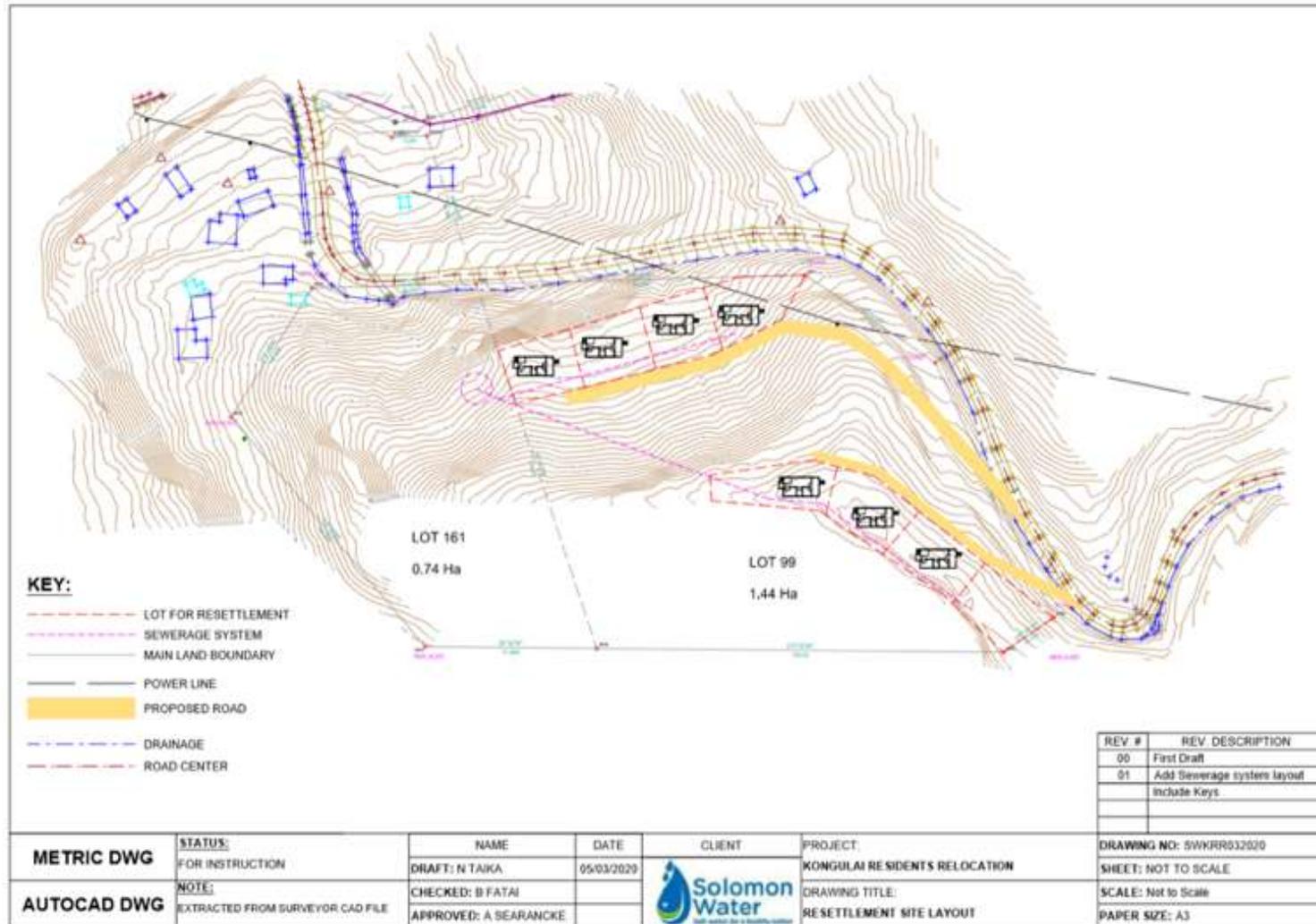


Figure 8: The location of the new houses including new road construction

4.5 Scope of Works and Project Activities

49. The scope of works includes (but are not necessarily limited to):
- Earthworks, including site platforms, river works, two ponds, and earth bunds around the site.
 - Upgrade access track to site.
 - Site civils including a road to the raw water pump station, pavements, fencing, storm water and landscaping.
 - New raw water intake and pipeline from the existing intake to the new raw water pump station.
 - New raw water pump station.
 - A new water treatment plant including:
 - A flocculation tank
 - Four clarifiers
 - Five filters
 - Chemical storage and dosing
 - Mechanical equipment including centrifugal pumps, blowers, air compressors, chemical dosing pumps, mixers, and chemical storage and dosing facilities
 - A building to house amenities, chemicals, control room and equipment
 - New treated water pump station.
 - A new proprietary designed reservoir.
 - Site services including compressed air, service water, power and controls.
 - Electrical and controls equipment including a standby generator, MCC room, VSD's Soft Starters and instruments (including flow meters, level instruments, pressure instruments, water quality analysers).
 - Building services including air conditioning and ventilation, small power, lighting, plumbing and drainage, fire detection, communications structured cabling system and site electronic security.
 - Relocation of existing transformer, and construction of new power pole, and temporary power supply to existing pump station.
 - Relocation of existing generator set and supply and installation of new 1000 litre diesel tank.
 - The construction team is expected to be between 8-10 persons for the building works. A similar number of personnel will be required for civil works including traffic control etc. A smaller number of personnel will be required for the building of new houses, primarily carpenters. All personnel will commute from Honiara or nearby settlements to undertake this work. A worker's camp is not required. An international contractor will oversee the construction of the WTP and pipeline relocation.
 - The construction timetable for the WTP, pipeline upgrades and re-location is 18 months as all projects can be undertaken concurrently.
50. The contractor will purchase gravel/aggregate from suppliers in Honiara. An Extraction Plan and Building Materials Permit (BMP) is required for sourcing gravel or aggregate from any site and the BMP will be held by the supplier of these materials to the contractor.
51. Current access to the WTP will be maintained through SW leasehold land on the current alignment, as the design of the fenced area encompasses only the immediate plant, structures and equipment. The current "road" (or track) a public right of way claimed by SW under the lands and titles act as common access to a parcel that has no other access. The local community is increasing in number, and the access way is well formed and used. This unofficial usage is utilized by all peoples with land locked titles as well as informal settlers. Due to this unofficial usage and continued development in the area, SW has repeatedly requested that the access ownership be vested in the government as a designated state road, but this process has yet to be completed. In the meantime, SW has notified the community of its intention to upgrade the road, and will maintain the 'road' and provide open access as is currently available, while pursuing SIG to gazette the access way as a road. Significant improvements to the road are planned to improve safety and maintainability of the access way.

5 DESCRIPTION OF THE ENVIRONMENT

5.1 Physical Environment

5.1.1 Climate

52. The climate in Guadalcanal is tropical with a distinct wet and dry season. The weather between March and November is dry and humid followed by a wet season from December to April. The wet season also coincides with the cyclone season.
53. The Solomon Islands is subject to south-easterly trade winds from May to October and the north-westerly trade monsoon winds from December to March. Air temperature has very little variation due to the country's proximity to the equator.
54. The average annual rainfall for Solomon Islands ranges from 3,000 to 4,000mm. The daily average rainfall is between 190 and 330mm. November to January are the wettest months.
55. The island of Guadalcanal has rainfall maximums between June and September, and this is particularly distinct on the Southern side of the island. The average long-term monthly rainfall for Honiara is presented in Figure 9.
56. Maximum average temperatures range from 29.8 to 32.3 degrees Celsius with a mean of 31.0 degrees Celsius while minimum temperatures average between 21.3 and 23.3 degrees Celsius with a mean of 22.5 degrees Celsius (Figure 10).

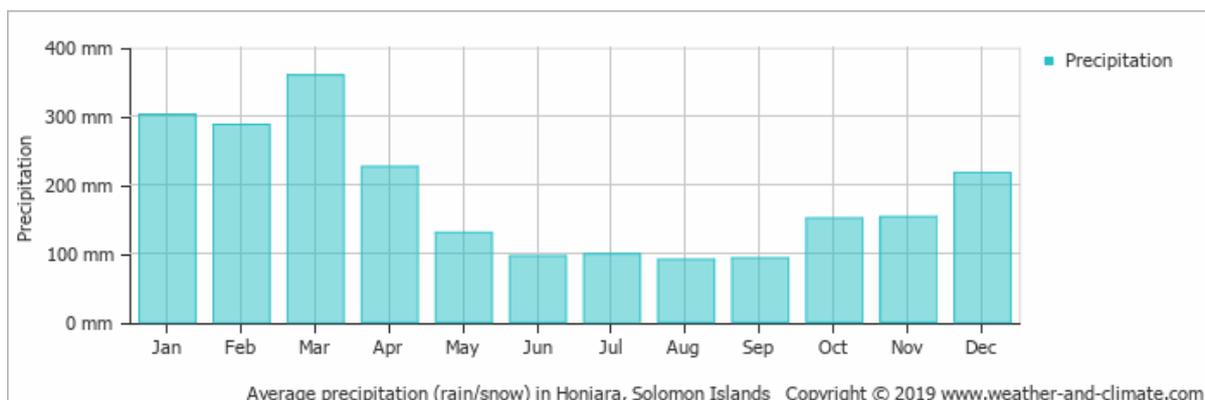


Figure 9: The average monthly rainfall for Honiara

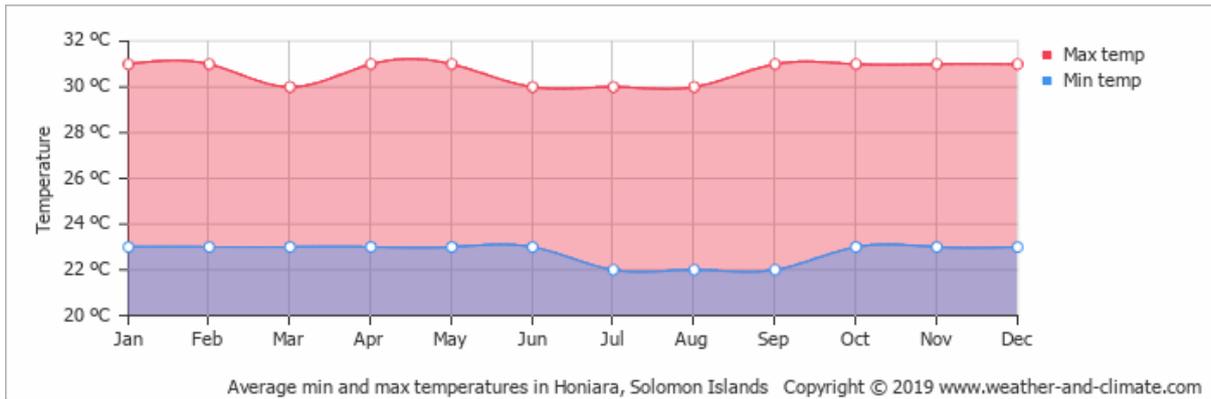


Figure 10: Average annual minimum and maximum temperature for Honiara

57. In the Solomon Islands, the southeast trade winds are usually established in April and continue 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).

5.1.2 Natural hazards.

58. Solomon Islands has been identified by the WB as one of the top 15 countries exposed to multiple hazards (Figure 11). The Project area is within a tropical storm intensity zone 3 (178-209 km/h on the Saffir-Simpson Scale). It is located in an earthquake zone of intensity VIII of the Modified Mercalli Scale (OCHA. March 2016): an intensity which is considered 'severe' and can cause considerable damage in ordinary substantial buildings with partial collapse; it can cause great damage to poorly built structures.
59. The threat from tsunamis is high in the Solomon Islands due to the occurrence of strong earthquakes. The tsunami that was triggered by a magnitude 8.1 earthquake in April 2007 caused significant damage and loss of life (PCMSC. 2016). In February 2013, an 8.0- magnitude undersea earthquake generated a tsunami that hit Santa Cruz and other islands, causing damage.

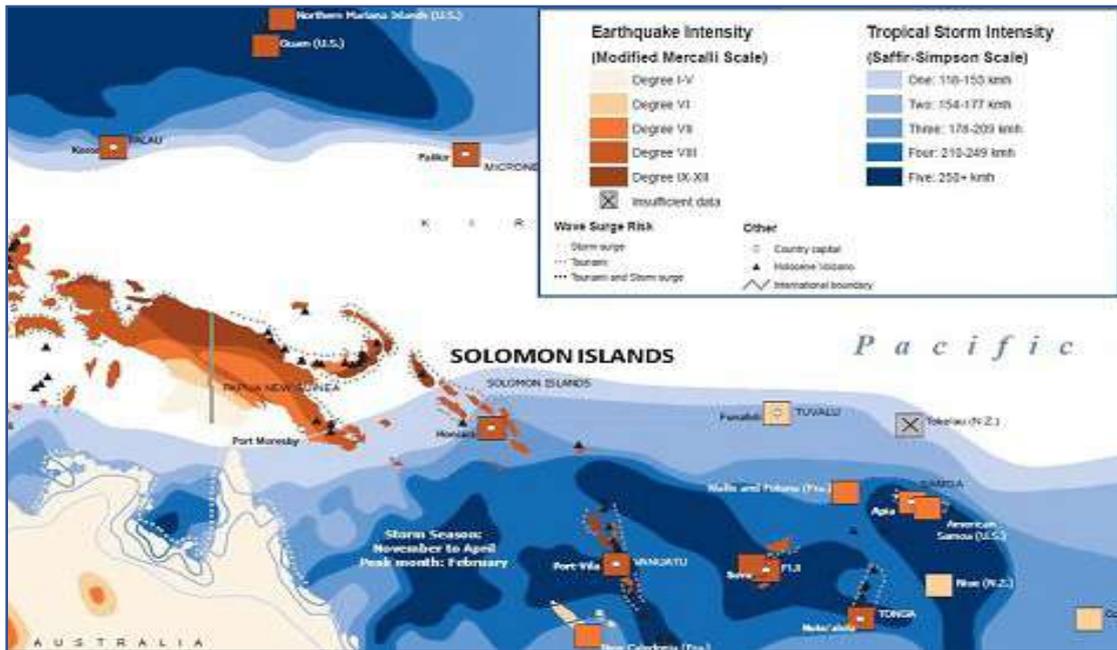


Figure 11: Major Natural Hazards in Asia and Pacific Source: OCHA. 2016.

60. The Pacific-Australia Climate Change Science Program (PCCSP) in 2014 reported that annual and half-year minimum temperatures have been increasing at Honiara since 1953. Minimum temperature trends are generally stronger than maximum temperature trends. There have been significant increases in warm nights and decreases in cool nights at Honiara. Annual and half-year rainfall trends show little change at Honiara since 1950. At Honiara, there is a decreasing trend in the number of rain days since 1955.
61. The PCCSP deemed the available data of cyclones as not suitable for assessing long-term trends. However, it noted that tropical cyclones were most frequent in El Niño years (39 cyclones per decade) and least frequent in La Niña and neutral years (21 cyclones per decade). It reported: (i) tropical cyclones affect Solomon Islands mainly between November and April; (ii) an average of 29 cyclones per decade developed within or crossed the Solomon Islands exclusive economic zone between the 1969/70 to 2010/11 seasons; and (iii) twenty-two of the 82 tropical cyclones (27%) between the 1981/82 and 2010/11 seasons were severe events (Category 3 or stronger). Fifteen of the 22 intense events occurred in seasons when an El Niño was present including a severe flooding event in 2014.

5.1.3 Topography

62. The island of Guadalcanal consists of a north-west to south-east trending, asymmetrically located mountainous spine that lie close to and parallel with the southern coast and flanked successively northwards by dissected high hills, terraces and a coastal plain. The central range contains several high peaks including Mt. Popomanaseu (2,310 m) the highest peak in Guadalcanal and Mt. Tanareirei (2,061 m). Drainage is mainly towards the north with smaller drainage systems to the south. The high hills flanking the volcanic basement have developed over mixed sediments and contain ridged areas, karst cuestas plateau. These merged northwards into low terraced landscapes and wide plains of recent alluvium fed by shallow, braided rivers.

5.1.4 Geology

63. Solomon Islands is a double chain archipelago of islands formed by fertile volcanic rock through tectonic activity also known as the Pacific Rim of Fire. The Solomon Islands (excluding the Santa Cruz group) are divided into three geological provinces: a pacific province, a central province and a volcanic province. Islands with recent extinct volcano which included the northwestern tip of Guadalcanal, the Russell Islands, Shortlands and Savo are found in this province.
64. The present-day highly oblique collision between the Pacific and Australian plates has resulted in the formation of rhombohedral intra- and back-arc basins and have caused continuous earth tremors and earthquake. The earthquake hazard map is shown as Figure 12.
65. The geology of Guadalcanal Island in general is dominated by extrusive igneous rocks generated by volcanism during the Oligocene to Pleistocene periods. Basaltic and andesitic lavas and ash deposits with the Tiaro tuff Breccias and Gallego Andesites form the most common rocks within the project site as they overlay atop the Mbonehe Limestone at approximately 300 metres deep⁷. The outcrop of the Mbonehe Limestone is prominent over much of the peripheral to the main outcrop of the Poha Diorite. The tributaries systems feature small, blind, dry valleys. In the White River valley about 3.5km up from the mouth, there is a spectacular resurgence of water at Vuratapiu. Hackman (1979) observed that this water originates not only from the headwaters of the White River/Kongulai system, but also from the Matanggungulu River, whose waters disappear into a sink hole in a fault-controlled NW-SE dry valley that links with both the Kohove and White River valleys. Notably, cave systems also occur in the Mbonehe Limestone in the area and a most notable one is the cave with which the Kongulai spring emerges.

⁷ Hackman, 1979 Source: Geological Survey Division (1977)

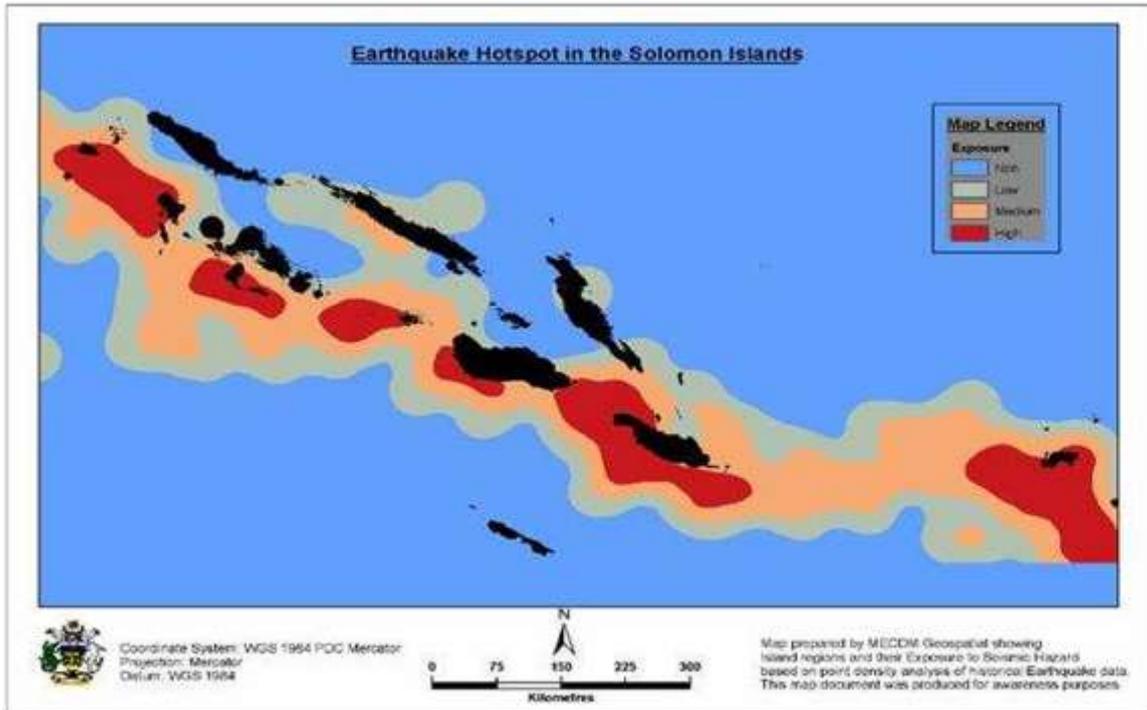


Figure 12: Earthquake Hazard Map (Source: MECDM) Source: Geological Survey Division (1977)

5.1.5 Soils

66. The soil at the project site comprise of a mixture of volcanic and sedimentary rocks. Over the sedimentary rocks are mainly heavy-textured soils, which range from those that are dark, rich in bases and organic matter over some limestones to red, mottled, deeply weathered and leached clays over some conglomerates. The area is described as a seasonally dry area Ustolls being associated with limestone-dominated areas, which is compatible with the geology of the area.

5.1.6 Landform

67. The landform in the area of the WTP site is Karst. The Karst here is not well developed despite the presence of the Mbonehe Limestone that form in the middle Tertiary age that overlies the Basement Diorites. The limestone thickness varies. Valley and hill lineaments are markedly angular reflecting structural weakness of the limestones and probably following fracture lines of the older basement material. Immediately northeast to east of the project site, the landform is distinctly of dissected hills with residual level summits.

5.1.7 Water Resources

68. Guadalcanal is known to have large rivers that drains from the high hills and mountains that run through the interior of the island. Large rivers that drain towards the northern coast within the bounds of Honiara city are the Lungga and Mataniko rivers.

69. Both rivers carry reasonably high bed loads of fine to medium sized (5-10 mm) gravels and sand that are derived from upland volcanic sources and consist of 70% andesitic rocks and 30% limestone. The majority of this is derived from natural geological erosion as the upper catchments of both rivers still retain most of their original forest cover, though areas around Mt Austen in the upper catchment are being harvested. In the alluvial plain sections, bank erosion occurs from the channels natural meandering requirements

and this will be a major source of finer material in the lower section. Bars build up at the mouth of both rivers during the drier season but during the wet season these are breached and the rivers discharge directly to Iron Bottom Sound. During the dry season, the Lungga and Mataniko rivers are slightly turbid but during the wet season, both rivers are prone to rapid changes in discharge and become highly turbid.

70. Catchments in the project site area have river courses that traverse the limestone area, are dry or intermittent; sink-holes and springs frequently mark the boundaries with adjacent formations. The tributary systems feature small, blind, dry valleys. The catchment has distinct waterways including Kongulai Spring, Kohove, Matangunggulu, Musona, Ora and several other springs. There are markedly sink-holes present in the area due to the karstic limestone formation.
71. The Kongulai Spring flow emerges from the base of a pool at the base of a rock face, through a limestone cave. 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. Although the Kovi Sinkhole is the flow input to the Kongulai Spring, it is understood that there are other significant inputs to this spring.
72. The location of the Kongulai Spring is shown in **Figure 13**. The source is found near the base of the Kongulai catchment, approximately 3 km from the ocean and 10 km from the top of the catchment. This water source supplies 40% of the total average daily production for Honiara (Solomon Water, 2017). Chlorinated water is supplied to nearly 8,500 connections (55% of households in the urban area surrounding Honiara). Per capita demand was 177 l/person/day in 2017.
73. The Kongulai catchment, which is located west of the national capital, Honiara, covers approximately 50 km², with less than 1 km² occurring within the municipal boundary, the remaining area being under customary ownership. The Kongulai Spring lies at the junction of upland forest and downstream urbanization within the catchment.
74. The catchment terrain is largely mountainous and heavily forested, although there has been some logging in restricted areas, with officially licensed logging areas covering about 4 km² of the total area. There are informal settlements in a narrow strip along the coastal road, with an accompanying small (though unmeasured) area of subsistence agriculture.

5.2 Water Quality at Kongulai Spring

75. Table 2 **Table 2** summarizes the available spring water quality data collected between October 2012 to August 2018 by Solomon Water and compared with World Health Organization (WHO) Drinking Water Guidelines (2017).
76. The water quality, as expected was fresh, alkaline because of the limestone source, turbid on occasions during rainfall events, low in heavy metals and contaminated with facial material from either animal or human fecal material. Water treatment including flocculation and chlorination would deliver a drinking water quality meeting WHO Guidelines.

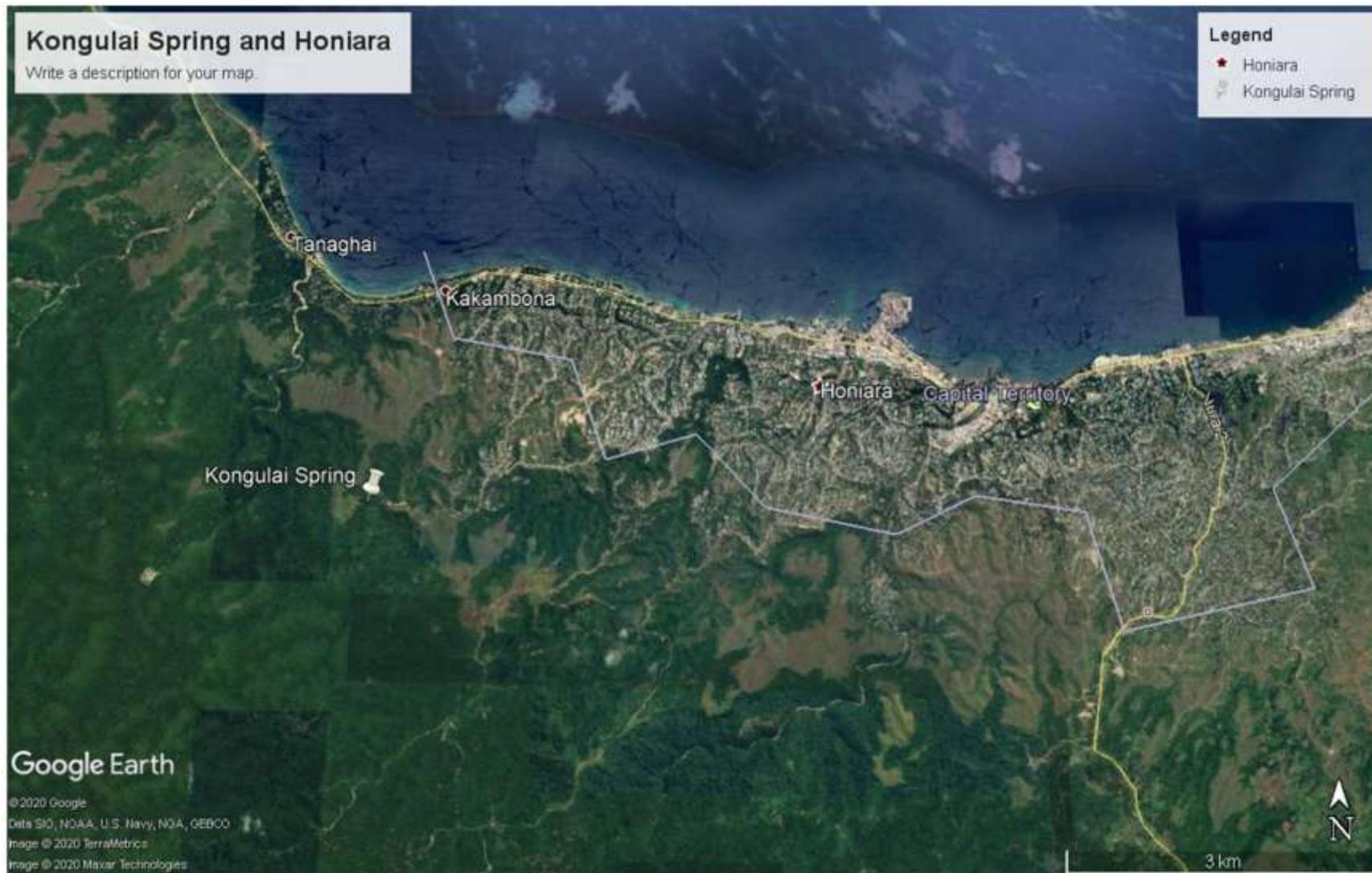


Figure 13: The Source of the Kongulai Spring and adjacent urban Honiara.

Table 3: Metal Concentrations at Kongulai Spring and WHO Water Quality Guidelines (2017)

Metal Analyte	Concentration (mg/L)	WHO Drinking Water Quality Guideline (2017) (mg/L)
Arsenic	<0.001	0.01
Boron	<0.05	2.4
Barium	0.008	1.3
Beryllium	<0.001	Rarely found in drinking-water at concentrations of health concern
Cadmium	<0.0001	0.05
Cobalt	<0.001	Rarely found in drinking-water at concentrations of health concern
Chromium	0.001	0.05
Copper	0.004	2
Fluoride	0.01	1.5
Manganese	0.002	0.1
Nickel	<0.001	0.07
Selenium	<0.001	0.04
Zinc	<0.01	Not of health concern at levels found in drinking-water
Silver	0.018	Available data inadequate to permit derivation of health-based guideline value
Mercury	<0.0001	0.006

78. Only limited turbidity data is available. Turbidity during floods peak at around 500 NTU, and 20 NTU can be exceeded for around 20 days per year.
79. A survey of the water quality upstream and downstream of the Kongulai spring was undertaken in January 2020. The five sampling sites are described in Table 4 and shown on Figure 14.
80. The surface water quality assessment included testing for microbial water quality (Total Coliform and *E.coli*) and in-situ testing for dissolved oxygen, temperature, conductivity, Oxidation/Reduction Potential (ORP) and pH (Table 5 and Table 6).



Figure 14: Water Quality Sampling and Fish Survey Sites - Yellow pin is WQ only; Red pin is both WQ and Fish and Blue pin is fish only

5.2.1 Description of Sampling Sites

Table 4: Sampling Sites for In-Situ and Microbial Water Quality

Site	Description	Geographical coordinates of sampling site		Photo
SW01	<ul style="list-style-type: none"> Water at the site originates from a spring coming out of a cave and is not part of the Kongulai stream. The water from the source is clear. The sampling site is approximately 10 meters from the source. There are huge boulders along the stream channel. It is a Class 2 stream with the channel width is less than 10 meter. There are dead leaves and twigs found at the site. The site is approximately 800 m from the main confluence with Kongulai stream (site SW02). Riverine vegetation is mainly of old secondary growth vegetation with open canopy. High canopy trees are ngali nuts and <i>Ficus</i> spp. The giant ginger plants are common as riverine plants. Surface runoff from higher beds and gullies are obvious which contribute to the murky colour of water at the site 	X – Axis S 09°26.966'	Y – Axis E 159°54.788'	
SW02	<ul style="list-style-type: none"> The site is a pool ~60 meters from the Kongulai dam site. The people of Kongulai usually bath at the pool. Obviously human activities have been remarkable and have modified the riverine vegetation of the site. There are boulders at the stream channel. The bottom substrate is mostly silts and sediments. The vegetation at the site include; mango trees, banana plant (<i>Musa</i> sp.), breadfruit trees, Sago palms (<i>Metroxylon salamonensis</i>), sugarcanes (<i>Saccharium</i> sp). Water cress is also grown at the site utilizing nutrient rich silts build up at shallow areas of the channel. 	S 09°26.770'	E 159°54.616'	

Site	Description	Geographical coordinates of sampling site		Photo
SW03	<ul style="list-style-type: none"> The site is close to the village Tambu site that is ~10 meters away. Highly modified riverine vegetation is common. There are boulders present along the stream channel. Silts and sediments are common as bottom substrates with lots of twigs and dead leaves. The common riverine plants include; breadfruit trees, giant ginger plants, vines and creepers as well as the presence of <i>Mimosa invisa</i> 	S 09°26.717'	E 159°54.664'	
SW04	<ul style="list-style-type: none"> The site is farther from the village and farther from the Kongulai dam site. Water flow at the site is slow as it is quite deep. The bottom substrate composed of sediments, cobbles, and debris. There seem to be no presence of boulders. It has a modified riverine vegetation with grasses (<i>Themeda australis</i>) being common. 	S 09°26.563'	E 159°54.647'	
SW05	<ul style="list-style-type: none"> The site is at Namuruka village, White River, Downstream of the Kongulai Spring. The site is highly modified due to presence of the village. The water here is used by people for bathing, washing of clothes and other human uses such as car wash etc. It has a modified riverine vegetation with presence of trees such as mango, lemon trees, and other ornamental plants. There is also a minor occurrence of grasses (<i>Themeda australis</i>). The bottom substrate is mainly of cobbles and sediments. Signs of enhanced anthropogenic surface runoffs are also obvious. 	S 09°25.824'	E 159°55.117'	

Table 5: Water Quality in Kongulai Spring – January 2020

Date	SW ID	Temperature (° C)	pH	Oxygen Reduction Potential (ORP mv)	Dissolved Oxygen (% saturation)	Conductivity (µS/cm)	Turbidity (NTU)
15/01/2020	SW01	25.35	7.04	137.7	190.8	615	19.5
15/01/2020	SW02	24.47	8.03	133.4	246.0	387	40.2
15/01/2020	SW03	24.56	8.03	151.8	252.1	383	47.6
15/01/2020	SW04	24.82	8.10	145.8	254.5	379	66.7
15/01/2020	SW05	26.66	7.92	152.5	243.3	407	52.6

81. The water quality downstream of the Kongulai Spring is alkaline because of the surrounding limestone substrate, fresh and turbid because of the anthropogenic activities e.g. clearing, farming, washing etc.

Table 6: Total Coli and E. Coli Counts at sites upstream and downstream of Kongulai Spring – January 2020

Date	SW ID	Total Coliform	E. Coli
15/01/2020	SW01	>2420	1414
	SW02	>2420	214
	SW03	>2420	980
	SW04	>2420	2420
	SW05	>2420	>2420

82. All sites exceeded the WHO water quality guideline of zero (0) MPN/100ml for *E. Coli* in water as a result of exposure to runoff from settlements in the area. Human settlements and lack of sanitation facilities are the main sources of fecal coliforms in the Kongulai Stream. Natural occurrence of fecal coliforms from wildlife feces and human activities associated with a lack of sanitary facilities especially in logging camps and settlements could be considered as the prime sources of high fecal coliforms on SW01 in the upper catchment of Kongulai tributaries whilst site SW02 is 60m downstream of the Kongulai Spring source. SW03 – SW05 are found further downstream in peri-urban areas of the catchment.

83. Dissolved oxygen percentage concentrations were high, due likely to high algal productivity during daylight hours. Conductivity values were suitable for drinking water quality and a reflection of the dissolved ions, in particular carbonates from the limestone-based catchment.

5.2.2 Forestry Activities.

84. Forestry is a significant industry in the Solomon Islands. **Error! Reference source not found.** shows forestry activities in the major river catchments of Honiara. The major water catchments are the Mataniko, Rove, White River, and Lungga. The Mataniko River flows through the central Central Business District of Honiara, while Lungga River meanders in the eastern part. Forestry and associated clearing leading to soil erosion upstream of the Kongulai water source is often a source of turbidity leading to the closure of the Kongulai water supply.

5.3 Air quality.

85. There are no available air quality data for Honiara as there is currently no environmental standards being implemented for air quality.
86. In general, the peri-urban areas of Honiara, where proposed components will be located, have no major sources of anthropogenic emissions and noise generators. For these areas, it is therefore expected that the average ground level concentrations of sulfur dioxide (SO₂), nitrogen dioxide (NO₂), and particulate matter (PM10) will not exceed the values in IFC's guidelines (EHS Guidelines of April 2007).

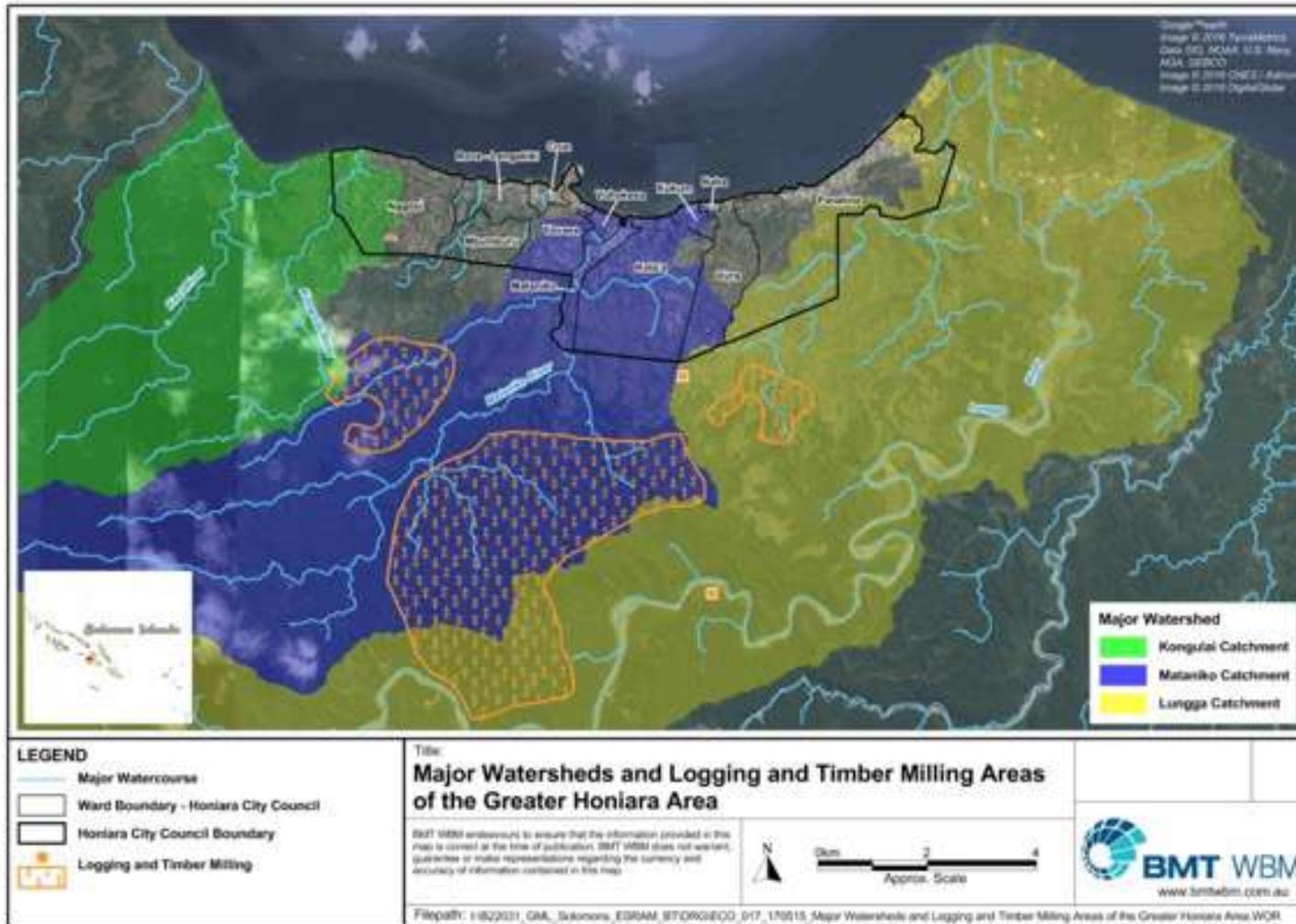


Figure 15: The major watersheds and logging and timber milling areas of the Greater Honiara Area including the Kongulai River Catchment

5.4 Biological Environment

5.4.1 Terrestrial Flora

87. Six distinct vegetation or forest types are distinguished in Solomon Islands, which vary in magnitude from one province to another, and reflect the geological formation, ranging from acidic volcanic origin in the bigger islands to alkaline limestones in low-lying atolls. According to Whitmore (1969), the range and types of plant species present is fairly similar between islands despite their geographical spread. These are, however, affected by six factors: soil type (based on parent rock), climate (e.g. rainfall and temperature), topographical features, altitude, natural catastrophes (cyclone and earthquakes), and human activities. ⁵
88. The six vegetation types are: lowland rainforest, hill forests, montane forests, freshwater swamp and riverine forests, saline swamp forests, and grassland and other non-forest areas.
89. i. Grassland and other non-forest areas: comprise predominantly non-tree species, mainly herbaceous species. Predominant species include *Imperata cylindrica*, *Dicranoptera linearis* and *Themeda australis*. Examples of commonly occurring species are *Mimosa invisa*, *Morinda citrifolia*, *Saccharum spontaneum*, *Polygala paniculata* and *Timonius timon*. Some of these species (e.g. *M. invisa*) are very common in disturbed areas.
90. ii. Saline swamp forests: are subject to tidal influence as they are found in estuaries and foreshores. Examples of species comprising this vegetation include *Barringtonia asiatica*, *Calophyllum inophyllum*, *Casuarina equisetifolia*, *Terminalia catappa*, *Intsia bijuga*, *Inocarpus fagifer*, *Pandanus spp.*, *Barringtonia racemosa* and species of mangroves.
91. iii. Freshwater swamp and riverine forests: are commonly found in poorly drained land at low altitudes with little micro-relief. Species such as *Inocarpus fagifer*, *Mextroxylon salomonense*, *M. sagu*, *Barringtonia racemosa* are found here, although some important timber species are also present (e.g. *Terminalia brassii* and *Dillenia salomonensis*).
92. iv. Lowland rainforests: include forests often with complex structure due to greater number of species from upper or hill forest and patches of freshwater swamp forest. Occasional cyclones and human activities often disturb this forest type as evident in a high incidence of re-growth and secondary species. Species predominant in this vegetation include timber species such as *Camptosperma brevipetiolata*, *Dillenia salomonensis*, *Endospermum medullosum*, *Parinari salomonensis*, *Terminalia calamansanai*, *Schizomeria serrata*, *Maranthes corymbosa*, *Pometia pinnata*, *Gmelina moluccana*, *Elaeocarpus sphaericus* and *Vitex cofasus*. Most indigenous fruit trees are also found in this forest including *Canarium spp.*, *Syzygium malaccensis*, *Magnifera minor*, *Spondius dulce*, *Barringtonia procera*, *B. edulis*, *Artocarpus altilis*, *Gnetum gnemon*, and *Burkella obovata*.
93. v. Hill forests: occur 100–600 m and on well-drained soils and exhibit complex structure with varying tree heights and canopy density. Some species in the lowland forest are also present here, as well as those species commonly found in the montane forest. Species forming this forest include *Pometia pinnata*, *Gmelina moluccana*, *Elaeocarpus sphaericus*, *Camptosperma brevipetiolata*, *Dillenia salomonensis*, *Endospermum medullosum*, *Parinari salomonensis*, *Terminalia calamansanai*, *Schizomeria serrata*, *Maranthes corymbosa*, and *Vitex cofasus*. Fruit tree species such as *Canarium spp.*, *Gnetum gnemon* and *Artocarpus altilis* are also present.
94. vi. Montane forests: refer to forests found generally above 600 m, on ridge tops and mountain summits, but can be found in lower elevations under harsher conditions. These are characterized by a dense and compact canopy with small lighter tree crowns. Species in this forest type include *Callophyllum kajewskii*, *Callophyllum pseudovitiense*, *Eugenia spp.*, *Dacrydium spp.*, *Pandanus spp.*, *Racembambos scandens* and ferns.

⁵ T.C. Whitmore (1969): The vegetation of the Solomon Islands, Volume 255, Issue 800, The Royal Society

95. The catchment of the Kongulai spring extends in elevation up to 600m with montane forest on the ridge tops, before a drop in elevation supports the hill forest. It is in the hill forest where the bulk of millable timber is harvested. The Kongulai spring sits in the catchment of both hill and lowland rainforest before there is sharp distinction of cleared land where human habitation is found adjacent to the stream all the way to the coast.
96. Since, the Project Site is located on the northwest leeward side of the Island of Guadalcanal the vegetation is commonly characterized by deciduous forest and grassland. The primary or very old secondary forest in the area particularly inland from the spring is dominated by *Calophyllum spp.*, *Pometia pinnata*, *Litsea spp.*, *Rhopaloblaste elegans*, and *Canarium spp.* Presence of *Vitex cofassus* is also noted. The young woody and herbaceous regrowth is composed of (but not limited to) *Hibiscus tiliaceus*, *Mangifera indica*, *Cananga spp.*, and *Cryptocarya medicinalis*. Secondary regrowth is dominated by *Macaranga spp.*, *Ficus spp.*, *Trema orientalis* and *Elaeocarpus spp.* The herb *Cominsea gigantea* is common in areas of secondary regrowth. *Themeda australis* is dominant as low scattered tussocks in area as well as *Imperata cylindrica* which is also common. *Polytoca macrophylla* is locally common at forest margin, while the occurrence of *Mimosa invisa* is also noted.
97. Crops and fruit trees grown in subsistence gardens include but are not limited to: sweet potato, cassava, banana, slippery cabbage, papaw, corn, Coconut, Taro, Peanuts, Eggplant and Sugar cane. There are also a wide variety of invasive species, including ornamentals and fruit trees. Also present were hibiscus trees, bougainvillea, soursop trees, castor oil plants, sago palms, guava, mango, breadfruit trees, betel nut trees, noni trees, Heliconia spp., kapok trees, mikania, jatropha and teak trees.
98. The site is covered with secondary growth vegetation while grasses become very common further north, and west of the project site (Figure 16)..
99. The short pipeline route (1.65km) from WTP to Tasahe Reservoir is through disturbed area dominated by species including *Imperata cylindrica*, *Dicranoptera linearis* and the invasive species *Mimosa invisa*, *Morinda citrifolia* and *Saccharum spontaneum*. (**Error! Reference source not found.7**).



Figure 16: [A] Thickets of young bamboo re-growth and vines of calamus type; [B] gardening area with betel nut farm; [C] overview of deciduous and grassland vegetation; [D] Sago palm and breadfruit trees on the western bank of the Kongulai stream, few meters downstream of the water source.



Figure 17: [A] and [B] Overview of the grassland vegetation and gardens [C] and [D] along the heavily cleared WTP to Tasahe Reservoir pipeline route

5.4.2 Terrestrial Fauna

100. The Solomon Islands terrestrial fauna is extremely diverse. It is believed that the country has a greater diversity of land animals with a high level of endemism than any other Pacific island country (UNDP et al., 2002). Fauna includes 223 species of birds (173 residential terrestrial species and 50 other species of shore/sea birds and visitors) including 19 species globally threatened; 52 mammals, 61 species of reptiles (25 are endemic), and 17 species of frogs.
101. There is a relatively high level of island endemism in the country. 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 only one or two islands.
102. The forests of Guadalcanal are known to support very high diversity of bird and vertebrate endemism. Terrestrial fauna includes a large number of birds (about 50 species) including the yellow-legged pigeon (*Columba pallidiceps*), thick-billed ground dove (*Gallicolumba salamonis*), white-headed fruit dove (*Ptilinopus eugeniae*), crested cuckoo dove (*Reinwardtiana crassirostris*), chestnut-bellied imperial pigeon (*Ducula brenchleyi*), as well as the abundant forest kingfishers. According to the Mataniko Environment Baseline Report, n.d., there are seven species of birds found in Guadalcanal that are listed as protected under the Wildlife Protection and Management Act 1998. These include: *Chalopsitta cardinalis*, *Geoffroyus heteroclitus*, *Cacatua durcopsii*, *Electus roratus*, *Micropsitta finschii*, *Trichogloussus haematodus* and *Haliastur sanfordi*. These species often forage at the top of the canopy and around disturbed areas and gardens.
103. The island is also known for presence of the large Discodeles frog which is common in the grasslands and lowlands. There is also the presence of this spectacular mammal known as the Guadalcanal monkey faced bat (*Pteralopex atrata*). Also, there are 9 family of reptiles found in Guadalcanal Island, Agamidae, Gekkonidae, Scincidae, Varanidae, Typhlopidae, Boida, Acrochordidae, Colubridae and Elapidae (McCoy, 2006).

104. Near the project site, where human settlements and other development activities are prevalent, the terrestrial habitats have been highly disturbed. In areas of secondary growths, where the original vegetation has been cleared, much of the original wildlife has disappeared. The invasive toad (*Bufo marinus*), Giant African snail and the Rhinoceros beetle are known to colonize these areas. Field observations did not find any significant wildlife species within the project area.

5.4.3 Freshwater Ecology and Fish Survey

105. The freshwaters of the Solomon Islands show a high level of biodiversity and endemism, especially among the aquatic insects.⁶ The 2008 survey undertaken of the freshwater ecosystems in the Solomon islands, including Guadalcanal recorded 93 species of Heteroptera representing 28 genera in 12 families of which 60% are endemic at the species level and at least 31 of the species collected are new to science. Sixty-three species of Odonata representing 37 genera and 12 families were recorded of which 44% are endemic at the species level and at least 1 new species was discovered. Nine described species of *Gyrinidae*, representing two genera and ten described species of *Simuliidae*, representing 2 genera were reported of which 90% of both are endemic at the species level.

106. Attributed to their mountainous physiography, the larger islands in the Solomon Islands archipelago have Gobioid fishes as the dominant fresh water fauna, represented by members of the Gobiidae, Eleotridae and Rhyacichthidae families. 43 species of fish belonging to 26 genera and 14 families were reported with no endemic species. One species of Gobiidae (*Lentipes solomonensis*) subsequently was found to be endemic through additional analysis. This species has not been found on the island of Guadalcanal.

107. On a specific note, an expedition made to the Kovi-Kongulai catchment in 2011, to study the Kovi catchments freshwater and terrestrial ecology has recorded 1% of the 47 freshwater species found in Guadalcanal. These include: two giant mottled eel (*Anguilla marmorata*), two species of freshwater prawns (*Macrobrachium lar* and *Macrobrachium sp.*) and two species of freshwater snails were also observed including: *Neritina petittii* and *Melanoides tuberculata*⁷. It was reiterated that the Kovi River flows through a lowland rainforest and fused limestone, sand and gravel substrate before submerging into two sinkholes and believed to emerge at Kongulai water catchment. Connectivity condition might be harsh for diversity of fish and crustaceans to properly thrive.

108. A field survey of the freshwater ecology was undertaken on 20th February 2020. The survey required free diving where the diver snorkels at each surveyed site for at least thirty minutes and capture pictures of fishes and other living things in the stream. Four sites along the Kongulai stream were surveyed and it was found that the fish Gobioids and Kuhlidae are very common (Table 7**Table 7**). The Gobioids are mostly represented by the Gobiidae family while the Kuhlidae are represented by *Kuhlia rupestris* and *Kuhlia marginata*. The survey also found crustaceans in the form of snails and crabs. The mountainous and physiographical attributes of the island favor the abundant occurrence of these two common fish species observed at Kongulai stream, the Gobioids and Kuhlidae.

⁶ Dan A. Polhemus, et.al (2008): Freshwater Biotas of the Solomon Islands - Analysis of Richness, Endemism and Threats, Bishop Islands Analysis of Richness, Endemism and Threats, Bishop Museum Bishop Museum Technical Report 45 Honolulu, Museum Bishop Museum Technical Report 45 Honolulu.

⁷ Boseto D. et.al (2007): Biodiversity and conservation of freshwater fishes in selected rivers on Choiseul Island, Solomon Islands The South Pacific Journal of Natural Science 25(1):16-21

Table 7: Freshwater Ecology Survey – Kongulai Spring

Site	Description	Geographical coordinates of sampling site		Photo
SW 02	<p>The site is a pool ~60 meter from the spring source. It is a man-made pool. Human impact at the site is very high. The water is always murky.</p> <p>The most common fishes found at the site are Gobioids and Kuhlidae. There is also presence of the snail <i>Melanoides tuberculata</i>. There is no sighting of prawns and eels at the site.</p>	X – Axis	Y – Axis	 <p data-bbox="948 757 1249 786">Snail, <i>Melanoides tuberculata</i>.</p>
SW 04	<p>The site is farther from the village and farther from the Kongulai dam site. Water flow at the site is slow as it is quite deep.</p> <p>The most common fishes at the site are again Gobioids and Kuhlidae.</p>	S 09°26.5 63'	E 159°54.6 47'	 <p data-bbox="932 1352 1265 1382">Gobiidae, A <i>Glossogobius</i> species.</p>
500 m Upstream of SW 05	<p>The site is downstream of the spring water source at the Kongulai 2 area. It is a pool within the stream's channel. Due to very high human impact, the pools are very dirty and quite murky. There is high presence of the fish Kuhlidae and Gobioids.</p>	S9°26'12 .76"	E159°54' 56.34"	 <p data-bbox="900 1899 1297 1928">Kuhlidae, Jungle Perch (<i>Kuhlia rupestris</i>)</p>

200 m upstream of SW 05	It is also a pool within the stream's channel. There is very high human impact at the site. The water is quite dirty and quite murky.	S 9°26'10.36"	E159°55' 2.32"	 <p>Kuhlidae, Dark-margined flagtail (<i>Kuhlia marginata</i>)</p>

5.5 Protected Areas

109. There is one protected area reserve area in Guadalcanal (Marau Sound) and this reserve is found at the eastern end of the island. The International Union for Conservation of Nature and Natural Resources (IUCN) has identified five marine turtle species as protected species in Solomon Islands in the Red List. These species are not known to inhabit beaches or dune areas within Honiara; they have been observed at Marau Sound and occasionally at the far western end of the island.

5.6 Environmental Values for the Construction and Operation of Water Treatment Plant and Pipeline to Tasahe Reservoir

110. The major environmental values for the proposed WTP site and pipeline to Tasahe reservoir are the terrestrial vegetation communities, riparian vegetation and downstream water quality. At present, both of these environmental values have been heavily impacted. The native terrestrial vegetation communities at the WTP have largely been replaced by subsistence farming and housing as the dominant land use with the remaining existing vegetation dominated by extensive local and introduced grasslands. Downstream of the site, the environmental values of the receiving waters and riparian vegetation are both heavily impacted by peri-urban development and subsidence farming. The environmental values of the pipeline route are primarily the heavily modified terrestrial vegetation communities which are dominated by existing crops and extensive native and introduced grasslands. During construction and operations, these environmental values may be slightly impacted or have nil impacts.

111. Sensitive receptors during the construction phase at the WTP will be nearby relocated households or a small number of households downstream of the site, however any impacts will be mitigated by works being undertaken during the day with well documented environmental controls for noise, air and sediment control amongst others.

112. During operations, there will be little or no impact on these households or downstream communities.

113. Sensitive receptors during construction of the pipeline, will be nearby relocated households and households adjacent to the pipeline route. Any construction impacts will be mitigated by works being undertaken with well documented environmental controls for noise, air and sediment control amongst

others.

114. During operations, there will be little or no impact on these communities.

5.7 Socio-Economic Resources

5.7.1 Population.

115. At the last census (2009), Honiara City's 64,609 inhabitants represented 12.5% of Solomon Islands' total population. Average annual growth rates ranged from -0.9% to 4.9% for the period 1999 to 2009 in 12 wards. The combined average annual growth rate in those wards was 2.7%. It is generally known that with temporary migrants and informal settlers the population of Honiara can be in the order of 150,000 (Table 8), The project is situated in Tandai ward, outside of the Honiara city boundary, in Guadalcanal province. It has a population of 14, 995 with 39% under 15 years (SISO, 2009 census). 98% of the population are indigenous Melanesian, so there is no distinct marginalized group.

116. In 2017, SW reported that chlorinated water was supplied to nearly 8,500 connections (55% of households in the Honiara urban area), while the sewerage system served an estimated equivalent population of 9,998. The subprojects will serve the projected population in Honiara's urban and peri-urban areas.

Table 8: Summary of Demographics (Honiara Population Census)

Indicator	Total	Males	Females
Total Population	64,609	34,089	30,520
Average annual increase. 1999-2009 (in numbers)	1,547	669	878
Average annual growth rate, 1999-2009 (%)	2.7	2.2	3.4
Population density (number of people/km ²)	2,953		
Urbanization			
Urban Population	64,609	34,089	30,520
Per cent urban (%)	100.0		
Average annual urban growth rate, 1999-2009 (%)	2.7		

Reproduced from: SINSO. 2010.

5.7.2 Health.

117. Tertiary health care needs are provided by the Honiara National Referral Hospital, while most primary healthcare services are provided through health facilities such as health centers, dispensaries, and aid posts. 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 MOHMS. 2017).

5.7.3 Noise level.

118. There is no available noise data for Honiara. For urban areas, such as along the main roads (Mendana Avenue and Kukum Highway), noise levels are expected to be higher due to traffic volumes, particularly during the daytime rush hour periods.

5.7.4 Economy.

119. Honiara is the economic, commercial and administrative center of Solomon Islands. The economic base is dominated by the services sector, including whole- sale businesses, retail stores, banks, tourism services shops, restaurants, and hotels. However, the economy is growing and the government forecasts

that the construction, manufacturing, and utilities sectors will contribute more to the country's gross domestic product.

120. Domestic food consumption is supported by several markets such as the Honiara Central Market in Central Honiara. Vendors from the five surrounding provinces, namely Central, Western, Guadalcanal, Malaita, and Isabel have been selling fish in the Honiara Central Market with fish sales estimated at over AUD2 million per annum.
121. Honiara has a higher cost of living than the rest of the country. Using the poverty line measure, specified as the minimum expenditures needed to obtain basic food and non- food goods, a government survey in 2012-2013 reported that Honiara's poverty line per adult equivalent per year (\$10,300) was almost three times that of the cheapest area in the country. This was attributed to poor infrastructures, markets not integrated, costly transport, expensive services, and very high urban housing prices (National Statistics Office and The World Bank. 2015).

5.7.5 Land use.

122. Honiara has a land area of 22.73 km². By 2012, 65% of the city's developable land was already fully developed, 1.5% was held by private developers, and 13.5% occupied by informal settlements (UN-Habitat. 2012). Today, commercial developments have continued on the narrow coastal strip of land with more industrial developments towards the east. More commercial building constructions are ongoing in the Chinatown area and further to the Panatina area.
123. The WTP and pipeline is in Tandai Ward 1 with a population based on the 2009 census report of 14,995 people with an area of 473km². The total WTP project area is 17,352m² comprising of 14,882 m² for the WTP and 1500 m² for the resettlement site and the balance of approximately 970 m² of roads and access. This is excluding the pipeline route and is primarily a small village setting with farming of crops and fruit trees.

5.7.6 Transport, communication, and energy.

124. Land transportation is mainly served by one route along a narrow strip of coastal land bounded by small hills. This main route consists of several road sections serially connected with Mendana Avenue at the central area and the Kukum highway going to the east. Minor roads, found in the lower, middle and upper catchments of Honiara, are connected to the main land transportation route. Honiara is served by Henderson Airport where several airlines and organizations operate. Maritime transport is predominantly served by the Honiara Port at Point Cruz area, owned and operated by the Solomon Islands Ports Authority. The port is experiencing increasing demand for: goods exportation and importation and (ii) inter island transport of goods and people.
125. Cellular phone services are available in Honiara and the government reported that in 2017, majority of the population have access to the mobile services networks of either Our Telekom or Bmobile Vodafone.
126. Honiara's electricity is supplied by the Solomon Islands Electricity Authority/Solomon Power using several energy sources. The main power stations are Lungga (80.73 GWh of electricity produced in 2017) and Honiara (1.65 GWh of electricity produced in 2017).
127. Water supply system. SW operates Honiara's large urban water supply system, which is presently supplied by various wells and springs. SW reports that around 58% of the total average daily production comes from 3 spring sources, while the balance comes from 27 wells.

5.7.7 Construction Workforce.

128. The workforce for the construction of the Kongulai WTP will be between 8-10 persons and will be for a period of between 15-18 months. Reconstruction of houses will employ 4-6 persons particularly those with carpentry skills. It is expected that construction will occur over a 3 month prior to any civil work

commencing. Road upgrade construction will employ 3- 4 persons including a grader driver. The laying of the pipeline from the Kongulai WTP to Tasahe Reservoir will employ 8-10 people including an excavator driver, welder and crane driver plus other associated staff during the 15-18-month period of the construction of the WTP.

129. Construction personnel where appropriate will be locally sourced; with skilled contractors engaged from Honoria. No additional accommodation will be required on site.

5.7.8 Physical Cultural Resources

130. In Solomon Islands, special, sacred or restricted sites, or 'tambu' areas represent the history, lineage and society of different clans and lines. The National Solomon Islands Museum keeps a National Tambu Site Register, which records several thousand sites of Solomon Islands. Based on information from the Register and the Honiara City Council, there are no recognized physical cultural resources within the Project area. There is no information on visible archaeological records such as stone-faced terraces, platforms, and walls representing earlier village sites, agricultural complexes, and shrines, in the subproject areas. There are, however, a few graves, related to the existing community, which are culturally sensitive, and will be protected under the current project, with access to visitors guaranteed.
131. The project site is located outside of the Town boundary and is therefore within the Guadalcanal Provincial jurisdiction. The Planning Board of the Guadalcanal Province will issue approval/ permission for development within their planning scheme. The project will take place within the existing Kongulai spring source area and with additional land required for installation of the WTP. The landowners have agreed in principal after consultations by SW. The existing land use of the area shows a mix of multiple uses. These include settlements, hamlets, access roads, road side stalls/market, gardening and logging.
132. The project site can be accessed from Tavioa ridge. The nearby communities and hamlets at the project site are rural and subsistence. They usually sell their garden produce and other products from the land to earn income.

5.8 Kongulai Community Profile

5.8.1 Project Neighborhood

133. The project neighborhood covers households within the radius of 20m from the project location. The WTP site, as noted above, is located outside of the Honiara City Town Boundary on customary land. Most of the area benefits from services associated with the city amenities such as schools, health, transport, road, communication etc.
134. A social, survey of the community comprising of 6 households and 30 people are reported below.
135. The distribution of ages is shown in Figure 18: Age groups in the Kongulai Spring Community , with the majority of people aged 40 years or less. The population of women and men are similar (Figure 19).

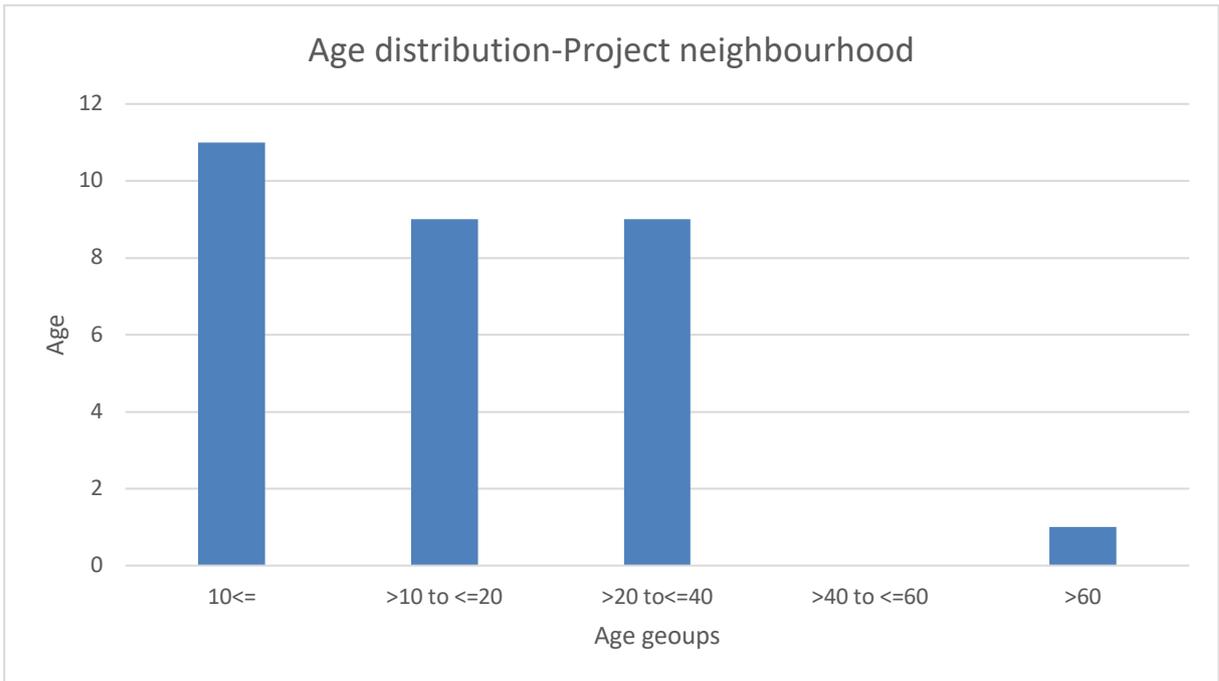


Figure 18: Age groups in the Kongulai Spring Community

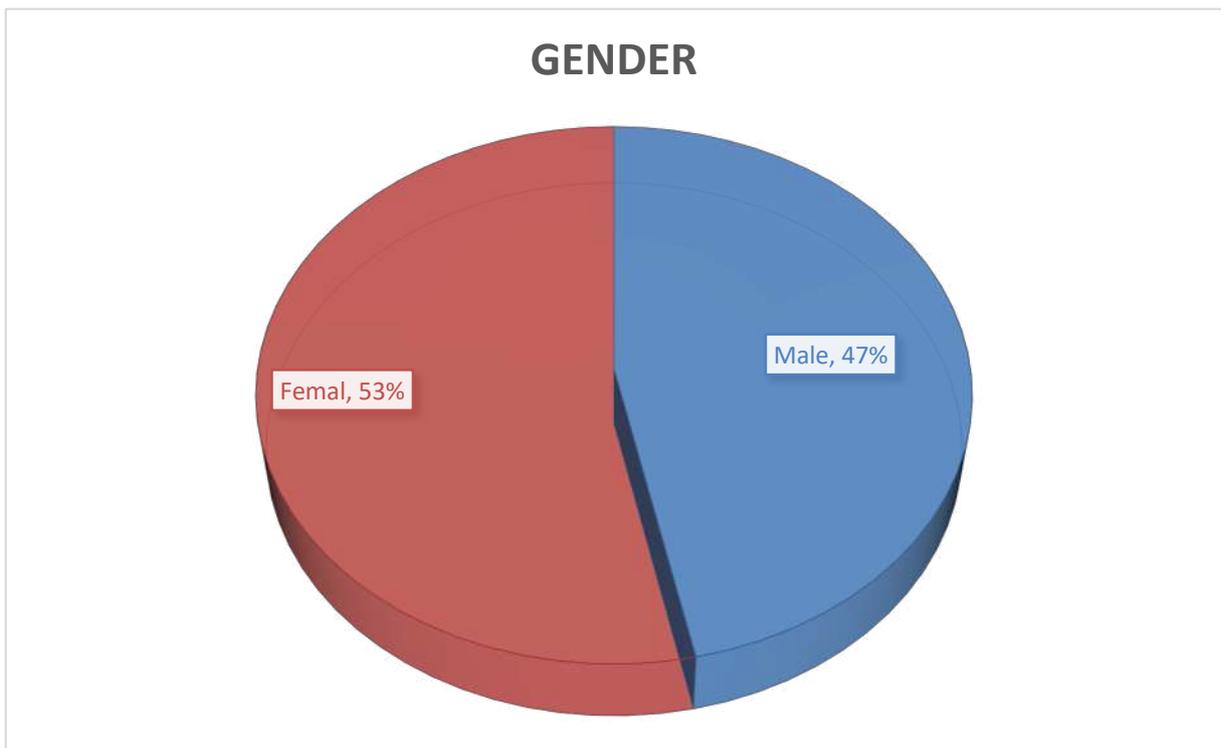


Figure 19: Gender in the Kongulai Spring Community

5.8.2 Household and standard of living

136. **Dwellings:** Four of the housing units are semi-permanent houses and two are made from bush materials. People who lived at Kongulai are customary owners of the land.
137. **Water:** Majority of the water use comes from the Kongulai river/stream. Rainwater is used mainly for drinking and the river for washing and cooking. There is visible water supply infrastructure visible in the area but the residents say they have access to the SW connection.

138. **Sanitation:** All households use the bush or the river for sanitation. According to the survey, the people complain that though the biggest water source for the Honiara City is situated in their area, there is no sanitation project so that people can protect the bush and the river.
139. **Energy:** All households in the area have access to electricity, which is supplemented with solar.

5.8.3 Social Services

140. **Health and Education:** The majority of the people in the area have access to basic health care and education. The closest schools are Tasahe primary school, Tanaghai community high school and White River Community High School. People travel to the National Referral Hospital (NRH) for medical attention. Others who have access to more cash or are covered under company health initiatives see private doctors in Honiara town.
141. **Communication:** The project area is well serviced with both Telecom and Bmobile Services.
142. **Transport:** Road access is beside the Rove via Tasahe road. Land transport is vital to people in the area. There is no bus service but taxi and private vehicles only. People in the area normally walk to White River or Rove to catch bus or taxi.

5.8.4 Income generation

143. Honiara is the economic base of the country and is dominated by service roles both commercial and administrative. Economic activities include banking, wholesaling, retailing, hotels, and restaurants from small to large scale businesses. The informal sector plays an important role in Honiara as it provides opportunity for self-employment among rural communities and youths. Majority of the income in the area comes from farming and through employment (Figure 20 **Error! Reference source not found.**) Households obtain an average income between \$200-\$500 weekly, which is typical of rural setting in the Solomon Islands (**Error! Reference source not found.**).

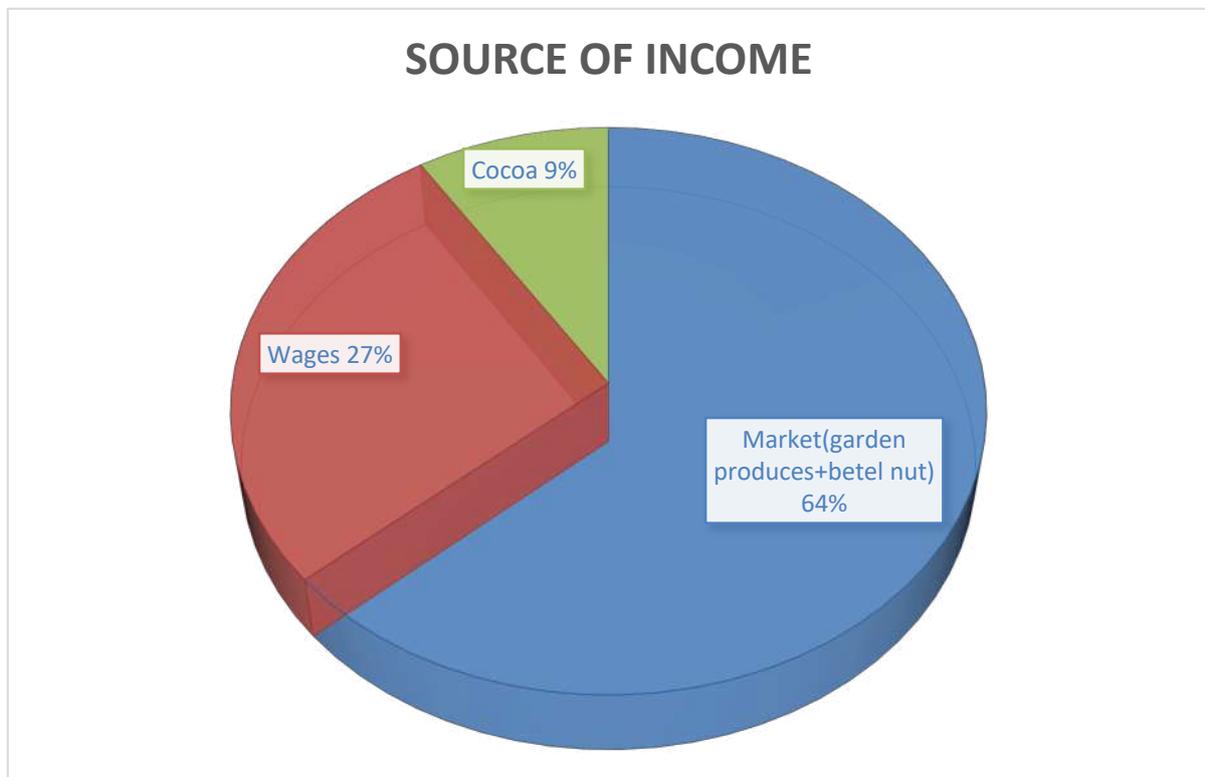


Figure 20: Source of income in the Kongulai Spring Community

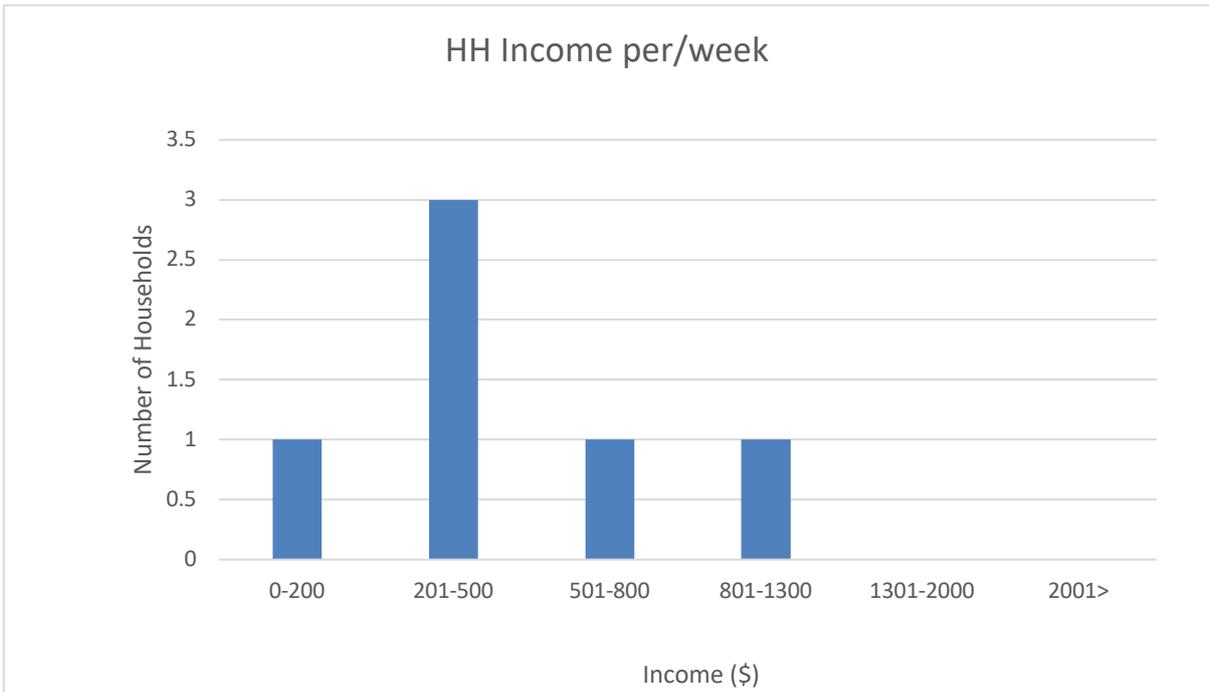


Figure 21: Household income in the Kongulai Spring Community

144. **Employment:** More resident are farmers. One person is working for SW who is also the tribal chief in the area. Causal laborers are mainly carpenters and those who are working for SW as casuals (Figure 22). According to the survey, unemployment rate is lower compared to other categories.

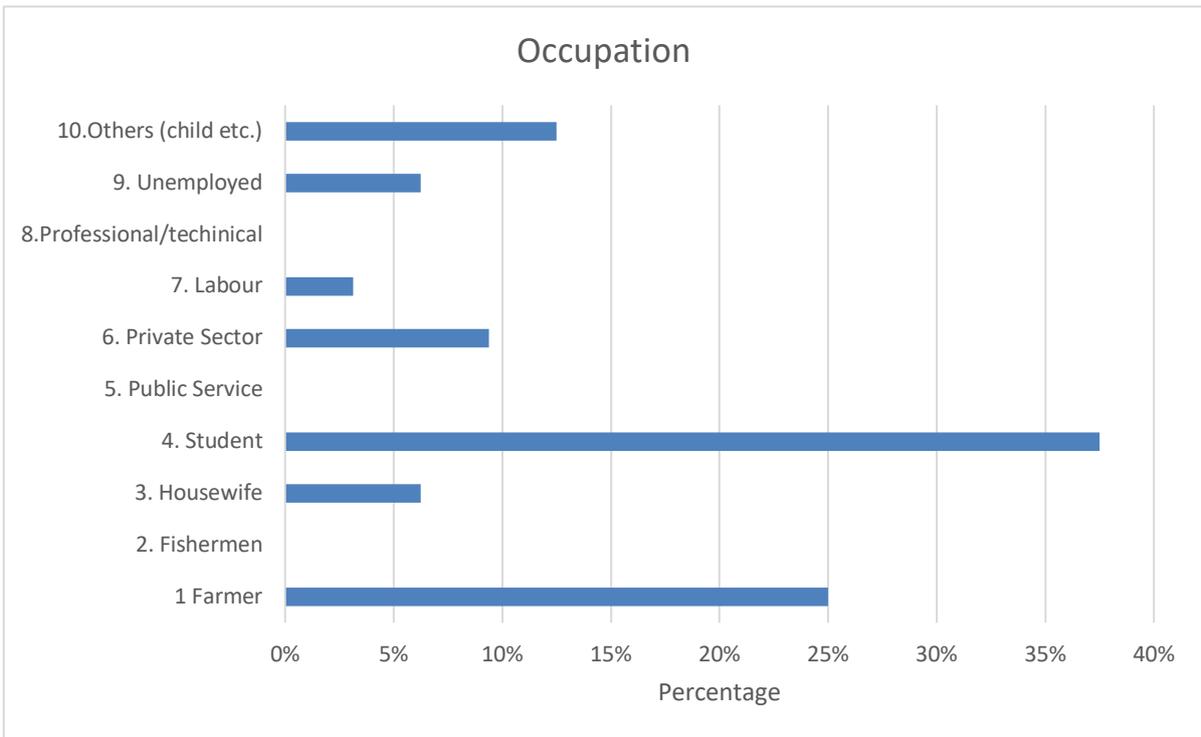


Figure 22: Occupational status in the Kongulai Spring Community

145. **Betel Nut:** Betel nut is becoming an important source of income for people in the area. It is sold locally and sent to Honiara markets. The price of betel nut fluctuates. Generally, the price producers get is SBD500-1000 dollars for a 20 kg bag. Betel nut is generally collected and bagged for market by women

and children. This source of cash income is controlled by women who use the income to meet the food and basic needs of the family. In compliance with WB and ADB safeguards policies, any betel nut trees which have to be removed as a result of the project, will be compensated at Ministry of Agriculture and Livestock determined rates, and owners will also receive the equivalent cash income from the lost crop, until the time when a replacement tree is producing nuts. (See budget line showing loss of income) in the RAP.

146. **Farming:** The main form of livestock farming is local chicken. Households do have approximately 1-2 chickens, however mainly for home consumption. Basic agriculture crops include, cassava, potatoes, cabbage (mainly water grass and slippery cabbage), and tomatoes. Farmers normally sell produce at the Tasahe, Ngossi, White River or Honiara City Markets. Farmers earned an average of SBD300 per week.
147. **Cocoa:** There is a cocoa plantation consisting of 40 trees, in the project area owned by Logino Vatohi's family. The family normally sell wet bean during the harvest seasons. The plantation, however, will be removed during clearing for construction of the WTP. SW follow WB and ADB best practice in paying for lost income from the cash crop, up until the time when an equivalent replacement crop is producing. Cash compensation for perennial crops and fruit bearing trees is based on annual net product market value multiplied by the number productive years. Cash compensation will be equivalent to prevailing market price of timber for non-fruit trees. The compensation arrangements for Logino Vatohi's family are detailed in Appendix F with a three-year compensation package for the loss of cocoa production included as per the SI agricultural compensation guidelines. A letter from the Ministry of Agriculture and Livestock dated the 15/09/2020 confirms that the crop compensation rates that were used by SW to determine the value for each crop owned by individual farmers were appropriate for any economic loss (Appendix G). The family has several hectares of alternative gardening land behind the WTP suitable for a new plantation. This means there will be no reduction in income from the removal of the cocoa trees, and the family will be provided with the resources to replant. The family is not solely economically dependent on cocoa and grow a variety of other cash crops and vegetables for sale.

5.8.5 Social Organization

148. **Tribal Affiliation:** The project neighborhood comprises people from various parts of Guadalcanal province. Further to the south and west are traditional tribal units of Guadalcanal (outside the project neighborhood); the closest are the Tandai tribes.
149. **Leadership:** There is a sense of communal affiliation at the project neighborhood and great respect is accorded to Logino who is their elder and tribal leader, a focal point in the area. The project neighborhood is in Tandai Ward 1 and is also under the North West Guadalcanal Constituency.
150. **Religion:** All the households in the area are Roman Catholics. There are no church buildings in the area. People in the area normally travel to Kakabona and other locations in the Honiara City to commune with other church members and go to church.
151. **Women and Youth:** The women and youth in the project neighborhood are either part of a church based group or women's association.
152. **Construction Workforce:** The workforce for the construction of the Kongulai WTP will be transient based on the project stage and work underway. A full-time team of 8 persons is required by the contract documents and includes the following personnel
- Site Safety Officer
 - Site Supervisor(s)
 - Quality Assurance Manager
 - Environmental Health and Safety Officer (EHSO)
 - Community Liaison Officer (CLO)
 - Commissioning Lead

- Contractor's Project Manager
- Contractor's Design Manager

153. **Workers on site:** It is estimated that on average 25 workers per day will be using the main construction site. This number will fluctuate based on the contractors chosen sequencing and methods.

154. **Construction of resettlement housing:** This construction will involve a minimum of 8 persons particularly those with carpentry skills. This contract is being let separately from the main construction contract by Solomon Water. The contractor will be locally sourced and all of the personnel with exception of the Project Manager are expected to be Solomon Islanders.

155. **Contractors temporary facilities:** The contractor is required to have their own temporary facilities for the use of the workforce. Temporary facilities are specified in the contract document with water and power already being established on site. The site is considered ample and no additional laydown or staging area is required.

156. **Construction Personnel:** No housing will be allowed on site and the contractor will house any expatriate personnel through their own commercial arrangements in an off-site location. It is expected that personnel where appropriate will be locally sourced.

6 ANTICIPATED SOCIAL AND ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1 Design and Pre-construction Phase

157. Design and pre-construction considerations include need for environmentally responsible procurement; climate change vulnerability; grievance management; disruption of utilities and services; disposal of excavation spoils; potential damage to archaeological and cultural assets; extraction of construction materials; and biosecurity matters. A Technical Advisory Note prepared by the WB on COVID-19 impacts on the construction works should be noted by the PMU and contractors.⁸

6.1.1 *Environmental management system and environmentally responsible procurement.*

158. Throughout the Project, for implementation of environmental safeguards to be effective, an environmental management and monitoring system will be established. The PMU will ensure that the EMP is updated, as required, based on detailed design and incorporated into the bid documents. The bid documents will also specify other environmental management requirements such as: (i) requirements to comply with applicable standards; (ii) the contractor will designate an environmental, health and safety officer (EHSO) and describe the reporting/communication lines and channels; (iii) the monitoring and reporting requirements; and (iv) delivery of induction, training and awareness sessions for workers and the community. Prior to works commencing at the project site, the contractor will prepare and submit a site-specific construction EMP (CEMP) to the PMU, the CEMP will be based on the project EMP and detail the construction methodology and program to be undertaken at each site, identify the risks associated with that construction methodology and detail mitigation measures to avoid or reduce the risks. The PMU will review and approve the CEMP. The PMU no objective is required before the Contractor can start work.

159. Once works commence, the EHSO will conduct monitoring of compliance of activities with the approved CEMP and the PMU will undertake inspections and audits of the effectiveness of the contractor's implementation of the approved CEMP. PMU will devise the checklist to be used for the inspections and audits and will consolidate the inspection/audit findings along with summaries of the contractor's monthly reporting. WB and ADB will undertake review missions which will report on, inter alia, overall implementation of social and environmental safeguard requirements.

160. The project has established a grievance redress mechanism (GRM) to address concerns and resolve complaints and issues raised on any aspect of Project and subproject implementation. Safeguards concerns will be addressed through the GRM.

161. The CEMP will outline how the contractor will implement the relevant elements of the GRM and how and when they will provide information about construction activities and timing to the community. The contractor will provide information about the works, impacts and mitigation/control measures to the community in a timely and effective manner. The contractor's liaison and communication with the community, managed by the CLO, will be guided by the Project's CCP.

162. Workers and sub-contractors will be inducted to the site and this will include awareness and training on the provisions and requirements of the CEMP and how it is to be implemented.

⁸ Esf/safeguards interim note: Covid-19 Considerations in construction/civil works projects - version 1: April 7, 2020

6.1.2 Climate change vulnerability.

163. Climate change resilience is a critical consideration because Honiara is vulnerable to the effects of intense rainfall. Changes in the intensity of extreme weather events and gradual change in climate parameters such as precipitation could damage proposed water supply infrastructure.
164. Soil erosion plans will be made by the contractor prior to construction of the Kongulai Spring WTP and the pipeline upgrade.

6.1.3 Disruption to utilities and services.

165. Prior to construction activities, SW and the contractors will:
- During detailed design coordinate with utility providers to obtain information about locations of services and utilities;
 - coordinate with the other utility companies regarding potential disruptions;
 - make provisions to preserve the operation of current facilities, and
 - notify affected households and establishments well in advance of disruptions

6.1.4 Improper disposal of excavation spoils.

166. Construction activities may generate excess excavation materials for the upgrade of water supply pipeline and the WTP.
167. The PMU will:
- require the contractors to submit a plan for the disposal of excess excavation spoils, and
 - undertake inspection and approval of the contractors' suggested disposal sites prior to actual construction.

6.1.5 Damage to unknown archaeological and cultural assets.

168. While there is no information at present of any archaeological and cultural assets that may be affected by excavations works, precautions will be taken to avoid potential damage to any archaeological and cultural assets. These will include:
- inclusion of a chance finds procedure in the CEMP; and
 - inclusion of provisions in tender and contract documents requiring the contractors to immediately stop excavation activities and promptly inform the local authorities and the Solomon Island National Museum on the presence of any unknown archaeological and cultural assets.

6.1.6 Sourcing of local construction materials.

169. Construction materials will be sourced by the contractor from local suppliers. Quarries and borrow pits will be required to meet the following criteria:
- Existing operations with development consents/BMP will be used
 - borrow pits will be covered by required government permits or approvals,
 - will not be located within 300 meters of any urban area sensitive receptors,
 - topsoil will be saved for rehabilitation during closure of the quarries and borrow pits, and
 - will be provided with drainage and sediment flow controls
 - proper closure of the quarries and borrow pits will be required. This will include fencing and placement of warning sign to the public.
 - The following materials will be required:

- 1000m³ of sand for sand bedding, pipe surrounds and concrete blinding
- 7000m³ of granular fill for retaining wall, foundations and drainage
- 1000m³ of boulders for erosion protection

6.1.7 Land access and use.

170. The WTP will be accessed by road with some access points to the pipeline requiring access agreements with local landholders.

6.1.8 Biosecurity of Imported Material (Invasive species/Diseases)

171. All construction equipment i.e. bulldozers, excavators, backhoes will be sourced locally i.e. from Honiara or nearby areas and as such will limit any bio-security concerns focusing on plant invasive species/disease control.

172. International bio-security controls for shipping of machinery is required to meet the acceptable cleanliness standards of the relevant countries' Department of Agriculture or be refused entry into that country. It is the importer's responsibility to ensure all machinery that arrives in the Solomon Islands to be free from biosecurity risk material, such as soil, seeds, plant and animal material.

6.1.9 Relocation of Households from the WTP Construction Area

173. Eight households and 41 residents will be relocated to a nearby area within 100m of the existing households as agreed between residents and SW. The households are located at a much greater distance from the WTP than their previous location adjacent to the WTP (see Figure 8). A program of construction of new households and compensation payments has been agreed between the residents and SW. A summary of community consultations can be found in Table 9 of the IEE, and Annex 4 of the RAP/LARP. Resettlement agreements between SW and displaced families can be found in Annex 7 of the RAP/LARP. Standard clauses in the agreements, list the value of the new 2 or 3 bed roomed house to be constructed; stipulate that SW will be responsible for the cost of providing water and power connection lines to the site; and that SW will meet the cost of transport hired for moving moveable items from the current settlement site to the new house site with cost estimates provided. The Resettlement Agreement also guarantees that SW (which is purchasing Perpetual Estate land), will arrange with the CoL LAO to transfer lease title (FTE) to the family on the relocation land, and will meet other associated relocation costs for works such as access track, septic tank, drainage, and building platforms.

174. The houses will be built by Solomon Water using local contractors. Displaced families will be entitled to salvage any materials from their current houses within one week of the handover of the resettlement site. This activity will be the prime activity prior to civil construction starting at the WTP

6.2 Construction Phase Impacts on the Physical Environment

6.2.1 Impact areas.

175. The upgraded WTP at the Kongulai Spring site and the upgraded water supply pipeline to Tasahe Reservoir.

6.2.2 Modification of site topography.

176. Construction activities will require some benching and the installation of retaining walls. Some additional clearing and pad preparation will be required for the WTP.

177. Site clearance and vegetation removal will be required for the Tasahe water supply pipeline upgrade. The pipeline will be constructed along a highly modified vegetation corridor by trenching, then backfilling after the pipe has been laid.

178. The access road to site will be upgraded. This upgrade will be on the same alignment as the existing

centre line alignment and all work will be within the existing formation. Culvert pipes will be installed to replace the existing drainage pipes and where appropriate increase the capacity. No modification of overland flow paths is proposed.

6.2.3 Soil erosion and sedimentation.

179. Potential source of sediment runoff includes site clearing, ground leveling, excavations for the foundation of structures and pipe laying. These activities can release soil materials to the surrounding areas during rainy periods if not provided with sediment control measures.
180. During the augmentation of the WTP, construction activities will involve substantial amounts of earthworks. The nature of the geology as per the design engineers factual geotechnical report shows that the material is relatively hard soil/weathered rock that is not friable and susceptible to run off. The main concern will be controlling surface water for constructability issues. The contractor will be required to have a sediment erosion control plan that details each construction activity, this plan will be included as a part of the CEMP. Where required the contractor will design sediment control measures, which may include but not be limited to: small interceptor dikes, pipe slope drains, grass bale barriers, silt fence, sediment traps, and temporary sediment basins to divert surface runoffs away from the exposed areas.
181. The material removed during trenching, before pipe laying, backfilling and compaction, will in the event of rainfall, be contained by grass bale barriers, silt fence, sediment traps, and temporary sediment basins, preventing sediments from moving offsite.
182. The geotechnical report will be provided as part of the contract documentation. This includes investigation and interpretation of onsite geology, allowing potential contractors to consider their proposed methods and the suitability of site for erosion control.

6.2.4 Storage, use and transportation of hazardous materials.

183. The use of oil products and other hazardous materials may be used in the construction activities of the proposed project. Fuel, oil, grease, paints, and solvents associated with the operation of heavy equipment and vehicles may accidentally be released to the environment during construction and adversely affect water quality and aquatic life. Mitigation measures, where required, include:
 - Prepare a hazardous substances management plan and an emergency response plan as part of the CEMP;
 - ensure all storage containers are in good condition with proper labeling; and
 - store waste oil, used lubricant and other hazardous wastes in tightly sealed containers to avoid contamination of soil and water resources.
184. Measures for clean-up and handling of contaminated materials will include:
 - immediate clean-up of spills,
 - oil stained wastes and used oil to be collected and disposed of through recyclers / authorized waste handlers and disposal in authorized waste facilities,
 - ensure availability of spill cleanup materials such as absorbent pads,
 - restoration of temporary work sites will include removal, treatment, and proper disposal of oil contaminated soils,
 - discharge of oil contaminated water into the environment to be prohibited; and
 - construction personnel designated to handle fuels/hazardous substances to be trained particularly in spill control procedures.

6.2.5 Air pollution.

185. The earthworks and work to improve the road is not expected to generate dust. This is due to the hard nature of the in-situ material. A significant portion of the roading work shall be concrete which further reduces the risk. Adjacent residential properties are limited due to the peri urban site location. The contractor is required to include dust generation mitigations which is expected to include watering of the road and material stockpiles
186. On-site dust generation and use of vehicles and equipment can be expected during dry periods from activities associated with site clearing, ground leveling, and excavations for pipe laying. Wind blowing on large stockpiles of construction materials such as soil and aggregates. Contractors will be required to:
- conduct regular water spraying of roads, work areas and other construction-related facilities to minimize dust generation;
 - ensure construction materials stockpiles are covered or sprayed with water, as appropriate, to prevent fine materials from being blown;
 - prohibit use of equipment and vehicles that emit dark sooty emissions;
 - provide trucks transporting loose construction materials such as sand, gravel, and spoils with tight tarpaulin cover or other suitable materials to avoid spills and dust emission; and
 - prohibit burning of all types of wastes generated at the construction sites, as well as other project-related facilities and activities.

6.2.6 Solid waste management.

187. Construction activities are expected to generate solid wastes including used wood materials, steel works cuttings, paint and solvents containers, used packaging materials, on-site office solid wastes, used oil from equipment, unused aggregates, and surplus earth materials. These solid wastes may cause aesthetic problems and will be potential sources of contaminants for surface runoffs and pollution of nearby water bodies. Contractors will be required to:
- Prepare a waste management plan as part of the CEMP;
 - provide garbage bins and facilities within the project site for temporary storage of construction waste and domestic solid waste;
 - separate solid waste into hazardous, non-hazardous and reusable waste streams and store temporarily on-site in secure facilities with weatherproof flooring and roofing;
 - ensure that wastes are not haphazardly dumped within the subproject site and adjacent areas;
 - regularly dispose of wastes to the Ranadi Landfill; and prohibit burning of all types of wastes.
 - After completion of work activities, contractors will be required to remove construction wastes from sites and implement the required restoration of disturbed sites.
188. All these activities will be reflected in the CEMP which will contain a waste management plan describing all waste types, amounts, disposal method, transport documentation requirements, and details of licensed waste treatment/recycling facilities for each waste stream.
189. Demolition wastes shall be assessed for recycling and disposal, including the determination if any of the wastes are hazardous and prescribe the appropriate handling and disposal for such wastes.

6.3 Construction Impacts on the Biological Environment

6.3.1 Impacts on rare or endangered species.

190. There are no Red Listed terrestrial or aquatic species in the Project influence area.

6.3.2 Terrestrial habitat alteration

191. Construction activities will not involve alteration of important terrestrial habitats since the sites are highly modified. An area of 17,043 m² may be cleared during the construction of the new WTP and resettlement area. Any remaining land cleared, and not required for construction, may be seeded with grass or native plants as required as part of the revegetation program to stabilize the areas from erosion.
192. Clearing of vegetation along the pipeline route will be for a distance of 1.6 km and up to 10 m wide. After the pipeline has been laid and backfilled, the site will be regularly maintained for access.

6.3.3 Aquatic Ecological Impacts

193. Soil erosion controls at the both sites during construction will be undertaken to maintain water quality downstream in Kongulai Stream by minimizing any increase in turbidity.
194. Solid waste will be collected and stored as per the Waste Management Plan so that no litter enters Kongulai Stream.

6.4 Construction Impacts on the Socio-Economic Environment

6.4.1 Construction noise and vibration.

195. Trucks and construction equipment, which can generate noise of 80 dB(A) from a distance of 30 meters are potential sources of noise during construction. The issue is mostly applicable along the road where water supply pipelines will be installed and the sites for the WTP.
196. Significant vibration from construction activities are not expected since pipeline installation will not involve heavy compaction activities. Contractors will be required to:
- provide prior notification to the community on schedule of construction activities;
 - whenever applicable, provide noisy equipment with noise reduction covers;
 - position stationary equipment that produce elevated noise levels, such as diesel generators and air compressors, as far as practicable from houses and other receptors;
 - prohibit operation of noisy equipment and construction works in populated areas and where sensitive receptors are found during nighttime (19:00 – 06:00);
 - in necessary nighttime operation, ensure prior notification and consultation will be made with affected people and local officials, and implement suitable noise reduction measures;
 - locate concrete batching plant, and rock crushing plant at a reasonable distance away from inhabited areas and sensitive receptors;
 - conduct regular noise level monitoring to determine compliance with WHO guidelines for noise which should not to exceed 55 dB(A) near residential areas during daytime and 45 dB(A) for nighttime.

6.4.2 Vehicular traffic congestion and hindrance to public access.

197. Construction activities and any temporary or partial road closures may cause traffic congestion and hinder public access. While this is not expected due to the location of the site at the end of a dead-end road; Contractors will be required to minimize impacts on livelihoods as noted in the entitlement matrix in the RP by:
- preparing a traffic management and control plan as part of the CEMP and provide traffic management personnel to direct the flow of traffic in the vicinity of the construction sites and construction-related facilities;
 - closely coordinate with local authorities for any closure of roads or rerouting of vehicular traffic;

- providing prior notification to the community on schedule of construction activities;
- providing traffic signs in the vicinity of the construction sites to direct motorists and pedestrians;
- scheduling construction activities with consideration to periods of heavy presence of people such as festivities, processions, parades, etc. to minimize disruption to local activities.

198. Where informal walking tracks are established the contractor shall allow for the passage of pedestrian traffic, these arrangements shall be noted in the CEMP. Where this is practically not possible the contractor will notify the closure of the track in advance of the impact being realized. This shall be via posting of signage and community awareness sessions as detailed in the CCP. Where alternative routes are available that do not impact adjacent land-owners the contractor shall nominate and sign post a safe route through the work site. In any circumstance the closure of any track should be temporary only and the passage of traffic reopened as soon as practical.

6.4.3 Potential social issues due to influx of workers.

199. A labor influx plan will be required from the contractor to address amongst others:

- Measures to minimize contact with local residents to prevent the risk of spread of communicable diseases including STIs, HIV / AIDS, and where necessary, Covid-19.
- induction of all workers on Project requirements regarding safeguards (including child protection), GRM and CCP requirements;
- agreement to and implementation of protocols (including code of conduct) concerning the workers contact with the local communities;
- ensuring that sufficient water supply and temporary sanitation facilities are provided for workers at work sites in order that community infrastructure is not over- burdened.
- security at contractor's yard to control unauthorized access and prevent entry of the public (especially children).
- the company may hire external security personnel or undertake the appropriate training for own personnel to meet Solomon Islands security requirements. All security personnel are to be trained in Gender Based Violence (GBV).
- Risks of child labour: the contractor must ensure that all workers are adults above the age of 18 years. The PMU will require the contractor to provide records of workers by age. The PMU will monitor risks of child labour and raise community awareness of the harm caused by children dropping out of school to work. These risks are considered low, as Honiara has high rates of school enrolment (89% net enrolment at primary school, National Statistics Office)

6.4.4 Occupational health and safety.

200. Health and Safety will be managed in accordance with the Safety at Work Act 1987 and where gaps exist best practice will be employed. This specifically refers to the use of Australian and New Zealand standards, guidelines and codes of practice.

201. The contractor is required to have a full-time health and safety representative that will be responsible for ongoing compliance including regular auditing and updates to project specific health and safety documentation. The contractor will prepare the health and safety plan to include the following procedures listed below.

202. The health and safety plan in the CEMP, shall generally include the following

- Accident and incident reporting
- Emergency plans

- First Aid plans
- Materials safety, storage and handling
- Site inductions
- Permits for high risk work
- Inspections and auditing
- Regular meeting procedures
- Specific safe work methodologies
- Plant and equipment testing
- Training records and certifications
- Management and reporting structures
- Preparation for emergency preparedness

203. This document will be a live document and will be subject to amendment should site conditions, methodologies, guidelines, laws or codes of practice change during the course of the works.

204. Risks to the contractor's workforce are those reasonably expected in a Water Treatment Plant construction project, no extraordinary risks are identified. This includes but is not limited to working at heights, confined spaces, deep excavations, live electrical systems, live hydraulic and pneumatic systems, lifting and cranes and use of power tools. Site specific risks do exist and it is expected that the contractor will develop work methodologies that consider all latent conditions. Bidders for the project are required to demonstrate their experience in similar projects.

205. Hazards to construction workers include sharp edges, falling objects, flying sparks, chemicals, noise and various potentially dangerous situations. It is contractors' duty to protect their employees from workplace hazards that can cause injury. A clean environment is also necessary to enable the workers to maintain good health and hygiene. Contractors will be required to:

- ensure that a properly equipped and resourced first aid station is available at all times,
- provide potable water and adequate sanitation facilities,
- provide personal protective equipment (PPE) suitable to tasks and activities undertaken to minimize exposure to a variety of hazards, and
- provide fire-fighting equipment and fire extinguishers in workshops, fuel storage facilities, and any sites where fire hazard and risk are present,
- ensure that all workers are aware of emergency response and medical evacuation procedures.

206. The Health and Safety Plan will include documentation and reporting on work-related accidents and preparation for emergency preparedness procedures.

6.4.5 Community health and safety.

207. Many of the measures to manage occupational health and safety will help mitigate the risk to the community. The movement of construction vehicles, trench excavations, and various activities may pose hazards to the public. Contractors will be required to:

- implement the various plans to minimize health and safety risks to the public;
- use barriers and install signage to keep the public away from construction sites and excavation sites;
- provide prior notification to the community on schedule of construction activities;
- provide in house staff to restrict public access to hazardous areas;
- operate construction night light in the vicinity of construction sites;

- provide adequate safe passage for public, as necessary, across construction sites; and
 - ensure that any access to properties or establishments that have been disrupted or blocked by the ongoing construction activities, are reinstated as quickly as possible or alternative access is provided.
208. Directly affected persons such as those living in close proximity will be consulted prior to the start of works on site through community consultation and awareness sessions as detailed in the CCP.

6.4.6 Temporary disruption in the water supply during the construction stage

209. As per the contract specification the contractor is required to plan any shutdowns and liaise with the Project Manager for approval before any shutdown works take place. Construction activities may cause temporary disruption to the water supply for customers. This may affect public health due to the lack of potable water so during periods of shutdown, SW will provide alternative water supply to affected communities (unless the shutdown is only for a few hours and PAP can fill containers prior to the shutdown to last throughout the shutdown). This information will then be discussed with community prior to any disruptions.

6.5 Operation Phase Environmental Impacts

210. Operational phase impacts will include risks to employee and public safety; health hazards due to poor water quality. The removal of elevated turbidity by flocculation during periods of peak runoff from the catchment are part of the design characteristics of the upgraded WTP. SW is undertaking discussions with Government officials including Forestry to reduce the incidence of illegal logging to enhance watershed protection.
211. The settled floc at the WTP will be stored in ponds. The supernatant from these ponds will be released to the Kongulai Stream. According to a review of the effects of residual flocculants on the aquatic receiving environment by the Auckland City Council, New Zealand, there appears to be a small risk to the natural aquatic environment arising from potential losses of unbound residual flocculants from treatment ponds. Impacts are likely to be low level and also likely to not be significant in relation to other factors which govern the health of aquatic communities. The benefit of reduced sediment levels in discharges is considered to outweigh the risk of any low-level impacts attributable to residual flocculants.⁹
212. The abstraction of water from Kongulai Spring will remain the same as the historical long-term rate of extraction. As a result, there will be minimal impact on the ecology of downstream aquatic and riparian ecosystems as the hydrological flows will remain at historical levels of water abstraction.
213. After construction, the establishment of vegetation by seeding with grass or native plants as required, to stabilize the area from erosion will assist in the maintenance of water quality downstream.
214. During operations, solid waste will continue to be collected and stored as per the Waste Management Plan so that no litter enters Kongulai Stream.
215. Operators will prepare health and safety maintenance manuals that include Health and Safety considerations to address the prevention, reduction and control of occupational injury and illness in operating water supply and sanitation facilities. The manuals will include information on: (i) clearly identifying conditions that may cause acute worker health and safety problems, (ii) requirements that all workers should comply during normal operations and emergency situations, and (iii) training requirements for health and safety in operating the facility.
216. The 1000L tank shall be fire rated for 4 hours with bunded containment equal to 100% of the volume of the tank. The tank shall be filled by one of the local bulk fuel suppliers tanker trucks. There shall be visible gauge external to the tank that allows tanker driver to see when the tank has become full during the filling process. The tank is located inside a building and the entrances to the site and building will have

⁹ Auckland City - Overview of the Effects of Residual Flocculants on Aquatic Receiving Environments – TP 226 - [www.aucklandcity.govt.nz > documents > technical publications >](http://www.aucklandcity.govt.nz/documents/technical/publications)

hazardous good storage signage in order that any emergency services and quickly and accurately assess the chemicals stored on site and in individual buildings. Material Safety Data Sheets will be kept on site and in the Site-specific Operations and Maintenance Manual. Spill kits will be maintained on site and the use of them will be advised in the operations and maintenance manual.

217. As per the RP the site acquired for use will maintain access across established tracks that are currently used for accessing burial sites and gardening in adjacent land. The fencing boundary shall not encompass the whole area acquired and significant portions of the access roads will be left for shared SW and public use. The grave sites will be kept outside of the permanent fencing but within the SW leasehold land, with permanent access guaranteed (in writing) by SW to the guardians of the graves. This will prevent development by other parties. Road access has, and will be, maintained by SW. Although SIG recognizes its use it is unlikely that they will legalize the access track as a gazetted road.

6.5.1 Chlorination operational risk and safety.

218. The use of chlorine gas as a disinfectant may pose particular safety risks. To reduce the operational risk and safety of WTP:

- workers will be trained on health and safety aspects of operating a water supply tank;
- A facility health and safety manual will be prepared;
- chlorine gas cylinders will be kept in separate safety rooms with the design fully compliant with AS/NZS 2927.
- A system will be established for safe use and handling of chlorine materials in the work place;
- Workers will be provided with the appropriate PPE for chlorine use and handling;
- an five-foot-high fence will be erected to control access and avoid exposing the public to any hazard due to the presence of the water supply tank.

7 GRIEVANCE REDRESS MECHANISM

7.1 PURPOSE

219. This Grievance Redress Mechanism (GRM) is designed to deal with grievances from the public in relation to Solomon Water managed projects at all stages of the project cycle. To date, the GRM has been delivered in English. Awareness of the GRM has been made through consultations in English and Pidgin. Documentation is currently in English but can be provided in Pidgin in future.
220. The mechanism allows for affected parties to make known grievances as they arise and aims to provide a predictable, transparent, timely and credible process to all parties, resulting in outcomes that are fair, effective, and lasting.
221. Inward communications to Solomon Water will be filtered at the initial query stage as being project specific or general enquiries by the customer relations team within SW. All external project communications and sites have project identifiers and unique names that allow customers to identify the potential project. Project specific queries will be dealt with confidentially by the Community Liaison Officer and a determination made as to the nature and whether a grievance need be raised. Generally, this will involve contacting the requestor.
222. The Grievance redress shall be highlighted to all employees of the contractor and shall be included in the site induction. Where 3rd party agreements are struck with groups or individuals the GRM shall be highlighted and the contact details of the Project Manager shall be communicated. It shall be noted that this is in addition to their rights under Solomon Islands Law which is applicable in all senses.
223. The Project Managers, as the delegated authority on the contracts will be responsible for managing grievances within the PMU.

7.2 PROCESS

The Solomon Water GRM is a three-stage process during any stage of which the grievance may be considered, by both parties, to have been resolved and closed off. The Grievance Log Information Sheet associated with the GRM is listed in Appendix E.

7.2.1 Stage 1

224. Any grievance should first be made known to Solomon Water Project Manager (PM) in charge of the project being implemented. This may initially be verbally however a monitoring form must be prepared and signed off by the party raising the grievance – support to filling in the form can be provided by Solomon Water to the aggrieved party.
225. On receipt of the Grievance Monitoring form the PM will hold a meeting with the aggrieved party in an attempt to resolve the grievance within 5 working days of the grievance being raised. Following the discussion, the grievance may either be resolved or need to be escalated to Stage 2.
226. A Stage 1 Grievance Outcome form should be prepared by the PM confirming either:
- The grievance has been resolved and the means of resolution
 - The grievance has not been resolved; and outlining Solomon Water Projects Team position on the grievance.
227. The Stage 1 Grievance Outcome form should be signed by both parties and a copy provided to the party raising the grievance. This form should include next steps in the process if they consider the issue not to be resolved.

7.2.2 Stage 2

228. If the grievance is not resolved under Stage 1, the grievance should then be referred to the General Manager of Solomon Water.
229. The General Manager will be provided with the Stage 1 Grievance Outcome form and a meeting arranged with the aggrieved party within 10 working days of issue of the form to discuss and try to resolve the grievance.
230. Based on the discussion the General Manager will issue a Stage 2 Grievance Outcome form confirming either:
- The grievance has been resolved and the means of resolution;
 - The grievance has not been resolved, and outlining Solomon Water General Manager position on the grievance.
231. The Stage 2 Grievance Outcome form should be signed by both parties and a copy provided to the party raising the grievance. This should include next steps in the process if the issue has not been resolved.

7.2.3 Stage 3

232. If the grievance is not resolved under Stage 2 the grievance should then be referred to a three-member Grievance Tribunal¹⁰ comprised of:
- A member of the Board of SW;
 - The PS (or designate) of the MMERE;
 - independent member selected by GM SW and Board Chairman.
233. All prior Grievance Outcome reports will be made available to the Tribunal; A meeting with the aggrieved party shall be held within 10 working days of issue of the Stage 2 Grievance Outcome Form.
234. Within 5 working days of the Tribunal meeting a formal response will be issued to the aggrieved party outlining the Tribunal's decision on the grievance raised.
235. The Tribunal's decision will be final.

7.3 MISCELLANEOUS

236. Whenever a grievance is resolved to the satisfaction of both parties, at whichever Stage this is achieved a written record of the agreement must be made and signed by both parties.
237. At all stages of the process the aggrieved party has the right to be represented by a third party at their own cost. The GRM nor its final decision does not affect the legal rights of the individual.
238. Provisions can be made for persons who cannot read, may have a learning disability, and/or need the written record provided in a written language other than English e.g. having it read to them, translated to a different language etc. when there is a need recognized by local community feedback.
239. Solomon Water are responsible to maintain an accurate register of grievances and the way they are dealt with.
240. SW Staff are all familiar with the GRM process and how to raise a grievance. As grievances require close out, a plaintiff must be identified. This preserves the ability to clarify and follow up grievances and agree outcomes. A SW staff member or any person may raise a grievance on behalf of someone but there must be a contact available for correspondence and close out. Solomon Water keeps private details of peoples raising grievances, the specific details of, and any details of settlements on a separate drive on their server which is accessible only to executive staff. Absolute confidentiality cannot be assured as Solomon Water encourages raising of grievances to any officer or contract staff regardless of station.

¹⁰ The composition of the Grievance Tribunal should always ensure at least one female member and where the complainant is female should consist of two female members and one male member.

241. Each stage in the process allows an appeal through escalation. After the SW Grievance Redress process has been completed to Stage 3, if the plaintiff is still not satisfied, they will be advised that they have legal measures available to them including the right to appeal through the Solomon Islands judicial system.
242. Solomon Water Projects Team must hold a grievance review meeting at least once every 6 months to report on all grievances received and in process.
243. A Grievance Log must be maintained by the Solomon Water Projects Team and an annual report provided to the GM of Solomon Water – this should identify grievances raised (month and to date), grievances resolved (month and to date) and balance of grievances outstanding with specific actions pending. Key information to be included in the grievance log can be found in Appendix E, and includes the type of problem or grievance:
- land related
 - compensation
 - construction
 - resettlement site
 - other (specify)

8 CONSULTATION AND INFORMATION DISCLOSURE

244. Information disclosure, public consultation, and public participation are part of the overall planning, design and construction of the proposed subprojects.

8.1 Public consultation.

245. From April, 2019 to January 2020, SW undertook consultation with the Kongulai community to formally discuss the proposed upgrade WTP. There was a good understanding from the community of the preparatory work that is currently underway for the WTP and the community have expressed their gratitude in regard to the initiative taken by SW to undertake the IEE so that the potential adverse impacts of the project are identified and managed so that any impacts are socially and environmentally acceptable. In March, 2020, a meeting with the key stakeholders of the new pipeline route was held. The discussion focused on compensation; since only heavily modified vegetation and some fruit trees and vegetable gardens will be disturbed, compensation has been approved between the landholders and SW.

246. The notes of these consultation meetings including date, location, number participants by male and female are found in APPENDIX C (WTP) and D (Pipeline Route). A summary is found in Table 9 for the WTP.

247. It is stressed that consultation is an ongoing process throughout the course of the project, so that it will allow community members to express their views and concerns in relation to the construction of WTP.

8.2 Consultations during Project implementation.

248. The Project's CCP will be updated early in Project implementation. The CCP will guide the future consultation and participation activities to be facilitated and undertaken by SW. Whenever necessary, stakeholder consultations will be conducted for specific issues that may arise during the design phase. Stakeholder consultations will be continued throughout the construction phase on an area by area basis to address any potential problems.

249. These will be conducted by SW's PMU, contractors, and implementation consultants prior to commencement of construction activities. The construction consultations will address stakeholders' specific concerns related to construction activities in their area, including the scheduling of activities and the potential nuisances to the public. Records of environmental and social complaints, received during consultations, field visits, informal discussions, and/or formal letters, together with the subsequent follow-up and resolutions of issues will be kept by SW's PMU.

Table 9: Summary of Community Consultation Meeting with regard to the WTP and Pipeline to Tasahe reservoir

Meeting Date/Time	Attendance	Sex	Concerns Raised	Responses (SW)
12/01/20 – 13.50 to 14.50 (Kongulai)	Community Meeting for Execution of IEE	10 Male/9 Female	<ul style="list-style-type: none"> Resettlement location and time Purpose of household survey What will happen to existing grave 	<ul style="list-style-type: none"> Not required to leave until new site developed Understand your livelihood and socio-economic background The grave will remain and be accessible
27/11/19, Time 11.00am King Solomon	Proposed Kongulai WTP land acquisition and resettlement	13 Male/ 7 Female	<ul style="list-style-type: none"> Include 2 additional trustees Establish total area required Plans for Type and cost of house Who to build houses 	<ul style="list-style-type: none"> Up to PE holders SW reorganize land survey SW will come up with plans and cost SW to engage private contractor
5/11/19, Time 3.00pm Kongulai	Resettlement and land issues	6 Male/ 2 Female	<ul style="list-style-type: none"> Will SW build each one their complete house on the relocation site Past experience SW make promises but failed to deliver Agree to relocate provided land title issues are resolved 	<ul style="list-style-type: none"> ADB Social Safeguard Guard Policy is to secure tenure at relocation site and better housing at resettlement site ADB Safeguards Policy ensures SW is committed to its agreements ADB Safeguards Policy provide for meaningful consultations to ensures concerns are addressed
7/08/19, 2pm, SW Mataniko Conference room	Water Treatment Plant Land tittle and relocation site meeting	8 Male/ 3 Female	<ul style="list-style-type: none"> Any Environmental impact to the settlers and surrounding areas 	<ul style="list-style-type: none"> Environmental Assessment and approval is a requirement of the project although we do not expect any significant environment impact.
13/06/19, 10am, Kongulai	Water Treatment Plant Project	10 Male/ 7 Female	<ul style="list-style-type: none"> Support Project but what will happen to their developments Family to discuss on their own 	<ul style="list-style-type: none"> ADB Safeguards covers resettlement Another discussion will take at a date to be set
8/03/20, 5.00am, Tasahe (Lower Tajelu)	Kongulai/Tasahe Pipeline Project	22 attendees	<ul style="list-style-type: none"> Can you explain how you are going to deal with land-owner and property owner for the affected people 	<ul style="list-style-type: none"> Safeguards allow for dealing with land-owners and property owners. Land-owners are Affected property owners will be relocated and compensated if there is loss of shelter (house etc.) or crops. This will be explained further during affected people consultation

9 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1 Introduction

250. Environmental assessment has determined that the Project will have less than significant impacts on the local environment. Subprojects can be implemented in an environmentally acceptable manner with appropriate mitigation measures to avoid or minimize the environmental impacts.
251. The EMP includes: (i) implementation arrangement, mitigating measures to be implemented, and (iii) required monitoring associated with the mitigating measures. It also describes institutional roles and responsibilities during pre-construction, construction, and operation phases.

9.2 Institutional Arrangements

252. The MOFT is the Project executing agency and SW is the implementing agency, operating through a PMU which will include various specialists.

9.2.1 *Project Management Unit.*

253. SW has established a PMU to prepare and implement the Project. The PMU will include an environment safeguards officer (ESO) and Resettlement Specialist who will receive training and capacity building from the international environmental specialist (IES) and international social specialist (ISS). Together the ESO, IES and ISS will ensure that all subprojects are implemented in accordance with the Project's EARF, RAP and environmental assessments are prepared, and development consents are obtained, and compliance with each subproject EMP and development consent conditions is monitored and reported. The Operations Department has prime responsibility for the operation of the new facilities. Though Safeguards are managed through the PMU, reports are shared with SW operations through Senior Management. Ongoing operations will have their own safeguards staff for operational activities.

9.2.2 *Construction contractors.*

254. The contractors undertaking the works will be responsible for ensuring that their activities comply with the environmental safeguard requirements of the contract including the technical specifications. The contractor will prepare a CEMP for review and approval by the PMU. The CEMP will be activity, site and subproject-specific and detail how the contractor intends to meet the environmental management requirements identified in the EMP of the IEE. It will be designed to ensure that appropriate environmental management practices are applied throughout the construction period. The CEMP will include all of the site-specific and sub-plans necessary to meet the standards and targets set out in the EMP. The contractor will be required to employ a full-time environmental health and safety officer (EHSO) to ensure compliance with all SIG requirements concerning environmental, health and safety, and labor regulations during construction.

9.2.3 *Environment Conservation Division.*

255. The ECD will review the development consent applications and issue, either with or without conditions. The ECD will be invited to participate in joint inspections and audits during construction activities.
256. A summary of the environmental management responsibilities for the Project is presented in Table 10.

Table 10: Summary of environmental and social management responsibilities in the Project

Project Implementation Organization	Management Roles and Responsibilities
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Asian Development Bank / World Bank	<ul style="list-style-type: none"> • Review and approve IEEs/EMPs • Review bidding documents • 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 semi-annual and annual EMR • Provide environmental and social safeguards capacity building to the PMU during missions and remotely.
Ministry of Finance and Treasury (executing agency)	<ul style="list-style-type: none"> • Guide and monitor overall project execution • Financial oversight • Ensure flow of funds to the implementing agency and the timely availability of counterpart funding
Project Steering Committee (PSC)	<ul style="list-style-type: none"> • 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 including SW Operations Department (implementing agency)	<ul style="list-style-type: none"> • 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 and WB • Assist in resolving complaints brought through the GRM that have not been resolved at lower levels • Has prime responsibility for the operation of the new facilities
SW Project Management Unit	<ul style="list-style-type: none"> • Responsible for overall project management (including design, construction and commissioning), implementation and monitoring • Review and coordinate evaluation of bids for works, goods, and consultant services • Responsible for SW's application for a Development Consent • Prepare the IEEs and EMPs based on the detailed design and submit to ADB and WB for clearance • Ensure environmental safeguard concerns are incorporated in the detailed engineering design • Disclose safeguard documents, as appropriate • Conduct awareness and consultations as per the CCP • Monitor on site construction progress and quality • Engage as appropriate specialist consultants in order to complete specific engineering inspections as required • Receive and answer all contractor related requests for information, extensions of time and variations. • Arrange and attend regular progress meeting on site

	<ul style="list-style-type: none"> • Recommend changes to the drawings, specifications and program for the employer’s approval. • Submit monthly, quarterly, semi-annual, and annual monitoring report to SW Management • Review and clear the CEMP 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 CEMP
PMU Environment Officer	<ul style="list-style-type: none"> • Ensure IEEs/EMPs are updated based on changes in site conditions, if required, and ensure their disclosure in locations and form accessible to the public; • Coordinate with the preparer of bid documents for the inclusion of IEEs/EMPs and CEMP frameworks in the bidding documents and civil works contracts; • Provide training for contractors’ environment and safety officers to ensure they understand the EMP requirements • Ensure required government permits and clearances acquired by SW prior to actual construction activities; • Establish system for monitoring environmental safeguards of the Project as described in the IEEs/EMPs; • Review, monitor, and evaluate the effectiveness of implemented mitigation measures and recommend corrective actions whenever necessary; • Prepare monthly environmental monitoring reports for consolidation to the semi-annual monitoring reports for SW and ADB; • Ensure grievance redress mechanism is activated prior to the start of construction; • During construction, conduct site visits and coordinate with the project engineers to ensure that required environmental mitigation measures are implemented at the construction sites, and • Coordinate with the contractors’ environment and safety officers to ensure that environmental awareness trainings for workers are done.
International Environment Specialist	<ul style="list-style-type: none"> • The International Environment specialist will support the National Environmental Officer by • Supporting the review and production of environmental safeguards documents (in particular Kongulai WTP, and review of Suez IEEs, PERs, and DCAs for HNWS, HNWW, and Provincial WSs and semi _annual reports for the WB/ADB). • Developing systems for ESMP implementation and

	<p>monitoring</p> <ul style="list-style-type: none"> • Ensuring contractors' compliance with environment management best practice during pre-implementation and screening • reviewing technical documents e.g. water quality guidelines in conjunction with the National Environmental Officer • Mentoring during all aspects of the program
<p>PMU Resettlement/Social Specialist</p>	<ul style="list-style-type: none"> • Ensure RAP is updated based on changes in site conditions, if required, and ensure their disclosure in locations and form accessible to the public; • Coordinate with the preparer of bid documents for the inclusion of RAP and CEMP frameworks in the bidding documents and civil works contracts; • Provide training for contractors' environment and safety officers to ensure they understand the CSEMP requirements • Ensure required government permits and clearances acquired by SW prior to actual construction activities; • Establish system for monitoring social safeguards of the Project as described in the RAPs; • Review, monitor, and evaluate the effectiveness of implemented mitigation measures and recommend corrective actions whenever necessary; • Prepare monthly environmental monitoring reports for consolidation to the semi-annual monitoring reports for SW and ADB; • Ensure grievance redress mechanism is activated prior to the start of construction; • During construction, conduct site visits and coordinate with the project engineers to ensure that required environmental mitigation measures are implemented at the construction sites, and • Coordinate with the contractors' environment and safety officers to ensure that environmental awareness trainings for workers are done.
<p>Contractor</p>	<ul style="list-style-type: none"> • Prepares and submit prior to construction the CEMP for review by PMU's Environment Specialist for approval by PMU • Environmental Health and Safety Officer (EHSO) also provides capacity building and training for workers on EMP requirements as needed • Activates an Environmental Health and Safety Officer (EHSO) to ensure that the contractor complies 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 • Act promptly on complaints and grievances concerning the construction activities in accordance with the project's GRM • Submit monthly progress reports on CEMP/EMP implementation to PMU

ECD of MECDM	<ul style="list-style-type: none"> • Responsible for processing of SW's application for a Development Consent • Monitors construction progress for compliance with the terms of the issued Development Consent • Monitors implementation of the mitigation measures and the EMP in general
Ministry of Mines, Energy and Rural Electrification (MMERE)	<ul style="list-style-type: none"> • 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 • Monitors contractor's compliance with the terms of the issued BMP

9.3 Environmental Mitigations and Monitoring Matrices

257. The EMP (including monitoring requirements) is presented in

258.

259.

260. **Table 12** and Table 12 for the upgraded pipework to Tasahe Reservoir and the upgraded WTP at Kongulai Spring.

Table 11: Environmental Mitigation and Monitoring Plan of Upgraded Pipework to Tasahe Reservoir

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
PRE-CONSTRUCTION							
Climate change vulnerability of Tasahe pipework	Climate change adaptation measures are: (i) results of engineering assessment on potential site erosion of the routes of the Tasahe pipework; and (ii) appropriate erosion protection for the pipework will be determined to avoid structural failures of the pipeline when unprotected against soil erosion.	Part of detailed design cost	Contractor	SW's PMU	Engineering drawings and specifications considered climate change adaptation features	Verify engineering drawings and specifications	SW PMU Cost
Implementation of the Tasahe pipework project's EMP	Tender documents and construction contract of the Tasahe pipework will include provisions that will: (i) require the contractors to prepare their respective Contractor's Environmental Management Plan (CEMP) prior to the start of the construction activities with details of staff, resources, implementation schedules, as well as monitoring and reporting procedures; (ii)	Part of contractors' bid cost	Contractor	SW's PMU	CEMP prepared by contractors	CEMP submittal by contractors to PMU/ prior to commencement of site works	To be undertaken as per contractor's contract

	issue a CEMP framework as guidance for the contractor in preparing a CEMP as part of his bid proposal; and (iii) require the PMU to review and approve the CEMP prior to site mobilization.						
Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Relocation of Households and residents	Eight households and 41 residents will be relocated to a nearby agreed area between residents and SW.	Part of contractors' bid cost	Contractor	SW PMU	Engineering drawings and specifications	Verify engineering drawings and specifications	To be undertaken as per contractor's contract
Complaints due to project- related impacts	SW's PMU and the contractors will: (i) establish the approved project's grievance redress mechanism (GRM); (ii) publicize the existence of the project's GRM through public awareness campaigns, website, billboards, public notifications, etc.; (iii) ensure that the names and contact numbers of representatives of the contractors and SW's PMU are placed on notice boards at agreed locations and/or website.	Part of contractors' bid cost	Contractor and SW's PMU	SW's PMU	Consultation meetings; specific provisions in tender documents on nuisance & problems to public;	Verify meetings documentation; Verify tender documents; verify the in-placed CACs/ after completion of meetings; once after tender documents prepared	SW PMU Cost
Disruption of utilities and services	SW and the contractors will: (i) coordinate with the other utilities companies regarding the potential disruptions; (ii) make provisions to preserve the operation of current facilities, and (iii) affected households and establishments will be notified well in advance of such disruptions.	Part of contractors' bid cost	Contractor and SW's PMU	SW's PMU	contractor's coordination with the other utility companies; notification of affected households and establishments	verify contractor's coordination meetings and notifications/ after completion of meetings and notifications	SW PMU Cost

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Disposal of excavation spoils	The PMU will: (i) require the contractors to submit a plan for the disposal of excess excavation spoils, and (ii) undertake inspection and approval of the contractors' suggested disposal sites prior to actual construction	Part of contractor's bid cost	Contractor	SW PMU	contractor's disposal plan for excess excavation spoils	PMU disposal sites' inspection/ after contractor's submittal	SW PMU Cost
Potential damage to unknown archaeological and cultural assets	Tender documents and construction contract will include a provision that will: (i) require construction activities to be stopped immediately upon discovery of any unknown archaeological and cultural assets; and (ii) the contractor will promptly inform the local authorities and the Solomon Island National Museum about the presence.	Part of tender preparation cost	Design Consultants		specific provision in tender documents on archeological/ cultural relics	verify tender documents/ once after tender documents prepared	SW PMU Cost
Environmental and Social Capacity Development	The international Environmental Specialist and Social Specialist will assist the local Environmental Specialist by and Social/Resettlement Specialist (i) Ensuring IEEs/EMPs and the RAP are updated based on changes in site conditions, if required, and ensure their disclosure in locations and form accessible to the public; (ii) Coordinating with the preparer of bid documents for the inclusion of IEEs/EMPs and CEMP frameworks in the bidding documents and civil works contracts; (iii) Provide training for contractors' environment and safety officers to ensure they understand the EMP requirements (iv) Ensure required government permits and clearances acquired by SW prior to actual construction activities (v) Establish system for monitoring environmental safeguards of the Project as described in the IEEs/EMPs; (vi) Review,	Part of SW's operational cost	SW PMU	SW PMU.	Permits are available for works to start, ensure environmental awareness trainings for workers is completed	Ongoing daily activities and monthly activity reports	SW PMU Cost

	<p>monitor, and evaluate the effectiveness of implemented mitigation measures and recommend corrective actions whenever necessary; (viii) Prepare monthly environmental monitoring reports for consolidation to the semi-annual monitoring reports for SW and ADB;(ix) Ensure grievance redress mechanism is activated prior to the start of construction; (x) During construction, conduct site visits and coordinate with the project engineers to ensure that environmental mitigation measures are implemented at the construction sites, and (xi) Coordinate with the contractors' environment and safety officers to ensure that environmental awareness trainings for workers are done.</p>						
Borrow pits and onsite gravel laydowns	<p>Will be included in works methodologies for the Project Mangers approval. Proposed implementation to be inspected prior to work commencement for these activities.</p> <p>The appointed contractor will negotiate agreements with local landowners, for access and temporary usage of private property (for borrow pits, wastes, stockpiles, and laydown areas), in accordance with Solomon Islands land law. An explanation of the GRM will be included in agreements, so that a person can make a complaint if they believe they have not been treated fairly.</p>	Construction contract cost	Contractor	PMU	Site layouts, laydowns, spoil stockpiles and imported material stockpiles	Once at the start of the contract part of the contractors Site Management Plans. And as subsequent updates are made	SW PMU

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
CONSTRUCTION							
Soil erosion and sediment loss from construction sites	The contractor will divert surface runoffs away from the exposed areas and prevent sediments from moving offsite. Measures may include, as appropriate for site conditions: (i) small interceptor dikes, (ii) pipe slope drains, (iii) grass bale barriers, (iv) silt fence, (v) sediment traps, and (vi) temporary sediment basins; total exposed area will be minimized as the conditions allow.	Part of contractors' bid cost	Contractor	SW PMU	Disturbed sites; use of appropriate sediment controls	Visual inspection of sites; plans verification/ daily during rainy periods	SW PMU Cost
Extraction of local construction materials	The contractor will provide sufficient information on the quarries and borrow pits to be used including commercial sources; The following will be required for quarries and borrow pits: (i) only licensed quarries will be used or the contractor will obtain its own licenses (ii) borrow pits will be covered by required government permits or approvals, (iii) will not be located within 300 meters of any urban area sensitive receptors, (iv) topsoil will be saved for rehabilitation during closure of the quarries and borrow pits, (v) will be provided with drainage and sediment flow controls, and (vi) closure will include fencing and placement of warning sign to the public.	Part of contractors' bid cost	Contractor	SW PMU	government permits or approvals of quarries and borrow pits; operational plan; drainage and sediment flow controls; topsoil management	Verification of material supply through docket, inspection of stockpiles on establishment and at least weekly	As per contractor's contract

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Oil and other hazardous materials releases.	To prevent accidental releases, where required, the contractors will implement the following: (i) provide, if required, maintenance shops, fuel and oil depot with impermeable flooring with sump where wash water and sludge can be collected for proper disposal; (ii) refueling and servicing of equipment should only be carried out in specified areas adequately equipped to avoid leaks and spills that could contaminate soil and water resources; (iii) chemicals, hazardous substances and fuel will be stored on-site within an enclosed and covered secure area that has an impervious floor and impervious bund around it, (iv) storage area will be located away from water-courses, flood-prone areas and danger areas, (v) equipment maintenance areas and fuel storage areas will be provided with drainage leading to an oil-water separator that will be regularly skimmed of oil and maintained to ensure efficiency; (vi) regularly check containers for leakage and undertake necessary repair or replacement; (vii) store hazardous materials above flood level; (viii) ensure all storage containers are in good condition with proper labeling; and (ix) store waste oil, used lubricant and other hazardous wastes in tightly sealed containers to avoid contamination of soil and water resources;	Part of contractors' bid cost	Contractor	SW PMU	measures required to prevent accidental releases; measures for clean-up and handling of contaminated materials; training records of personnel for hazardous materials; records of accidental releases	visual inspection of sites; records verification/ daily	SW PMU cost

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
	<p>Measures for clean-up and handling of contaminated materials include: (i) undertake immediate clean-up of spills, (ii) oil stained wastes and used oil should be collected and disposed of through recyclers / authorized waste handlers and disposal in authorized waste facilities; (iii) ensure availability of spill cleanup materials such as absorbent pads, (iv) restoration of temporary work sites will include removal, treatment, and proper disposal of oil contaminated soils, (v) discharge of oil contaminated water into the environment will be prohibited; and (vi) construction personnel designated to handle of fuels/hazardous substances will be trained particularly in spill control procedures.</p>						

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Solid waste management	The contractor will be required to: (i) provide garbage bins and facilities within the project site for temporary storage of construction waste and domestic solid waste; (ii) separate solid waste into hazardous, non-hazardous and reusable waste streams and store temporarily on-site in secure facilities with weatherproof flooring and roofing; (iii) ensure that wastes are not haphazardly dumped within the project site and adjacent areas; (iv) regular disposal of wastes to the Ranadi Landfill; (v) prohibit burning of all types of wastes; (vi) remove the construction wastes from the sites after work completion, and (vii) implement the required restoration of disturbed sites. The CEMP shall contain a waste management plan and describing all waste types, amounts, disposal method, transport documentation requirements, and details of licensed waste treatment/recycling facilities for each waste stream.	Part of contractors' bid cost	Contractor	SW's PMU	construction wastes; waste separation, temporary on-site waste storage, regular disposal records, surplus materials not removed upon completion	Visual inspection of sites/ daily	As per contractor's contract

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Construction noise and vibration	The contractor will control noise generation from their activities near residential areas. The contractor will: (i) provide prior notification to the community on schedule of construction activities; (ii) provide noisy equipment with noise reduction covers whenever applicable; (iii) position stationary equipment that produce elevated noise levels, such as diesel generators and air compressors, as far as practicable from houses and other receptors; (iv) prohibit operation of noisy equipment and construction works in populated areas and where sensitive receptors are found during nighttime (19:00 – 06:00); (v) make prior notification and consultation with the affected people and local officials for necessary nighttime operation; (vi) locate concrete batching plant, and rock crushing plant at a reasonable distance away from inhabited areas and sensitive receptors; and (vii) conduct regular noise level monitoring to determine compliance with WHO guidelines for noise which should not to exceed 55 dB(A) near residential areas during daytime and 45 dB(A) for nighttime	Part of contractors' bid cost	Contractor	SW's PMU	Noise levels not to exceed 55 dB(A) near residential areas during daytime and 45 dB(A) for nighttime; noisy equipment not to be operated between 19:00 – 06:00hrs; regular noise level monitoring by contractor	Use of sound levels meter; visual inspection of sites/ daily	As per contractor's contract

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Vehicular traffic congestion and hindrance to public access	The contractor will: (i) prepare a traffic plan and provide traffic management personnel to direct the flow of traffic in the vicinity of the construction sites and construction-related facilities; (ii) closely coordinate with local authorities for any closure of roads or rerouting of vehicular traffic; (iii) provide traffic signs in the vicinity of the construction sites to direct motorists and pedestrians; and (iv) minimize disruption to local activities by timing the construction activities with consideration to the schedules of festivities, processions, parades, etc.	Part of contractors' bid cost	Contractor	SW's PMU	Contractor's traffic plan and traffic management personnel; traffic signs in vicinity of construction sites; contractor's work schedule related to festivities, processions, parades, etc.	traffic plans verification; visual inspection of sites/ daily	SW PMU

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Community health and safety	<p>The contractor will: (i) use barriers and install signage to keep the public away from constructions sites and excavation sites; (ii) provide security personnel in hazardous areas to restrict public access; (iii) operate construction night light at the vicinity of construction sites; and (iv) whenever necessary, provide adequate safe passageways for the public crossing the construction sites whose access to properties, establishments, etc. has been disrupted or blocked by the ongoing construction activities.</p> <p>A labor influx plan will be required from the contractor to address amongst others: (i) Measures to minimize contact with local residents to prevent the risk of spread of communicable diseases including STI's and HIV. (ii) induction of all workers on Project requirements regarding safeguards (including child protection), GRM and CCP requirements; (iii) agreement to and implementation of protocols (including code of conduct) concerning the workers contact with the local communities; (iv) ensuring that sufficient water supply and temporary sanitation facilities are provided for workers at work sites in order that community infrastructure is not over- burdened; (v) security at contractor's yard to control unauthorized access and prevent entry of the public (especially children).</p> <p>Detailed procedures to address potential COVID-19 impacts will be provided by the contractor during the construction phase e.g. the COVID-19 focal point, hand hygiene,</p>	Part of contractors' bid cost	Contractor	SW's PMU/ Contractor	work sites safety plan; warning signs, barricades, and night lamps for open excavations, lighting system for nighttime operations; adequate safe passageways for the public crossing the construction sites. All aspects of the labor influx management plan. Co-vid Safety Plans	work sites safety plan verification; visual inspection of sites/ daily/weekly All aspects of the labor influx management plan. visual inspection of sites/ daily/weekly	As per contractor's contract/SW PMU Cost

	checking and recording of worker temperatures, awareness raising with workers, COVID-19 posters (e.g. symptoms, methods of transmission, hand hygiene etc), cleaning and waste disposal practices, reducing contact between workers etc.							
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Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Occupational health and safety at work sites	<p>The contractor will implement good practices of occupational health and safety at the construction sites by: (i) implementing a construction site health and safety management plan (CSHSMP), (ii) ensuring that an equipped first aid station is available at all times, (iii) providing the workers with potable water and adequate sanitation facilities, (iv) providing the workers with personal protective equipment (PPE) to minimize exposure to a variety of hazards, and (v) providing firefighting equipment and fire extinguishers in workshops, fuel storage facilities, and any sites where fire hazard and risk are present.</p> <p>Detailed procedures to address potential COVID-19 impacts will be provided by the contractor during the construction phase e.g. the COVID-19 focal point, hand hygiene, checking and recording of worker temperatures, awareness raising with workers, COVID-19 posters (e.g. symptoms, methods of transmission, hand hygiene etc), cleaning and waste disposal practices, reducing contact between workers etc.</p>	Part of contractors bid cost	Contractor	SW PMU	Health and safety plan; first aid station; PPE, sanitation, facilities; firefighting equipment and fire extinguishers	Health and safety, plan verification; visual inspection of sites/weekly	As per contractor's contract
Monitoring and Reporting	During the pre-construction phase any gaps in the baseline will be filled. It is in the pre-construction phase where requirements for environmental monitoring in the construction phase can be legally required by placing specific	Part of specs preparation cost	Contractor	SW's PMU	specific provisions on environmental monitoring in the: (i) project specifications, (ii) bidding	verify that these aspects are incorporated in the said documents	As per contractor's contract

	<p>provisions on environmental monitoring in the: (i) project specifications, (ii) bidding documents, and (iii) construction contracts. Relevant aspects of each subproject's EMP shall be incorporated in these documents. The PMU shall verify if these aspects are incorporated in the said documents first during submission of the draft documents and later during submission of the draft final documents.</p>				<p>documents, and (iii) construction contracts.</p>	<p>during submission of the draft documents and later during submission of the draft final documents.</p>	
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Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
OPERATIONS							
Public health risk due to unplanned outages and emergencies of the water supply system	Mitigations include: (i) identification of potential causes of unplanned outages and emergencies shall be conducted during operation of the water supply system and updated as necessary; (ii) written management procedures for unplanned outages and emergencies as required by the water safety plan implementation (advocated by WHO); (iii) regular inspection and maintenance of the backup power supplies and the associated Automatic Transfer Switch (ATS) of the backup power supplies at the water pumping stations to ensure uninterrupted operation during power failure; (iv) regular inspection and maintenance of pumping systems and emergency backup systems to ensure that these are in good working conditions; (v) implement flushing and disinfection, as necessary, during unplanned outages and emergencies to prevent microbial contamination of the water supply system; (vi) written standard operating procedures manual to be available at the facilities to provide guidance to the water supply system's staff on how to handle unplanned outages and emergencies; (vii) regular training of water supply system's staff on how to handle unplanned outages and emergencies	Part of SW's operational cost	SW's operations personnel	SW's Operations Dept. Mgt.	Written management procedures for unplanned outages and emergencies (per water safety plan); schedule of inspection and maintenance of pumping systems, emergency backup systems and automatic transfer switch of the backup power supplies at the water pumping stations; standard operating procedures manual for unplanned outages and emergencies; flushing and disinfection plan for unplanned outages and emergencies;	Verify regular inspection and maintenance/ weekly; verify implementation of operating procedures manual/ weekly; verify implementation of water supply flushing and disinfection plant/ after incidents.	Visual inspection

					training of water supply system's staff; unplanned outages and emergencies		
Occupational health and safety at work sites	<p>SW will implement good practices of occupational health and safety at the construction sites by: (i) implementing a construction site health and safety management plan (CSHSMP), (ii) ensuring that an equipped first aid station is available at all times, (iii) providing the workers with potable water and adequate sanitation facilities, (iv) providing the workers with personal protective equipment (PPE) to minimize exposure to a variety of hazards, and (v) providing firefighting equipment and fire extinguishers in workshops, fuel storage facilities, and any sites where fire hazard and risk are present.</p> <p>Detailed procedures to address potential COVID-19 impacts will be provided by the contractor during the operations e.g. the COVID-19 focal point, hand hygiene, checking and recording of worker temperatures, awareness raising with workers, COVID-19 posters (e.g. symptoms, methods of transmission, hand hygiene etc), cleaning and waste disposal practices, reducing contact between workers etc.</p>	SW ongoing costs	SW's PMU	SW's PMU	Health and safety plan; first aid station; PPE, sanitation, facilities; firefighting equipment and fire extinguishers	Health and safety, plan verification; visual inspection of sites/weekly	SW's PMU

Table 12: Environmental Mitigation and Monitoring Plan of Kongulai WTP Upgrade Project

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
PRECONSTRUCTION							
Climate change vulnerability of Kongulai WTP Upgrade	Climate change adaptation measures are: (i) results of engineering assessment on potential site erosion of the Kongulai WTP Upgrade to be used as the basis for climate change adaptation considerations;	Part of detailed design cost	Contractor	SW's PMU	Engineering drawings and specifications considered climate change adaptation features	Verify engineering drawings and specifications/ once	As per contractor's contract
Implementation of the Kongulai WTP Upgrade Project's EMP	Tender documents and construction contract of the Kongulai WTP Upgrade will include provisions that will: (i) require the contractors to prepare their respective Contractor's Environmental Management Plan (CEMP) prior to the start of the construction activities with details of staff, resources, implementation schedules, as well as monitoring and reporting procedures; (ii) issue a CEMP framework as guidance for the contractor in preparing a CEMP as part of his bid proposal; and (iii) require the PMU to review and approve the CEMP prior to site mobilization.	Part of contractors' bid cost	Contractor	SW's PMU	CEMP prepared by contractors	CEMP submittal by contractors to PMU Project Manager prior to commencement of site works	SW PMU cost

Complaints due to project- related impacts	SW's PMU and the contractors will: (i) establish the approved project's grievance redress mechanism (GRM); (ii) publicize the existence of the project's GRM through public awareness campaigns, public notifications, etc.; (iii) ensure that the names and contact numbers of representatives of the contractors and SW's PMU are placed on notice boards at agreed locations and/or website.	Part of contractors' bid cost	Contractor and SW's PMU	SW's PMU	Consultation meetings; specific provisions in tender documents on nuisance & problems to public; GRM activated with community advisory committees (CACs) created	Verify meetings documentation; Verify tender documents; verify the in-placed CACs/ after completion of meetings; once after tender documents prepared	SW PMU cost
Disruption of utilities and services	SW and the contractors will: (i) coordinate with the other utilities companies regarding the potential disruptions; (ii) make provisions to preserve the operation of current facilities, and (iii) affected households and establishments will be notified well in advance of such disruptions.	Part of contractors' bid cost	Contractor and SW's PMU	SW's PMU	Contractor's coordination with the other utility companies; notification of affected households and establishments	verify contractor's coordination meetings and notifications/ after completion of meetings and notifications	SW PMU cost
Borrow pits and onsite gravel laydowns	Will be included in works methodologies for the Project Mangers approval. Proposed implementation to be inspected prior to work commencement for these activities. The appointed contractor will negotiate agreements with local landowners, for access and temporary usage of private property (for borrow pits,	Construction contract cost	Contractor	SW's PMU	Site layouts, laydowns, spoil stockpiles and imported material stockpiles	Once at the start of the contract part of the contractors Site Management Plans. And as subsequent updates are made	SW PMU

	wastes, stockpiles, and laydown areas), in accordance with Solomon Islands land law. An explanation of the GRM will be included in agreements, so that a person can make a complaint if they believe they have not been treated fairly.						
Disposal of excavation spoils	The PMU will: (i) require the contractors to submit a plan for the disposal of excess excavation spoils, and (ii) undertake inspection and approval of the contractors' suggested disposal sites prior to actual construction.	Part of Contractor's cost	Contractor	SW's PMU	Contractor's disposal plan for excess excavation spoils	PMU sites' inspection/ after contractor's submittal	SW PMU cost
Potential damage to unknown archaeological and cultural assets	Tender documents and construction contract will include a provision that will: (i) require construction activities to be stopped immediately upon discovery of any unknown archaeological and cultural assets; and (ii) the contractor will promptly inform the local authorities and the Solomon Island National Museum about the presence.	Part of specs preparation cost	Contractor	SW's PMU	specific provision in tender documents on archeological/ cultural relics	verify tender documents/ once after tender documents prepared	SW PMU cost
Monitoring and Reporting	During the pre-construction phase any gaps in the baseline will be filled. It is in the pre-construction phase where requirements for environmental monitoring in the construction phase can be legally required by placing specific provisions on environmental monitoring in	Part of specs preparation cost	Contractor	SW's PMU	specific provisions on environmental monitoring in the: (i) project specifications, (ii) bidding documents, and (iii) construction contracts.	verify that these aspects are incorporated in the said documents during submission of the draft documents and later during submission of the draft final documents.	As per contractor's contract

	<p>the: (i) project specifications, (ii) bidding documents, and (iii) construction contracts. Relevant aspects of each subproject's EMP shall be incorporated in these documents. The PMU shall verify if these aspects are incorporated in the said documents first during submission of the draft documents and later during submission of the draft final documents.</p>						
Environmental and Social Capacity Development	<p>The international Environmental Specialist and Social Specialist will assist the local Environmental Specialist by and Social/Resettlement Specialist (i) Ensuring IEEs/EMPs and the RAP are updated based on changes in site conditions, if required, and ensure their disclosure in locations and form accessible to the public; (ii) Coordinating with the preparer of bid documents for the inclusion of IEEs/EMPs and CEMP frameworks in the bidding documents and civil works contracts; (iii) Provide training for contractors' environment and safety officers to ensure they understand the EMP requirements (iv) Ensure required government permits and clearances acquired by SW prior to actual construction activities (v) Establish system for monitoring environmental safeguards of the Project as</p>	Part of SW's operational cost	SW's PMU	SW's PMU	Permits are available for works to start, ensure environmental awareness trainings for workers is completed	Ongoing daily activities and monthly activity reports	SW PMU Cost

	<p>described in the IEEs/EMPs; (vi) Review, monitor, and evaluate the effectiveness of implemented mitigation measures and recommend corrective actions whenever necessary; (viii) Prepare monthly environmental monitoring reports for consolidation to the semi-annual monitoring reports for SW and ADB;(ix) Ensure grievance redress mechanism is activated prior to the start of construction; (x) During construction, conduct site visits and coordinate with the project engineers to ensure that required environmental mitigation measures are implemented at the construction sites, and (xi) Coordinate with the contractors' environment and safety officers to ensure that environmental awareness trainings for workers are done.</p>						
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Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
CONSTRUCTION							
Soil erosion and sediment of construction sites	The contractor will divert surface runoff away from exposed areas and prevent sediments from moving offsite. Measures may include, as appropriate for site conditions: (i) small interceptor dikes, (ii) pipe slope drains, (iii) grass bale barriers, (iv) silt fence, (v) sediment traps, and (vi) sediment basins; total exposed area temporary will be minimized as the conditions allow	Part of contractors' bid cost	Contractor	SW's PMU	disturbed sites; use of appropriate sediment controls	visual inspection of sites; plans verification/ daily during rainy periods	SW PMU cost
Extraction of local construction materials	The contractor will provide sufficient information on the quarries and borrow pits to be used including commercial sources; The following will be required for quarries and borrow pits: (i) only licensed quarries will be used or the contractor will obtain its own licenses (ii) borrow pits will be covered by required government permits or approvals, (iii) will not be located within 300 meters of any urban area sensitive receptors, (iv) topsoil will be saved for rehabilitation during closure of the quarries and borrow pits, (v) will be provided with drainage and sediment flow controls.	Part of contractors' bid cost	Contractor	SW's PMU	government permits or approvals of quarries and borrow pits; operational plan; drainage and sediment flow controls; top soil management.	visual inspection of sites; plans verification/ weekly	SW PMU cost

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Oil and other hazardous materials releases.	To prevent accidental releases, the contractors will, as required, implement the following: (i) provide maintenance shops, fuel and oil depot with impermeable flooring with sump where wash water and sludge can be collected for proper disposal; (ii) refueling and servicing of equipment should only be carried out in specified areas adequately equipped to avoid leaks and spills that could contaminate soil and water resources; (iii) chemicals, hazardous substances and fuel will be stored on-site within an enclosed and covered secure area that has an impervious floor and impervious bund around it, (iv) storage area will be located away from water-courses, flood-prone areas, and danger areas, (v) equipment maintenance areas and fuel storage areas will be provided with drainage leading to an oil-water separator that will be regularly skimmed of oil and maintained to ensure	Part of contractors' bid cost	Contractor	SW's PMU	Measures required to prevent accidental releases; measures for clean-up and handling of contained materials; training records of personnel for hazardous materials; records of accidental releases.	visual inspection of sites; records verification/weekly	SW PMU cost

	<p>efficiency; (vi) regularly check containers for leakage and undertake necessary repair or replacement; (vii) store hazardous materials above flood level; (viii) ensure all storage containers are in good condition with proper labeling; and (ix) store waste oil, used lubricant and other hazardous wastes in tightly sealed containers to avoid contamination of soil and water resources; Measures for clean-up and handling of contaminated materials include: (i) undertake immediate clean-up of spills, (ii) oil stained wastes and used oil should be collected and disposed of through recyclers / authorized waste handlers and disposal in authorized waste facilities; (iii) ensure availability of spill cleanup materials such as absorbent pads, (iv) restoration of temporary work sites will include removal, treatment, and proper disposal of oil contaminated soils, (v) discharge of oil contaminated water into the environment will be prohibited; and (vi) construction personnel designated to handle of fuels/hazardous substances will be trained particularly in spill control procedures.</p>						
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Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
On-site dust control due to construction activities	The contractor will be required to do the following: (i) regular water spraying of roads and work areas to minimize dust generation; (ii) construction materials stockpiles and spoils with potential for significant dust generation to be covered or sprayed with water, (ii) hauling trucks transporting loose construction materials such as sand, gravel, and spoils to be provided with tarpaulin cover or other suitable materials to avoid spills and dust emission; and (iv) prohibit burning of all types of wastes generated at the construction sites, as well as other project-related facilities and activities.	Part of contractors' bid cost	Contractor	SW's PMU	dust generation, water spraying, cover of stockpiles, smoke emitting equipment, open burning of materials	visual inspection of sites/ daily	SW PMU cost

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Solid waste management	<p>The contractor will, as required, (i) provide garbage bins and facilities within the project site for temporary storage of construction waste and domestic solid waste; (ii) separate solid waste into hazardous, non- hazardous and reusable waste streams and store temporarily on- site in secure facilities; (iii) ensure that wastes are not haphazardly dumped within the project site and adjacent areas; (iv) regular disposal of wastes to the Ranadi Landfill; (v) prohibit burning of all types of wastes; (vi) remove the construction wastes from the sites after work completion, and (vii) implement the required restoration of disturbed sites.</p> <p>The CEMP shall contain a waste management plan describing all waste types, amounts, disposal method, transport documentation requirements, and details of licensed waste treatment.</p>	Part of contractors' bid cost	Contractor	SW's PMU	construction wastes; waste separation, temporary on-site waste storage, regular disposal records, surplus materials not removed upon completion	visual inspection of sites/ daily	SW PMU cost

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Construction noise and vibration	The contractor will reduce noise generation from their activities near residential areas by (i) providing prior notification to the community on schedule of construction activities; (ii) providing noisy equipment with noise reduction covers whenever applicable; (iii) position stationary equipment that produce elevated noise levels, such as diesel generators and air compressors, as far as practicable from houses and other receptors; (iv) prohibit operation of noisy equipment and construction works in populated areas and where sensitive receptors are found during nighttime (19:00 – 06:00); (v) make prior notification and consultation with the affected people and local officials for necessary nighttime operation; (vi) locate concrete batching plant, and rock crushing plant at a reasonable distance away from inhabited areas and sensitive receptors; and (vii) conduct regular noise level monitoring to determine compliance with WHO guidelines for noise which should not to exceed 55 dB(A) near residential areas during daytime and 45 dB(A) for nighttime	Part of contractors' bid cost	Contractor	SW's PMU	Noise levels not to exceed 55 dB(A) near residential areas during daytime and 45 dB(A) for nighttime; noisy equipment not to be operated between 19:00 – 06:00hrs; regular noise level monitoring by contractor	Use of sound levels meter; visual inspection of sites/ daily	SW PMU cost

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Vehicular traffic congestion and hindrance to public access	The contractor to: (i) prepare a traffic plan and provide traffic management personnel to direct the flow of traffic in the vicinity of the construction sites and construction-related facilities; (ii) closely coordinate with local authorities for any closure of roads or rerouting of vehicular traffic; (iii) provide traffic signs in the vicinity of the construction sites to direct motorists and pedestrians; and (iv) minimize disruption to local activities by timing the construction activities with consideration to the schedules of festivities, processions, parades, etc.	Part of contractors' bid cost	Contractor	SW's PMU	Contractor's traffic plan and traffic management personnel; traffic signs in vicinity of construction sites; contractor's work schedule related to festivities, processions, parades, etc.	traffic plans verification; visual inspection of sites/daily	SW PMU cost

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Community health and safety	The contractor will: (i) use barriers and install signage to keep the public away from constructions sites and excavation sites; (ii) provide security personnel in hazardous areas to restrict public access; (iii) operate construction night light at the vicinity of construction sites; and (iv) whenever necessary, provide adequate safe passageways for the public crossing the construction sites whose access to properties, establishments, etc. has been disrupted or blocked by the ongoing construction activities	Part of contractors' bid cost	Contractor	SW's PMU	work sites safety plan; warning signs, barricades, and night lamps for open excavations, lighting system for nighttime operations; adequate safe passageways for the public crossing the construction sites	work sites safety plan verification; visual inspection of site/ daily	SW PMU cost
Potential social issues due to influx of imported workers	Measures include: (i) induction of the workers on requirements of the project's regarding community health and safety, grievance redress mechanism, and consultation and communications plan; (ii) implementation of protocols concerning the workers contact between the local communities; (iii) implementation of a communicable disease awareness and prevention program on the risk of disease spreading including sexually transmitted diseases and HIV and (iv) contractor's yard will be secured by a fence and provided with warning signs to control unauthorized access and prevent entry of the public.	Part of contractors' bid cost	Contractor	SW's PMU	Check implementation of worker's induction, required protocol, awareness and prevention program on the risk of disease spreading	Records verification and visual inspection / at start of work and monthly	SW PMU cost

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Construction monitoring.	Contractors are expected to implement the relevant aspects of each project's EMP as per their approved CEMP during execution of the construction activities as stipulated in their contracts. The contractors' CEMP will detail the monitoring plan (based on the subproject EMP) with details on staff, resources, implementation schedules, and monitoring procedures (parameters, frequency etc.).	Part of contractors' bid cost	Contractor	SW's PMU	CEMP	visual inspection of sites/ daily	As per contractor's contract
Reporting.	Overall the Project will establish a system of reporting. The contractor will prepare monthly reports which will include a section on compliance with the approved CEMP, corrective actions, training and the like. This will also record any grievances lodged and project communications undertaken by the contractor. The PMU will review and consolidate information from the monthly reports of all subprojects. The quarterly progress report (QPR) prepared by the PMU will include a section on safeguards implementation summarizing the monthly reports (including training and capacity development activities).	Part of contractors' bid cost	Contractor	SW's PMU	Data collected from inspections, GRM, training reports, monthly reports, quarterly summary reports by PMU	visual inspection of sites/ daily	As per contractor's contract

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Occupational health and safety at work sites	<p>The contractor will implement good practices of occupational health and safety at the construction sites by: (i) implementing health and safety management plan (HSP), (ii) ensuring that an equipped first aid station is available at all times, (iii) providing the workers with potable water and adequate sanitation facilities, (iv) providing the workers with clean eating areas, (v) providing the workers with personal protective equipment (PPE) to minimize exposure to a variety of hazards, and (vi) providing fire-fighting equipment and fire extinguishers in workshops, fuel storage facilities, and any sites where fire hazard and risk are present.</p> <p>Detailed procedures to address potential COVID-19 impacts will be provided by the contractor during the operations e.g. the COVID-19 focal point, hand hygiene, checking and recording of worker temperatures, awareness raising with workers, COVID-19 posters (e.g. symptoms, methods of transmission, hand hygiene etc), cleaning and waste disposal practices, reducing contact between workers etc.</p>	Part of contractors'	Contractor	SW's PMU	health and safety plan; first aid station; PPE, sanitation facilities; fire-fighting equipment and fire extinguishers. Co-vid Safety Plan	health and safety plan verification; visual inspection of sites/weekly	SW PMU Cost

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
OPERATIONS							
Health hazard due to delivery of poor water quality	SW will implement its updated water safety plan as advocated by the WHO to: (i) prevent contamination of the water sources, (ii) treat the water to reduce or remove contamination that could be present and meet the water quality targets, and (iii) prevent re-contamination during storage, distribution and handling of drinking water	Part of SW's operational cost	SW's Operations Dept.	SW's Operations Dept. Mgt.	water safety plan implemented	Verify water safety plan implementation; water sampling and laboratory test/ monthly for bacteria; annual for physical & chemical	Part of SW's operational cost
Kongulai WTP Upgrade operational risk and safety	Measures to reduce the operational risk and safety of WTP include: (i) workers will be trained on health and safety aspects of operating a WTP; (ii) a facility health and safety manual will be prepared to address the prevention, reduction and control of occupational injury and illness. The manual will among others: clearly identify conditions that may cause acute worker's health and safety problems, specify requirements that all workers should comply during normal operations and emergency situations, and specify training requirements for health and	Part of SW's operational cost	SW's Operations Dept.	SW's Operations Dept. Mgt.	use of facility health and safety manual, chlorine handling procedures, workers' PPE for chlorine use and handling, facility fence. Co-vid Safety Plan	visual inspection; records verification/ weekly	SW Operational Cost

	<p>safety; (iii) reduce the risks associated with the use of chlorine gas as disinfectant by observing the following: chlorine gas cylinders will be kept in separate safety rooms and equipped with fully automated chlorine gas shutoff system, establish a system for the safe use and handling of chlorine materials in the work place, and provide the workers with the appropriate PPE for chlorine use and handling; and (iv) provide the facility with a five-foot- high fence to control access and avoid exposing the public to any hazard due to the presence of the water supply tank.</p> <p>Detailed procedures to address potential COVID-19 impacts will be provided by the contractor during the operations e.g. the COVID-19 focal point, hand hygiene, checking and recording of worker temperatures, awareness raising with workers, COVID-19 posters (e.g. symptoms, methods of transmission, hand hygiene etc), cleaning and waste disposal practices, reducing contact between workers etc.</p>						
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Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Public health risk due to unplanned outages and emergencies of the water supply system	Mitigations include: (i) identification of potential causes of unplanned outages and emergencies shall be conducted during operation of the water supply system and updated as necessary; (ii) written management procedures for unplanned outages and emergencies as required by the water safety plan implementation (advocated by WHO); (iii) regular inspection and maintenance of the backup power supplies and the associated Automatic Transfer Switch (ATS) of the backup power supplies at the water pumping stations to ensure uninterrupted operation during power failure; (iv) regular inspection and maintenance of pumping systems and emergency backup systems to ensure that these are in good working conditions; (v) implement flushing and disinfection, as necessary, during unplanned outages and emergencies to prevent microbial contamination of the water supply system; (vi) written standard operating procedures manual to be available at the facilities to provide guidance to the water supply	Part of SW's operational cost	SW's Operations Dept.	SW's Operations Dept. Mgt.	written management procedures for unplanned outages and emergencies (per water safety plan); schedules of inspection and maintenance of pumping systems, emergency backup systems, and automatic transfer switch of the backup power supplies at the water pumping stations; standard operating procedures manual for unplanned outages and emergencies; flushing and disinfection plan for unplanned outages and emergencies;	verify regular inspection and maintenance/ weekly; verify implementation of operating procedures manual/ weekly; verify implementation of water supply flushing and disinfection plan/ after incidents	SW Operational Cost

	system's staff on how to handle unplanned outages and emergencies; (vii) regular training of water supply system's staff on how to handle unplanned outages and emergencies				training of water supply system's staff; unplanned outages and emergencies		
Management and storage of diesel	The tank will be fire rated for 4 hours and provide bunded containment equal to 100% of the volume of the tank. The tank shall be filled by one of the local bulk fuel suppliers tanker trucks. There shall be visible gauge external to the tank that allows tanker driver to see when the tank has become full during the filling process. The tank is located inside a building and the entrances to the site and building will have hazardous good storage signage in order that any emergency services and quickly and accurately assess the chemicals stored on site and in individual buildings..	Part of SW's operational cost	SW's Operations Dept.	SW's Operations Dept. Mgt.	Material Safety Data Sheets will be kept on site and in the Sites-specific Operations and Maintenance Manual. Spill kits will be maintained on site and the use of them will be advised in the operations and maintenance manual	Verify regular inspection and maintenance/ weekly; verify implementation of operating procedures manual/ as required	SW Operational Cost

10 MONITORING AND REPORTING

261. Environmental monitoring is required across all phases of subproject implementation. The monitoring meets two objectives to ensure: (i) that mitigation measures are effective in reducing/managing impacts, and identify corrective actions as required; and (ii) that safeguard requirements are being complied with by the contractor and the implementing agency (on behalf of government).
262. **Pre-construction monitoring.** During the pre-construction phase any gaps in the baseline will be filled. It is in the pre-construction phase where requirements for environmental monitoring in the construction phase can be legally required by placing specific provisions on environmental monitoring in the: (i) project specifications, (ii) bidding documents, and (iii) construction contracts. Relevant aspects of the EMP shall be incorporated in these documents. The PMU shall verify if these aspects are incorporated in the said documents first during submission of the draft documents and later during submission of the draft final documents.
263. **Construction monitoring.** Contractors are expected to implement the relevant aspects of each project's EMP as per their approved CEMP during execution of the construction activities as stipulated in their contracts. The contractors' CEMP will detail the monitoring plan (based on the subproject EMP) with details on staff, resources, implementation schedules, and monitoring procedures (parameters, frequency etc.).
264. Compliance with the approved CEMP will be the basis for inspections and audits by PMU and the WB and ADB. The BCD will include provisions requiring the contractor to submit their CEMP which will include a section on monitoring which should be linked to allocation of budget and staff for implementation.
265. **Reporting.** Overall the Project will establish a system of reporting. The contractor will prepare monthly reports which will include a section on compliance with the approved CEMP, corrective actions, training and the like. This will also record any grievances lodged and project communications undertaken by the contractor. The PMU will review and consolidate information from the monthly reports of all subprojects. The quarterly progress report (QPR) prepared by the PMU will include a section on safeguards implementation summarizing the monthly reports (including training and capacity development activities).
266. A semi-annual safeguard monitoring report will be submitted to ADB and WB. This report will be based on the QPR and will include the environmental performance of each subproject/component.
267. **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 project. The PMU is responsible for overall project management, project delivery, safeguards implementation, and monitoring.

11 CONCLUSION AND RECOMMENDATIONS

268. The project covered in this assessment offer benefits to Honiara by ensuring adequate supply of potable water, by delivering high priority elements of SW's 30-Year Strategic Plan and 5-Year Action Plan.
269. The environmental and social screening process has identified and addressed the minor nature of the environmental and social issues of the proposed project. The project is located in a peri-urban area which are highly modified.
270. Based on the potential environmental impacts and risks of the proposed projects, there are no significant negative environmental impacts or risks that cannot be mitigated or managed. The EMP prepared will be used as the basis for preparation of the CEMP to be prepared by the contractor. Monitoring and reporting of the approved CEMP will ensure that each project can be implemented in an environmentally acceptable manner.
271. A detailed Resettlement Plan has been approved and consultation program has been undertaken with the Kongulai Spring community and the relevant authorities. This program is ongoing.

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APPENDIX A: Solomon Islands International Agreements

Solomon Island has been a party to some international agreements on the principles and actions necessary for sustainable development and environmental protection. This include international agreements with environmental and conservation implications as well as for the protection, promotion and safeguarding of cultural heritage and traditional knowledge.

Regional agreements include: (i) Pollution Protocol for Dumping. Ratified 1998. Prevention of pollution of the South Pacific region by dumping, (ii) Pollution Protocol for Emergencies. Ratified 1998. Co-operation in combating pollution emergencies in the South Pacific region, (iii) Natural Resources & Environment of South Pacific Region (SPREP Convention). Ratified 1998, and (iv) Waigani Convention on Hazardous & Radioactive Wastes 1995. Ratified 1998. Bans the importation and the trans-boundary movement and management of hazardous wastes within the South Pacific region.

International agreements on chemicals, wastes, and pollution include: (i) Liability for Oil Pollution Damage. Ratified. Liability of ship owner for pollution damage, (ii) (Marine Pollution Convention (London). Ratified. Prevention of marine pollution by dumping of wastes, (iii) POPs Convention (Stockholm). 2004. Bans use of persistent organic pollutants.

International agreements on biodiversity include: (i) CITES, ratified 1998. Regulates trade in wild animals and plants, (ii) World Heritage Convention. Acceded 1992. Protection of sites of Outstanding Universal Values, (ii) Desertification (UNCCD). Acceded 1999. Agreement to combat desertification and drought, (iii) Convention on Biological Diversity (UNCBD). Ratified 1995, and (iv) Cartagena Protocol on Biosafety. Acceded 2004. Protection of human health and the environment from possible adverse effects of modern biotechnology.

International agreements on climate change include: (i) Montreal Protocol. Acceded 1993. Phase out of substances that deplete the ozone layer, (ii) Ozone Layer Convention (Vienna). Acceded 1993. Protection of the ozone layer, and (iii) Climate Change (UNFCC). Ratified 1994, and (iv) Kyoto Protocol. Ratified 2003. Reduce greenhouse gases especially CO₂ by an average of 5.2% by 2012.

International agreements on culture and cultural heritage include: (i) World Heritage Convention. Acceded 1992. Protection of sites of Outstanding Universal Values. (East Rennell Island is listed as a World Heritage site), (ii) The Convention for the Safeguarding of the Intangible Cultural Heritage 2003, and (iv) The Convention of the Protection and Promotion of the Diversity of Cultural Expressions 2005

APPENDIX B: Site Photos



Plate 1: Current Kongulai Spring Site



Plate 2: Existing Kongulai Pump Station



Plate 3: Secondary vegetation in the area



Plate 4: Deciduous and grassland vegetation of the area- north of project site



Plate 5: Water cress – a food source grown at Kongulai stream



Plate 6: Consultation at Kongulai settlement

APPENDIX C: KONGULAI WATER TREATMENT PLANT PROJECT CONSULTATION MEETINGS (APRIL 2019 TO NOVEMBER 2019)

Meeting – Water Treatment Plant Project – 30th April 2019

Attendees: Ray Andresen, Agnes Atkin, Logino, Brian Vatohi

Objective: Joint site Visit with design team (Becca), at the same time to have Family initial discussion/consultation on the Proposed Project on Water Treatment Plant

	Action
Outline	<ul style="list-style-type: none"> - Session attended by 2 family members –Logina and Brian - Agnes discussed Purpose of site visit –SIWA proposed WTP project - Likely resettlement thoughts
Discussions	<ul style="list-style-type: none"> - Agnes and Ray discussed with Logino and son (Brian) the followings:- - a) The purpose of the visit is to show on site to the design team the extend of the topography survey carried out by JV’s surveyors - b) Agnes further explain SW WTP and new pipeline project (from pump house to Tasahe Tank) - c) Agnes initial resettlement discussion that there is likely that all the houses will be affected by the project and that they might have to be relocated therefore they need to have a thought as to where they will relocate to - d) Discussion continue on to get each house ownership detail. Detail as follows: 1st house: owner is Anthony Tebolo Vatohi (1st son), complete 2 bed room and incomplete 3 bedroom. See Fig 1 2nd house: owner is Brian Vatohi (5th son), complete 3 bedroom. See Fig 2 3rd house: owner is Lynes Vatohi, incomplete 2 bedroom. See Fig 3 4th Grave house of late Mrs Anna Longino. See Fig 4 5th house: owner is Emily Vatohi (4th daughter), complete 2 bedroom. See Fig 5 6th house: kitchen accommodates Dad– Longino bedroom and cooking area used by both Longino and Brian. See Fig 6 7th house: incomplete lodge. See Fig 7 8th shrine– Mary statue memorial. See Fig 8 9th house: owner is Lillian Vatohi (1st daughter), Temporary 2 bedroom house. See Fig 9 - e) Agnes discussed the thoughts around supporting and not supporting the project and respond was that–support because there is land to move to but they have building developments and question was asked as to what will happen to their developments. - Agnes responded that initial discussion now will form part and partial of the safeguard policy which covers resettlement. When asked as to what their expectations from the project they decided to do a family talk and will feed back later on next discussion. - Next discussion was not set
Actions	<ul style="list-style-type: none"> ➤ Ray and Agnes will have another discussion/family consultation at a date to be set ➤ Family to Contact title holder–Michael to discuss and resolve title grievances

	<ul style="list-style-type: none"> ➤ Discussion resolution to be conveyed to Agnes to assist in document preparation
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Key Findings

- ❖ Family welcomes the plan but will have to sit with rest of the family members
- ❖ Agnes and Ray to hold another consultation with the rest of the family

Fig 1. Anthony Tebolo Vatohi 2 houses



Fig 2. Brian Vatohi complete 3 bedroom house



Fig 3. Lynesi Vatohi incomplete 2 bedroom house



Fig 4. Grave house



Fig 5. Emily Vatohi complete 2bedroom house

Fig 6. Kitchen house

Fig 7. Incomplete Lodge



Fig 8. Shrine House
bedroom House



Fig 9. Lillian Vatohi temporary 2



Family Consultation MeetingDate: 13th June 2019

Subject: Water Treatment Plant Project

Attendees: Logino and family members (see attendance sheet attached)

Objective: -Re confirm the Re-settlement
 -Resettlement Plans according to ADB
 - Confirmation of site relocation

	Action
Outline	<ul style="list-style-type: none"> - Introduction - Agnes discussed Purpose of site visit -Follow up on previous meeting - ADB Safe Guard Policy (Affected Persons/Displaced Persons) - Likely resettlement thoughts - Relocation Site
Discussions	<ol style="list-style-type: none"> 1. A family member opened the meeting with a word of Prayer 2. Ray did the introduction by :- <ol style="list-style-type: none"> a) Thank you on behalf of SIWA b) Back ground of the project c) Initial ground work -seen people walk around d) Turbidity/debility-Main Issue (before clean water) e) SIWA -need to have WTP (Tank Like) f) Cost-if dirty water continue g) New Pipeline to Tasahe Tank h) Social media-call for GM to resign (Dirty water) 3. Agnes continue with the meeting in detail the followings:- <ol style="list-style-type: none"> a)going through the first initial meeting minutes dated 30th April 2019 for confirmation-minutes confirmed b)Explained the initial design work so far and the confirmation of the site for the WTP c)explaining the ADB requirement:- <ol style="list-style-type: none"> i)resettlement of affected Persons ii)SW Leasing the Land iii)Confirmation of Land Title holder-Lands (ROT) records d)get feedback thoughts on resettlement and resettlement location:- <ol style="list-style-type: none"> i)SW to build their complete house prior to moving ii)Identify area of location/resettlement-area already dozed next to the meeting location -191-074-10 iii)dispute over current title holder-resettlement is subject Land Title settled 4. General Comments- (Family Members) <ol style="list-style-type: none"> a)Resettlement ok but question is will SW build each one their complete houses on the relocation site b)Past experience SW promised land Owners but failed the promises c)Land Title to Michael is a stolen one, they have spent about 100k including Chupu for Land to be excluded from the tribal land and to be their own private family land d)They have for the past so many years-trustees did not recognize their existence and never had any share of the Kongulai Lease Payments f)Agree to relocate subject Land Title/Issue is settled 5. Closing Remarks <ol style="list-style-type: none"> a) Ray- Thank you, Touch on Past Premises raised, re-assurance of SW Abide by the MOU to be agreed on Later. b)Barnabas Upwe- Family/Community Senior re(Lawyer by profession-re iterating the Resettlement requirement by ADB c) Agnes-closing Prayer

Actions	Discussion Outcome:- 1)Agree for resettlement subject land issue is ironed out 2)Likely resettlement site identified 3)Family to set date to meet with Michael regarding Land 4.Feedback of meeting to Ray and Agnes
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Key Findings

- ❖ Resettlement is subjected to Land Title settlement

Kongulai Meeting: Stanley with Kongulai family Members

Date: 5th November 2019

Subject: Land Disagreements and Resettlement

Venue: Kongulai

Attendees: All Affected Persons, other family members, Stanley, Bernard, Ray, Agnes

Objective: - Land resolution
- Resettlement area resolution
- way forward

	Action
Outline	<ul style="list-style-type: none">- Prayer/Welcome- Introduction- Update discussions to date- Open discussion: -Land dispute solutions -resettlement plans- Way ford
Discussions	<p>Agnes:- opening the meeting with a word of prayer</p> <ul style="list-style-type: none">-welcome and special thank you to Stanley Teteha for organizing the meeting-clarification to all that Solomon Water presence is purposely to listen and take minutes and to answer questions if needed be- The meeting is purposely for themselves to sort out the land title in Dispute- for purposes of updating those family members who have not been part of the meetings been held so far, Agnes introduce the Project purpose, brief on meetings held and status of the last meeting held , ADB requirement regarding Land issue and resettlement-Hand over the next proceedings to Stanley <p>Stanley - words of thank you to every family members for attending the meeting</p> <ul style="list-style-type: none">- open up and invites family members to speak their hearts out <p>Tebolo - the meeting follows previous Stanley visitation and discussion with them regarding the resettlement</p> <ul style="list-style-type: none">- today discussion will be on land only weather to Lease or outright Purchase. Resettlement will be an internal matter for themselves to discuss with SW <p>Jaylyn - I am the one that disagrees all along these times</p> <ul style="list-style-type: none">- I have disagree with the title , why was there was no notice given for title transfer-SW requested us to relocate but we disagree because we want any of us to come in the title-now that we having this meeting can I ask my brother Stanley for -Kutu or any of them to come in the title- request that Pipeline trustees not to come in the title <p>Melisa - Not happy with Ray and Agnes regarding the survey done</p> <ul style="list-style-type: none">-the survey was done on GAINALI LAND, why did they been not informed- interest to know where would the project area covers and what is the total land area, How much would the land value- understand area of interest would also covers the access road, fear is that one day the access road will be block and by the time you will no longer be in office

	<p>Kutu - I have nothing to say but to tell what Michael say that is we wait for Stanley to arrive. Now Stanley is here and I am happy that Stanley is now facilitating this meeting to happen</p> <p>Stanley -Having listening to all the stories my decision is I will accept for the inclusion of 2 of your nominated representative to be in the title - for resettlement I will also can subdivide and give title to the resettlement land you want to move to</p> <p>Melisa - apologies on their behalf to SW (Ray and Agnes) for whatever disagreements/ unhappiness /unacceptable words thrown to you since the start of the negotiation</p> <p>Agnes - responded to the apology by Melisa by conveying on behalf of SW its apology as well for whatever SW did in action or words that also Not acceptable to you people.</p> <p>Bernard -words of thank you for the meeting held -Thank you for the good decision made which he believes will become a good blessing for them -advise for them is for both parties to work on a good agreement</p>
	<p>Discussion Outcome:-</p> <ol style="list-style-type: none"> 1)Agreement for 2 of Kongulai family to include in the title 2)Land to be Leased 3) Stanley is willing to subdivide out their resettlement land of interest and transfer title to them 4) resettlement to be discussed later with SW 5) an internal meeting to be held to decide who to come in the title and to discuss lease agreements

Key Findings

- ❖ Every family members happy with the meeting and with resolution made

Present: Barnabas Upwe (Legal Counsel – LO), Logino Vatehi (Affected Person rep), Stanley Teteha and Michael Hanikouna (Trustees), Bernard Gado (Chief), Mark Waite (SW PMU), Agnes Atkin (SW PMU), Ray Andresen (SW PMU), Relinta Manaka (SW Comms)

Venue: King Solomon

Date: 27/11/2019

Time: 11.00am

Items and Updates Discussed	Action	By When
<ul style="list-style-type: none"> • Brief overview of the UWSSP project to support water supply and sewerage improvement and reliability. 	Note	
<ul style="list-style-type: none"> • SW is keen to purchase land for the proposed Kongulai WTP • SW wants to continue dialogue and build relationship with key land stakeholders at Kongulai to understand land issues, boundary and resettlement issues. • SW understands that 8 households will be affected and will need to be relocated from the proposed project site. • SW will acquire alternate land for resettlement and title of the plot given to the affected party. • Alternate land for resettlement will be agreed upon with all affected parties and formal registration carried out. Option for title given to SW first and then transferred to affected person. 	Note Note SW All	
<ul style="list-style-type: none"> • SW wants to look into, discuss and agree on a resettlement option with affected party. Options include: <ul style="list-style-type: none"> ○ Compensate at full replacement cost for assets and properties affected. Agree on a market value and make payments. ○ Relocate affected properties on behalf of affected parties and improve or better housing ○ Build housing at resettlement site for affected parties. ○ Rental option during period for taking over site if livelihoods cannot be fully re-established immediately. • Re-establish any restricted access due to the project. • Compensation for loss of fruit trees and crops • Proposed work is urgent and SW intends to move in with option to rent during period for taking over site if livelihoods cannot be fully re-established immediately. Works may start around June 2020 	All	
<ul style="list-style-type: none"> • SW prefers outright purchase of the land for the project but is flexible and can accept lease arrangement through consensus. • There are 3 trustees in the Kongulai PE. Affected party wants to include 2 additional trustees. Current trustees agree to include 2 from AP on the affected land only if leased to SW. If land is purchased outright, then no need for inclusion but will be discussed between themselves outside of this meeting. 	Note	

Items and Updates Discussed	Action	By When
<ul style="list-style-type: none"> Provide a master plan of the proposed site through demarcation. SW to organise survey to confirm and establish the total land area required. Proposed land required is about 2 – 2.5ha. 	SW	Wk beginning 02/12/19
<ul style="list-style-type: none"> Plans for the types and cost of houses proposed for the affected people? 3 bedroom houses requested. Who is going to build the houses? SIWA is not going to build. 	Note	
<ul style="list-style-type: none"> Full access to the grave on site. Outside of land to be acquired. 5 m distances from propose fences. 	Note	

END

APPENDIX D: TASAHE PIPELINE ROUTE CONSULTATION MEETINGS (March 2020) – Concerns and Responses

Minutes of Kongulai/Tasahe Pipeline Project Consultation with Community

Date: 8th March 2020

Venue: Tasahe (Lower Tajelu)
 Time: 5.00pm
 Attendance: Attached

Item	Discussion	
1	Welcome/Opening Prayer	<ul style="list-style-type: none"> • Welcome by Solomon Water rep and opening prayer by community rep
2 & 3	Project Objectives & Details	<ul style="list-style-type: none"> • This is the first consultation meeting on the pipeline component of the main project • Project is to address the issue of water turbidity and Improve water supply to 24/7 • The two safeguards requirements are environmental and social (land, property, crops etc.) • Public Environment Report (PER) is about to be submitted to Ministry of Environment • Social safeguards work for the pipeline has commenced. After this community consultation for the affected people will be consulted further • Affected people will then enter into memorandum of understanding after agreements has been reached • At the end of the week consultations with affected people will be finalised and that also represents the cut of date for any claims • New pipeline has been designed after detailed survey work at the end of last year • New pipeline construction will be on SIG leased area • Old pipeline is not in the SIG leased area and will be made redundant • The new pipeline will affect several properties, fruit trees & crops • Initial survey of affected people has been done • As per safeguards policy avoid impacts of the project where possible and in the case this is not possible then need to minimize, mitigate and/or compensate where avoidance is not possible • In the next couple of weeks a UXO survey team is to commence work
4	Questions & Answers	<ul style="list-style-type: none"> • Q - Can you explain how you are going to deal with land owner and property owner for the affected people • R – Safeguards allow for dealing with land owners and property owners. Land owners are required to show ownership with legal land titles if there is loss of land and will be compensated. Affected property owners will also be relocated and compensated if there is loss of shelter (house etc.). This will be explained further during affected people consultation • Q – With the project can residents here apply for water connection

		<ul style="list-style-type: none"> • R – Currently Solomon Water requirements for new water connection are for an application to be made. An inspection will follow and the two key requirements to meet is if water supply is possible hydraulically and your land tenure. Land tenure of where you house is located and the reticulation pipe network. • Q – Can you explain why the old pipe is not located on the leased area • R – We do not have any historical records why this has occurred but according to some information in circulation this was a result of pipeline work happening first before actual survey work • Q – We really need water so can Solomon Water assist us on this? • R – As per my previous response Solomon Water will require land tenure ownership and if connection is hydraulically possible. It is best that you go and see our customer service based in the Solomon Water BJS office in Point Cruz for more information • Q – Why cannot Solomon Water just replace the current existing pipeline because there will be no affected persons as we already knew there is a pipeline there • R – The two main reasons why Solomon Water chose the new route is because first hydraulically it is the best route which will mean less energy cost for pumping. The second reason is Solomon Islands Government has a 75-year lease with land trustees representing the original landowners so making such changes is going to be complex in negotiation. Furthermore, the land acquisition will be costly as a lot of subdivisions have taken place since the existing pipeline was constructed in the early eighties. • Q – Can Solomon Water give at least a days’ notice for the affected person’s consultation. Some of us work in offices and will need time off if you want to visit during week days otherwise weekends are preferred. • R – The request is noted and accepted.
5	Going Forward	<ul style="list-style-type: none"> • This is the first consultation with the community • This coming week Solomon Water safeguards team will carry consultation with affected people and then draft agreements • UXO survey will also occur in a couple of weeks’ time • Solomon Water is happy with this consultation and will work closely with the community as much as possible • For any further information do not hesitate to contact the Project Management Unit team at Solomon Water
	Meeting close at 6.00pm	<ul style="list-style-type: none"> • Closing prayer by community rep

SOLOMON WATER

KONGULAI/TASAHE PIPELINE PROJECT COMPONENT CONSULTATION MEETING

ATTENDANCE LIST

8th March 2020

	Name	Contact
1	JERRY HITE	7386260
2	CHARLEY FIDALI	7265882
3	Aurence M. Hite	
4	Emily Smith	7869184
5	Gaylyn Korai	7191275
6	Carlton Kwin	7399536
7	JOE. HOLTZ	7789926
8	PAUL EGA	
9	BOBBY TOIFMI	8599913
10	Paul Kde	7722983
11	Leadly Zari	73048 7308411
12	Ben Kge	
13	Adrian Smith	
14	Alban Ramo	7872408
15	CALVIN GRANSON	7411114
16	Irene Pepera	7193774
17	Arnold HORESI	7808766
18	Immaculata Pepera	
19	Charles Pepera	7346737
20.	Elia Langhauer	
21.	Nathaniel Salini	7906030
22.	Meresiana Hanikouva	7278017

APPENDIX E: Grievance Log Information

Complainant Information (Person Reporting)

1. Name:
2. Address:
3. National ID:
4. Gender:
5. Contact Details - Telephone, Email
7. Type of complainant:
Affected person/s
Intermediary (on behalf of the AP)
Civil organization
Service organization (e.g., local government institution)
Other (specify)
9. Registration Number: - assigned by Projects Team

Complaint Details

10. Mode of receiving the grievance:
Letter
Phone call
Fax
Email
Verbal complaint (walk-in)
Other (specify)
11. Location of the problem/issue specified in the complaint:
Town:
Province:
12. Type of problem/grievance:
Land related
Compensation
Construction
Resettlement site
Other (specify)
13. Short description of the problem:
14. Short description of the factors causing the problem:
15. Person/agency responsible for causing the problem:
16. Past action/s taken by the complainant (if any):
17. Details of the focal point that received the complaint:

Name of the person who received the complaint:

Position: _____ Name of the receiving office: _____ Date: _____

18. Actions taken by the Receiving Office

Stage 1 Action taken; SW Responsible person; Outcome

Stage 2 Action taken; SW Responsible person; Outcome

Stage 3 Action taken; Tribunal Members; Outcome

19. Summary of Final Resolution

APPENDIX F: Agreement between Solomon Water and Lillian Vatohi for loss of Crops and future Income for the Loss of Income from Cocoa Trees

D. AGREEMENT AND RESPONSIBILITIES UNDER THIS AGREEMENT

6. *Off Site Agreement and Responsibilities*

6.1 House Compensation

- a) LILLIAN VATOHI has chosen the relocation option of self-relocation instead of the project sponsored resettlement site for economic reasons including availability of replacement and social reasons, LILLIAN VATOHI and Solomon Water agreed that:
 - i. Solomon Water will provide LILLIAN VATOHI cash compensation equivalent to the replacement estimated value of the approved 2 bedroom house of SBD \$375,000
 - ii. LILLIAN VATOHI will dismantle any materials from her current existing house on site effective from the date of signing this Agreement till in receipt of the *house, crop and loss of income assistance compensation.*
 - iii. LILLIAN VATOHI will forfeit cost provision for water and power access
 - iv. Solomon Water will meet the cost of transport hiring for moving and transporting movable items from current settlement site to new resettlement site at Kakabona. Cost estimate is SBD\$600 per Load x 2 =SBD\$1,200-00 (3 -4 ton truck)

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MT



6.6 Loss of Crop Compensation and Loss of Income Assistance

- a) Solomon Water will compensate LILLIAN VATOHI, an amount of **SBD\$1,985-00** dollars being for Loss of Crops based on the final survey Crop listing calculated basing on the Ministry of Agriculture Crop Rates.
- b) Solomon Water will further compensate LILLIAN VATOHI, an amount of **SBD\$17,865-00** dollars being for Loss of income assistance.



Appendix G - Letter of Support from the Ministry of Agriculture and Livestock with regard to Compensation Rates Paid by Solomon Water