



**Initial Environmental Examination
Honiara Water Supply Components
Guadalcanal, Solomon Islands**

**Prepared by Solomon Water, Solomon Islands for the
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Acronyms

ADB	Asian Development Bank
ANZ	Australian and New Zealand
AXO	Abandoned Explosive Ordonance
BCD	Bid and Contact Documents
BMP	Building Materials Permit
CAC	Community Advisory Committee
CCP	Communications and Consultation Plan
CESMP	Construction Environmental and Social Management Plan
CITES	Convention on International Trade in Endangered Species
CoL	Commissioner on Land
CLO	Community Liaison Officer
CSHSMP	Construction Site Health and Safety Management Plan
CSS	Country Safeguard System
DC	Development Consent
DN	Diameter Nominal
DED	Detailed Engineering Design
DMA	District Metered Areas
EARF	Environmental Assessment and Review Framework
ECD	Environment Conservation Division
EDS	Environmental Impact Assessment Decision Statement
EHSG	Environment, Health and Safety Guidelines
EHSO	Environment, Health and Safety Officer
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement (under the CSS)
EMoP	Environmental Monitoring Plan
ERW	Explosive Remnants of War
ESMF	Environmental and Social Management Framework
ESMP	Environmental and social management plan
ESO	Environmental Safeguards Officer (in the PMU)
FGD	Focus Group Discussion
GRM	Grievance Redress Mechanism
GBV	Gender Based Violence
GI	Gastrointestinal Infection
HCC	Honiara City Council
HDPE	High Density Polyethylene
HSP	Health and Safety Plan
IEE	Initial Environmental Examination
IP	Indigenous People

IPP	Indigenous Peoples Plan
IPPF	Indigenous Peoples Planning Framework
ISDS	Integrated Safeguards Data Sheet
IUCN	International Union for Conservation of Nature and Natural Resources
JICA	Japan International Cooperation Agency
MDAPC	Ministry of Development Planning and Aid Coordination
MECDM	Ministry of Environment, Climate Change, Disaster Management and Meteorology
MID	Ministry of Infrastructure Development
MLD	Million liters per day
MMERE	Ministry of Mines, Energy and Rural Electrification
MOFT	Ministry of Finance and Treasury
NDS	National Development Strategy
PCCSP	Pacific Climate Change Science Program
PER	Public Environment Report
PMU	Project Management Unit (in SW)
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
RF	Resettlement Framework
RP	Resettlement Plan
ROW	Right of Way
SBD	Solomon Island Dollars (code)
SIPA	Solomon Island's Port Authority
SPM	Safeguards Procedural Manual
SPS	Safeguard Policy Statement 2009
SW	Solomon Islands Water Authority trading as Solomon Water
TOR	Terms of Reference
UWSSSP	Urban Water Supply and Sanitation Sector Project
UXO	Unexploded Ordnance
WASH	Water Awareness, Sanitation and Health
WB	World Bank
WBSP	World Bank Safeguard Policies
WHO	World Health Organization
WSP	Water Safety Plan
WTP	Water Treatment Plant

EXECUTIVE SUMMARY

1. **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 safe water and improved sanitation in urban and peri-urban areas by implementing high priority components identified in Solomon Water’s 30-Year Strategic Plan and 5-Year Action Plan.
2. **Safeguards approach.** The Project overall comprises capacity building, a water awareness sanitation and health (WASH) component, and physical works—upgrading existing water supply transmission and distribution and installing new water supply 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) report is the assessment of the Honiara Water Supply Subprojects that have been identified as a result of the detailed design undertaken during 2020. The IEE, as per discussions with Environment and Conservation Division (ECD) is more or less equivalent to a public environment report (PER) as required for development consent application for the subprojects; the IEE has been reformatted as a PER and submitted with the application.
3. This IEE was conducted in accordance with ADB’s Safeguard Policy Statement 2009 (SPS) and with WB Safeguards Policies (WBSP) as set out in the EARF and the requirements of the country safeguard system (CSS) as set out in the Environmental Act (1998), Environment Regulations (2008) and Environmental Impact Assessment (EIA) Guidelines (2010). The document is an update of the initial IEE developed during the project preparation phase and this update is based on the detailed engineering design. The Project is deemed Category B for environment per ADB’s environmental screening, based on the most sensitive component, because the impacts are largely site-specific, related to the construction phase and can be readily mitigated and/or managed. This category is also appropriate under the WBSP. The IEE found no significant negative environmental impacts or risks that could not be mitigated. It was determined that a full environmental impact assessment was not warranted.
4. 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.
5. **Component/Subproject Description.** The subprojects covered in this IEE are located in Honiara City in the Province of Guadalcanal. The proposed projects for Honiara Water Supply are the following:
 - The proposed **trunk mains subproject** will increase the transfer capacity in the city to meet with future development through the implementation of: (a) replacement and strengthening of White River trunk main, from the future WTP to White River and Rove (6km length; 400 and 315 mm DN); (b) new trunk main from extending East Kola existing main tank to Kukum Highway, thus strengthening the distribution towards the coastal area, in both eastern and western directions (1.8km length; 315 mm DN); (c) new trunk main from Panatina reservoir towards the Eastern Part of the City – King George VI and Burns Creek (3.2 km length; 315 mm DN)
 - The proposed **service reservoir augmentation capacity subproject** will: (a) increase the storage capacity in the eastern part of the City to cope with future

development by implementing a new reservoir at the Panatina site (new 2.5 ML reservoir); (b) increase and secure storage at Tasahe by replacing the old steel tank (0.9 ML) with a new reservoir with greater volume (3 ML); and (c) increase the storage at Titinge (new 3ML reservoir).

6. **Anticipated impacts and mitigation measures.** Scoping and assessment of the subprojects have identified social and environmental considerations for the Project's pre-construction, construction and operational phases.
7. Pre-construction considerations include climate change vulnerability; updating of environmental and social management plan (ESMP) based on latest project design and components; integration of ESMP and development consent (DC) conditions in the bid and contract documents; update of the Project's communications and consultation plan (CCP); grievance redress and management (GRM); identification of materials sources, materials extraction and application for buildings material permit (BMP); biosecurity issues and potential introduction of alien invasive species; identification of sensitive receptors, cultural resources identification; land access arrangements and unexploded ordnance. Actions necessary to address pre-construction considerations will be included in tender documents and construction contracts.
8. Land acquisition and resettlement impacts have been avoided where possible (using existing land owned by SW or existing pipe easements). There are three groups of affected persons on the Titinge reservoir site: including (i) the registered landowner with four family members, (ii) the claimant sub-tribe, and the land occupier. The full payment for the land has been completed for both registered landowner and sub-tribe claimants. The remaining assets to be paid by SW are those of the land occupier. The payment will be in the form of a house and land, chosen by the land occupier, and purchased by SW.
9. Along the Kongulai-White River trunk main, there are 22 affected persons mostly belonging to extended families with at least 88 family members planting crops and trees along the proposed pipeline route which follows the existing pipeline easement along the Kongulai section.
10. Land and Resettlement Plans (LARP) have been developed for each sub-project and discussed with affected persons including compensation payments for permanent and temporary impacts. A feature of the project, most notably in the case of the Kongulai pipeline section, there has been water connections made to Affected Persons (APs) and surrounding households in the immediate vicinity as a form of compensation and as a measure to reduce existing and future commercial NRW levels. These tertiary networks and customer connections have been introduced into the project scope and in the resultant bidding documents.
11. The construction phase considerations are site access and clearance including potential disruption of utilities (power and communication cables); soil erosion and sedimentation control; disposal of excavation spoils; oil and hazardous materials management; dust control ; site waste management including demolition ; construction noise and vibration; traffic management; community and occupational health and safety; potential social issues due to influx of workers; potential damage to hidden archaeological and cultural assets; and demolition of an existing reservoir. Contractors will be required to prepare Construction Environmental and Social Management Plan (CESMP) based on the ESMP included as part of the environmental and social assessment. This CESMP will reflect their construction approach and methodology to ensure appropriate environmental and social management during the construction period including COVID-19 preparedness and response.

12. Operational considerations of the water supply subprojects will include health and safety risks during operation and maintenance e.g. handling and storage of chlorine. Operational impacts will be addressed by incorporating necessary measures, such as a water safety plan, use of appropriate operational procedures and ensure effective mitigation and monitoring plan for each subproject.
13. **Analysis of alternatives.** Analysis of alternatives include the alternative and option for White River and East Kola trunk main in terms of interconnection, alternative material for reservoir and alternative location for Titinge reservoir.
14. **Grievance redress mechanism.** SW has already established a grievance redress mechanism (GRM) and this is being applied to the project. The GRM is designed to deal with grievances from the general public in relation to SW managed projects at all stages of a project cycle.
15. **Environmental and social management plan.** Based on the Project's ESMP, contractors will be required to prepare their CESMP to ensure appropriate environmental and social management during the construction period. In responding to the Project's ESMP, the CESMP 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.
16. **Consultation and Participation.** SW conducted consultations during Project preparation and will continue to do so during the construction phases following the guidance set out in the Project's CCP. SW will publicly disclose any prepared project safeguard documents.
17. During feasibility study stage, SW conducted an initial public consultation in July 2018 to formally discuss the proposed subprojects with 24 stakeholders (six female and 18 male), including representatives of various civic organizations, community leaders and government officials. In February 2019, a second consultation was held which was attended by 48 stakeholders comprising of local and national government, CSOs, NGOs, and landowners to generate community feedback about the proposed project.
18. During detailed design stage, for trunk mains subproject, SW held consultations with the affected communities particularly the garden and structure owners in July 2020 to discuss the project and conduct an inventory of losses resulting from the replacement of old pipes and improvement of pipe alignment. Follow up consultations were held particularly prior to conduct of payment to the APs in December 2020 and to secure an agreement from one FTE holder to provide an easement access. For reservoir subproject, SW held individual consultations with the registered landowners and sub-tribe claimant to sell the land and with the affected land occupier to move from the site.
19. Lastly, a public hearing was conducted in February 2021 as part of the process for the approval of the PER and to disclose and consult further on the RP. Three sessions of public hearing were conducted, the first two were held on 25 February 2021 at 10:00 am in Namoruka and at 2:00 PM in Titinge. The third session was held on 26 February 2021 in National Auditorium.
20. **Conclusion and recommendations.** The findings of the IEE shows that no further environmental or social assessment is required. The IEE has been used to support the national environmental clearance and the development consent application(s). The recommendations are:

- The updated ESMP, IEE and the associated PER based on the detailed design, will be included in the bid documents along with any conditions of the development consent(s).
- It will be a requirement of the contract that each contractor will develop and submit a CESMP to SW which will be approved by SW-PMU prior to any physical works commencing.
- Construction contracts will also require the contractors to respond to the Project's CCP and GRM in their CESMP.
- Training of SW's personnel on operation and maintenance of the rehabilitated and new assets.
- 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.

1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

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 Sector Project (UWSSSP). This 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 Ministry of Finance and Treasury (MOFT) is the Project executing agency and SW is the implementing agency, operating through a Project Management Unit (PMU). To ensure compliance with required safeguards, the PMU will ensure that the Project will be implemented in accordance with the Project's Environmental and Social Assessment and Review Framework (EARF) and resettlement framework (RF).
3. The EARF has been prepared which establishes the process and procedures that must be followed for the screening, assessment, review and monitoring of each component or subprojects that will be prepared during Project implementation. The EARF will ensure that during implementation, the components, and the Project overall, will comply with the requirements of the country safeguards system (CSS), WB's Safeguard Policies (WBSP) and the ADB's Safeguard Policy Statement 2009 (SPS).
4. In addition to the EARF, this Initial Environmental Examination (IEE) has been prepared for the water supply component covering the subprojects identified for the City of Honiara¹ notably the trunk mains subproject to increase the transfer capacity in the city to meet with future development and the service reservoir augmentation capacity subproject to increase the storage capacity in the eastern part of the City to cope with future development.
5. The IEE provides the baseline conditions, an assessment of the environmental impacts and risks created by the subprojects during pre-construction, construction, operations, and maintenance. It is based on field visits to the proposed subprojects' areas; review of available information; and discussions with government agencies and communities in subproject areas.
6. Following the EARF guidelines, the Project has been screened as Category B based on 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 and social management plan (ESMP).

1.2 SCOPE AND OBJECTIVES OF THE STUDY

7. The main objective of this assessment is to identify potential environmental and social impacts of the water supply sub-projects and the necessary measures that will ensure the

¹ This IEE does not cover the Kongulai Water Treatment Plant subproject which is the subject of separate documentation.

proposed project mitigates any potential adverse impacts on the environment and communities during project construction and implementation.

8. The assessment was undertaken in full compliance with the Country Safeguard System (CSS) including Environment Act 1998 and Regulation 2008. In addition, appropriate sectoral legal provisions relevant to such project have also been referred to for the necessary considerations during the pre-construction, construction, and operation of the project.
9. Specific objectives of the study include (but not limited to) the following:
 - Define the project area for each subproject and establish the environmental baseline conditions through review of available information and data and additional surveys/investigations where required;
 - Describe the works and activities that will be undertaken at each of the locations;
 - Based on the above identify environmental impacts associated with the proposed project implementation;
 - Describe the consultation activities and feedback;
 - Establish a comprehensive ESMP which will address the impacts expected during pre-construction, construction, and operation phases of the project.

2.0 ADMINISTRATIVE, LEGAL AND POLICY FRAMEWORK

10. The environmental safeguard requirements of the Project will be implemented to comply with Solomon Islands' laws and regulations (as comprised in the CSS) and the SPS and WBSP.

2.1 COUNTRY SAFEGUARDS SYSTEM

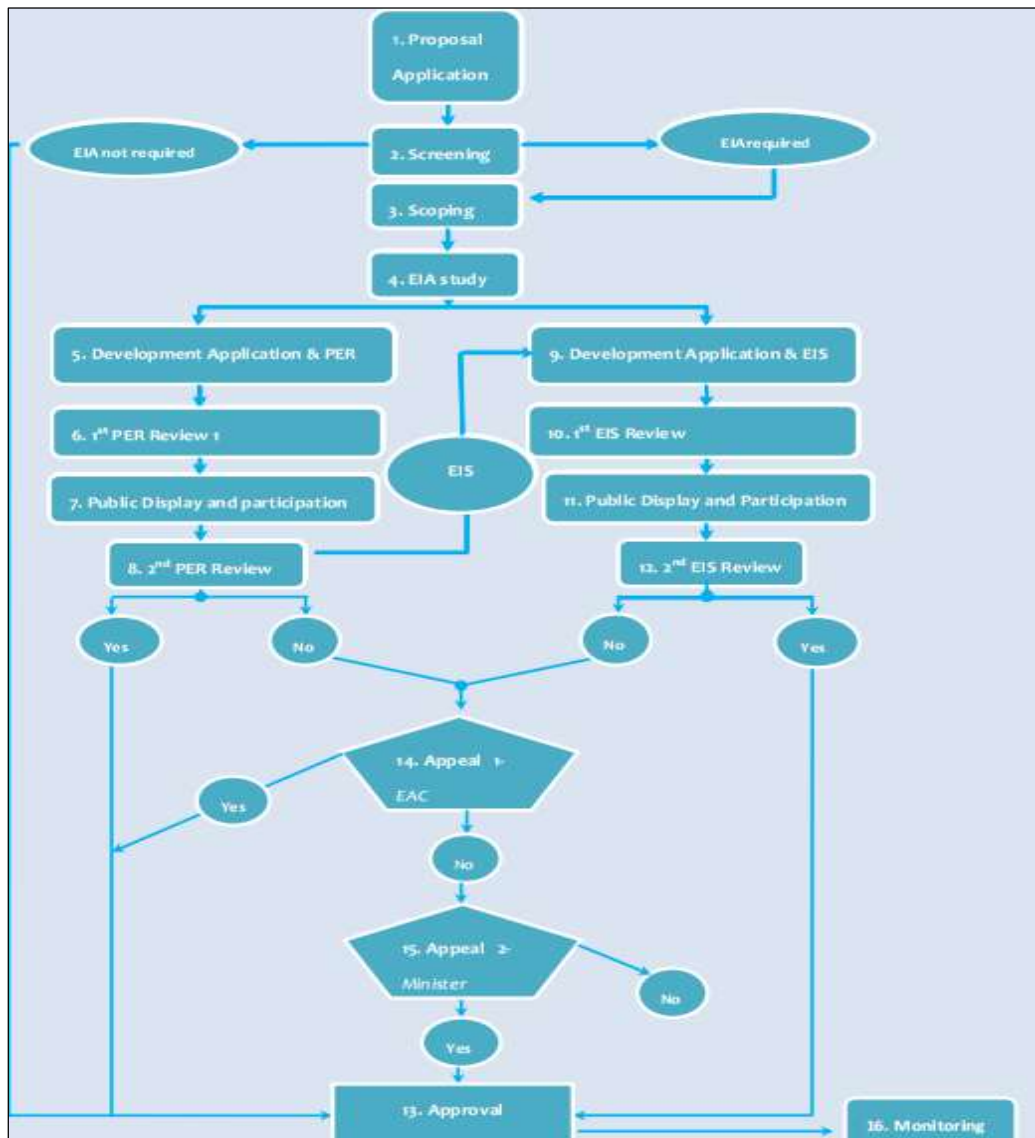
2.1.1 Environment Act (1998)

11. The Environment Act (1998) provides the legal basis for environmental protection and management. It provides the foundation of the Solomon Islands' environmental impact assessment (EIA) system, under the jurisdiction of the Environment and Conservation Division (ECD) of the Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM).
12. The Environment Act requires one of two levels of environmental assessment, depending on the scale and anticipated impacts of a development proposal as listed in the Second Schedule: (i) PER or (ii) environmental impact statement (EIS) for developments which may cause more serious impacts. The Environment Regulations 2008 (see below) further defines the procedures for undertaking the environmental assessment of projects and the process of issuing Development Consent (DC).
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) which include standards for a range of parameters including air and water quality.

2.1.2 Environment Regulation (2008)

14. The Environment Regulation was published in 2008 and enforced to effectively ensure the implementation of the Environment Act. The Environment Regulations 2008 entails detailed requirements for EIA on "prescribed" developments listed in second schedule of the Environment Act. All prescribed developments require a simple assessment through "screening" or "scoping" process, to see what form of additional assessment is required. Most development projects require a PER, while many major projects will also need a second stage of appraisal which include technical, economic, environmental, and social investigations presented in an EIA or EIS report. The project components are included in the prescribed developments under item 9. Public Works Sector including infrastructure developments and reservoir developments of the second schedule of the Environment Act of 1998. The project needs to undergo some form of environment impact assessment as detailed in the regulation. The 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.
15. **Environment Impact Assessment Guideline, 2010:** The EIA guideline is designed to administer the schedule 16 of the Environment Act 1998. The guideline comprises of EIA procedural descriptions, stakeholders in the EIA process (see **Figure 2-1**) and fees required for development type. "The guideline was prepared by the ECD with the aim of simplifying the procedures in the Act, provide basic advice and guidance to government officers, planners, developers, resource owners on the environment impact assessment process" (MECDM, 2010).

Figure 2-1: Procedural steps of EIA



16. **Environmental Permits required for the Project:** Under the Environment Regulation (2008), any developer must submit an EIA Report to the MECDM for any prescribed development. The Ministry would also require an environmental management plan (EMP) and a corporate policy for each of the companies that involved in the project development.
17. The Director shall not issue any development consent under this part, if the following had occurred:
 - The PER or EIS did not support the application;
 - The discharge of waste, noise, odour, radiation, or other forms of pollution is inevitable; or
 - The discharge of waste or emission of noise, odour or electromagnetic radiation would be harmful to the environment.
18. **Environmental Impact Assessment Decision Statement (EDS):** The EDS will be issued by the Ministry of Environment upon satisfactory review of the EIA. The process is that upon receiving the PER or the EIS Report, the Director of Environment shall convene

a meeting (or a Public Hearing) and the Director shall receive both oral and written submission from any person in relation to the application.

19. The Director, within 15 working days, will issue a development consent if there is no objection made on the application.
20. The Director may also amend the license, if the discharge or emission will be carried out in manner consistent with all relevant environmental policies.
21. **Application to this Sub Project:** During preliminary phases of UWSSSP an initial IEE undertook the different steps (1 to 4). Following detailed design an initial development consent application (PER) was submitted to MECDM and discussed at a meeting of the 01 October 2020. Following revision of the PER submitted to the MECDM on the 18 December 2020, a Public Hearing (Step7) was held in Honiara on the 25-26 February 21. To streamline the public consultation process, the resettlement plan (RP) developed under the project was also disclosed and discussed at these public hearings. It was decided following this meeting that no further environmental assessment is required, and a PER is sufficient for further review. The development consent for the sub-projects has been provided during March 2021.

2.1.3 Waters Resource Bill

22. **Rivers and Water Act (1996)** was enacted to administer and control developments that would impact on a river. The Act, however, only applies to rivers that have been designated under the Act. This means that all activities taking place within and around the vicinity of the declared Rivers are governed under the Rivers and Waters Act 1996.
23. **Waters Resource Bill (2006)** has been prepared to go through parliament and if approved, passed, and published, it will supersede the Rivers and Water Act (Revised edition 1996). The purpose of the Act is:
 - To provide for the integrated water resource management of Solomon Islands;
 - To promote the most efficient, fair and beneficial use of natural water;
 - To ensure the natural water resources are available for the sustainable use for the benefit of all present and future Solomon Islanders;
 - To provide for the protection of natural watercourses and water catchments;
 - To provide for the control of activities occurring over or beside waterways or watercourses
24. The Act requires a Waters Resources Advisory Board, whose function is to advise the Minister on matters pertaining to the Act and consult with the Director of Water Resources on technical matters. The Director with his/her staff shall administer, manage, and implement the Act accordingly to achieve the purpose of the act. The Act covers all water bodies, rivers, streams whether in a registered or non-registered, public, or private or customary land in Solomon Islands.
25. The Water Resources Department is located within the Ministry of Mines, Energy & Rural Electrification (MMERE). The Ministry has the authority to control the use and development of all water catchments and riverbanks. Logging, mining and sands and gravel extraction in water catchments, riverbanks and riverbeds may be restricted by the Ministry according to the requirements of the catchment management and conservation. Section 21 of the Act provides for the Ministry to recommend to the Board to declare a water body such as a catchment, groundwater, or flood control zone as a Water Control Area. If approved by the Minister and published, mining of sand and gravel will be prohibited. This also includes any contraction, altering, removing or in any way impede or be likely to impede flow or

movement of surface water. This clause of the Act is significant as it may have a direct impact to sand and gravel extraction in the future if the current activities are not sustainably managed.

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

2.2 OTHER RELEVANT LAWS

27. **Environmental Health Act 1980.** This Act 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.
28. **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.
29. **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.
30. **Mines and Minerals Regulation, 1996** complements and gives a clear detail of the Mines and Minerals Act. It further elaborates on the needs for a better step for achieving a sound minerals resource administration and management in the country. The Regulation has provisions that specify mineral rights holders which include BMP holders, to adhere to good mining practice so that their activities result in minimum ecological damage or destruction, prevent avoidable damage to trees and avoid harm to freshwater, marine and animal life.
31. **Labor Act 1978.** This act deals with protections for workers. Part IX Care of Workers requires the employer to provide workers with rations (Article 65); protect workers and dependents from malaria (Article 66); provide workers with an accessible supply of clean, non-polluted water for drinking, washing and for other domestic purposes (Article 67); make sufficient and proper sanitary arrangements for workers (Article 68); provide accommodation for the worker and family if they are not conveniently located to the workplace (Article 69). Article 70 requires the employer to provide medical care at the workplace including: (i) treatment facilities, medicines, first aid equipment and transportation facilities; (ii) responsibility to move workers as quickly as possible either to the employer's treatment facilities or to the nearest medical facilities; (iii) treatment for workers or hospitalization; and (iv) should a worker die the employer is obliged to pay for funeral costs. Article 71 states that the employer may be required to provide medical facilities and services of a medical practitioner and the employer is to maintain a register of workers treated.
32. **Safety at Work Act, 1996** states that it is the duty of every employer to provide a safe workplace and to ensure the health and safety of employees under his control. This Act is linked to the Labor Act of 1978.
33. **Biosecurity Act 2013.** This Act is to prevent the entry of animal and plant pests and disease to Solomon Islands; to control their establishment and spread in Solomon Islands, to regulate the movement of animal, plant pest and diseases and of animals and plants

and their products; to facilitate international cooperation in respect of animal and plant diseases and related matters. The Act is supported by Bio-Security Regulations 2015.

34. **Wildlife Protection and Management Act 1998.** This law provides for the protection, conservations, and management of wildlife in Solomon Islands by regulating the export and import of certain animals and plants. It is also intended to address the compliance of the obligations imposed on Solomon Islands under the Convention on International Trade in Endangered Species (CITES). It provides lists of: (i) “Prohibited or Restricted Exports” in Schedule I, (ii) and “Regulated and Controlled Species” in Schedule II. It was amended in 2017 to strengthen Solomon Islands’ compliance to the requirements of CITES.

2.2.1 International agreements

35. 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 provided as **Appendix 1** of this document.

2.3 ADB SAFEGUARD POLICY

36. 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.
37. 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. The water supply components have been deemed category B for environment based on the significance of its potential environmental impacts and risks. An IEE (more or less equivalent to a PER) is the appropriate level of assessment for a category B project.
38. An EARF has been prepared which establishes the process and procedures that must be followed for the screening, assessment, review and monitoring of each component or subprojects that will be prepared during Project implementation. The EARF will ensure that during implementation, the components will comply with the requirements of the country safeguards system (CSS), WB’s Safeguard Policies (WBSP) and the ADB’s Safeguard Policy Statement 2009 (SPS). As prescribed in the EARF, the IEE was prepared for this project component.
39. The SPS requires compliance with the ADB Environment, Health and Safety Guidelines (EHSG). The EHSG requires that workers be provided with a safe and healthy working environment, considering inherent risks, any hazards in the work areas, including physical, chemical, and biological hazards. The EHSG requirements are integrated into the ESMP.

2.4 WORLD BANK SAFEGUARDS POLICIES

40. The WBSP aims 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.

41. The WBSP include ten safeguard policies established to inform decision making, ensuring that projects financed by the WB are environmentally and socially sustainable. The water supply subprojects may be covered by these policies: Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), Indigenous Peoples (OP/BP 4.10), Physical Cultural Resources (OP/BP 4.11) and Involuntary Resettlement (OP/BP 4.12). **Table 2-1** presents these policies and their applicability to the component.
42. 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. When host country regulations differ from the levels and measures presented in the EHSG, projects are expected to achieve whichever is more stringent.

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

Table 2-1: World Bank Safeguard Policies: Main Objectives, Applicability and Triggered by the Sub-Projects²

Safeguard Policies	Main Objective	Applicability	Application to Honiara Water Supply Components
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.	This policy is applicable when a project or sub-project has potential to cause negative environmental impacts in its area of influence.	<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 (RF) establish the process to mitigate these impacts. Consultations with stakeholders and affected communities are used to inform the decision-making process.</p>

² This table was taken from the EARF of the UWSSSP. The application to the Honiara Water Supply is explained in the last column.

Safeguard Policies	Main Objective	Applicability	Application to Honiara Water Supply Components
OP 4.04 Natural Habitats	<p>This policy recognizes that the preservation of natural habitats is essential to protect original biodiversity, for the preservation of environmental services and products for human society and for long term sustainable development. 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. 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.</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 has not essentially modified the area's primary ecological functions.</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>
OP 4.10 Indigenous Peoples	<p>For all projects proposed for 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. The projects financed by the Bank are designed with the assurance</p>	<p>This policy is applied when the Project affects direct or indirectly indigenous people.</p>	<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>

Safeguard Policies	Main Objective	Applicability	Application to Honiara Water Supply Components
	<p>that indigenous people receive social and economic benefits that are culturally appropriate and adequate gender and inter-generations.</p>		<p>The project will focus on rehabilitating failed water supply 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>
<p>OP 4.11 Physical Cultural Resources</p>	<p>The objective of this policy is to assist countries to avoid or mitigate adverse impacts on physical cultural resources from 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>This policy is used by any Project or sub-projects considered as potential to cause changes (loss) or degradation of physical cultural resources.</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>Triggered</p> <p>The project involves construction works in modified urban and peri-urban areas, where it is unlikely that unknown physical cultural resources will be encountered. In the case of the Kongulai-White river trunk main the pipeline has been re-routed to avoid known cultural features ie. graves.</p> <p>However, a Chance Find procedure will be included in the CESMP 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</p>

Safeguard Policies	Main Objective	Applicability	Application to Honiara Water Supply Components
			<p>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>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.</p> <p>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 RF for any project or sub-project.</p>	<p>Triggered</p> <p>The projects involve small amount of land acquisition and impacts related to use of easement for new trunk mains.</p> <p>A RF has been prepared to assess potential impacts and outline measures to avoid, mitigate or manage these impacts. In the case land access is required, a Resettlement Plan (RP) will be developed. Communities will be consulted to ensure there are no pending issues. A formal grievance redress mechanism will be established to channel and manage potential grievances arising during project implementation.</p>

³ Guidance Note 8 - International Finance Corporation

2.5 OTHER RELEVANT POLICIES

43. The following policies are important consideration in terms of services provided by SW in the country.

2.5.1 National Development Strategy (NDS)

44. The National Development Strategy (NDS) is a very comprehensive policy that strategizes ways to achieve the development aspirations of the country. The NDS focuses on two key areas: social and economic livelihoods. These two key areas are enshrined into the NDS National Vision "Improving the Social and Economic Livelihoods of all Solomon Islanders".
45. Therefore, to achieve all those NDS Objectives, SW as one of the country's SOE ensures that it provides access to clean water to its clients. Being an SOE, SW strives to improve the quality and accessibility of water it provides to households, government houses, business houses and industries in the urban areas. Such is important to improving the social and economic livelihoods of people and more so to support growth and economic development of the country.

2.5.2 Climate Change Policy

46. The Solomon Islands Government through the MECDM launched the Climate Change Policy, highlighting steps the government would take in aiding the country and its people to exist and adapt to present imminent climate change and its impact. The Policy aims to integrate climate considerations within the framework of national policies and guiding the government and its partners so as to ensure the people, natural environment and economy of the country are resilient and able to adapt to the predicted impacts of climate change.
47. **National Climate Change Policy 2012-2017** is the guiding framework to: (a) integrate climate considerations and support the implementation and achievement of the National Development Strategy and other regional and international policies and frameworks; and (b) to guide the government and its partners' efforts in ensuring that; (i) the people, natural environment, and economy of the country are able to adapt to the predicted impacts of climate change; and (ii) the country benefits from clean and renewable energy, energy efficiency, and mitigation technologies that improve people's livelihoods and the national economy.

2.5.3 National Energy Policy

48. The National Energy Policy recognizes the importance of reducing dependency on imported fossil fuel. Solomon Islands have abundant of resources renewable energy source such solar, hydropower, geothermal and biomass and wind energy.

2.5.4 Unexploded Ordnance (UXO)

49. Technically WWII ordnance found in the Pacific Islands can be defined as either unexploded ordnance (UXO) or abandoned explosive ordnance (AXO). UXO is defined as explosive ordnance that has been primed, fused, armed, or otherwise prepared for use in armed conflict but has failed to explode. AXO is defined as explosive ordnance unused during an armed conflict and subsequently abandoned or left behind. UXO and AXO are defined collectively as Explosive Remnants of War (ERW). Solomon Islands was the scene of bitter fighting during World War II. While this was over 60 years ago, UXO may still be found around Solomon Island. Should UXO be discovered at the project site, the contractor is to immediately cordon off the area, arrange the evacuation of nearby

residences and inform relevant division within the Royal Solomon Island Police Force (RSIPF) to remove the UXO. Currently all UXO/AXO finds are reported to the RSIPF who arrange the pickup, transport, storage, and ultimate disposal of the finds.

50. Based on a risk assessment, construction sites will be swept for and cleared of UXOs/AXOs prior to construction by SW; it is nevertheless important that a chance find procedure for handling the UXOs/AXOs during the construction is included in the contractor's Construction Environment and Social Management Plan (CESMP). This will be the responsibility of the contractor. Ultimately, SW will be responsible for the supervision and monitoring of the contractor.

2.5.5 COVID-19 Pandemic Control

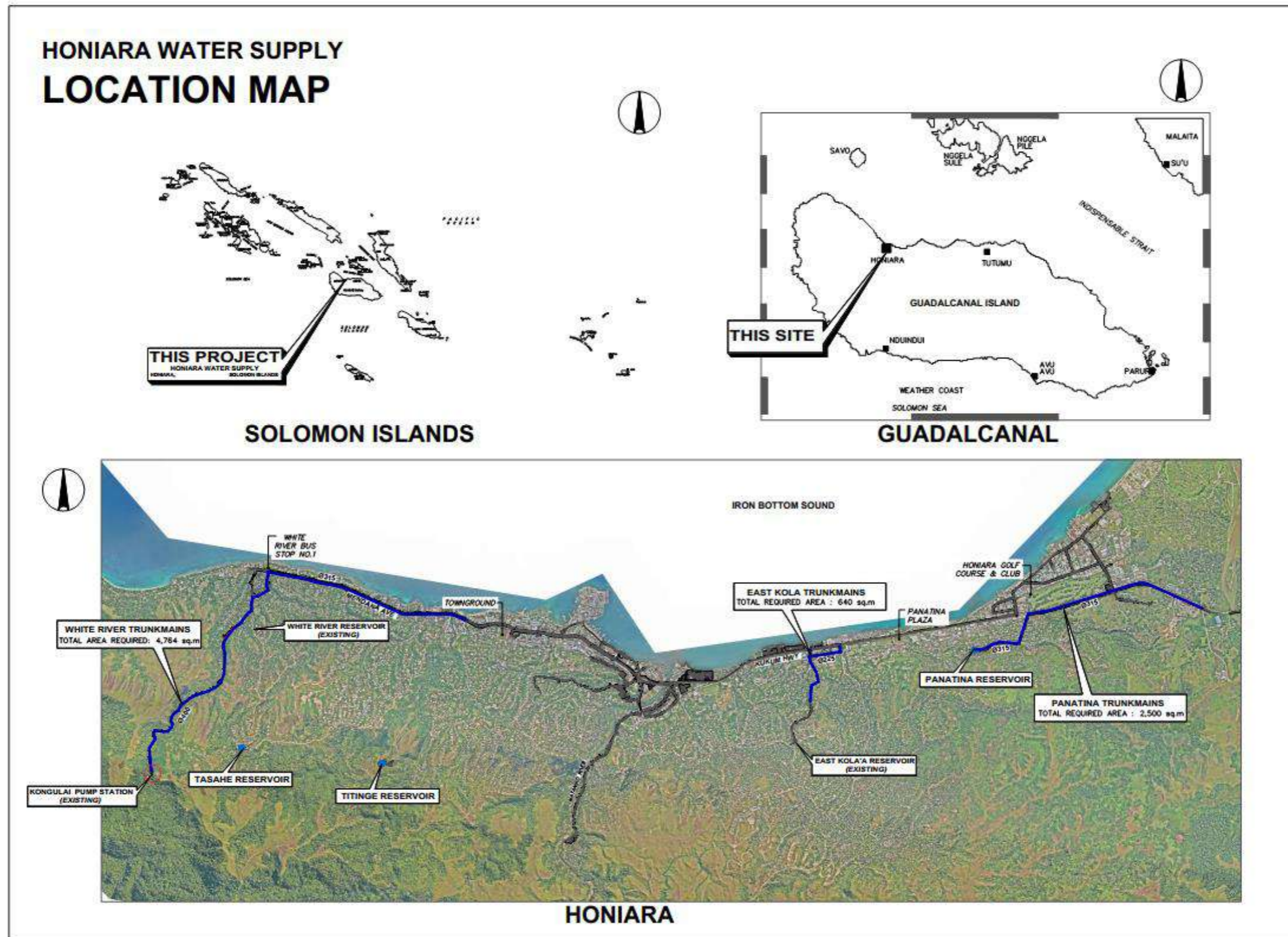
51. The ESF/Safeguards Interim Note is provided as Appendix 4.

3.0 PROJECT DESCRIPTION

3.1 PROJECT COMPONENT'S LOCATION

52. The Project is located in Greater Honiara (comprising Honiara City itself and external linked suburban areas) in the Province of Guadalcanal, in the Solomon Islands. The Greater Honiara is the largest urban area and Honiara City is the capital of the Solomon Islands.
53. The water supply subprojects covered in this IEE and to be financed under UWSSSP cover the following:
 - Trunk mains
 - Reservoir
54. **Figure 3-1** shows the location map of proposed Project for Honiara water supply.

Figure 3-1: Proposed Project for Honiara Water Supply



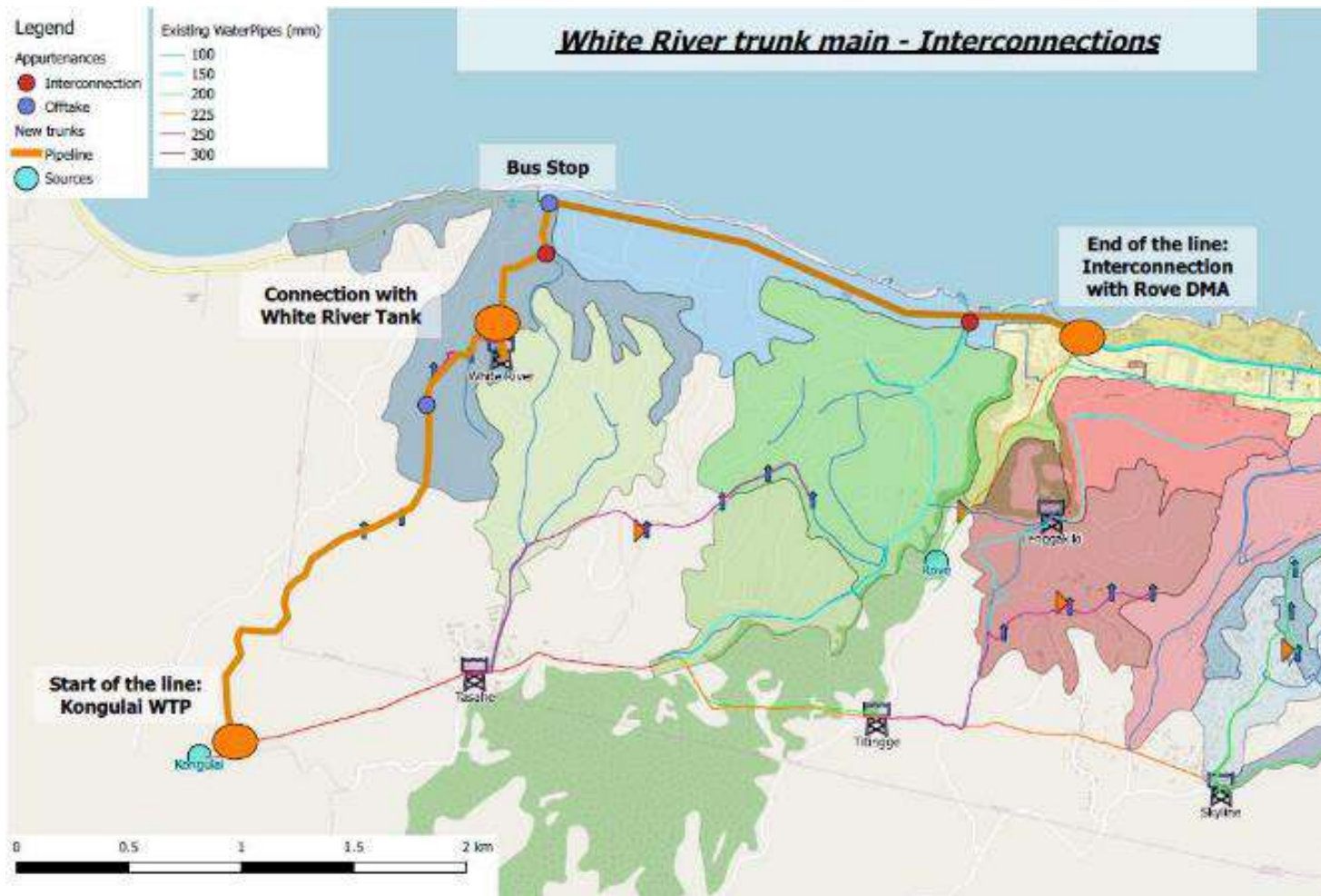
3.1.1 Honiara Trunk Mains Subproject

55. This subproject consists of the
- Replacement of an existing trunk main in the White River Section;
 - New trunk main from East Kola tank to Kukum Highway;
 - New trunk main from Panatina reservoir towards the Eastern Part of the City – King George VI and Burns Creek.
56. A corridor of maximum 2.5m from each side of the pipe (i.e. 5m maximum corridor) is defined. All impacts have been based upon this level of disturbance.

White River Trunk Main

57. **Project Objectives:** The aim of the sub-project is to secure and reinforce the western part of Honiara network and the gravity system from Kongulai spring, in relation to the construction of the new Water Treatment Plant (WTP) at Kongulai (additionally financed under UWSSSP). The benefits of the new transmission system are: many:
- Improve existing water supply service and solve pressure issues;
 - Ensure distribution capacity for long term requirements of White River area;
 - Enhance system resilience by developing interconnections and transfer capacity with adjacent distribution system, notably Rove. Interconnection with White River tanks will also provide a back-up option or complement to the boreholes; and
 - Rationalize existing distribution and enable better monitoring of the system.
 - Contribute to reducing NRW in the White River DMAs.
58. **Location of Pipeline.** In line with the outline design, the White River trunk main is proposed to be installed between Kongulai production site and Rove interconnection. It is envisaged that the trunk main will start from the future clear water tank at Kongulai WTP site and connect by pipeline with White River tanks along the pipeline route.
59. The total length of the White River trunk main is 6 km. The pipeline route includes approximately 2.5 km along Mendana Avenue. The envisaged location of the pipeline is presented in **Figure 3-2**.

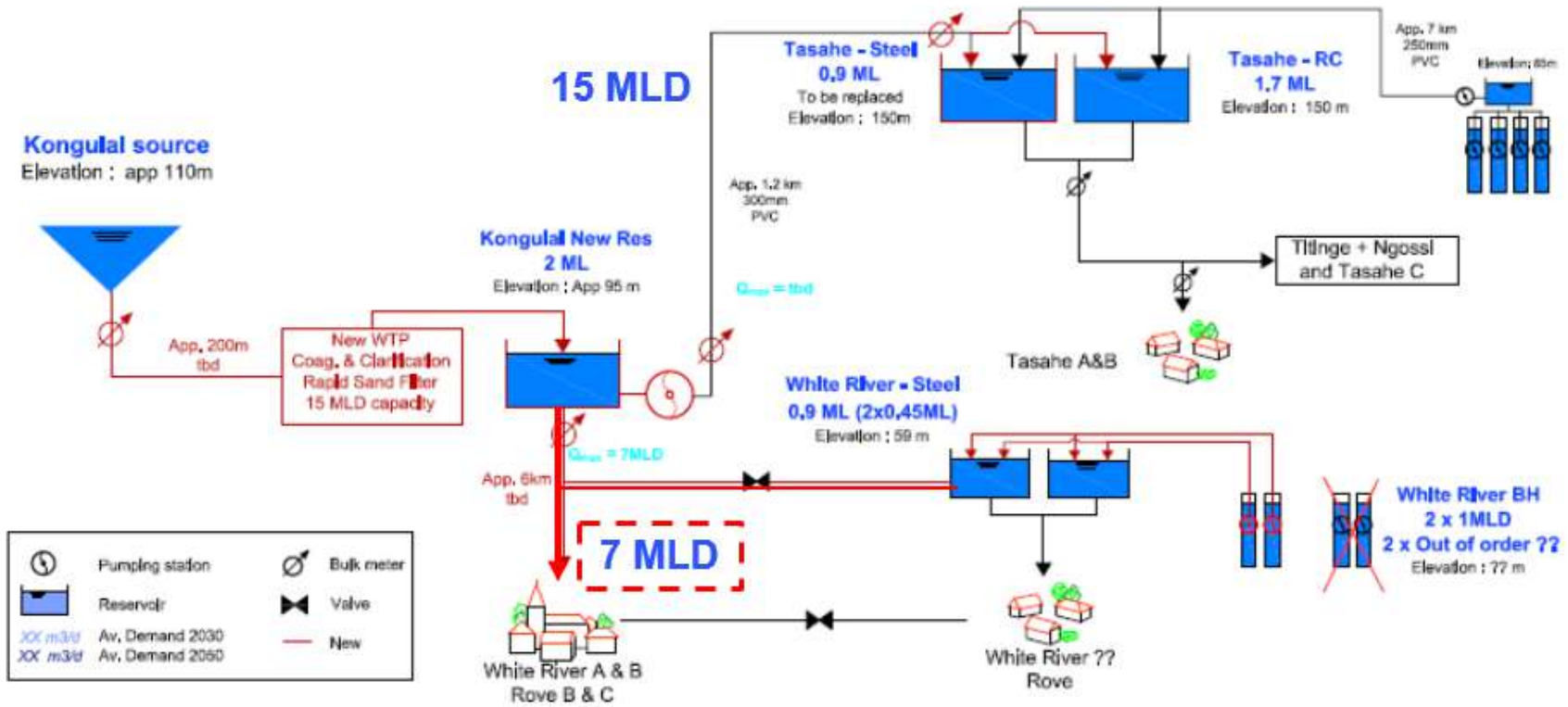
Figure 3-2: Proposed Location of White River Trunk Main



Source: SW PRF BOD Honiara WS, September 2019

60. The pipeline will replace the existing transmission main between Kongulai and White River area, up to 01 Bus Stop area (connection with Mendana Avenue). The new pipe will be installed along the existing pipe route which will be decommissioned upon completion of the works. For the lower part, from White River to Rove, the new trunk main will be installed in parallel with existing lines and will be used as a conveyance pipe with interconnections with existing system at strategic locations.
61. It should be noticed that the upcoming road works along Mendana Avenue is likely to change the organization of the network should existing pipes be removed from the new road footprint.
62. It is proposed to connect the new trunk main with the White River tank, possibly using the existing pipe. Although White River tanks would normally be supplied from the bore field, this would provide greater flexibility should the tanks be supplied from Kongulai.
63. **Design Flow.** The design flow for this trunk main is 7 MLD. This design flow is consistent with:
- Short term demand of both White River and Rove areas according to the strategic plan: 7.2 MLD in the 5 Year plan. Hence, the pipe will have the capacity to supply both zones if required (e.g. interruption of Rove source).
 - Long term demand of White River considering future development according to the strategic plan: 7.2 MLD in the 30 Year plan
 - The majority of the flow (i.e. not less than 8 MLD out of the expected 15 MLD) from Kongulai will be directed toward Tasahe reservoir to benefit from the available head.
64. Furthermore, this pipe will be used for distribution with storage upstream. Consequently, hourly peak needs to be applied to determine the design flow for pipe sizing purpose. Based upon a maximum daily flow of 7 MLD and an hourly peak of 1.75, the design flow is fixed at 510 m³/h.
65. **Figure 3-3** summarizes the future functioning of the Kongulai/White River system, highlighting the location of the trunk main.

Figure 3-3: Flow Diagram of Kongulai, Tasahe and White River Future Functioning



Source: SW PRF BOD Honiara WS, September 2019

66. **Pipe Sizing.** The existing pipeline is insufficient to supply the design flow. Therefore, it is necessary to increase the transfer capacity by strengthening the pipeline. Based on hydraulic calculation, 400 mm (external diameter) appears to be the most suitable pipe diameter for White River trunk main. For hydraulic optimization, it is proposed to reduce the diameter for the last part of the main trunk, between Bus Stop and Rove where the maximum expected flow would be reduced from the design flow. Based on hydraulic calculations, a 315 mm pipe is sufficient to ensure an adequate hydraulic performance while reducing the investment cost.

East Kola Trunk Main

67. **Objective:** The aim of the work is to increase the transfer capacity in the eastern part of the distribution system from East Kola reservoir. In doing so, the benefits of the new transmission system are:
- Improve existing water supply service, especially in the northern edge of the distribution zone;
 - Ensure distribution capacity for long term requirements and future development;
 - Enhance system resilience by developing interconnections and transfer capacity with adjacent distribution systems, notably Lower West Kola and Panatina; and
 - Improve flexibility with regard to long term plans with the possibility of supplying East Kola tank from the coastal zone.
68. **Location of Pipeline:** East Kola trunk main is proposed to be installed between East Kola tank and Kukum Highway. Starting from the reservoir, the trunk main will go down to the coastal area where it will then connect to existing mains along Kukum Highway at two locations: at Kukum and Vura.
69. Accordingly, the total length of East Kola trunk main is expected to be approximately 1.8 km. The envisaged location of the pipeline is presented in **Figure 3-4**.

Figure 3-4: Proposed Location of East Kola'a Trunk Main (on landscape page by itself)



Source: SW PRF BOD Honiara WS, September 2019

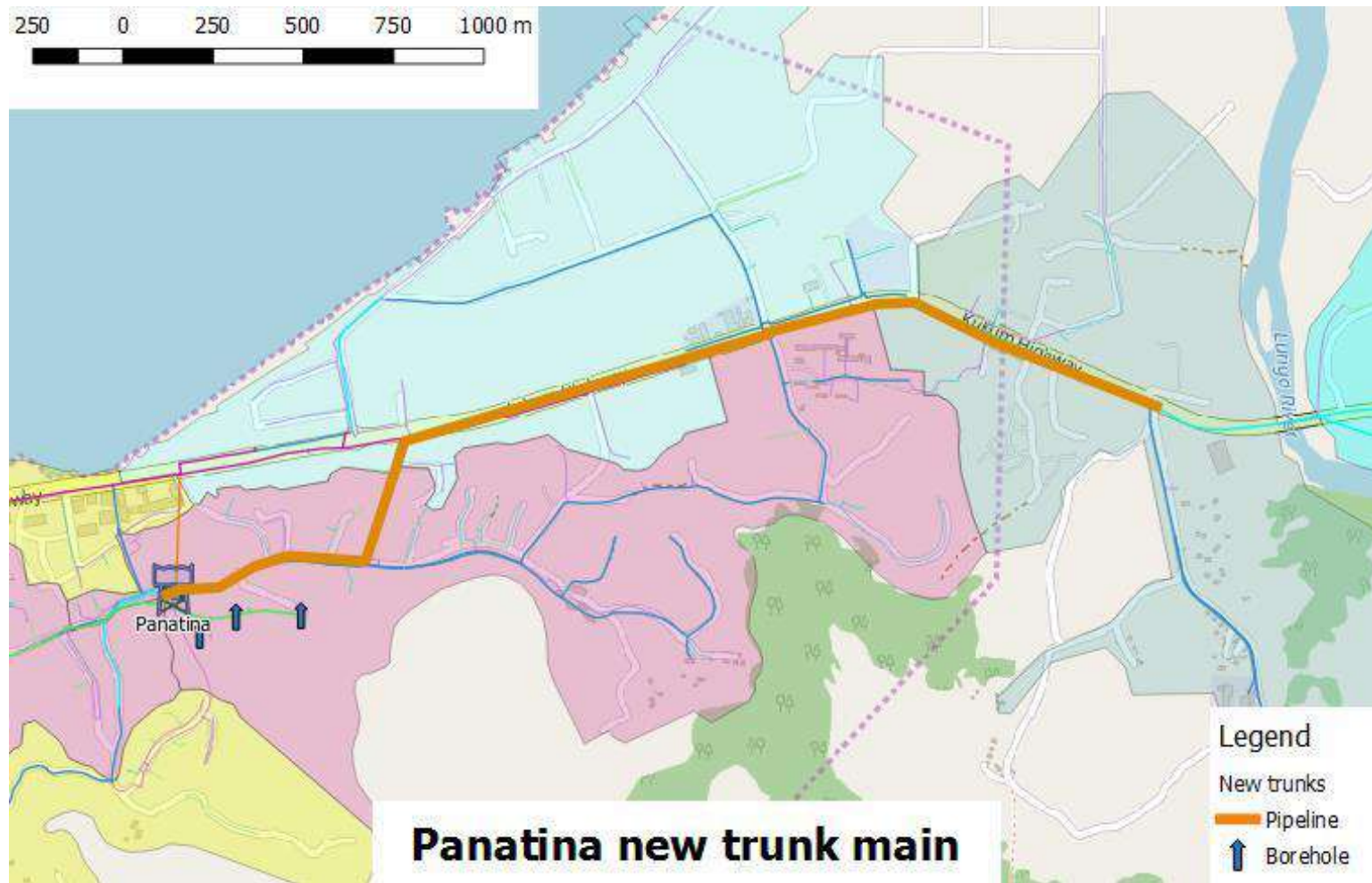
70. It is envisaged that the trunk main will start from the interconnection point in front of the reservoir site. It is proposed to install the pipe along the existing line and then further extend it to Kukum Highway. The existing pipe would then be decommissioned upon completion of the works. Once reaching Kukum highway, two connections will be made by extending the pipeline, corresponding to two distribution zone (East and West). Interconnection will be made with existing trunk main along the highway. In the case of several parallel mains, Solomon Water shall confirm to which pipeline the interconnection should be made.
71. As the high elevation of the reservoir generates significant head, pressure regulation is envisaged to maintain an acceptable pressure in the low-lying areas. Furthermore, the pipe design will enable water supply in both directions, provided minor changes in case the future water resource development plan requires supply the tank from the coastal area.
72. **Design Flow.** The design flow for this trunk main is proposed to be set at 4 MLD, corresponding to the total volume of the reservoir. This flow is therefore significantly higher than current average flowrate, which is estimated to be less than 2 MLD. The underlying hypothesis is that, in the future, the trunk main has the capacity to supply (or be supplied) in one with the entire volume of the storage. Hence, considering a maximum daily flow of 4 MLD and an hourly peak of 1.75, the design flow is 292 m³/h.
73. **Pipe Sizing.** The existing pipeline cannot supply water from the reservoir to Kukum highway under acceptable conditions with very limited transfer capacity due to network sizing. Therefore, it is necessary while extending the length of the main to also increase its transfer capacity by increasing the size of the pipeline.

74. Based on hydraulic calculation, 315 mm (external diameter) is the most suitable pipe diameter for East Kola trunk main. Indeed, diameters below 315 mm are not acceptable due to very high hydraulic gradient (>10 m/km). High velocity generates a high level of head losses. On the other hand, diameter above 315 mm would appear oversized given the high hydraulic head available at East Kola. In order to rationalize the distribution system and avoid a multiplicity of different diameters which would become more difficult to operate (spare parts, etc.), it is proposed to select 315mm (similar size as White River and Panatina trunk mains).

Panatina Trunk Main

75. **Objective:** The aim of the work is to increase the transfer capacity in the eastern part of the distribution system from Panatina reservoir. In doing so, the benefits of the new transmission system are:
- Improve existing water supply service in the Airport area;
 - Ensure distribution capacity with on-going and future development of the eastern Honiara and new sport facilities; and
 - Improve flexibility for long term plan and future resource development from Lungga
76. **Location:** Panatina trunk main is proposed to be installed from Panatina reservoir to the eastern part of the city in the direction of the Airport. The pipeline route would follow Panatina Ridge before continuing along the highway, passing in front of SINU, King George VI (KGVI) school, all the way to Burns Creek.
77. Accordingly, the length of Panatina trunk main is 2.1km between Panatina reservoir and KGVI, plus an additional 1.1km to Burns Creek, thereby a total length of 3.2km. The envisaged location of the pipeline is presented in **Figure 3-5**.

Figure 3-5: Proposed Location of Panatina Trunk Main

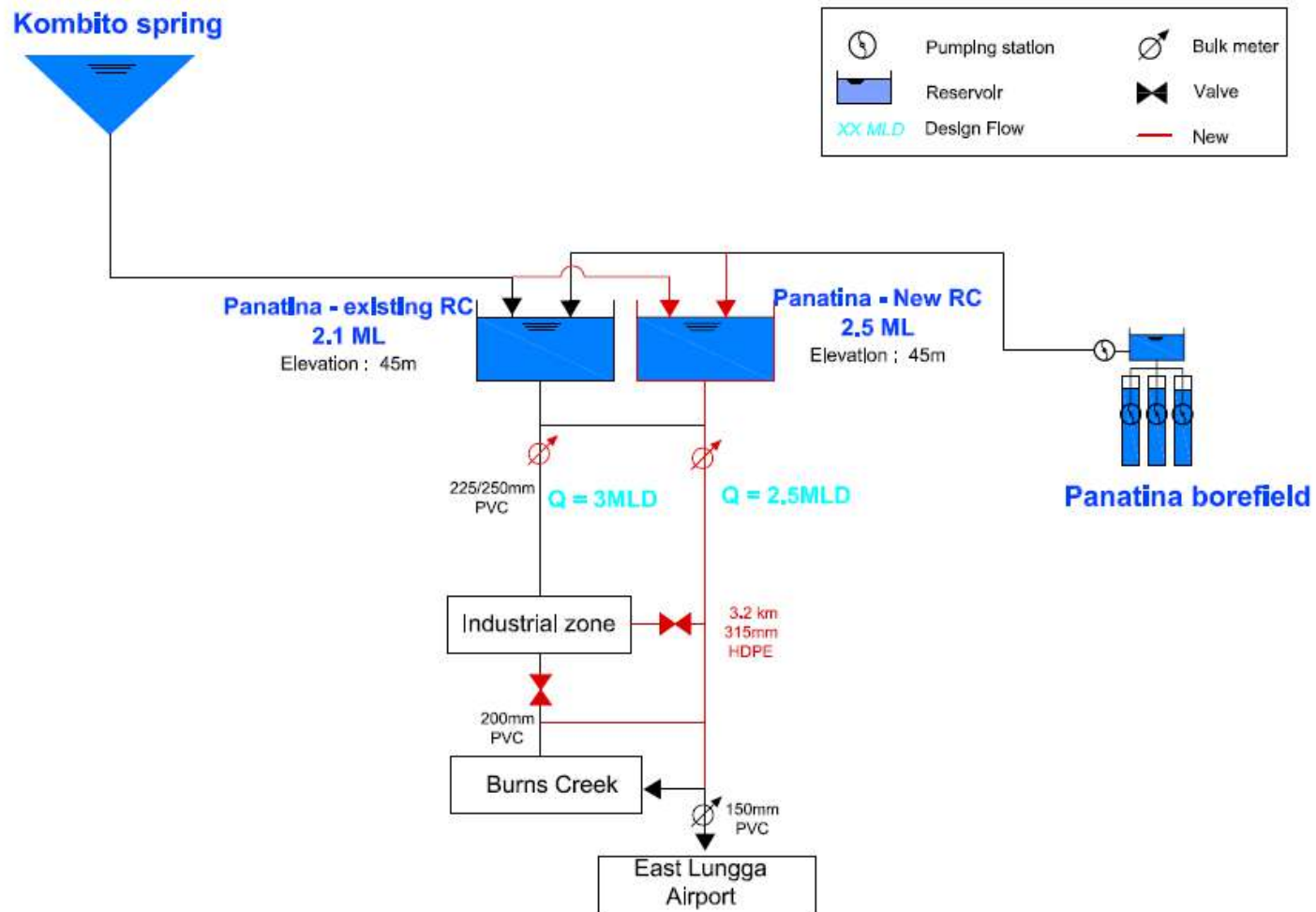


Source: SW PRF BOD Honiara WS, September 2019

It is envisaged that the trunk main will start from the interconnection between the existing reservoir site and the existing network.

78. It is proposed to use the existing system to supply the industrial zone while using the trunk main to transfer water to Burns Creek and Eastern Honiara. In this configuration, there would be two main outlets from the storage site. The new trunk main will follow Panatina ridge and then run parallel with the existing line. Interconnections will be made with the existing main at KGVI and further down at Burns Creek. The proposed functioning is presented in **Figure 3-6**.
79. Furthermore, the pipe design will enable water supply in both directions, provided minor changes in case the future water resource development plan requires to supply the tank from the Eastern area.

Figure 3-6: Flow Diagram of Panatina Future Functioning



Source: SW PRF BOD Honiara WS, September 2019

80. **Design Flow.** Across the entire distribution zone, it is assumed that a sharp increase of the distributed volume; a total of 5.5 MLD; is to be supplied from Panatina tank, corresponding to an increase of 175%. The estimated flow increase per District Metered Areas (DMA) is presented in the **Table 3-1**. This plan is generally consistent with the demand estimated in the 5 Year Plan (7.4 MLD for Kombito spring and Panatina area).

Table 3-1: Design Flow per DMA for Panatina DMZ

Zone / DMA	Demand 2019 (MLD)	Design Flow (MLD)	Increase
Industrial Zone	1.4	3	x 2.1
Burns Creek	0.5	1.5	x 3
Lungga Airport	0.1	1	x 10
Total	2	5.5	x 2.75

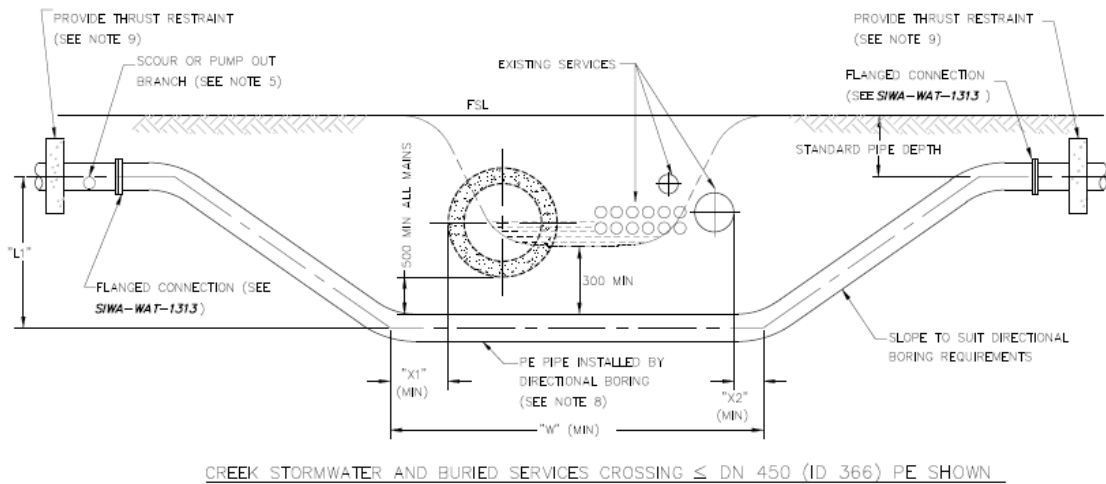
Source: SW PRF BOD Honiara WS, September 2019

81. Accordingly, the design flow for this trunk main is proposed to be set at 2.5 MLD, which is much higher than current average flowrate, which is estimated to be less than 0.6 MLD (Burns Creek and Lungga Airport District Metered Areas (DMAs)). This corresponds to the growth and development expected in the area. Hence, considering a maximum daily flow of 2.5 MLD and an hourly peak of 1.75, the design flow is 182 m³/h.
82. **Pipe Sizing.** The existing pipeline cannot supply water from Panatina reservoir to eastern Honiara under acceptable conditions. Looking at future demand, the situation will continue to deteriorate. Therefore, it is necessary to increase the transfer capacity by strengthening the pipeline, while adapting the network configuration.
83. Based on hydraulic calculation, 315 mm (external diameter) appears to be the most suitable pipe diameter for Panatina trunk main. Indeed, diameters below 315mm are not acceptable due to relatively high hydraulic gradient (>5 m/km). High velocity generates high level of head losses which is critical due to the limited head available at the reservoir. On the other hand, diameter above 315 mm would appear oversized.
84. Given the current very low water demand of Lungga Airport DMA (eastern bank of the river), it is not proposed to extend the new trunk further than Burns Creek. Based on the calculation, the existing 150 mm is suitable to cope with water demand increase. However, should the requirements be higher than the design flow, it would then be necessary to strengthen the pipeline due to high level of head losses.

Pipe Installation

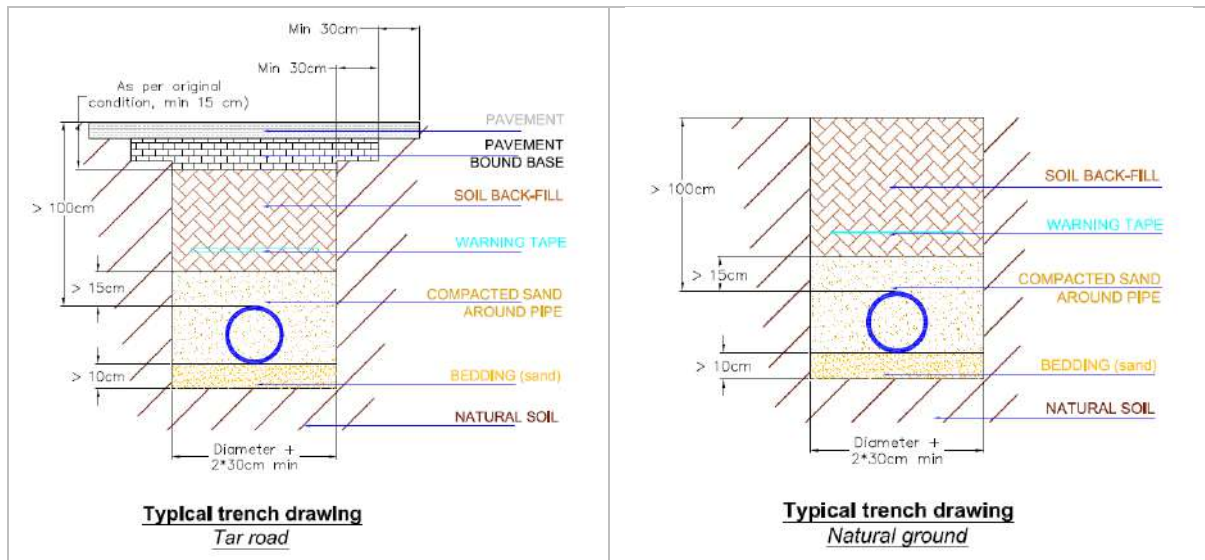
85. Pipelines will generally be installed using trenching methods along roads except for the Kongulai-White River section where mains will go under the creek with concrete casing to protect against scouring and other obstructions (see typical design in **Figure 3-7**). Wherever possible, roadsides will be favored so as to limit formed road surface damage and reinstatement as well as potential settlement. It is expected that most of the network will be installed under existing formed road surfaces given the limited space available and obstacles such as trees, services, signs, poles and drains in the road edges.

Figure 3-7: Creek/Stormwater and Buried Services Crossing



86. Pipes will be laid according to SW standards (SIWA Construction Code). **Figure 3-8** provides general requirements for pipe trenching and installation which will depend on the type and quality the road. Based on above diameter selection, the minimum width of the trench at the bottom would then be 1 m.

Figure 3-8: General Layout for Pipe Trench and Installation



Note: While SW codes indicate a minimum width of hard shoulder of 60cm on each side of the trench for road reinstatement (min 30cm bound base + min 30cm pavement), it is suggested to reduce this value for secondary roads. For those, a hard shoulder of 20 to 30cm could be proposed, thus significantly reducing the cost.

Source: SW PRF BOD Honiara WS, September 2019

Temporary Areas

87. Temporary areas for construction materials will be established nearby to each location of major works. These areas will be clearly identified in the site-specific CESMP to be prepared by the contractor.

Many of these locations are to be decided between the contractor and SW prior to construction. Site inspections will be undertaken as required to determine sites which minimize environmental and social impacts.

Material Sources

88. The contractor is expected to extract locally sources materials from areas already permitted. If not available, the contractor will be required to apply for a BMP to open a new site/source.
89. Gravel extraction sites at river systems within the subproject areas maybe logistically more useful. The gravel extraction site at Lungga River and Tamboko River can be considered for the project. Land-based quarry sites can also be considered but it must be noted that these sites create dust, stability and health and safety issues. The existing Guadalcanal quarry sites, stockpiled materials and crushing yards can be considered for the project.

Many of these locations are to be decided between the contractor and SW prior to construction. Site inspections will be undertaken as required to determine sites which minimize environmental and social impacts.”

Access Paths/Roads

90. Construction vehicles will use local access paths/roads or negotiate access with landowners to obtain access to private lands. Where local access roads are used, the contractor will return these roads to the original condition after the completion of work.

Many of these locations are to be decided between the contractor and SW prior to construction. Site inspections will be undertaken as required to determine sites which minimize environmental and social impacts.

Ancillary Facilities

91. It is unlikely that a construction camp will be required but work sites and yards will be sited on appropriate land, identified through consultation with stakeholders. It is also suggested to use the previously cleared sites for equipment and materials storage.

Many of these locations are to be decided between the contractor and SW prior to construction. Site inspections will be undertaken as required to determine sites which minimize environmental and social impacts.

92. **Plate 3-1** shows some of the photographs of proposed sites for trunk mains.

Plate 3-1: Photographs of Proposed Sites for Trunk Mains

A. White River Trunk Main from Kongulai to White River





B. White River Trunk Main from Kongulai to Rove





C. East Kola Trunk Main





D. Panatina Trunk Main





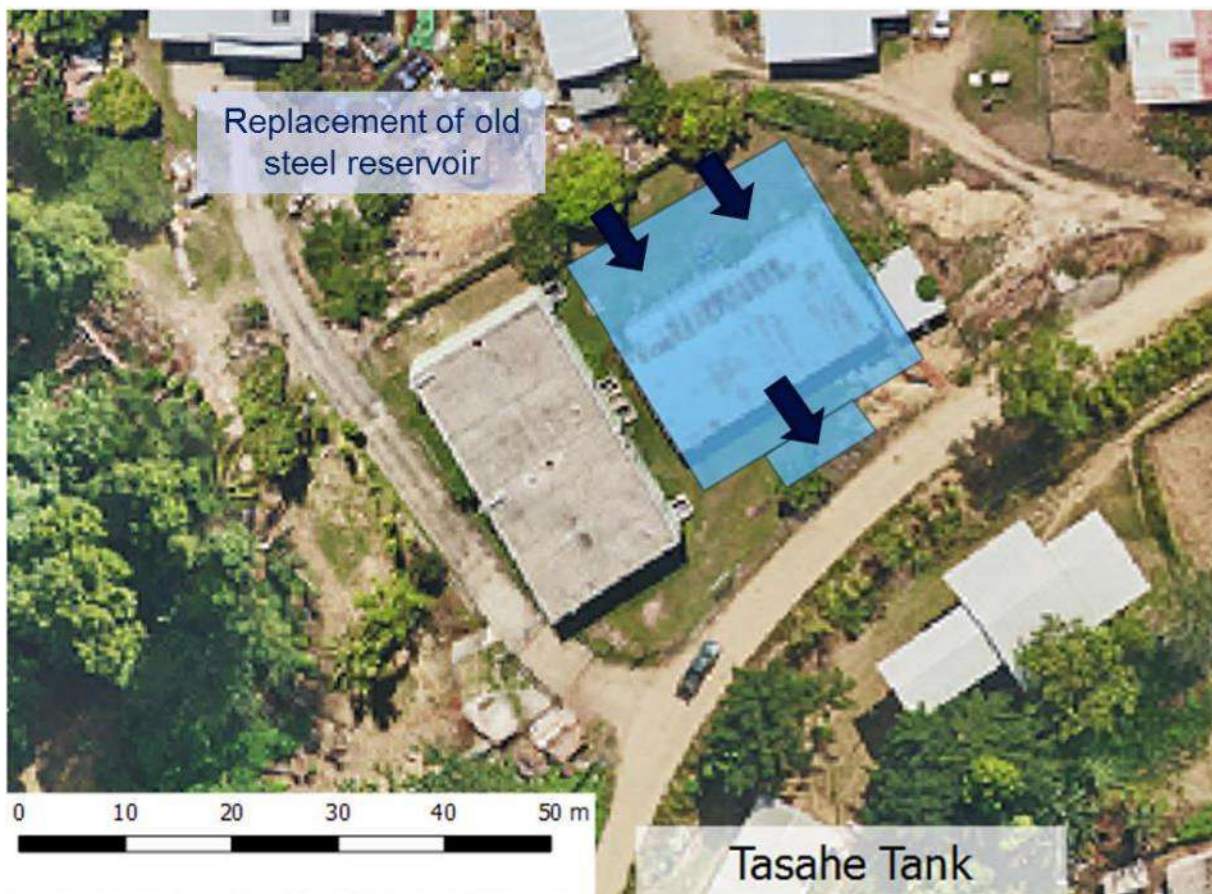
Source: SW PRF BOD Honiara WS, September 2019

3.1.2 Honiara Reservoirs SubProject

Tasahe Reservoir

93. **Objective:** Increase and secure storage at Tasahe by replacing the old steel tank (0.9 ML) with a new reservoir with higher volume (3 ML reservoir) following the installation of a new WTP at Kongulai and a pumping main from Kongulai to Tasahe (these latter facilities are financed under UWSSSP)
94. **Location:** The new reservoir will be constructed at the location of the existing old steel tank with coordinates system WGS84 of X = 601050, Y = 8956040, Z = 154 m. The footprint and dimensions of the new reservoir will be extended in order to maximize the storage volume within the available space. This will require the demolition of the existing tank and chlorination house.
95. Pipe gallery and outflow will be located on the roadside where the interconnection with the existing network will be made. Existing pipe work will have to be modified accordingly. The proposed layout of the reservoir is presented in **Figure 3-9**.

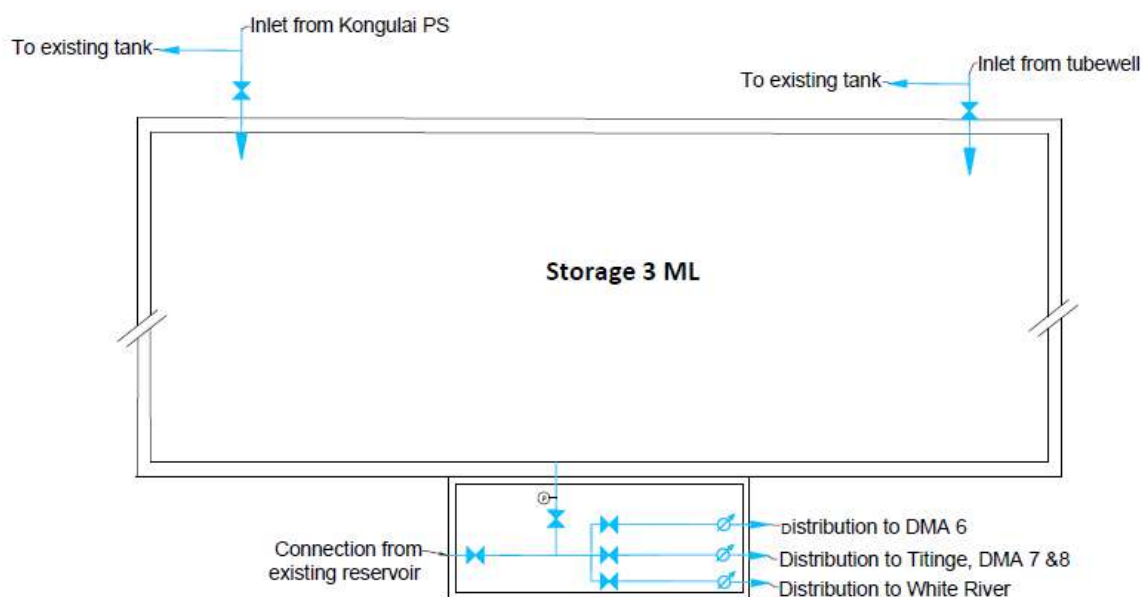
Figure 3-9: General Layout of Tasahe Reservoir



Source: SW PRF BOD Honiara WS, September 2019

96. **Function.** The reservoir will be balanced with the existing tank with similar water inlet (above maximum water level) and bottom distribution outlet (same level as existing reservoir). Water inlets will be installed on the opposite side from the outlets to promote water circulation within the tank. The reservoir will be divided in two compartments to facilitate routine maintenance and cleaning.
97. Outlets, washout and overflow will be located within the pipe gallery, together with control valves and flowmeters. Interconnection with the outlet from existing tank will be made inside the pipe gallery.
98. A pressure transducer will be installed within the gallery on each outlet pipe or washout. In terms of control, the tank will have the same functioning as existing tank with inflow regulated on water level (stop at maximum water level / start at pre-defined water level). Pressure transducer will be used to generate alarm on low and very high (overflow) water levels.
99. Data transmission system will be installed inside the pipe gallery if required, able to transmit operational data (water level, flow, CI, alarm, etc.) to the SCADA system. Electrical supply for the equipment (lighting, EMF, data transmission, etc.) will be made from nearby low-tension electrical line.
100. **Figure 3-10** summarizes the proposed functioning of the reservoir.

Figure 3-10: Proposed Functioning of Tasahe Reservoir

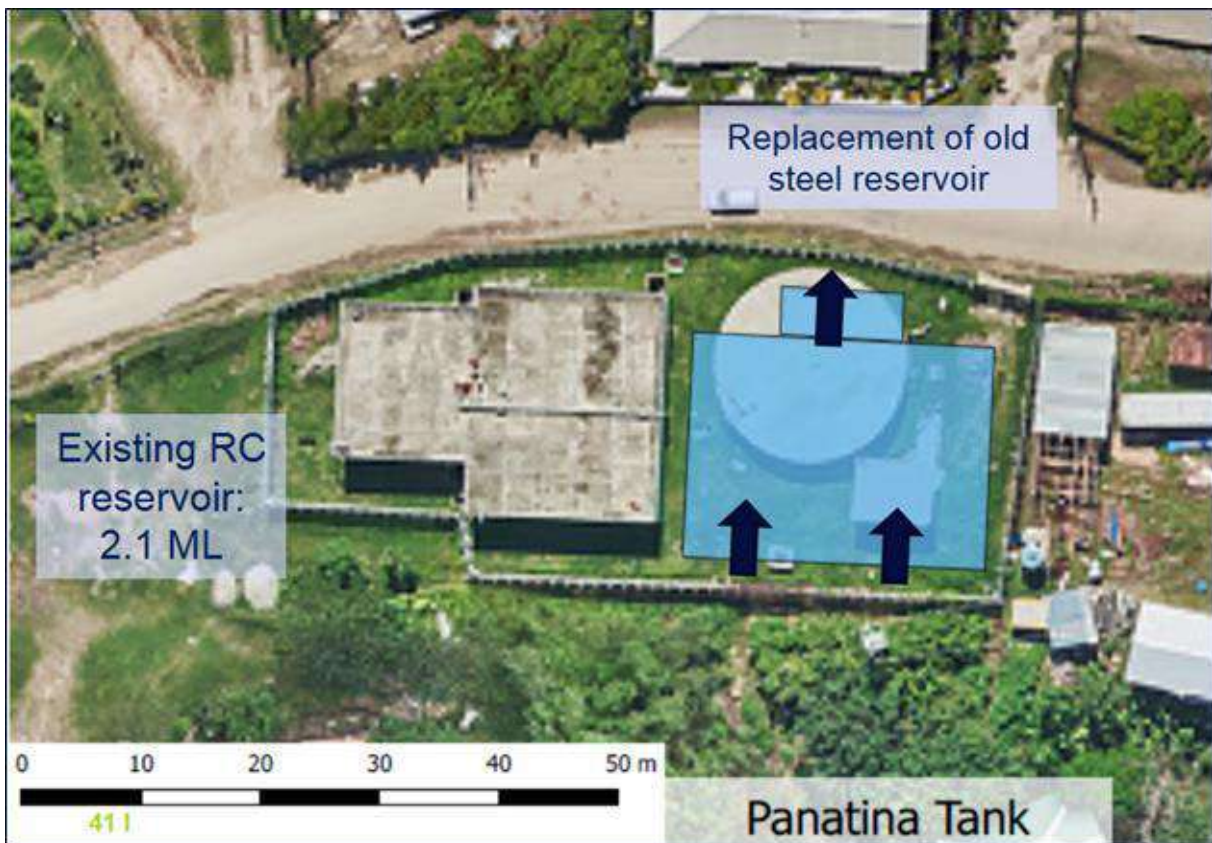


Source: SW PRF BOD Honiara WS, September 2019

Panatina Reservoir

101. **Objective:** Increase the storage capacity in the eastern part of the city to cope with future development by implementing a new reservoir at the Panatina site (new 2.5 ML reservoir).
102. **Location:** A new reservoir will be constructed at the location of the existing old steel tank with coordinate system WGS84 of X = 609820, Y = 8957190, Z = 44 m. The footprint and dimensions of the new reservoir will be extended in order to maximize the storage volume within the available space. This will require the demolition of the existing tank and chlorination house.
103. Pipe gallery and outflow will be located on the roadside where the interconnection with the existing network will be made. Existing pipe work will have to be modified accordingly. A new chlorine house will also be installed to treat the incoming water from the Panatina borefield. Initially, liquid chlorine will be used and replaced with gas chlorination at a later stage; the new chlorine house will be designed following ANZ standards for gas chlorination.
104. During operations, the amount of chlorine dosing water is adjusted so that the amount of free chlorine residual should be always over 0.4 mg/L and less than 1.0 mg/L in the system. Estimated normal dosing rates will be up to 2 mg/L for the Panatina borefield requiring between 20 to 40 bottles to be stored on a monthly basis. Dependent on the future source of water, treatment at the source and operational adjustments, the system will switch to gas chlorination in the future.
105. The proposed layout of the reservoir is presented in the **Figure 3-11**.

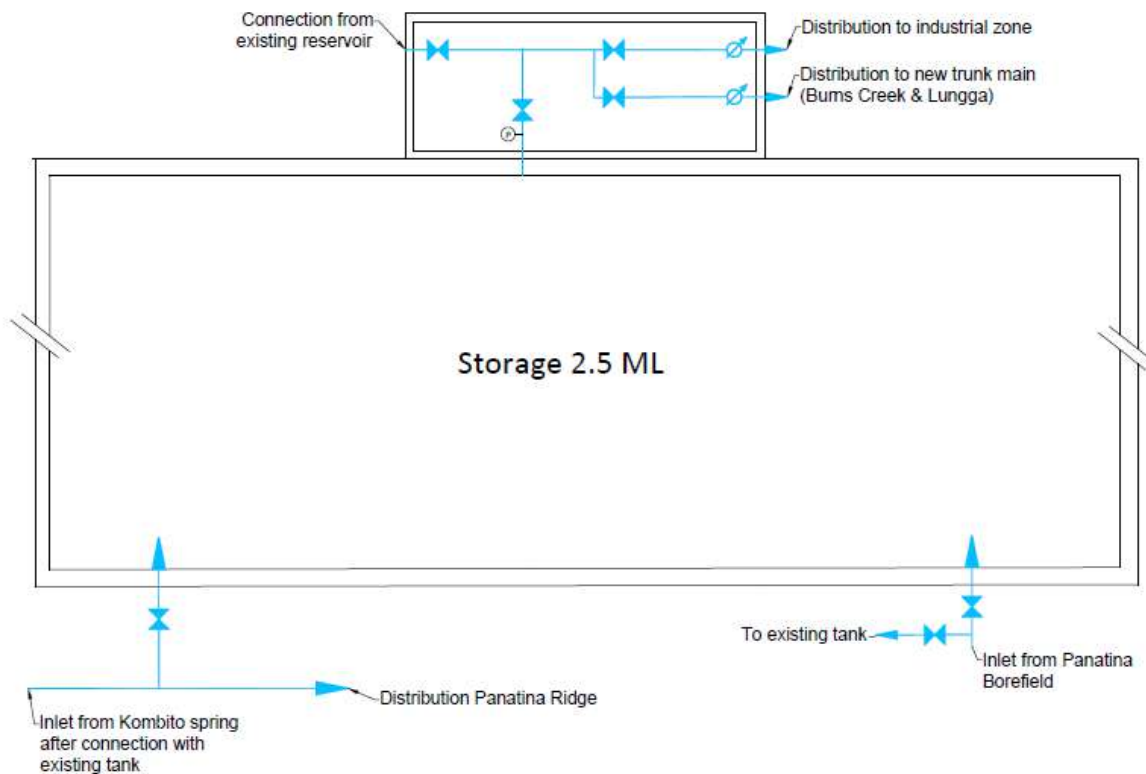
Figure 3-11: General Layout of Panatina Reservoir



Source: SW PRF BOD Honiara WS, September 2019

- ¹⁰⁶. **Function.** The proposed function of Panatina reservoir is similar as Tasahe and is summarized in **Figure 3-12**. However, unlike Tasahe and the pumped supply from Kongulai, the inflow from Kombito spring is under gravity conditions. Therefore, a regulation or floating valve would be necessary to control the inflow from the source.

Figure 3-12: Proposed Functioning of Panatina Reservoir

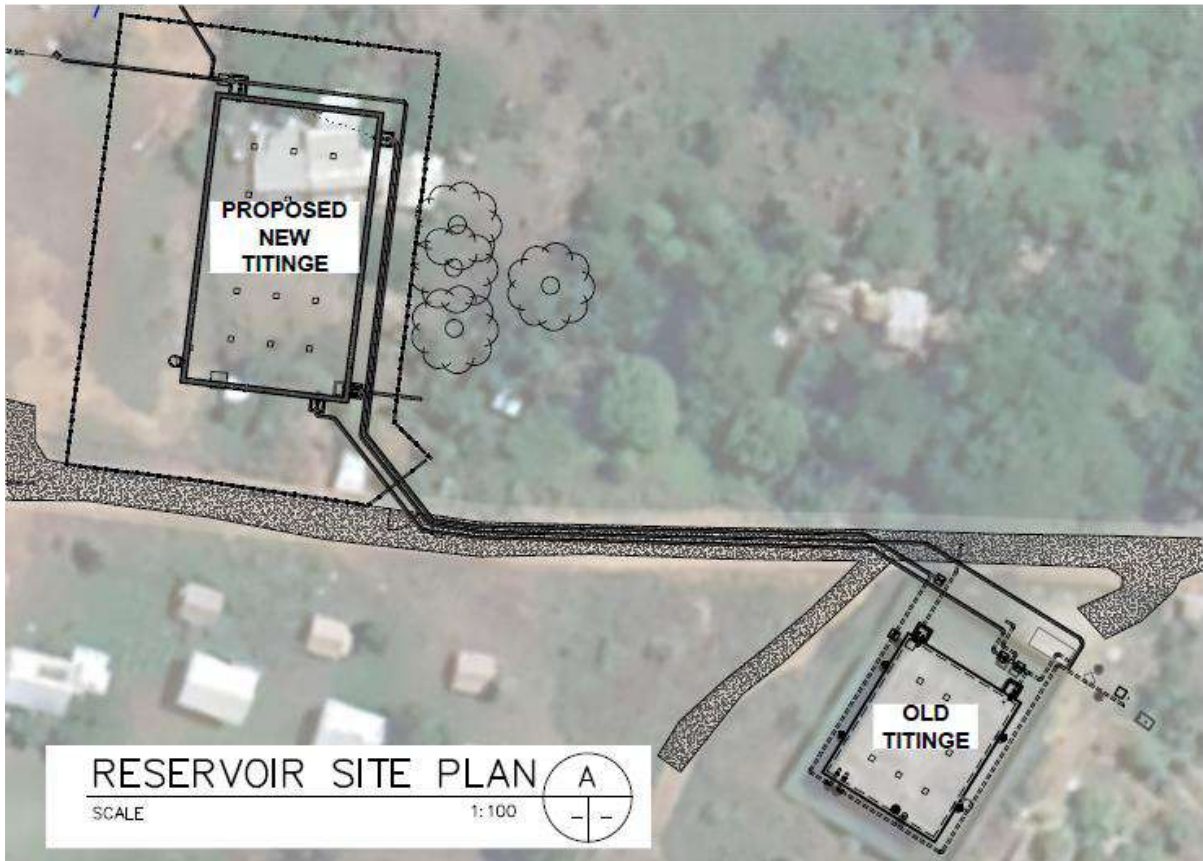


Source: SW PRF BOD Honiara WS, September 2019

Titinge Reservoir

107. **Objective:** Increase storage at Titinge. (new 3 ML reservoir)
108. **Location:** The existing reservoir site is insufficient to provide for additional storage. The reservoir capacity augmentation cannot be achieved using existing storage site and a new site has been selected in the vicinity of the existing one with coordinate system WGS84 of X = 602840, Y = 8955840, Z = 135 m.
109. Outflow will be located on the roadside where the interconnection with the existing network will be made, in front of the existing reservoir. Existing pipe work will have to be modified accordingly.
110. The proposed layout of the reservoir is presented **Figure 3-13**.

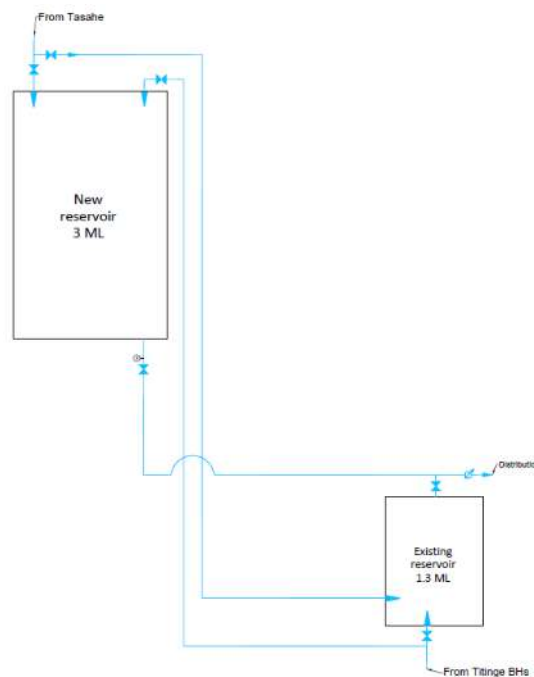
Figure 3-13: Proposed Location for Titinge Reservoir



Source: SW PRF Detailed Design Honiara WS, January 2020

111. **Functioning.** Figure 3-14 shows the proposed functioning of Titinge reservoir.

Figure 3-14: Proposed Functioning of Titinge Reservoir



Source: SW PRF BOD Honiara WS, September 2019

112. **Plate 3-2** shows the photographs of proposed sites for reservoirs.

Plate 3-2: Photographs of Proposed Sites for Reservoirs



Source: SW PRF BOD Honiara WS, September 2019

3.2 ASSOCIATED OR LINKED FACILITIES

113. **Kongulai Water Treatment Plant and Pipeline Sub-Project:** This sub-project covers the installation of a water treatment plant at Kongulai Spring to provide potable water during rainfall events currently causing stopping the resource; the sub-project covers the

treatment plant and the pumping station and associated force main from Kongulai to the Tasahe Reservoirs. The Kongulai-White River Trunk Main will start from the clear water tank of this WTP.

114. **Wastewater & Septage Management:** UWSSSP includes the development of wastewater and septage management sub-projects which cover the collection of wastewater, treatment and disposal of wastewater via marine outfalls and the development of a septage management component. In this way UWSSSP will cater for the increase in water supply and consequent wastewater resultant from UWSSSP.
115. Environmental and social safeguard documentation has been developed for these sub-projects following the EARF and RF developed under UWSSSP.
116. There are a number of ongoing road projects notably those financed by the ADB in the White River Rove section and in Kukum Highway (via JICA). The impact of these road projects on the proposed infrastructure, notably the White River-Rove Trunk main and the Panatina trunk main is taken into account in this project.

3.3 SCHEDULE

117. Construction of the facilities is envisaged to take 18 to 26 months (work inputs include 350 employees for all contracts including provinces, of which 60 are foreign).

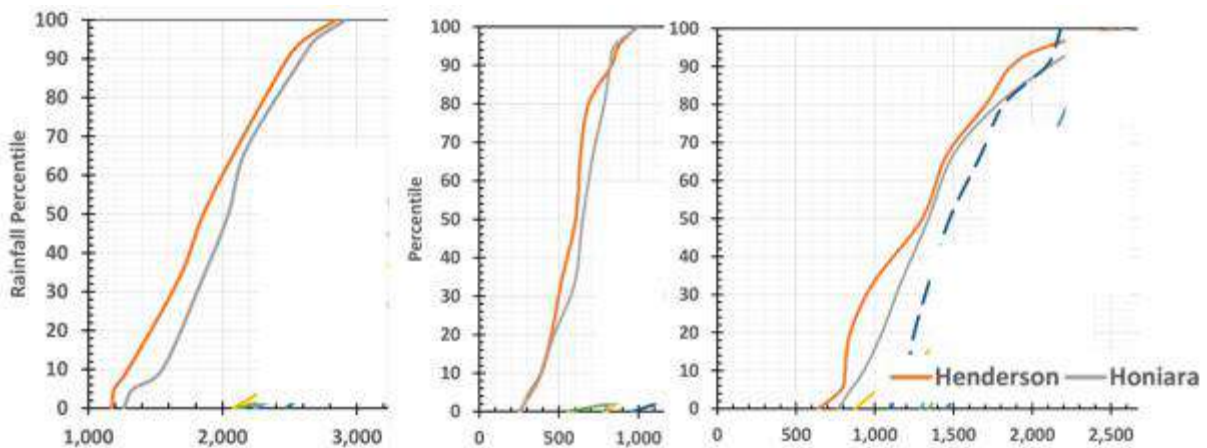
4.0 DESCRIPTION OF THE EXISTING ENVIRONMENT

4.1 PHYSICAL ENVIRONMENT

4.1.1 Climate

118. Honiara has a two-season tropical monsoon climate with minimum daily temperatures ranging on average from 22.0°C to 23.5°C and maximum daily temperatures ranging on average from 30.1°C to 30.7°C. Seventy percent of the average annual rainfall falls within the November-April wet season, while rainfall during the dry season averages 110 mm per month.
119. The percentile distributions of annual rainfall for the two climate stations near Honiara are shown in **Figure 4-1**.

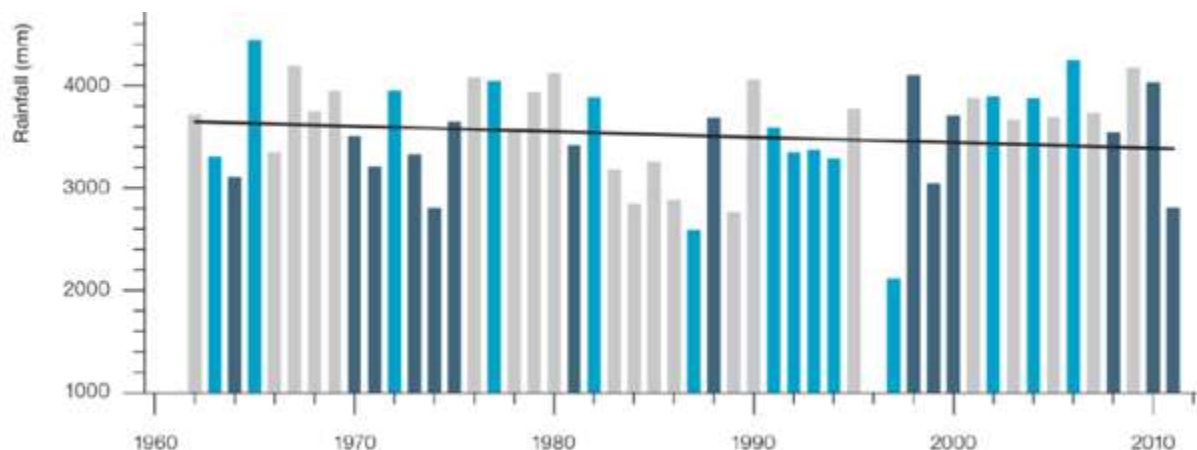
Figure 4-1: Percentile Rainfall Distributions of Annual, Dry Season and Wet Season Rainfall for Honiara and Henderson Stations



Source: Climate Change Impacts and Adaptation Options. 2018

120. The annual rainfall pattern for Honiara from 1962 to 2011 is shown in **Figure 4-2**. It shows that over this period, there has been substantial variation in rainfall from year to year. The highest recorded rainfall of 281 mm over a 12-hour period was recorded in 2009 resulting in destructive flooding and loss of lives. In April 2014, the highest recorded daily rainfall of 318mm was recorded, which caused widespread flooding and damage to property, infrastructure, and loss of 23 lives along the Mataniko River, Central Honiara.

Figure 4-2: Annual Rainfall for Honiara from 1962 to 2011



Note: Light blue bars indicate El Niño years, dark blue bars indicate La Niña years and the grey bars indicate neutral years

Source: Climate Change Impacts and Adaptation Options. 2018.

121. From the studies conducted, it was observed that there is a decrease in the number of rain days indicating that rainfall now arrives in larger event days, but these days are less than the annual maximum wet day total. This implies that the rainfall from extreme event days is not increasing. Regardless of this, between 1966 and 2015, there were 12 years with heavy rainfall due to cyclones or a very wet season that lead to some flooding, so it is not just the very extreme events that cause flooding.
122. The data for evaporation shows that the estimated annual evaporation losses for SI is around 1,230 - 1,300 mm/year with the estimated dry season evaporation to be in range of 600 – 630 mm and wet season evaporation to be in range of 630 – 670 mm.
123. The data for drought in Honiara shows that the lowest dry season rainfall recorded in the region was ~250 mm while the lowest wet season rainfall was ~850 mm. **Table 4-1** shows the extreme seasonal low rainfall for Honiara.

Table 4-1: Extreme Seasonal Low Rainfall for Honiara

STATION	HONIARA
Mean Annual Rainfall, mm	2,040
Mean Dry Season Rainfall, mm	637
Lowest Dry Season Rainfall, mm	248
Mean Wet Season Rainfall, mm	1,414
Lowest Wet Season Rainfall, mm	847

Source: Climate Change Impacts and Adaptation Options. 2018.

124. East to southeast winds are usually from May to October, although not usually as strong as in other Pacific regions further south or east but still have a large degree of constancy. The typical speed of the winds over the sea, free from the influence of the mountainous islands of the region, would be about 30 km/hr. Stronger southeast winds occur at times, possibly blowing at more than 40 km/hr for several days, when the subtropical high-pressure belt is stronger than usual in the south.
125. West to northwest winds from November to April is usually lighter than the southeast trades and much less persistent.
126. In addition to the seasonal winds, there is also a strong diurnal wind pattern caused by the islands themselves and several effects contribute to this. Over the land areas, the wind

speed tends to increase during the morning, reaching maximum during the afternoon at the time of the maximum temperature, and then decreasing at night to become light and variable or calm. In coastal areas, the greater heating of the land during the day allows a flow of air from over slightly cooler sea, the sea breeze strength is typically 20 -30km/hr. Conversely, at night a land breeze can occur because of the more rapid cooling of the land. The offshore breeze is much weaker than the sea breeze. Finally, where there is hilly or mountainous terrain, cool and relatively dense air can flow downhill at night as a katabatic wind. If this reaches the coast, it can combine with the land breeze effect to give an offshore wind as strong as 20 km/hr in the early morning. All these effects are important in Solomon Islands in determining the daily wind pattern at any particular location.

127. For the strong winds, these may be caused by the occasional tropical cyclone between November and April season, or thunderstorm squalls at any time of the year. A very intense cyclone would be rare but have winds of 200 km/hr near its center. The frequency of strong winds at places for which measured wind speeds are available is quite low. Strong winds which speed averaging at least 39 km/hr are likely to happen less than six days each year.

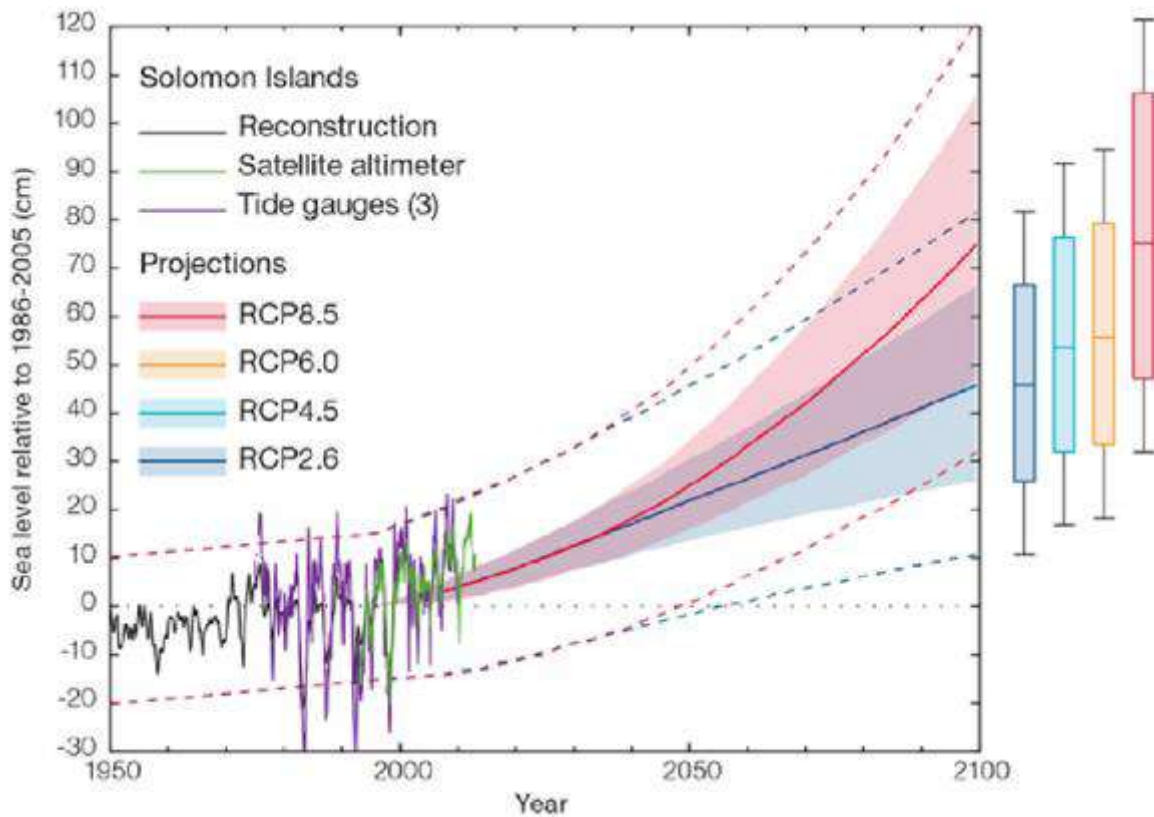
Climate Change

128. Based on the study conducted by BoM & CSIRO (2014), the duration of meteorological drought may increase by 20% from 25 to 30 months and the frequency may increase from 0.65 extreme droughts per decade to 1 per decade. In terms of frequency and duration of hydrological drought, the analysis shows that it may occur up to 5 times per decade and it will last on average of 8 days and may last up to 19 days.
129. There is a projected increase in temperature for 1-in-20-year event by $1.4^{\circ}\text{C} \pm 0.7^{\circ}\text{C}$ ⁴. Also, high temperatures for a 1-in-20-year event will increase from 35.9°C to 37.3°C and for a 1-in-100-year event from 37.3°C to 38.8°C ⁵.
130. The tropical cyclones are likely to decrease but the intensity is likely to increase by 1.3 m/s. Also, there will be increase in mean maximum wind speed by 2-11% and in rainfall rates by 20% within 100 km of the cyclone center.
131. The projected changes in SI wave properties include decrease in mean wave height during December-March. The comparison of the recorded and projected sea level rise is shown in **Figure 4-3**. The mean sea level rise is projected to rise in the future.

⁴ BoM & CSIRO (2014)

⁵ CLIMsystems (2017)

Figure 4-3: Past and Projected Sea Level of Solomon Islands



Note: Bars on the right – ranges of projections for four emission scenarios; Dashed lines – estimate of inter-annual variability in sea level

Source: Climate Change Impacts and Adaptation Options. 2018.

132. **Table 4-2** shows the projected changes of average annual and seasonal rainfall in Honiara.

Table 4-2: Projected Changes of Average Annual and Seasonal Rainfall in Honiara

Variable	Historical, mm	Change, %	Change, mm	Projected, mm
Annual	2,052	3	61.6	2,114
Wet Season	1,420	3	42.6	1,462
Dry Season	625	3	18.8	644

Source: Climate Change Impacts and Adaptation Options. 2018.

133. Based on the study conducted by BoM & CSIRO (2014), a 1-in-20-year 24 hr extreme high rainfall event will become 3.5% or 9mm larger by 2030. Based on the study conducted by CLIMsystem (2017), the projected rainfall Intensity, Duration, Frequency (IDF) shown in **Table 4-3** indicates that the 1-in-20-year 24 hr extreme high rainfall event will change from 220 mm to 236 mm by 2050 (a change of 15.5 mm or 7%).

Table 4-3: Historical Extreme RIDF Event and Projected Change for 2050

ARI	Duration								
	30 min	1 hour	3 hours	6 hours	12 hours	18 hours	24 hours	48 hours	72 hours
2	26.9	34.3	50.4	64.2	81.8	94.3	104.3	132.9	153.2
3	32.5	41.4	60.8	77.5	98.8	113.8	125.9	160.5	184.9
5	39	49.7	73.1	93.1	118.7	136.8	151.3	192.8	222.2
10	47.8	60.9	89.5	114	145.4	167.5	185.3	236.1	272.1

15	53	67.6	99.3	126.5	161.2	185.8	205.5	261.9	301.9
20	56.8	72.4	106.3	135.5	172.7	199.1	220.2	280.6	323.4
25	59.8	76.2	111.9	142.7	181.8	209.5	231.7	295.4	340.4
30	62.3	79.3	116.6	148.6	189.3	218.2	241.3	307.6	354.5
40	66.2	84.4	124	158	201.4	232.2	256.8	327.2	377.1
50	69.4	88.4	129.9	165.6	211	243.2	269	342.8	395.1
100	79.6	101.4	148.9	189.8	242	278.9	308.4	393.1	453
150	85.8	109.4	160.6	204.7	261	300.8	332.6	423.9	488.6
200	90.4	115.2	169.2	215.7	274.9	316.8	350.3	446.5	514.6
300	97	123.7	181.6	231.5	295.1	340.1	376.1	479.4	552.5
Projected Change For 2050									
ARI	Duration								
	30 min	1 hour	3 hours	6 hours	12 hours	18 hours	24 hours	48 hours	72 hours
2	27.9	35.6	52.3	66.5	84.6	97.5	107.5	136.9	157.6
3	34	43.3	63.6	81	102.9	118.6	130.8	166.4	191.6
5	41.2	52.5	77.1	98	124.6	143.6	158.3	201.4	231.8
10	51.1	65.1	95.6	121.4	154.3	177.8	196	249	286.7
15	57.1	72.7	106.8	135.6	172.3	198.6	218.9	278.1	320
20	61.5	78.3	115.1	146	185.5	213.8	235.7	299.4	344.6
25	65	82.8	121.7	154.3	196.1	226	249.1	316.4	364.2
30	67.9	86.6	127.2	161.2	204.9	236.1	260.3	330.5	380.5
40	72.7	92.6	136	172.5	219.1	252.5	278.4	353.5	407
50	76.4	97.4	143.1	181.4	230.5	265.6	293	371.9	428.1
100	88.9	113.3	166.4	210.7	267.8	308.7	340.7	432.2	497.8
150	96.7	123.2	181	229	291.3	335.7	370.8	470.2	541.6
200	102.4	130.5	191.8	242.6	308.6	355.7	393	498.4	574.1
300	110.9	141.4	207.7	262.5	334.2	385.1	425.9	539.8	622

Source: Climate Change Impacts and Adaptation Options. 2018.

134. The extreme monthly rainfall is projected to decrease in the future. **Table 4-4** shows the extreme monthly rainfall for 2050 and 2100 in comparison to baseline condition.

Table 4-4: Extreme Monthly Rainfall for 2050 and 2100

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DRY	WET	ANN UAL
CUR RENT	270	286	304	200	132	92	99	92	92	127	146	204	634	1410	2044
2050	231	245	253	187	119	69	65	79	78	121	135	196	531	1247	1778
2100	230	261	236	187	108	74	83	75	68	84	106	188	492	1207	1699

Source: Climate Change Impacts and Adaptation Options. 2018.

4.1.2 Topography

135. Honiara, the capital city of Solomon Islands, is located at the northwestern coast of Guadalcanal. The island of Guadalcanal is mostly steep and rugged with a mountainous zone in the southern half of the island rising to over 2,300 m with a northwest-to-southeast trending spine. The mountains are flanked on the northern side by foothills that form an intermediate zone of intensely dissected plateaus, hills and rolling ridges (Hackman, 1980). Guadalcanal Plains in the northern part is an alluvial zone with minimal relief. Honiara is a narrow low-lying coastal strip of land bounded by hills in the south. **Figure 4-4** shows the Honiara water supply topographic map.

Figure 4-4: Honiara Water Supply Topographic Map

Legend

Customers with GPS_vf

- 0 - 1.5 m³/day
- 1.5 - 21.6 m³/day
- 21.6 - 190 m³/day

Main assets

Sources

- Bore Wells
- Spring

Tanks

- Existing
- Project

Boreholes

- Meter
- Other

Boreholes pumping station

- ↑ Operating with meters
- ↑ Project

Pipes

Existing and project pipes

- Distribution Network
- Existing Trunk Mains
- New trunk mains
- WTP Project

HNWS Lidar

- 1
 - 160
- 0 1000 2000 m

HNWS
Water supply system with Lidar



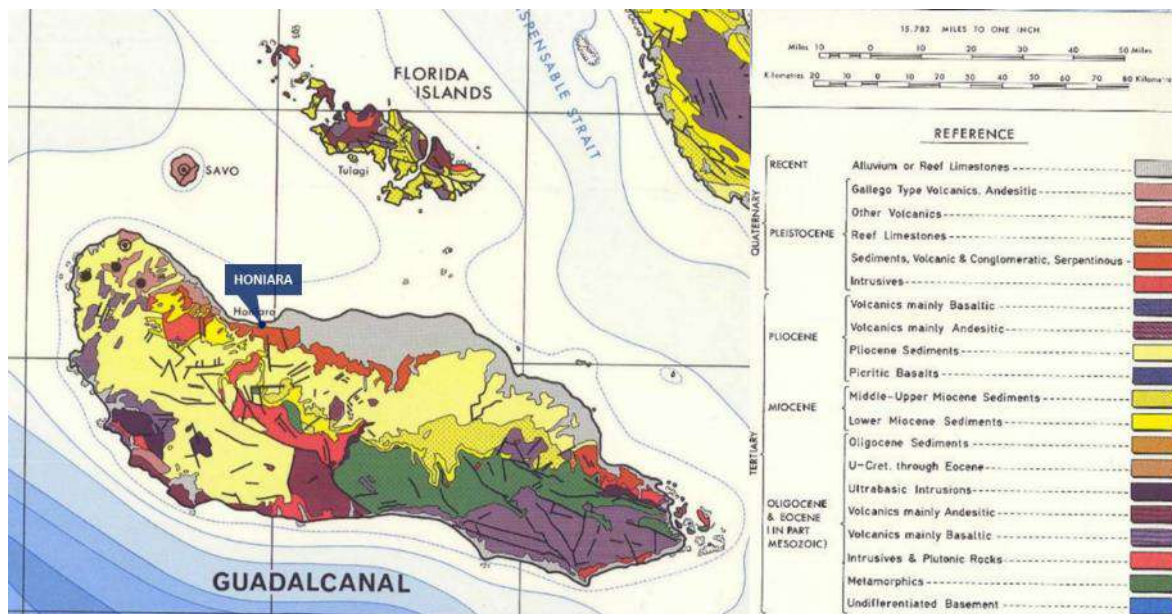
4.1.3 Geology

136. The soils of Guadalcanal are a mixture of volcanic and sedimentary rocks, humus-rich, and base-poor. Willow loams and clays are at high altitudes, while young loams, clays and peats are in valleys and coastal plains.
137. Geotechnical surveys were conducted at existing reservoir site, few hundred meters from the proposed site, in December 2008 (Yachiyo Engineering Co., Ltd) which includes the following:
 - Soil classification test
 - Moisture content
 - Plasticity Test
 - Specific gravity
 - Grain size distribution analysis
 - Plate load test

Geology of Immediate Honiara Area

138. The Honiara Beds are capped by a 60 m of corallgal biolithite and derived debris, the Honiara Reef Limestones (Qpr), which are associated with a magnificent complex sequence of terraces with a height ranging from 700 m above to 100 m below the sea level.
139. Most of the coastal are fringed with dead corals (Qr), which is being swamped by alluvions. Extensive alluvial valleys occur along the courses of the Lungga, Poha and Umasani River.
140. The structural geology is controlled essentially by faulting. Faults trending NNW – SSE are the most persistent along their strikes, e.g., the Saghalu Fault, which forms the western “hinge” to the main outcrop of the Poha Diorite: many of these fractures are high-angle reverse fault which have contributed to composite horsting of the pre-Pliocene basement. **Figure 4-5** shows the geology map of the immediate Honiara area.

Figure 4-5: Geology Map of the Immediate Honiara Area



Source: SW PRF BOD Honiara WS, September 2019

141. **Table 4-5** shows the result of geotechnical survey in the existing site of Tasahe reservoir. The results of this survey are:

- From the plasticity chart for soil classification, the soil sample for 2 – 6 m depth is medium compressible inorganic clay. The soil sample for 8 m depth and 10 m depth is low compressible inorganic soil.
- The average particle specific gravity is 2.56.
- From the result of the plate loading test, the recommended load of 3.0 kg/cm² or 30 ton/m² is applied and yet there is no indication of settlement above 2 mm. The acceptable allowable capacity of 10 ton/m² is within the strength of the soil tested, which is about 50 cm below the ground level.

Table 4-5: Result of Geotechnical Survey in Site of Tasahe Reservoir

A. Moisture Content			
Sample	1-5 m depth		6-10 m depth
Moisture Content (%)	14.3		15.4
B. Plasticity Test			
Sample	2-6 m depth	8 m depth	10 m depth
Liquid Limit (%)	40	32	35
Plastic Limit (%)	18	19	21
Plasticity Index (%)	22	13	14
Linear Shrinkage (%)	8.6	6.3	7.3
C. Specific Gravity			
Sample	1	2	3
Specific Gravity (Gs)	2.57	2.52	2.58
D. Grain Size Distribution Analysis			
Sample	1-5 m depth		6-10 m depth
D10	0.075		0.075
D60	2.5		3.6
Cu	33		48
	Well Graded		Well Graded
D30	0.2		0.4
Ce	1		1.48
	Medium Graded		Medium Graded

Source: SW PRF BOD Honiara WS, September 2019

142. **Table 4-6** shows the result of geotechnical survey in the existing site of Panatina reservoir. The results of this survey are:

- From the plasticity chart for soil classification, the soil sample at Panatina service reservoir is medium compressible inorganic clay.
- The average Particle Specific Gravity is 2.61.
- From the result of the plate loading test, the ultimate bearing loading for the soil condition in Panatina is 2.0 kg/cm² or 20 ton/m². The soil at the test level is mostly clay soil. The tests done shows that soil was moist following the rainfall the day before, which also indicate cohesion type soil.

Table 4-6: Result of Geotechnical Survey in Site of Panatina Reservoir

A. Moisture Content		
Sample	1-4 m depth	6 m depth
Moisture Content (%)	14	14.9
B. Plasticity Test		
Sample	1-4 m depth	6 m depth
Liquid Limit (%)	43	41
Plastic Limit (%)	27	18
Plasticity Index (%)	16	23

Linear Shrinkage (%)	6.4	7.9	
C. Specific Gravity			
Sample	1	2	3
Specific Gravity (Gs)	2.62	2.59	2.63
D. Grain Size Distribution Analysis			
Sample	1-4 m depth	6 m depth	
D10	0.075	0.075	
D60	2.7	5.8	
Cu	36	77	
	Well Graded	Well Graded	
D30	0.72	1	
Ce	3.6	2.3	
	Uniform	Medium Graded	

Source: SW PRF BOD Honiara WS, September 2019

143. **Table 4-7** shows the result of geotechnical survey in the existing site of Titinge reservoir. The results of this survey are:

- From the plasticity chart for soil classification, the soil sample is medium compressible inorganic clay.
- The average particle specific gravity is 2.6.
- From the result on plate loading test, the recommended load of 32 ton/m² is applied and there is an indication of settlement occurring about 4 mm. The ultimate bearing capacity is 30 ton/m².

Table 4-7: Result of Geotechnical Survey in Site of Titinge Reservoir

A. Moisture Content		
Sample	3-5 m depth	6-10 m depth
Moisture Content (%)	10.2	10.8
B. Plasticity Test		
Sample	4-6 m depth	8-10 m depth
Liquid Limit (%)	42	34
Plastic Limit (%)	27	25
Plasticity Index (%)	15	9
Linear Shrinkage (%)	11.4	8.6
C. Specific Gravity		
Sample	1-5 depth	6-10 depth
Specific Gravity (Gs)	2.62	2.58
D. Grain Size Distribution Analysis		
Sample	1-5 m depth	6-10 m depth
D10	0.075	0.075
D60	2.7	5.8
Cu	36	77
	Well Graded	Well Graded
D30	0.72	1
Ce	1.63	0.28
	Uniform	Medium Graded

Source: SW PRF BOD Honiara WS, September 2019

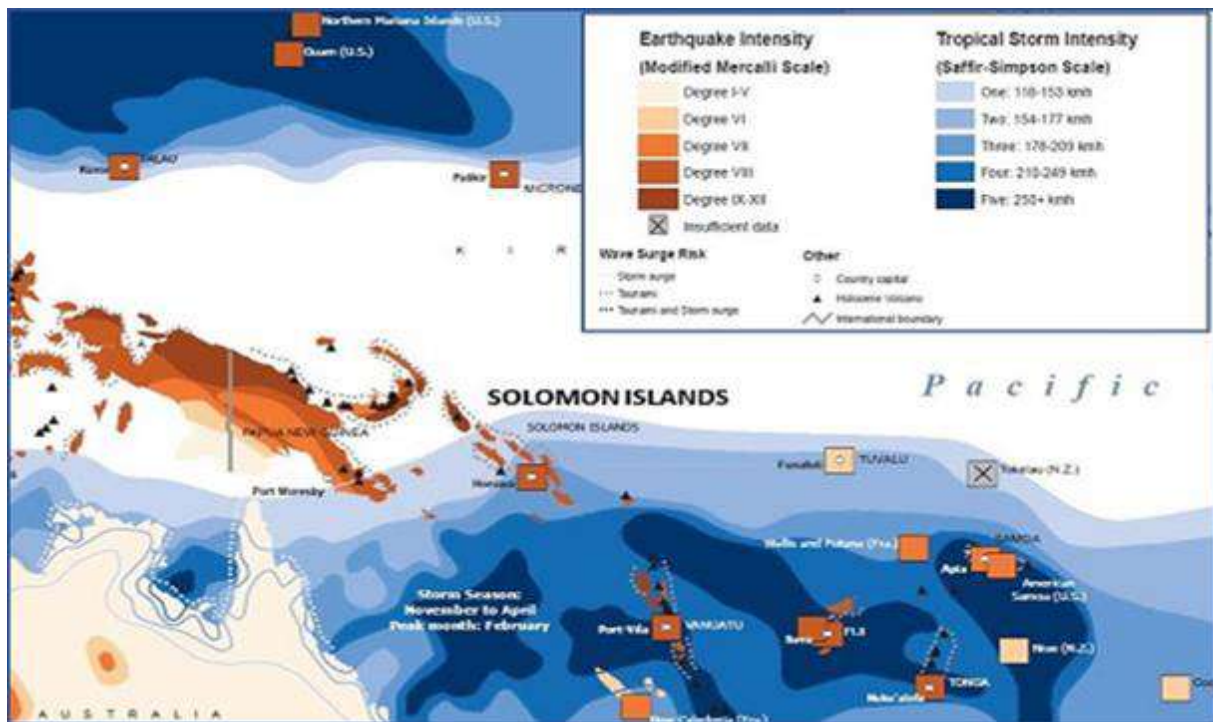
4.1.4 Natural Hazards

144. Solomon Islands has been identified by the WB as one of the top 15 countries exposed to multiple hazards (see **Figure 4-6**). 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.

145. The threat from tsunamis is real in 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.

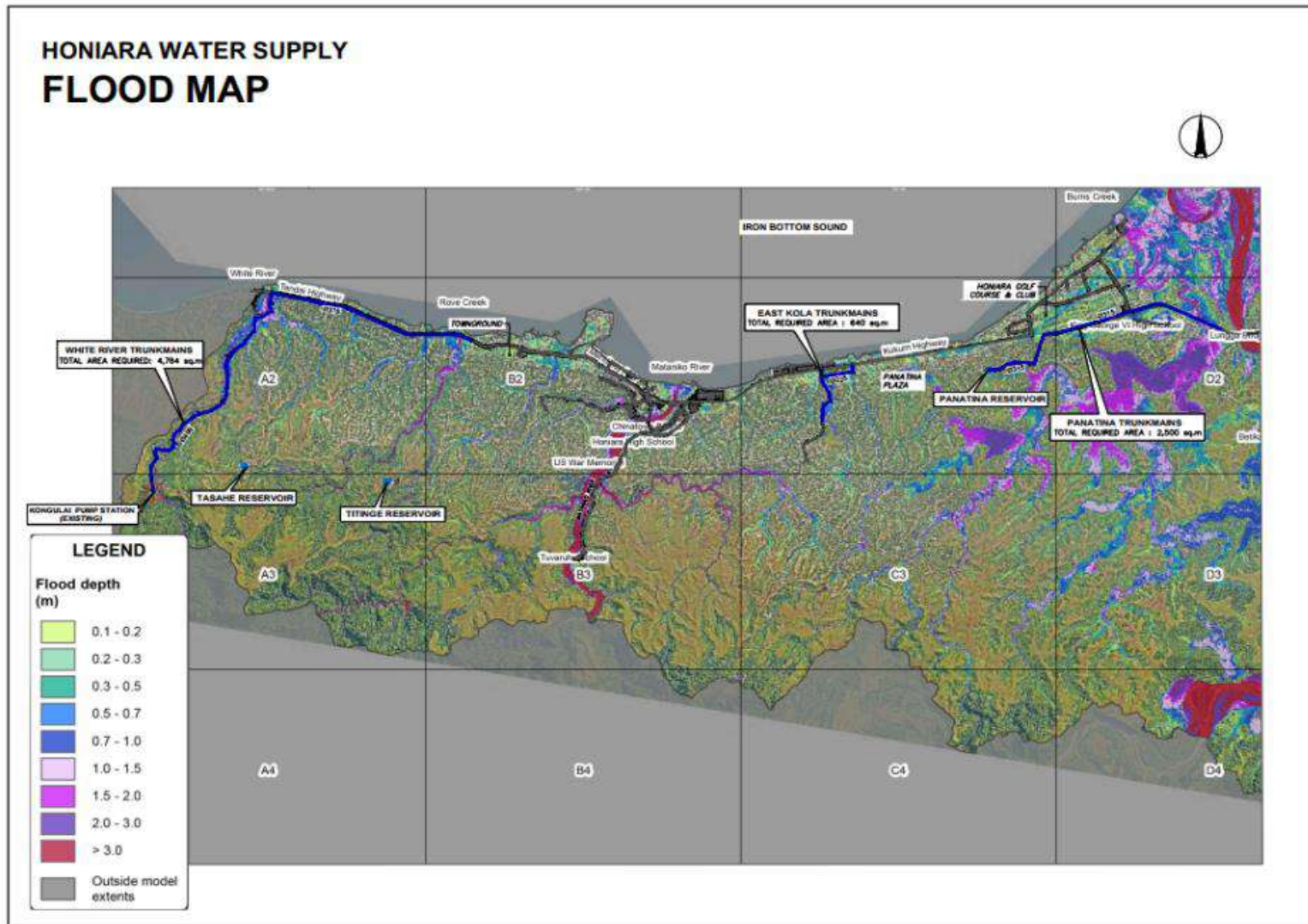
Figure 4-6: Major Natural Hazards in Asia and Pacific



Source: OCHA. 2016.

146. **Severe flooding of Honiara.** Honiara is vulnerable to severe flooding and has suffered flooding as a result of extreme rainfall since 2009. Most recently demonstrated in April 2014 when a slow-moving tropical depression delivered more than 732 mm of rain over four days in Honiara. The resulting flooding affected approximately 52,000 people and caused severe damage to several residential and commercial areas and urban infrastructure. **Figure 4-7** shows the Honiara design flood map incorporating the location of proposed projects.
147. In relation to this sub-project, only the Kongulai White River section of the new trunk mains is located in a flood prone area. The easement for the new pipeline is located however away from the main river and is not impacted by flooding.

Figure 4-7: Honiara Design Flood Map (1 in 5 AEP Design Event Peak Flood Depth)



148. **Earthquake.** Solomon Islands experience earthquake of magnitude 4.5 and above on average 12 times every month. In recent years, Solomon Islands experience some of the most devastating earthquake in magnitude 7 & 8 in the Richter scale. The major earthquakes occurred on 2 April 2007 with magnitude 8.1 which kills 52 people and cause 15,000 homeless. On 6 February 2013, off the coast of the Santa Cruz Islands in the southeast Solomon Islands, a magnitude 8.0 quake generates a 3-foot tsunami wave that kills 10 and damages or destroys more than 700 homes. On 9 December 2016, three provinces are affected by a magnitude 8 earthquake. Aftershocks followed, including a second magnitude 6.9 quake the next day.

4.1.5 Soils

149. There are 27 soil groups in Solomon Islands. Depending on parent material and land use, soils exhibit a range of fertility. The basalt volcanic derived soils are generally rich in nitrogen, phosphorous and organic carbon, but poor in potassium. The most fertile and agriculturally important of all soils found in Solomon Islands are the recent alluvial soils located on the northern Guadalcanal alluvial plains (Hansell & Wall, 1974).

4.1.6 Water Resources

150. 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. The Mataniko River flows through the central Central Business District of Honiara, while Lungga River meanders in the eastern part. 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.
151. Located within Honiara Botanical Garden, Rove spring is an artificial wetland from which water gravitates to the central area. It is understood that the source experiences less variations in term of raw water quality. Nevertheless, human activities are taking place in the catchment area and there is a risk of contamination.
152. The Kombito spring is located on the south-eastern edge of Honiara. It consists of a concrete weir that has recently been refurbished. A settling basin has been constructed near the spring during the JICA project. Nevertheless, the facility has not been used yet, as it is understood to reduce the already limited hydraulic head, thus limiting the water supply capacity. SW is now installing a new transmission line from the source to Panatina to increase the supply from Kombito spring which would then enable to operate the treatment facility.
153. **Plate 4-1** shows the photographs of existing springs.

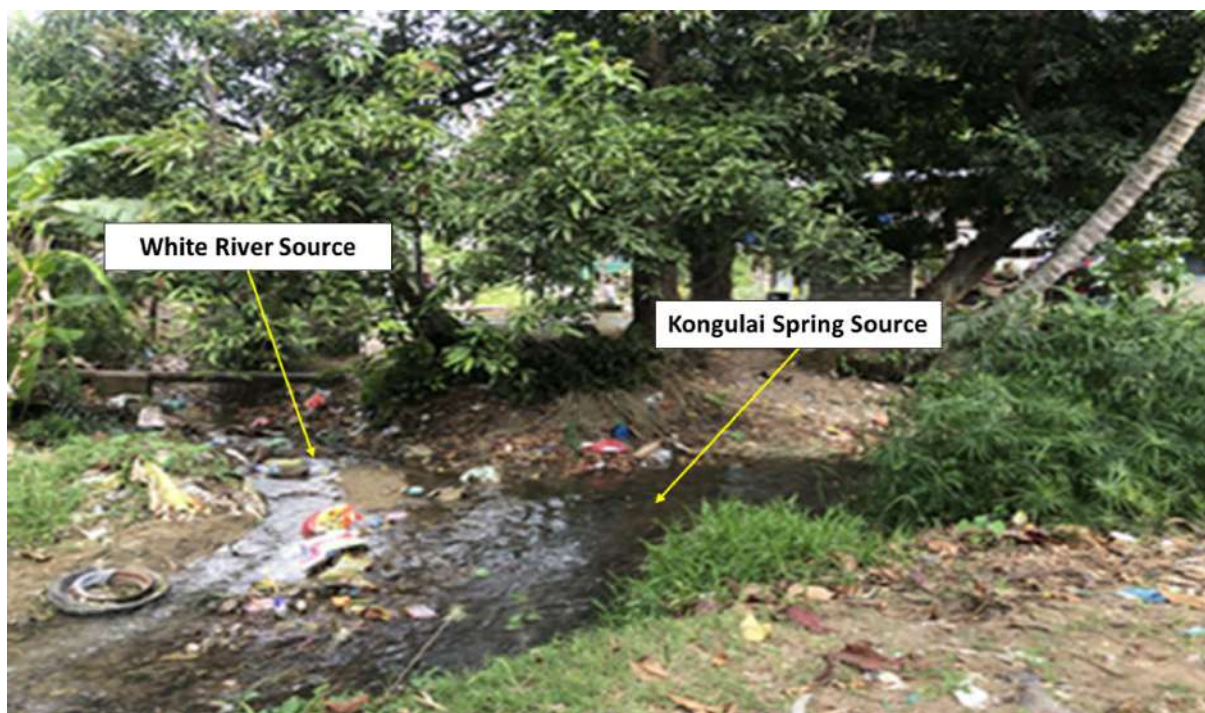
Plate 4-1: Photograph of Existing Springs



Source: SW PRF BOD Honiara WS, September 2019

154. The Kongulai Spring is also connected with White River. The point of intersection is near the 6th crossing, and both flows in the same channel and drains into the coast.
155. **Plate 4-2** shows the connection of Kongulai Spring and White River.

Plate 4-2: Connection of Kongulai Spring and White River



Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

156. Honiara water supply system relies on a variety of surface water and groundwater sources that have been progressively developed over time. With natural springs being the historical supply, groundwater has recently been developed, thus diversifying the water resource. Under current conditions, springs account for approximately 62% of the production, with Kongulai springs corresponding to 41% of the overall capacity. It is therefore a key facility that supplies most of the high-level reservoirs. As detailed in the Strategic Plan, the remaining production is essentially sourced from 27 groundwater boreholes located across the city area.
157. Nearly 60% of these bores (16) were recently installed as part of the JICA aid project (JICA Project for the Improvement of Water Supply Systems in Honiara and Auki), completed in 2014. However, production from the boreholes cannot fill the gap between the production capacity and water demand. While facilities implemented in 2013 were expected to provide an additional 3.2 MLD source capacity per bore field (i.e., 12.8 MLD in total), the four bore fields only supplied around 7 MLD. **Table 4-8** presents the summary of the actual production based on average values from January and February 2019.

Table 4-8: Honiara Water Supply System – Water Resources and Production

Type	Water Source	Components or Sub-units	Average Daily Production (m ³ /day)	% Supply from the Total	Approximate Elevation (masl)
Spring (62%)	Kongulai Spring – Gravity	Gravity supply to White River	~2,500*	8%	105
	Kongulai Spring – Pumped	Pumping to Tasahe tank & water transfer until East Kola'a	~11,000*	33%	105

	Rove Spring	Gravty supply to Rove & White River areas	3,250	10%	35
	Kombito Spring	Gravity supply to Panatina	3,577	11%	90
Groundwater (38%)	Tasahe Bore Field	04 BHs with PS	2,790	8%	50
	Titinge Bore Field	04 BHs with PS	1,289	4%	45
	Skyline Bore Field	04 BHs with PS	996	3%	40
	Tuvaruhu / JICA Bore Field	04 BHs with PS	1,555	5%	-2
	Tuvaruhu / SW Bore Field	04 BHs with PS	1,641	5%	-15
	Borderline Bore Filed	04 BHs with PS	1,712	5%	45
	Gilbert Camp Bore Field	04 BHs with PS	1,466	4%	42
	Panatina Bore Field	04 BHs with PS	1,164	4%	-2
Total			32.94 MLD	100%	

Note: Under normal functioning. Average production over the first semester of 2019 is expected to be low due to repeated shutdown of the spring due to high turbidity.

Source: SW PRF BOD Honiara WS, September 2019

158. In addition, Solomon Water is now in the process of recommissioning the White River bore field, rehabilitating two of the four boreholes. This action is expected to add an additional 1 MLD to the current production, supplying White River tanks.

4.1.7 Water Quality

159. A survey of the water quality upstream and downstream of the Kongulai Spring was undertaken in January 2020. The five sampling sites are shown on **Figure 4-8**.
160. 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 4-9** and **Table 4-10**).

Figure 4-8: 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

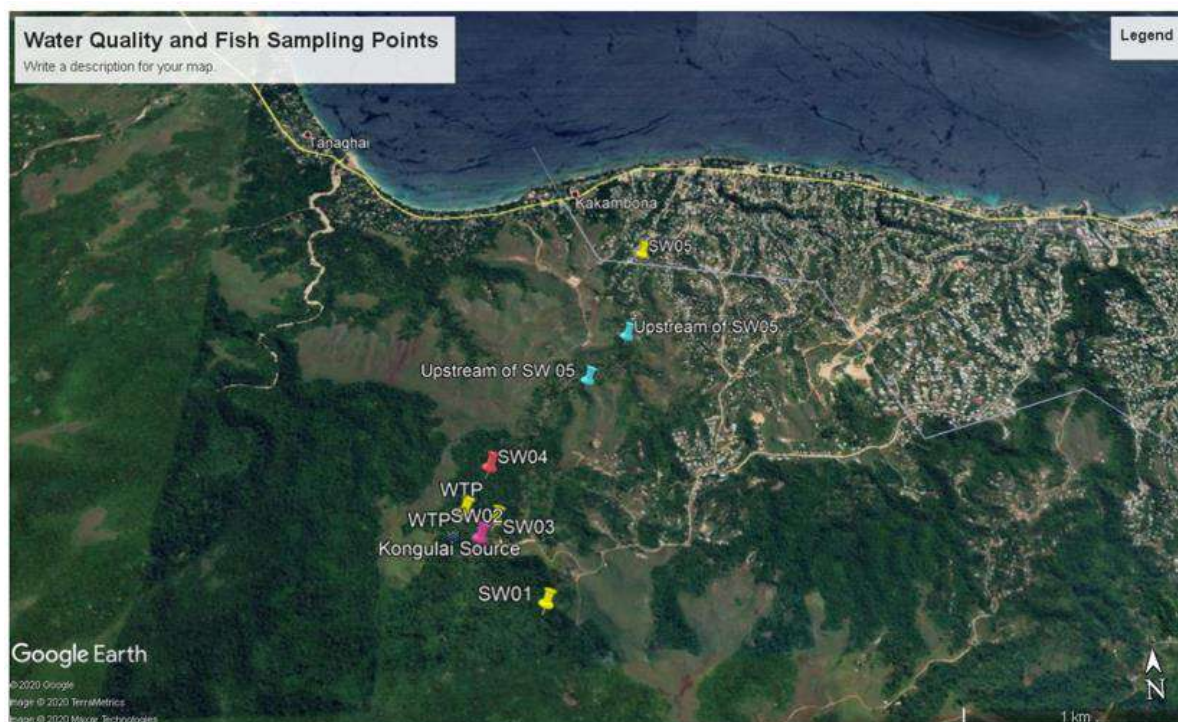


Table 4-9: Water Quality in Kongulai Spring – January 2020

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

¹⁶¹. 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 4-10: 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

162. 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 where not all residents currently have access to SW services.
163. 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.
164. Metal concentrations for water quality data was collected in February 2020 and are reported in **Table 4-11**. All metal concentrations were below WHO Drinking Water Quality Guidelines.

Table 4-11: Metal Concentrations at Kongulai Spring (February 2020)

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
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

165. In addition, a surface water quality assessment (physical and microbial) was conducted along the Kongulai-White River section last 16 July 2021. The seven sampling sites are shown in **Figure 4-9**.

Figure 4-9: Sampling Sites of Surface Water Quality Assessment along the Kongulai-White River Section



Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

166. The surface water quality assessment includes testing for microbial parameters (Total Coliform and E. coli) and in-situ testing for dissolved oxygen, temperature, conductivity, Oxidation/Reduction Potential (ORP), and pH.

167. **Table 4-12** presents the result of surface water quality assessment.

Table 4-12: Result of Microbial Water Quality Assessment (16 July 2021)

Date	SW ID	GPS Coordinates	Total Coliform	E. Coli	Units
16/07/2021	SW-1- Pool below Kongulai Weir	N 0599920 E 8955698	>1600	220	MPN/100ml
	SW-2-Crossing 1	N 0599958 E 8955871	>1600	240	MPN/100ml
	SW-3-Crossing 2	N 0599994 E 8956094	>1600	500	MPN/100ml
	SW-4- Crossing 3	N 0600015 E 8956162	>1600	500	MPN/100ml
	SW-5-Crossing 4	N 0600034 E 8956243	>1600	900	MPN/100ml
	SW-6-Crossing 5	N 0600340 E 8956568	>1600	900	MPN/100ml
	SW-7-Crossing 6	N 0601009 E 8957489	>1600	1600	MPN/100ml

Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

168. The Total Coliform and E. coli counts exceeded the WHO water quality guideline of zero (0) MPN/100ml.

169. The high levels of coliform organisms indicate the presence of human or animal excretal, which is a known source of microbial contamination.
170. The sites with low E. coli levels are SW-1 (Pool below Kongulai Weir) and SW-2 (Crossing 1), as the site is upstream and away from human influences. However, the results from SW-3 (Crossing 2) to SW -7 (crossing 6) show very high E. coli levels due to sewage effluent from informal settlements and the staggering volume of solid waste being disposed of carelessly.
171. The results of the water quality testing for physical parameters are detailed in **Table 4-13**. The pH at all the sampling sites is around 8. Its alkalinity is due to the soil and bedrock type.

Table 4-13: Result of Physical Water Quality Assessment (16 July 2021)

SW ID	GPS Coordinates	Location/Site	Temp (° C)	PH	Oxygen Reduction Potential (ORP) (mV)	Dissolved Oxygen	Dissolved Oxygen (% saturation)	Turbidity (NTU)	Conductivity (µS/cm)	Characteristics of the Stream Width (m)	Correlation with SW samplings carried out in 2020	Comment (samplings carried out in 2020 by SW)
SW-1	N 0599920 E 8955698	Pool Below Wier	24.43	8.51	157.2	11.70	128.5	1.2	404	10	SW ID closest : SW02	WQ & Fish Survey(2020)
SW-2	N 0599958 E 8955871	Crossing 1	24.88	8.4	124.1	13.2	160	1.8	411	6	SW ID closest : SW03	WQ & Fish Survey(2020)
SW-3	N 0599994 E 8956094	Crossing 2	25.38	8.22	151.7	12.96	149.7	1.9	405	6	SW ID closest : SW04	WQ & Fish Survey(2020)
SW-4	N 0600015 E 8956162	Crossing 3	25.42	8.36	144.0	12.31	152.7	2.0	403	9.1		
SW-5	N 0600034 E 8956243	Crossing 4	25.53	8.11	147.9	11.78	149.6	2.2	400	10		Fish Survey(2020) – 500m and 200m upstream of SW05
SW-6	N 0600340 E 8956568	Crossing 5	26.57	8.5	140	11.04	144	3.1	388	15		
SW-7	N 0601009 E 8957489	Crossing 6	27.47	8.16	129.8	11.46	133.5	13.6	421	5	SW ID closest : SW05	

Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

172. Turbidity levels at each sampling site are either clear, cloudy, and murky. Clearwater has low turbidity and cloudy water has a high turbidity level. Also, turbidity has an inverse relationship with temperature. It is evident from the data collected that as turbidity increases the temperature increases. A high turbidity value indicates a high number of suspended particles which in turn absorb more heat energy. This leads to an increase in the temperature of the water. Also indicated in the data, as turbidity increases, the dissolved oxygen decreases. This happens because, at high turbidity, a high concentration of suspended particles minimizes the amount of sunlight reaching the photosynthetic aquatic plants, thus lowering the oxygen produced as a result of reduced photosynthesis. Turbidity is low at all sampling sites except for site 7 (crossing 6) with very high turbidity from suspended particles caused by the residents residing within the close vicinity of the crossings and also along the stream. These activities include washing, farming, dumping of domestic waste, and also open defecation in the stream. This gives rise to the algal growth as observed in the stream.
173. Test results for DO reveal that the DO concentrations would support aquatic fauna. Concentrations of DO decrease throughout the day as water temperature increased. Low levels of DO are typical for polluted water which is a result of the higher bacterial loads.
174. Conductivity values are constant, a reflection of the amount of cations and anions in the water which are likely to be to be dominated by calcium carbonate as the catchment is predominately limestone substate.
175. The stream location where water quality testing was undertaken has different stream widths. **Table 4-14** presents the characteristics of stream where the water quality testing was undertaken.

Table 4-14: Characteristics of Stream

SW ID	GPS Coordinates	Location/Site	Characteristics of the Stream Width (m)
SW-1	N 0599920 E 8955698	Pool Below Wier	10
SW-2	N 0599958 E 8955871	Crossing 1	6
SW-3	N 0599994 E 8956094	Crossing 2	6
SW-4	N 0600015 E 8956162	Crossing 3	9.1
SW-5	N 0600034 E 8956243	Crossing 4	10
SW-6	N 0600340 E 8956568	Crossing 5	15
SW-7	N 0601009 E 8957489	Crossing 6	5

Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

4.1.8 Air Quality & Noise Levels

176. There are no available air quality and noise level data for Honiara. There are also no environmental standards being implemented for air quality and noise levels. The ECD of the MECDM has confirmed that environmental standards for Solomon Islands are still being developed.

177. In general, the peri-urban areas of Honiara, where proposed components of subprojects 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) which are 20 µg/Ncm, 40 µg/Ncm, and 20 µg/Ncm, respectively.
178. For urban areas, such as along the main roads (Mendana Avenue and Kukum Highway), particulate matter concentrations and noise levels are expected to be in elevated levels due to increased vehicular traffic, particularly during the daytime rush hour periods. Road paving activities of Kukum Highway is also contributing to localized increased concentrations of particulate matter.

4.2 BIOLOGICAL ENVIRONMENT

4.2.1 Terrestrial Flora

Kongulai-White River Trunk Main

179. The Kongulai-White River trunk main will follow the existing alignment from the Kongulai WTP site and connect by pipeline to White River tanks along the pipeline route.
180. From Kongulai WTP, the trunk main will pass through secondary forest, through the areas of shifting cultivation, settlements, and then to the White River suburb through the 01 Bustop. At White River, vegetation comprises of secondary habitat, which is mostly introduced vegetation. There are residential buildings/private properties along the road corridor by which the pipe will pass through.
181. **Plate 4-3** shows the typical corridor along Kongulai-White River trunk main.

Plate 4-3: Typical Corridor Along Kongulai- White River Trunk Main



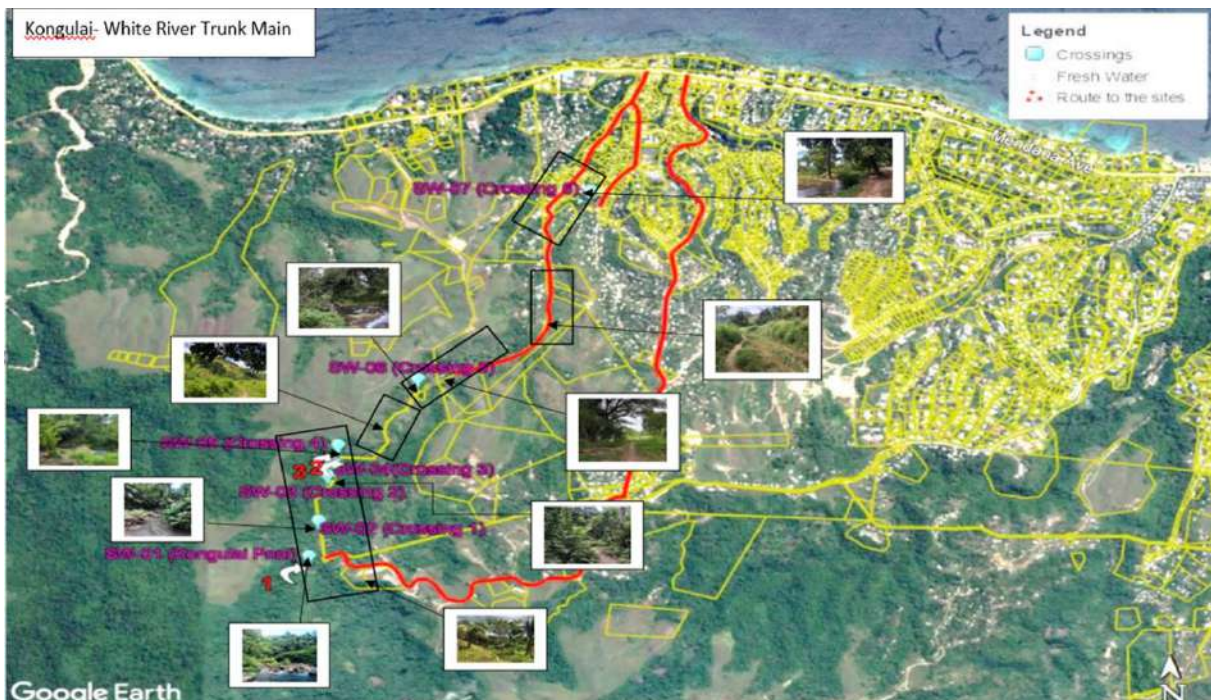


Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

182. The Kongulai-White River trunk main footprint is characterized by riparian vegetation in lowland forest with patches of grassland and regrowth, areas of shifting cultivation, and settlements.

183. **Figure 4-10** shows the route and sections of the Kongulai-White River trunk main.

Figure 4-10: Route and Sections of the Kongulai-White River Trunk Main



Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

184. At the downstream of the Kongulai Spring (weir), the surrounding vegetation observed includes *Pometia pinnata* (Akwa), *Canarium spp* (Nagli Nut), *Mangifera indica* (Mango), *Cananga Odorata* (Ylang-ylang), *Cryptocarya medicinalis*, *Macaranga spp*, *Areca catechu* (Betel Nut), *Metroxylon salomonense* (Sago), *Cassia grandis spp* (Sweet Pods), *Senna alata* (Ringworm Shrub), *Sphaerostephanos unitus* (L) (Ferns), shrubs and grasses. The invasive *Spathodea campanulata* (African Tulips) are colonizing and dominating the immediate stream. The aquatic flora found include the *Ipomea aquatica* (Kangkong) and *Nasturtium officinale* (Watercress).

185. **Plate 4-4** shows the typical riverine vegetation surrounding the Kongulai Spring (weir)

Plate 4-4: Typical Riverine Vegetation Surrounding the Kongulai Spring (Weir)



Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

186. At the WTP site, the flora includes fruit trees such *Spondias cytherea*, *Psidium guajava* (Guava), *Citrus aurantifolia* (Key Lime), *Citrus grandis* (Pomelo), *Syzygium malaccense* (Malay Apple), *Averrhoa carambola* (Star Fruit), *Musa spp* (Banana), *Barringtonia procera* (Cut Nut), *Inocarpus fagifer* (Tahitian Chestnut), *Cocos nucifera* (Coconut) and *Mangifera indica* (Mango). Other trees such as *Ceiba pentandra* (Kepok) and *Alstonia scholaris* (Devil's Tree) are also present. South of the WTP site is dominated by *Theobroma cacao* (Cocoa) and *Areca catechu* (Betel Nut), which were planted by those settled in the area.

187. **Plate 4-5** shows the typical vegetation surrounding the WTP site.

Plate 4-5: Typical Vegetation Surrounding the WTP site





Typical vegetation at the WTP site facing the existing water pumping station

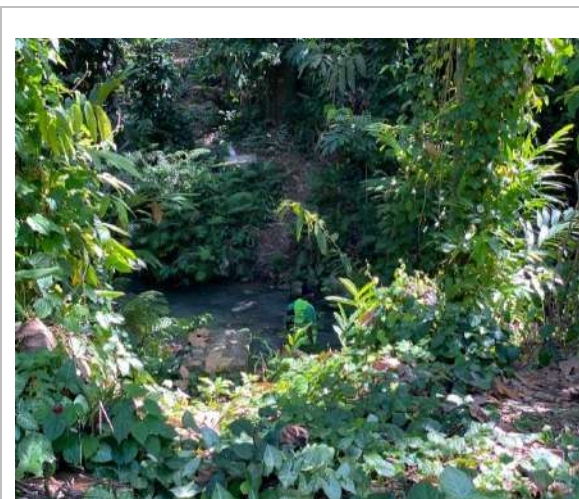


Shrubs, ferns, gingers

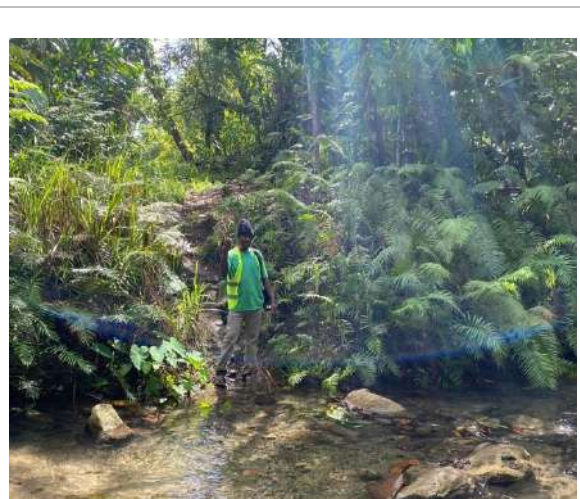
Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

188. Other shrubs, herbs, climbers and creepers, *Sphaerostephanos unitus* (L) (Ferns), and grasses identified include *Sida rhombifolia*, *Merremia peltate*, *Mikania micrantha* (Mile-a-minute), *Leucaena leucocephala* and *Senna alata* (Ringworm Shrub), and several other grass species.
189. Observation of flora within the vicinity of the river crossings (1-4) where the trunk main will traverse is quite similar. Most of the vegetation consists mainly of secondary regrowth with *Alpinia purpurata* (Giant Gingers) with either pink or white flower, *Cyanthea spp* (Ferns spp) *Sphaerostephanos unitus* (L), *Colocasia Esculenta* (Taro spp), *Bambusa spp* (Bamboos), *Ipomea aquatica* (Kangkong), shrubs and vines (*Merremia peltate*, *Syngonium podophyllum*, *Mikania micrantha*) and grasses.
190. **Plate 4-6** shows the typical riverine vegetation at stream crossings 1-4 (Kongulai section).

Plate 4-6: Typical Riverine Vegetation at Stream Crossings 1-4 (Kongulai Section)



Crossing 1



Crossing 2



Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

191. Where the trunk main passes through before or after the river crossings at the Kongulai section, some identifiable trees includes *Pometia pinnata* (Akwa), *Broussonetia papyrifera* (Paper Mulberry), *Canaga odorata* (Ylang-ylang), *Macaranga similis*, *Spathodea campanulate* (African Tulip) *Ficus elastica* (Fig Tree), *Delonix regia* (Christmas Trees), *Ficus spp* (Amau/Kanava), *Ficus benjamina*, *Ficus congesta*, *Schizostachyum tessellatum* (Small Green Bamboo) including fruit trees such as *Syzygium aqueum* (Water Rose Apple), *Syzygium malaccense* (Abarai), *Barringtonia procera / Novae-hibernae* (Cut Nut), *Mangifera indica* (Mangoes), *Artocarpus altilis* (Bread Fruit), *Canarium indicum* (Ngali Nuts), *Cocos nucifera* (Coconuts), *Terminalia spp* (Alite), *Averrhoa carambola* (Star Fruit), *Psidium guajava* (Guava).
192. **Plate 4-7** shows the typical vegetation along the trunk main corridor – Kongulai section.

Plate 4-7: Typical Vegetation along the Trunk Main Corridor - Kongulai Section





Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

193. Gardens owned by settlers are also observed and garden crops planted include *Manihot esculentum* (Tapiok), *Colocasia esculenta* (Taro), *Dioscorea spp* (Yam), *Musa spp* (Banana), *Saccharum edule* (Long Pitpit), pawpaw, slippery cabbage, *Polyscias spp* (Yellow Leafy Cabbage), *Pseuderanthemum wharftoniaum* (Ofenga), *Sauropus androgynus* (Bonio), *Ananas comosus* (Pineapples).
194. Other grasses and vines found along the footprint include *Pueraria spp*, Piper betel, *Imperata cylindrica*, *Paspalum mandiocanum*, *Mimosa pudica*, *Mimosa invisa*, *Sida rhombifolia*, *Eleusine indica*, *Merremia peltate*, *Syngonium podophyllum*, *Mikania micrantha*.
195. Towards the White River section, the vegetation along the trunk main footprint vegetation highly altered due to human settlements. The surrounding vegetation consist mainly of garden crops such as *Manihot esculentum* (Tapiok), *Musa spp* (Banana), *Pseuderanthemum wharftoniaum* (Ofenga), *Polyscias spp* (Yellow Leafy Cabbage) and *Saccharum offinarium* (Sugar Cane), *Areca catechu* (Betel Nut Trees), *Metroxylon salomonense* (Sago Palms), *Pandanus tectorius* are also present. Some introduced trees are *Broussonetia papyrifera* (Paper Mulberry), *Mangifera minor* (Mango), *Artocarpus altilis* (Breadfruit), *Samanea saman* (Rain Tree), *Polyscias spp* (Shrub) and *Plumeria acuminata* (Frangipanies).
- 196.

¹⁹⁷. Plate 4-8 shows the typical vegetation along White River section.

Plate 4-8: Typical Vegetation along White River Section



Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

198. The flora within the vicinity of the river crossings (5-6), where the trunk main passes through consist of *Samanea saman* (Rain Tree), *Mangifera indica* (Mango), *Musa spp* and *Morinda citrifolia* (Noni) including vines and creepers. Aquatic plant present is *Ipomea aquatica* (Kangkong)
199. **Plate 4-9** shows the typical vegetation at crossings 5-6 (White River section)

Plate 4-9: Typical Vegetation at Crossings 5-6 (White River Section)



Crossing 5



Crossing 6

Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

200. There are also areas where grasses and associated weeds colonizing the road corridor where the pipe will pass through. This also includes the area where the White River tank is located. Within the White River suburb, where the pipe will pass through until it reaches 01 Bus Stop, the vegetation is limited to landscaping plants within properties.
201. During the construction stage, trees and fruit trees including garden crops within the pipeline corridor along the Kongulai-White River section will be removed.

East Kola Trunk Main

202. The East Kola Trunk Main is located within the road corridor in an urban suburb in East Honiara. The suburb accommodates the residence of the Governor General of Solomon Islands which is immediate to the trunk main site, and along the route, there are residential homes, canteens, churches, schools, shops, and market (fishing village).
203. The Trunk Main will also pass through a small stream (Kukum) and Panatina. The stream is highly polluted with rubbish and other wastes dumped into it.
- 204.

205. Plate 4-10 shows the typical corridor along East Kola trunk main.

Plate 4-10: Typical Corridor along the East Kola Trunk Main



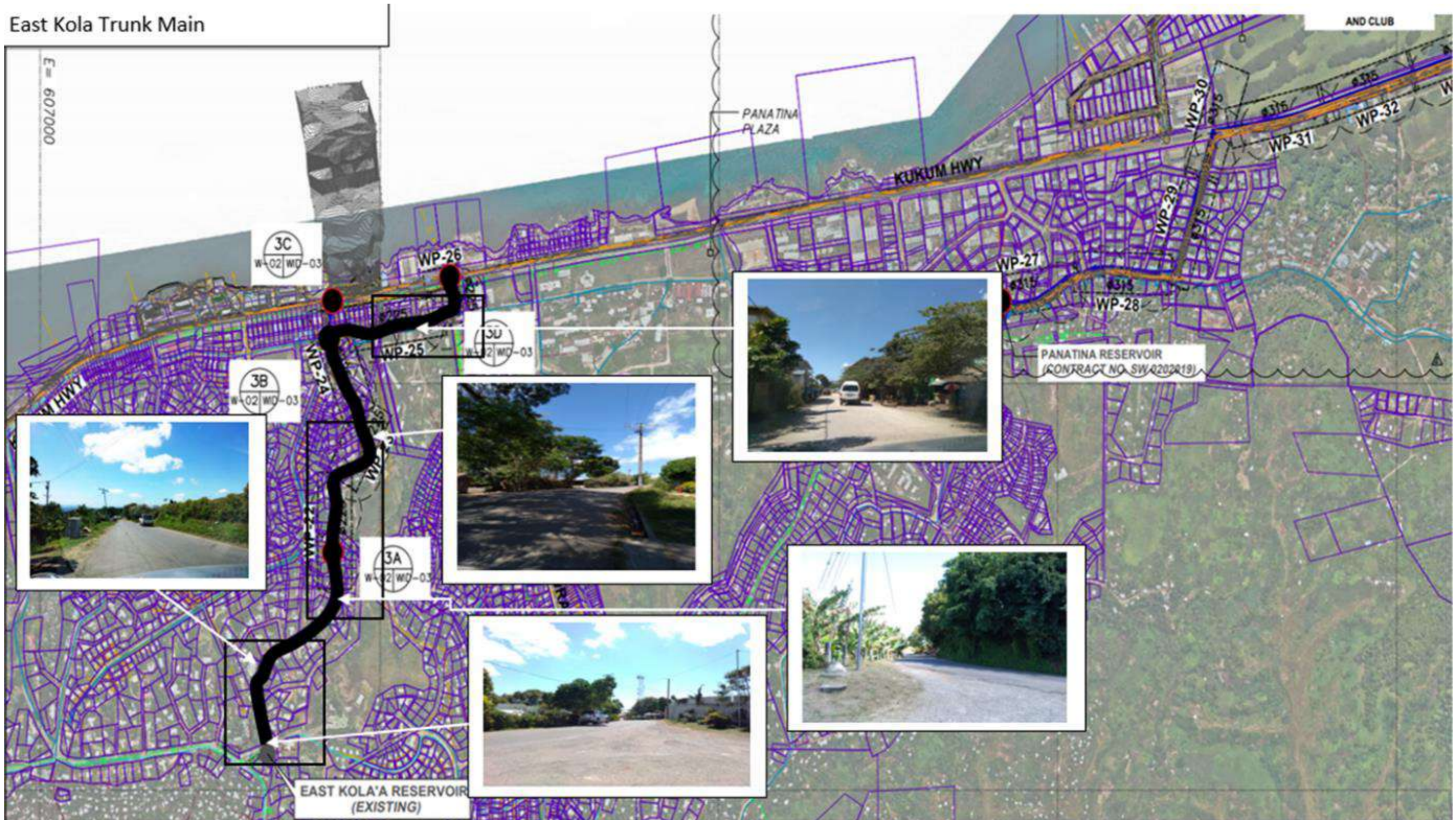
Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

206. Along the East Kola trunk main alignment, most vegetation is scattered roadside trees and shrubs along the road corridor and is tolerant to disturbances.

207.

208. Figure 4-11 shows the route and sections of the East Kola trunk main.

Figure 4-11: Route and Sections of the East Kola Trunk Main



Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

209. All original forest vegetation has been cleared decades ago for the establishment of the suburb. The typical vegetation comprises of *Frangipany*, *Premna corymbosa* (Premna), *Delonix regia* (Christmas Trees), *Broussonetia papyrifera* (Paper Mulberry), *Elaeis guineensis* (Oil Palm), *Citrus limon* (Lemon). *Musa spp* (Banana), *Carica papaya* (Pawpaw), *Mangifera indica* (Mango) and *Morinda citrifolia* (Noni).

210.

211. Plate 4-11 shows the typical vegetation along East Kola trunk main.

Plate 4-11: Typical Vegetation along East Kola Trunk Main



Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

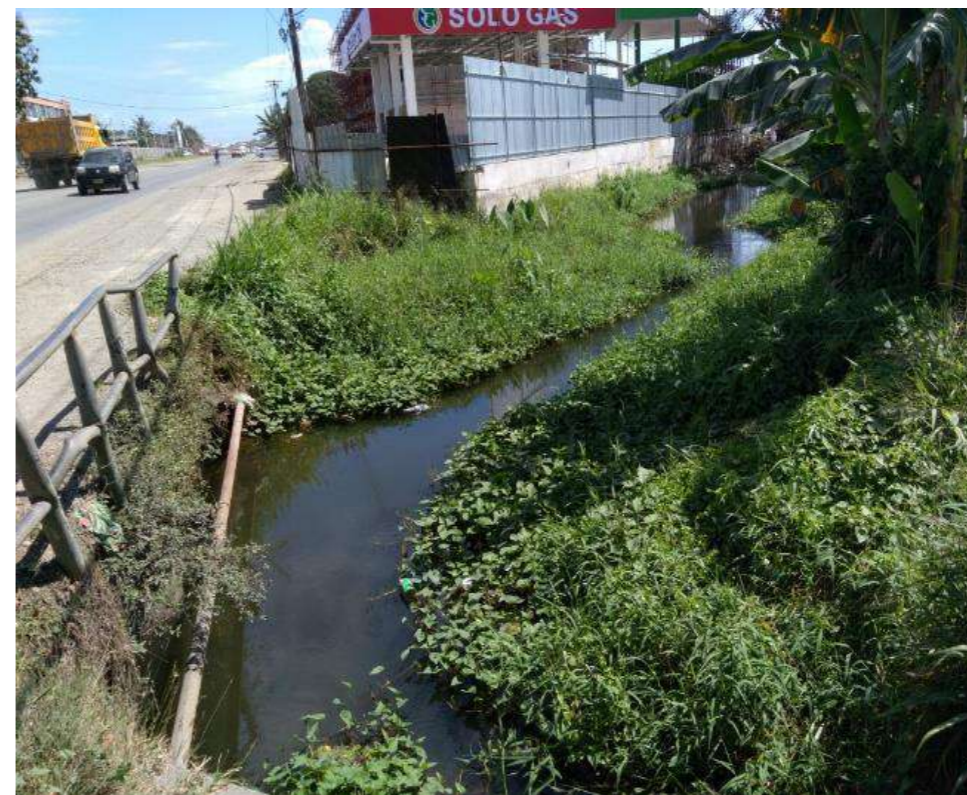
Panatina Trunk Main

212. The Panatina trunk main is located at Panatina Suburb which is further East from the East Kola trunk main. Within this area, there are residential homes, an open-air roadside market, and canteens. Where the trunk main will connect to the main road, adjacent to it are the newly constructed stadiums at the Telekom grounds, Solomon Islands National University bus stop and grounds, and the Honiara golf field on the opposite side. Further along are the Ranadi industrial areas with shops and hardware, King George IV School, Perch Christian School, KG Betel Nut Market, and the Burns Creek area. There is a large shopping center known as Capital Park, a school, and a roadside market. There is a stream at Burns Creek before the Lungga Bridge and Lungga River.

213.

214. Plate 4-12 shows the typical corridor along Panatina trunk main.

Plate 4-12: Typical Corridor Along Panatina Trunk Main



Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

215. Along the Panatina trunk main alignment, natural vegetation is limited and consists of roadside trees and grasses along the road corridor.

216.

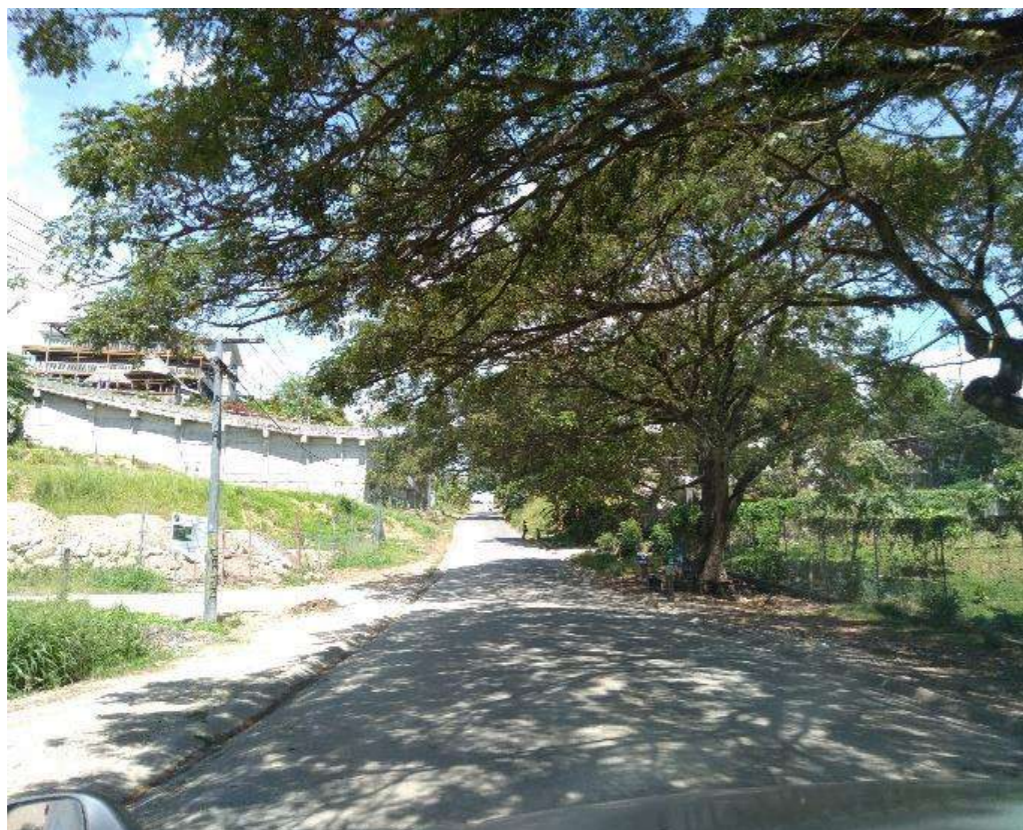
217. Figure 4-12 shows the route and sections of the Panatina trunk main.

218. No natural forest exists on the project site or in the surrounding areas. Roadside trees include *Samanea saman* (Rain Tree), *Delonix regia* (Christmas Trees), *Broussonetia papyrifera* (Paper Mulberry), *Vitex cofassus* (Vasa), and grasses such as *Panicum miliaceum* (L) (Common Millet), *Cynodon dactylon* (L), and Bermuda grass were identified.

219.

220. **Plate** 4-13 shows the typical vegetation along the Panatina trunk main.

Plate 4-13: Typical Vegetation along the Panatina Trunk Main



Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

4.2.2 Terrestrial Fauna

221. The riparian ecosystem at Kongulai and that including the disturbed ecosystem along the White River area provides habitat for birds, reptiles/lizards, amphibians, and other vertebrates found. From field observation, the fauna is either sighted or identified by their sounds, seed deposits (in their droppings), or that made-know by those living in the area.
- **Birds.** *Rhipidura leucophrys* (Willie Wag Tail), *Chalcopsitta cardinalis* (Cardinal Lory), *Acridotheres tristis* (Common Myna), *Urodynamis taitensis* (Long-tailed Cuckoo), Hornbill and Flying Fox.
 - **Amphibians.** *Rhinella marina* (Cane Toad)
 - **Reptiles/Lizards:** Solomon Blue-Tailed Skink, Pacific Black Skink, Emerald Tree Skink
 - **Other terrestrial fauna observed.** *Oryctes rhinoceros* (Coconut Rhinoceros Beetles), *Cicadoidea* (Cicadas), *Anisoptera* (Dragon Flies), *Tettigoniidae* (Bush Crickets), *Oecophylla smaragdina* (Green Weaver Ants), and *Lissachatina fulica* (Giant African Snails) were being observed.
222. **Plate 4-14** shows the terrestrial fauna observed along the White River area.

Plate 4-14: Terrestrial Fauna Observed along the White River Area



Birds



Reptiles/Lizards



Amphibians



Other terrestrial fauna observed

Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

4.2.3 Aquatic Fauna

223. The Kongulai stream provides important habitat for wildlife concealed in the rocks or mud, in pools or stream edges. Aquatic life such as algae, aquatic plants, snails, macro-invertebrates, and fishes was observed. Freshwater fish identification was conducted particularly in pools with a water depth of up to 1-2 m or more. Three sites were identified in sections where water velocity is near to being still.
224. **Figure 4-13** shows the survey sites of fish and other aquatic fauna undertaken in 2021.
225. An earlier field survey of the freshwater ecology Kongulai Spring and White River was undertaken on 20th February 2020 for the Kongulai WTP. Four sites along the Kongulai stream were surveyed and it was found that the fish Gobioids and Kuhlidae are very common. The Gobioids are mostly represented by the Gobiidae family while the Kuhlidae are represented by *Kuhlia rupestris* and *Kuhlia marginate*. 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 Spring /White River, the Gobioids and Kuhlidae⁶.

⁶ Initial Environmental Examination, July, 2020. 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



Figure 4-13: Survey Sites of Fish and Other Aquatic Fauna



Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

226. **Table 4-15** presents the aquatic fauna observed underwater.

Table 4-15: Aquatic Fauna Observed Underwater

Site Description	GPS Coordinates	Aquatic Fauna Identified
Pool below Kongulai Weir	N 0599920 E 8955698	<i>Awaous melanocephalus</i>
		
Pool upstream of Crossing 3	N 0600053 E 8956110	<i>Gobiidae</i> , <i>A. Glossogobius</i> species, <i>Melanoides tuberculata</i> (snails)
		
Pool at Crossing 4	N 0600034 E 8956243	<i>Kuhlia maginata</i> ,
		

Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

4.2.4 Threatened and Vulnerable Species

Flora

227. The riparian vegetation in the lowland forest along the Kongulai-White River trunk main section provides habitat for few threatened and vulnerable flora found within the trunk main corridor and adjacent areas.
228. **Table 4-16** list the threatened flora along the trunk main corridor.

Table 4-16: List of Threatened Flora along Trunk Main Corridor

Location	Species	Common Name	Protection Status
Lowland Riparian Forest, Secondary Regrowth along Trunk Main Corridor	<i>Canarium indicum</i>	Ngali, Canarium Nut	Threatened
	<i>Pometia pinnata</i>	Taun, Akwa	Threatened
	<i>Vitex cofassus</i>	Vasa	Threatened
	<i>Alstonia scholaris</i>	Alstonia, Milky Pine	Threatened

Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

Fauna

229. **Table 4-17** list the threatened fauna along the trunk main corridor.

Table 4-17: List of Threatened Fauna along the Trunk Main Corridor

Location	Species	Common Name	Protection Status
Lowland Riparian Forest, Secondary Regrowth along Trunk Main Corridor	<i>Rhyticeros plicatus</i> (Blyth's hornbill)	Hornbill	Threatened

Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

4.2.5 Protected Area

230. There is no protected area within project boundaries at the Kongulai-White River area. As shown in the map of terrestrial/marine protected areas in Solomon Islands in **Figure 4-14**, most protected areas are outside of the project boundary.

Figure 4-14: Map of Terrestrial/Marine Protected Areas in Solomon Islands



Source: Survey of Riparian and terrestrial flora and Fauna of the Proposed Pipeline Route, August 2021

4.3 SOCIO-ECONOMIC ENVIRONMENT

4.3.1 Population Profile

231. According to the 2009 census the population of the Solomon Islands was determined as being 515,870 which is dispersed widely across the archipelago and a population growth rate of 2.3%/yr. The population has a broad-based age-sex structure. 40% of the population was found to be below 15 years of age. Moreover, in 2018, the country's population to be approximately 667,044 (SIG, National Statistic Office) with a sex ratio of 1.07 males to females, with an annual population growth rate of 2.0%, a medium age of 19.9 years, a life expectancy average of 74.2 years (76.9 females, 71.6 males) and a density 22 persons per square kilometer. This reflects a sharp increase from the 17 persons per square kilometer recorded in the 2009 census. The population is thought to be doubling every 30 years, and pressure on available services and natural resources is said to be increasing dramatically. This requires the Solomon Islands government to invest in for social infrastructure.
232. Specifically, the estimated population for Guadalcanal in 2018 is 145,000. An estimated population for Honiara is 86,529, with the highest number of citizens aged less than 15 years. The data provided in the Household Income and Expenditure Survey 2012/13 (HIES) indicated fluctuating population growth rates for Guadalcanal over the past two decades. The population grew rapidly, at 4.3% per year, for the inter-census period 1976-86. For the next period (1986-99) the growth rate had dropped to 1.5% due to the 1998/1999 departure of a large number of migrants from other provinces. There was a further large outflow of people in 2000, during the civil conflict, known as the 'ethnic tension' (1999-2003). The annual growth rate for the period 1999-2005 was 5.6% and since then an average growth rate of 4.4% (HIES, 2013).
233. At the last census (2009), Honiara City's 64,609 inhabitants represented 12.5% of Solomon Islands' total population (see **Table 4-18**). 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 Grater Honiara Area (encompassing both Honiara City Council and adjacent areas in Guadalcanal) can be in the order of 150,000.

234. Provisional results from the 2019 census (SINSO, 2019) confirm these trends, with the overall population of the Solomon Islands growing by 2.7% per year from 2009 to 2019 and totaling 721,455; the growth rate of Honiara is accelerating at 5.8% per year and a total population of 130,176 almost doubling since 2009.
235. As of June 2019, chlorinated water was supplied to nearly 60,000 people equivalent to 9,600 customers. The subprojects will serve the projected population in Honiara’s urban and peri-urban areas.

Table 4-18: Summary of Demographics (Solomon Island’s Population Census)

Indicator	Total	Male	Female
Total Population 2019	721,455	369,252	352,204
Average annual growth rate, 1999-2009 (%)	2.7		
Population density (number of people/km2)	24		
Urban Population (2019)	184,832		
Honiara Population (2009)	64,609	34,089	30,520
Per cent urban (%)	100.0		
Average annual urban growth rate, 1999-2009 (%)	4.0		
Urban Population (2019)	130,176	67,064	63,112
Average annual growth rate, 1999-2009 (%)	5.8		

Reproduced from: SINSO. 2009, 2019.

4.3.2 Economic Context

236. Honiara is the economic, commercial, and administrative center of Solomon Islands. Its 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.
237. 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 AUD 2 million per annum (M. Keen and others. 2017).
238. 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).

4.3.3 Cultural Component

239. 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 record of visible archaeological records such as stone-faced terraces, platforms, and walls representing earlier village sites, agricultural complexes, and shrines, in the subproject areas.

4.3.4 Land-Use and Settlement Pattern

240. Honiara has a land area of 22.73 km². In 2012, 65% of the city's developable land was developed, 1.5% was held by private developers, and 13.5% occupied by informal settlements (UN-Habitat. 2012). Today, commercial developments have continued along 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.

4.3.5 Built Environment⁷

241. **Transportation.** Honiara is the main transport hub of Solomon Islands, connecting it to other countries through its main airport, Henderson International Airport now known as Honiara International Airport, and its port at Point Cruz. Additional transportation networks include the highways and bridges.
242. Kukum Highway is perceived to be at capacity and peak hour traffic congestion which spills onto secondary roads is regularly experienced. Roads in residential and commercial areas are poorly constructed and poorly maintained causing difficulties in accessing some parts of Honiara. In terms of footpaths, these are non-existent in high foot traffic areas and many may be considered as merely walking tracks. Also, these become waterlogged and muddy after rain events that is why people are forced to walk on the roads together with fast moving vehicles.
243. Increase in traffic volume is causing serious traffic congestions along the Kukum Highway. The causes of the traffic congestion are the bottlenecks at New Mataniko Bridge (the highway width narrows from 4-lane to 2-lane), the City Council Roundabout, where many traffic directions intersect, and the front of the Central Market, where road crossing facilities are inadequate. Other causes are the seriously deteriorated road pavement, caused by frequent floods along the highway.
244. Traffic survey was carried out along the Kukum Highway to understand the traffic condition of the highway and to obtain the data to forecast the future traffic demand. The following are the summary of the result of the survey:⁸
- Queue Length Survey: The maximum length of the queue are 2.3km to the east and 1.1 km to the west from the City Council Roundabout.
 - Travel Speed Survey: Travel speed of west direction at distance between -0.5km and 2.0km is less than 10km/h which means that the head of the traffic congestion is at the Central Market. While travel speed of east direction at distance between -1.0km and 0.0km is about 10km/h which means that the head of the traffic congestion is at the City Council Roundabout.

⁷ Information about infrastructure and services was taken from Greater Honiara Urban Development Strategy and Action Plan (Volume I)

⁸ Preparatory Survey for Kukum Highway Upgrade Project in the Solomon Islands, November 2014

245. Future traffic demand forecast was also conducted for Kukum Highway Upgrade Project. **Table 4-19** presents the future traffic volume from 2013 to 2033. **Figure 4-15** shows the location map of traffic count station.

Table 4-19: Future Traffic Volume (2013-2033), PCU/day

Station No. 1	2013	2018	2023	2028	2033
1	35,336	45,996	51,329	56,824	62,432
2	44,510	50,148	55,990	62,015	68,171
3	31,453	35,639	40,002	44,545	49,233
4	21,757	24,655	27,679	30,829	34,081
5	12,851	8,266	9,222	10,206	11,210

PCU - Passenger Car Unit

Source: Preparatory Survey for Kukum Highway Upgrade Project in the Solomon Islands, November 2014

Figure 4-15 Location Map of Traffic Count Station



Source: Preparatory Survey for Kukum Highway Upgrade Project in the Solomon Islands, November 2014

246. As shown in **Plate 4-15**, Mendana Avenue is typically a linear, two-lane, two-way major road. At times, the traffic volume significantly exceeds the capacity of the road.

247. Traffic counts were carried out on 05 April 2018 showing 7,400 vehicles over the 12-hour count of which 3.8% were heavy vehicles.⁹

Plate 4-15: Mendana Avenue



⁹ IEE Report Solomon Islands: Land and Maritime Connectivity Project – Multi-tranche Financing Road Component, September 2020

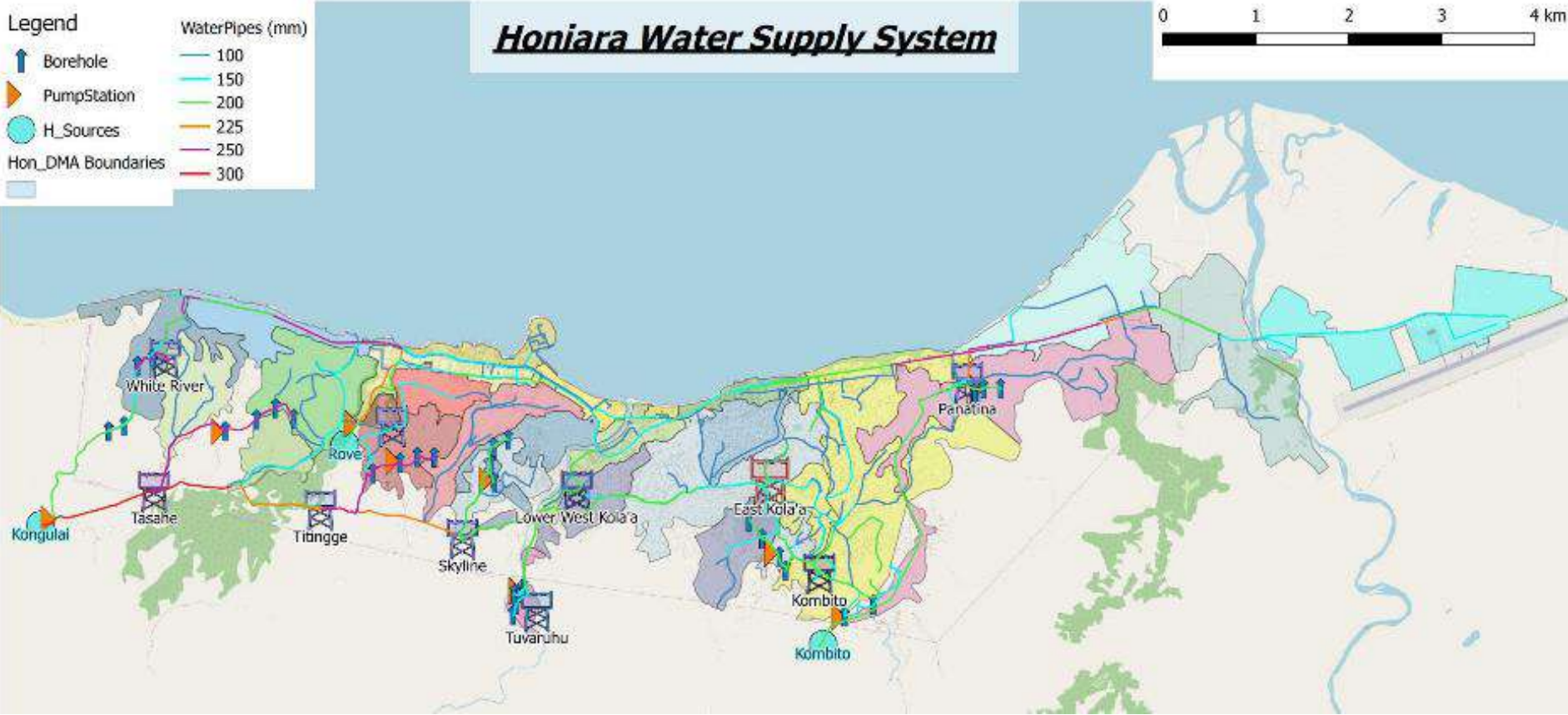
248. **Water Supply.** Honiara water distribution system is a large piped system supplying approximately 55% of households in the Greater Honiara urban area (covering Honiara City Council and surrounding communities).
249. The distribution system is fed by both surface and groundwater from 3 surface water sources and 27 boreholes. Households not connected to the piped system receive water from various sources including rainwater tanks, rivers/streams, communal standpipes, and unprotected wells. Over the years, SW has increased its production capacity and secured additional sources to bridge the large gaps between supply and demand in Honiara.
250. The underlying driver to this increasing demand is the fast-urban growth and associated economic activities. While some areas are supplied 24 hours per day and 7 days per week, parts of the system experiences intermittent supply with approximately only 22 hours per day. Although recent foreign funded projects have facilitated the construction of new key assets, notably under the Japan International Cooperation Agency (JICA) water supply improvement project completed in 2014, most of the distribution network is 40-50 years old. The structure of the existing system strongly relies on the original configuration with surface water being gravitated from high level reservoirs to the coastal area. **Figure 4-16** presents a map of the water supply system with main features in **Table 4-20**.

Table 4-20: Main Features of Existing Water Supply System of Honiara City

- Nearly 60,000 people supplied (~9,600 customers) as of June 2019
- Eight groundwater abstraction systems with a total number of 27 boreholes
- Three surface water sources
- Amount of supplied water is ~33 MLD
 - About 38% from groundwater
 - About 62% from surface water with Kongulai spring accounting for 41% of the overall production
- Nearly 295 km of network ranging from 15 to 300 mm, 62% PVC pipeline, 20% PE, 13% GI and balance CI/DI
- 28 DMAs with limited pressure regulation
- Chlorine disinfection on all production systems
- No existing water treatment plant in operation
- 12 ground reservoirs in service
- 16.3 ML storage equivalent to half day autonomy of current production

Source: SW PRF BOD Honiara WS, September 2019

Figure 4-16: Map of Existing Water Supply System of Honiara City



Source: SW PRF BOD Honiara WS, September 2019

251. **Storage and Distribution:** Storage capacity was significantly increased and secured with the construction of 5 reservoirs under the recent JICA project for a total capacity of 7.35 ML as well as the recent construction of East Kola steel tank under DFAT funding (4 ML). The current storage capacity in the Honiara water supply system is 16,300 m³ which represents approximately 50% of the existing daily production capacity. Despite the recent improvements, a few of the old reservoirs are in a poor condition and will need to be rehabilitated (e.g. old Tasahe Tank and Lengakiki Tank).
252. Another important point is the geographical distribution of the storage capacity which does not necessarily match current production capacity and demand. This results in unequal storage autonomy across the system and increased vulnerability to water supply shortages during power outages or other system interruptions in some areas. The list of main reservoirs with their characteristics is summarized in **Table 4-21**. The city water supply system can be broadly divided into 6 independent systems that use groundwater and/or spring water as resources.
253. These discrete systems can further be divided into 10 primary water supply zones which are presented in **Table 4-21** together with their main characteristics. Although these district meter zones are isolated from each other, some of their networks are interconnected with closed valves. SW operates 28 district metered areas (DMAs) which are presented in **Figure 4-17**, with different colors per primary water zone.

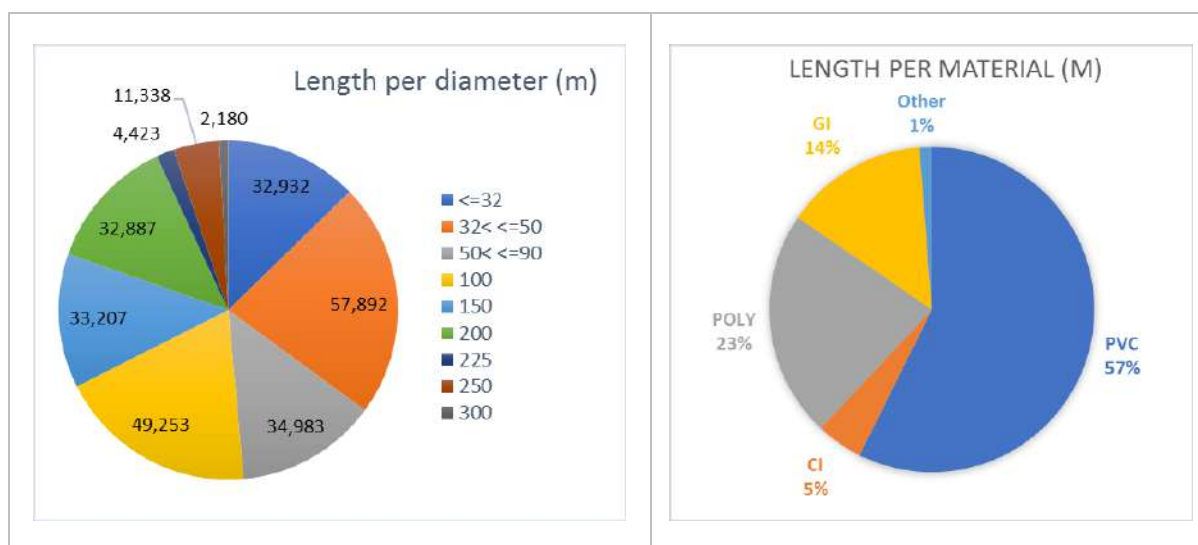
Table 4-21: Existing Main Reservoirs

Primary Water Supply Zone	Source/s	Key Reservoirs (Elevation, Capacity)	Key Supply Areas
1. White River	<ul style="list-style-type: none"> ▪ Kongulai Spring (White River bore fields in near future) 	White River (59 m, 0.9 ML)	White River A & B
2a. Tasahe	<ul style="list-style-type: none"> ▪ Kongulai Spring ▪ Tasahe bore fields 	Tasahe (154 m, 2.6 ML)	<ul style="list-style-type: none"> ▪ Tasaje ▪ Ngossi
2b. Titinge	<ul style="list-style-type: none"> ▪ Kongulai Spring ▪ Titinge bore fields 	Titinge (136 m, 1.3 ML)	<ul style="list-style-type: none"> ▪ Lengakiki ▪ Titinge ▪ Vavae Ridge
2c. Skyline	<ul style="list-style-type: none"> ▪ Kongulai Spring ▪ Mataniko bore fields ▪ Skyline bores 	Skyline (115 m, 2.3 ML)	<ul style="list-style-type: none"> ▪ Skyline ▪ Mbokonavera
2d. East Kola	<ul style="list-style-type: none"> ▪ Kongulai Spring 	East Kola (86 m, 4 ML)	<ul style="list-style-type: none"> ▪ Lower Kombito ▪ Jackson Ridge
3. Rove	<ul style="list-style-type: none"> ▪ Rover Spring 	N/A	<ul style="list-style-type: none"> ▪ Rove Gravity
4. Mataniko	<ul style="list-style-type: none"> ▪ Tuvaruhu bore fiels 	<ul style="list-style-type: none"> ▪ Tuvaruhu (30 m, 0.1 ML) ▪ Lower West Kola'a (57 m, 0.9 ML) 	<ul style="list-style-type: none"> ▪ Tuvaruhu ▪ Lower West Kola'a
5. Borderline	<ul style="list-style-type: none"> ▪ Kombito bore fields ▪ Borderline bore fields 	Kombito (88m, 2.7 ML)	<ul style="list-style-type: none"> ▪ Kombito / Borderline
6a Kombito	<ul style="list-style-type: none"> ▪ Kombito Spring 	N/A	<ul style="list-style-type: none"> ▪ Kombito Gravity
6b Panatina	<ul style="list-style-type: none"> ▪ Panatina bore fields ▪ Kombito Spring 	Panatina (47 m, 2.7 ML)	<ul style="list-style-type: none"> ▪ Panatina ▪ Lungga / Airport

Source: SW PRF BOD Honiara WS, September 2019

254. With regard to the distribution network, the total length of network is estimated at nearly 295 km, the majority of which are PVC pipes. There is a large proportion of small diameter reticulation pipes within the system, which accounts for poor supply pressures across some parts of the network. The length of network per diameter is presented in **Figure 4-17**.
255. Distribution system is also responsible for significant losses. While the current level of NRW is estimated to be at nearly 60% (2019), the volume of physical losses remains unknown but is likely to be high in relation with the ageing distribution network and pressure variations associated with the topography. With approximately 9,300 connections, the average length of network is 28 m per connections, which corresponds to a low-density area, thus increasing the likelihood of pipe leakage.

Figure 4-17: Total Length of Network per Diameter and Material



Source: SW PRF BOD Honiara WS, September 2019

256. **Sanitation and Wastewater:** The wastewater system is also managed by SW which serves only about 10% of the city's population. This is limited to small part of Honiara such as Tuaruhu, Vara Creek, Naha and Rove. Untreated wastewater is disposed of, through 17 outfalls along the coast and Mataniko River. Many of the outfalls are broken near the shoreline which results to near-shore pollution.
257. Residents not connected to wastewater system may have improved on-site sanitation facilities but mainly rely on closed tanks (often intended to be septic tanks but with inadequate or no drain fields) and pits for containment.
258. In terms of septage collection, the city government is responsible for septage collection, but the coverage and quality of services are very limited. After collection, septage is disposed at the Ranadi solid waste dumpsite without any treatment discharging directly to the coastline via a small creek.
259. **Solid Waste Management:** Based on the 2009 census, around 36% of the total households of Honiara have access to formal solid waste collection services. The majority of residents not being served are from the informal settlement area.
260. The Ranadi dumpsite, located 6 km from the city, is presently the only dumpsite to serve Honiara and until 2013, it was largely uncontrolled and not constructed to modern standards. Largely as a result of work (Japan International Cooperation Agency supported), the Ranadi site is better managed, and the life of the landfill has been extended by about 5 years. The government of Solomon Islands plans to eventually close this

dumpsite and a tentative site for a landfill has already been identified in the Henderson Area.

261. **Energy / Power:** Honiara's electricity is supplied by the Solomon Islands Electricity Authority (SIEA) also known as Solomon Power using several energy sources. The main power stations are in Lungga and Honiara.
262. Based on 2009 census, 64% of the population of Honiara has access to electricity. It was estimated that the demand of power is growing by 6% per annum and by 2020, the peak demand will be around 25.5 MW.
263. The electricity in Solomon Islands is characterized by low in-service coverage area and high cost. This is due to its geography and high dependency on imported fossil fuel. The low service coverage is mostly from the informal settlements area. It was recorded that only 18% of the informal settler households are connected to SIEA.
264. **Information and Communication Technology:** 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.
265. Access to affordable, good quality broadband internet-based services, has so far remained out of the reach of a significant proportion of the general public. The limited capacity and high cost of international bandwidth is caused by a total dependence on satellite connectivity, which is also the principal constraint to higher broadband penetration, the introduction of new telecommunications services, and new market entrants.
266. **Health Services:** Tertiary health care needs are provided by the Honiara National Referral Hospital (NRH), 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).
267. In terms of coronavirus disease (COVID-19), the first case in Solomon Islands was recorded on October 3 and as of March 14, there are 18 confirmed cases with zero deaths in Solomon Islands¹⁰. Solomon Islands is in state of public emergency due to the pandemic. Social distancing and other methods to limit the possibility of transmission are encouraged but not enforced.
268. Solomon Islands has a high incidence of water-borne diseases. Diarrheal diseases are the sixth most common cause of deaths, accounting for 4% of deaths or 28 deaths per 100,000 people. The high incidence of water-borne diseases can be primarily attributed to limited access to safe water and improved sanitation and poor hygiene awareness and behaviors.¹¹
269. There is an increasing demand for health services at all levels. The decision to relocate the NRH is an opportunity to address a number of national health service problems, such as the limited level of provincial services resulting in many patients travelling to Honiara to seek primary and/or secondary care that ideally should be managed in their home province. Services for low-risk birthing, care for non-communicable diseases, simple surgical procedures, and other primary and secondary diagnostic and case management needs to be further developed.

¹⁰ The Weather Channel

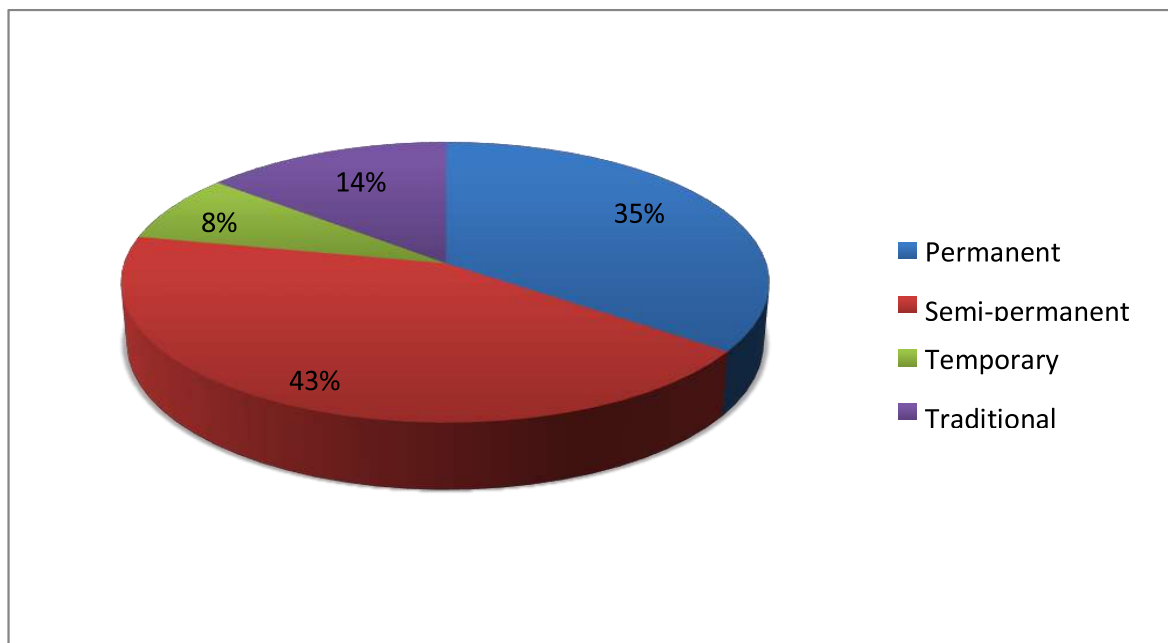
¹¹ Sector Assessment (Summary): Water and Other Urban Infrastructure and Services, UWSSSP

270. **Residential and Commercial Building Infrastructure:** In Honiara and other urban/rural centers, the most common form of housing is single story timber frame construction (around 46%). Around 7% of surveyed houses are of traditional construction, and 6% are of poor construction.
271. Most government facilities and commercial and industrial developments are located in Honiara’s coastal plain, as well as a few small but densely populated villages. Development on the foreshore seems to be largely unregulated as many buildings and structures encroach on it. Residential developments of single detached houses are mostly found in grassy foothills. A number of informal settlements have sprung up in the past few decades, some of which have already encroached on customary land beyond the town boundaries.

4.4 SOCIO-ECONOMIC BASELINE OF PROJECT AREAS

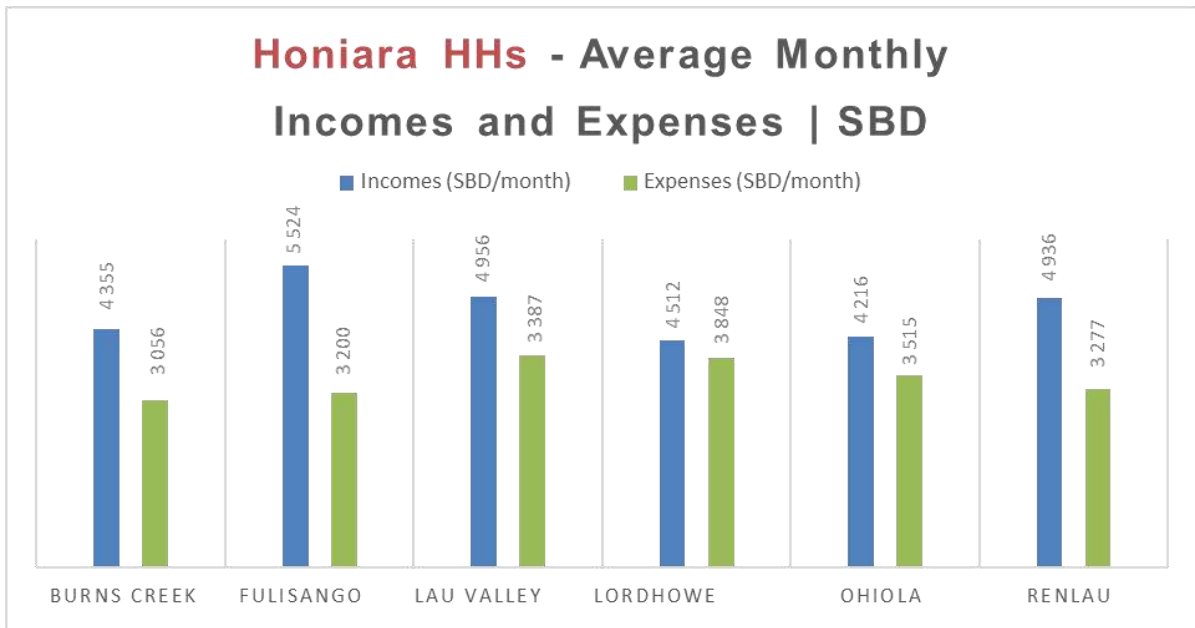
272. Socio-economic surveys were undertaken around the project sites; these consisted of the household surveys undertaken during the development of feasibility study report (FSR) and additional surveys undertaken during the detailed design phase. A total of 393 households were surveyed from 6 settlements in Honiara last July 2018 (or about 10% of the total households in Honiara).
273. **Habitat:** As shown in **Figure 4-18**, over half of respondents described their housing as either temporary or semi-permanent, reflecting the pattern of settlement in informal areas. 35% of respondents described their housing as permanent.

Figure 4-18: Type of Housing of all HHs Surveyed in Honiara



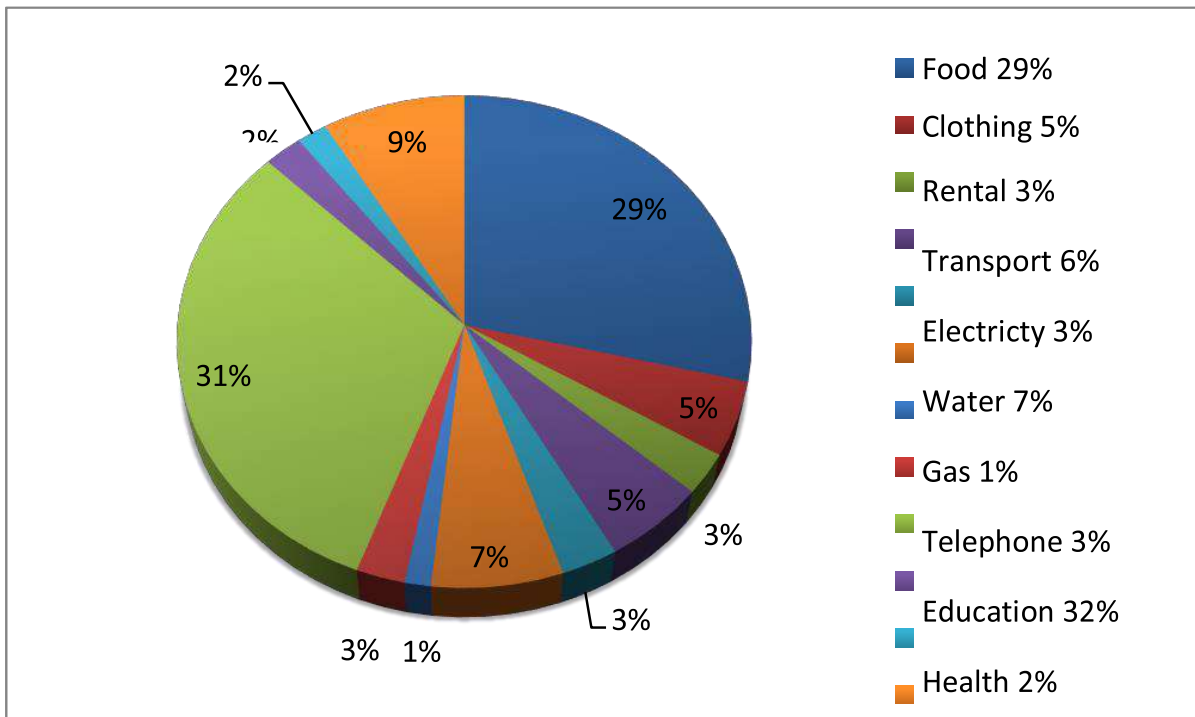
274. **Socio-Economic Conditions of Surveyed Households:** The average monthly income recorded per household is \$4,699 SBD. The recorded average monthly expense total per household is \$3,397 SBD.
275. **Figure 4-19** outlines the average household monthly incomes and expenses for each of the six survey areas. Households living below the poverty line are the most prevalent in Renlau, where approximately half reported incomes are assessed to be below the poverty line.

Figure 4-19: Household Incomes & Expenditure Honiara



276. As shown in **Figure 4-20**, household monthly average spending is recognized under twelve key areas including food, clothing, house (rent / repair), transport (fuel / service / repair / taxi), electricity, water, gas, telephone, education, health, loan repayment / local borrowing, and religious / social / traditional obligations. Education is the highest expenditure of all households across the 6 communities at 31% of overall expenses. Food is closely behind at 29%.

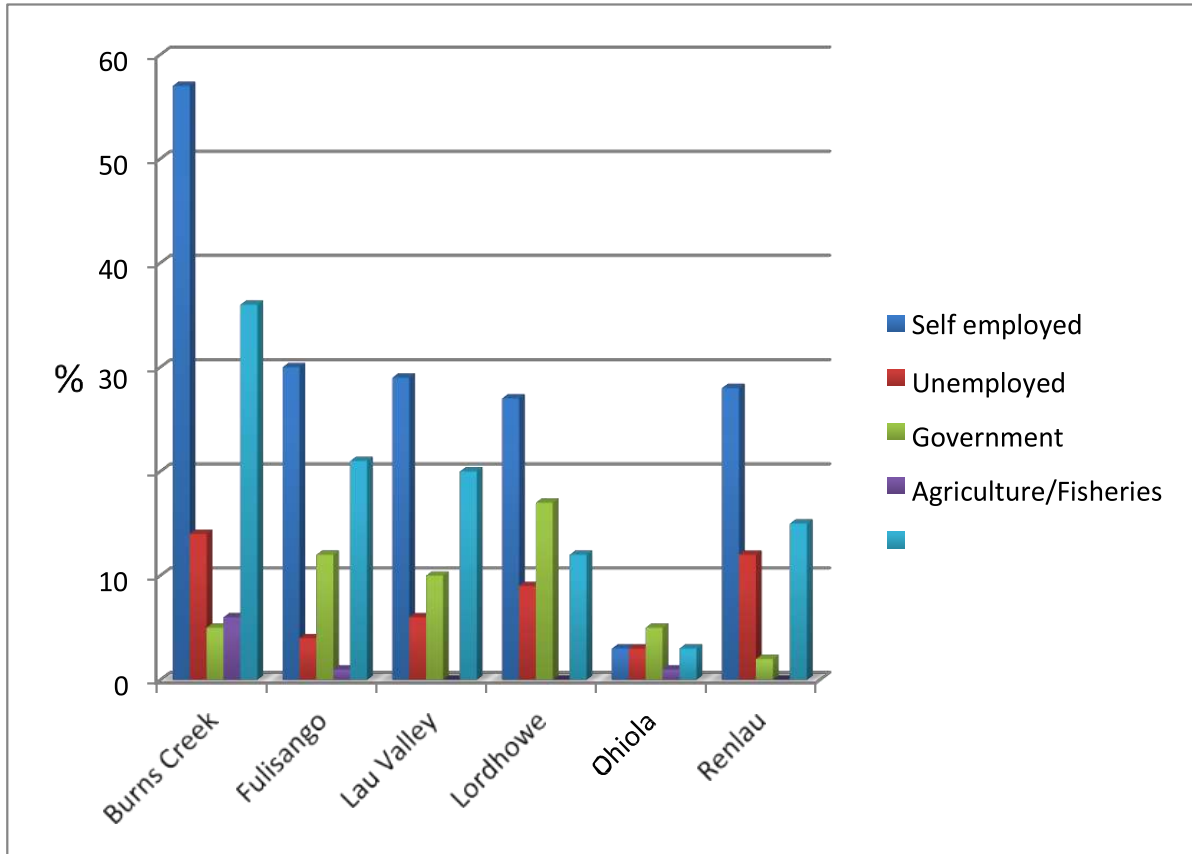
Figure 4-20: Average Monthly Expenditure of HHs Surveyed in Honiara



277. **Employment** of Heads of Households is depicted in **Figure 4-21** with formal employment low at 13% across all households surveyed and restricted to the government sector. Self-employment is the largest category at 45% across all households, reflecting a reliance on

subsistence and micro- enterprise livelihoods. Unemployment is relatively low at 12%, but it can be assumed that most households within the categories of 'self-employed' and 'other' are engaged in low-income livelihoods, particularly when cross-referenced to monthly income figures.

Figure 4-21: Overview of Head of Household Employment per Survey Area in Honiara



278. **Water Supply:** As shown in **Figure 4-22** and **Table 4-22**, SW piped water supply is the predominant water source in all survey areas except for Burns Creek.

Figure 4-22: Overview of Primary Water Sources in Surveyed Areas of Honiara

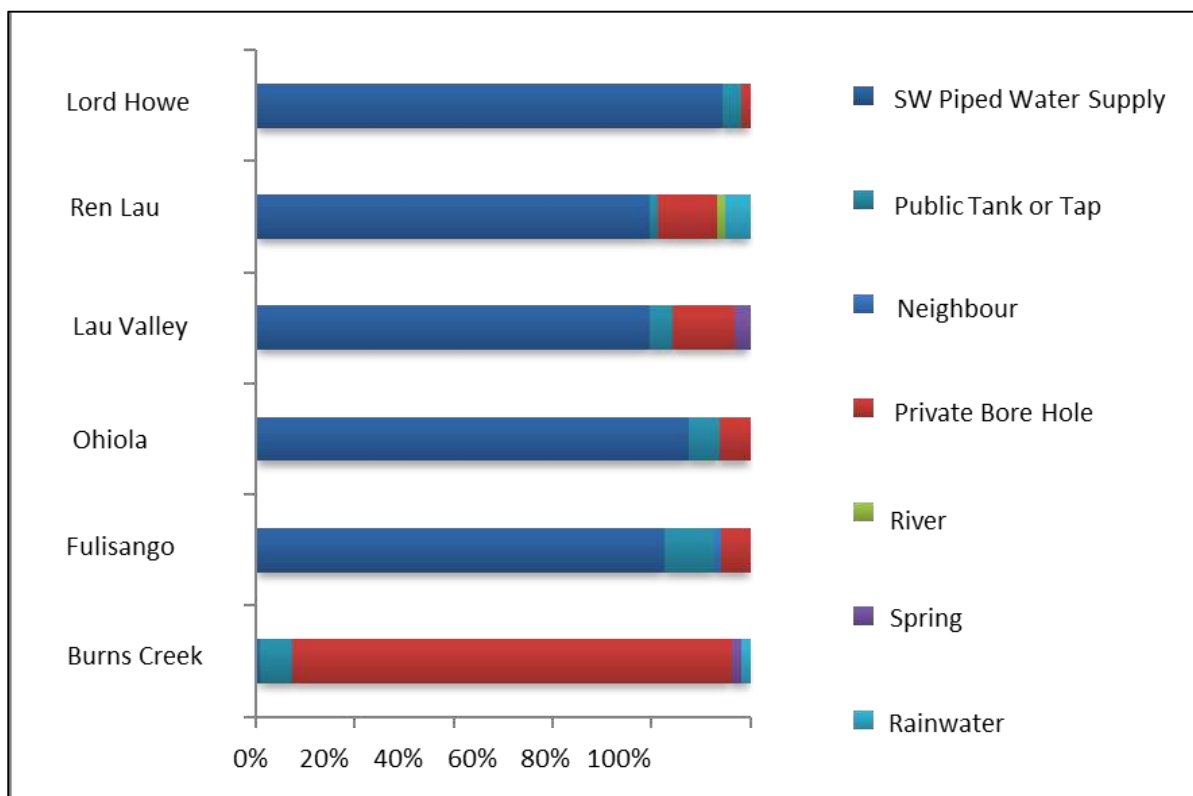


Table 4-22: Overview of Primary Water Sources in Surveyed Areas of Honiara

No HH Respondents	Burns Creek	Fulisango	Ohiola	Ren Lau	Lord Howe	Lau Valley
	113	69	16	59	53	64
Source of Primary Water Supply (% of HHs Surveyed)						
Rainwater	2%	-	-	5%	-	13%
Water Vendor	-	-	-	-	-	-
Other	4%	-	-	-	-	3%
Rainwater	2%	-	-	5%	-	13%
Water Vendor	-	-	-	-	-	-
Other	4%	-	-	-	-	3%
Rainwater	2%	-	-	5%	-	13%
Water Vendor	-	-	-	-	-	-
Other	4%	-	-	-	-	3%

279. Connections in immediate neighbourhood of project areas: Official connections in the immediate neighbourhood of the project infrastructure are shown in **Figure 4-23** and **Figure 4-24**. In general, there are high levels of connections except for the Kongulai-White River area and around the proposed Titingge reservoir. In the former case it is known that there is a high level of NRW in the White River DMAs, part of which is due to commercial losses (there are known to be a number of illegal connections in this area on the existing pipeline, disconnection of which will deprive occupants of existing services); in the case of the latter, there is no access to the service.

Figure 4-23: SW Connections around Kongulai White River Trunk Main

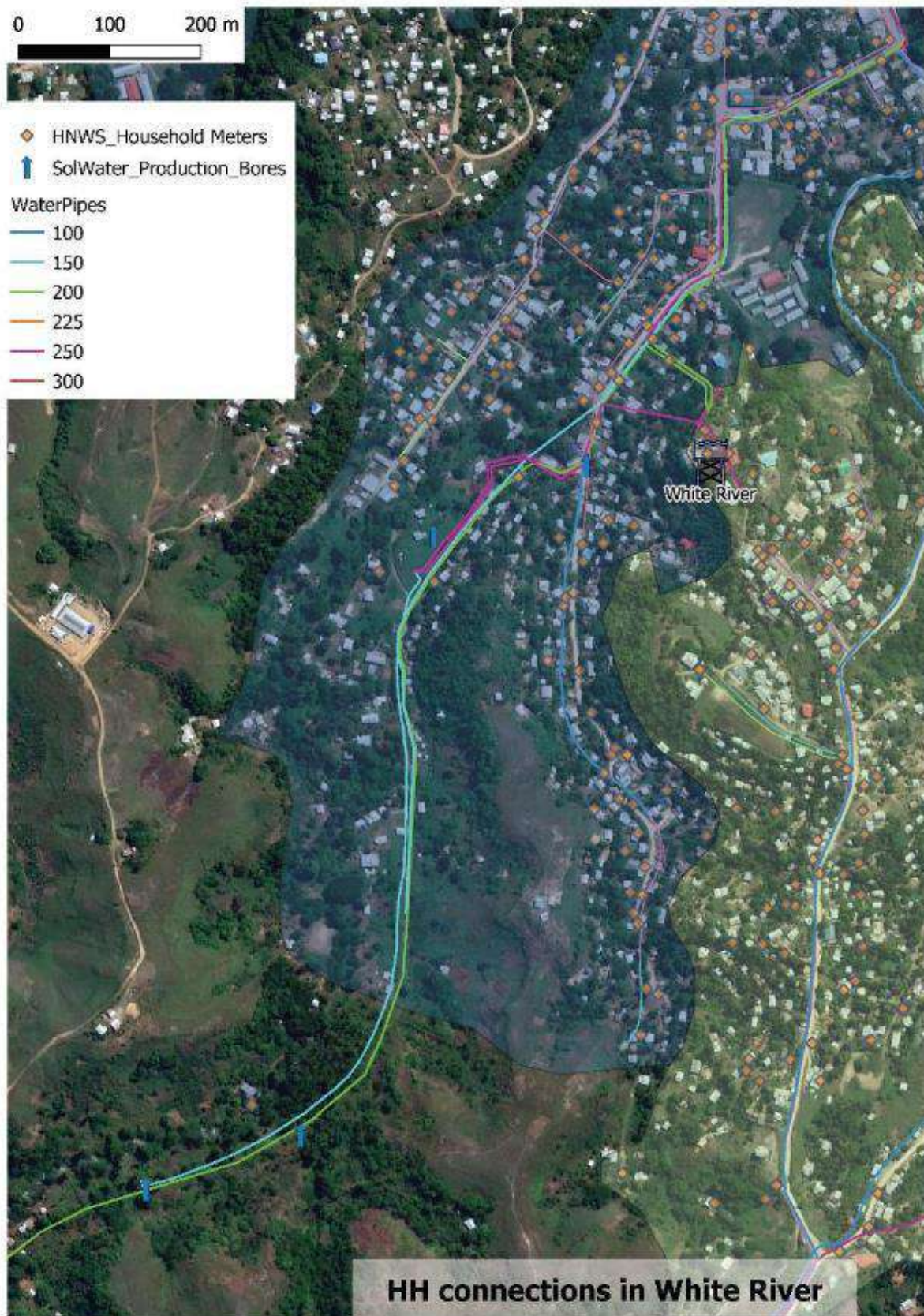


Figure 4-24: SW Connections around Titinge Reservoir

Legend

- Customers with GPS_vf
- 0 - 1.5 m³/day
 - 1.5 - 21.6 m³/day
 - 21.6 - 190 m³/day

Main assets

Sources

- Bore Wells
- Spring

Tanks

- Existing
- Project

Boreholes

- ⊙ Meter
- Other

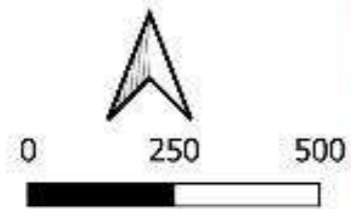
Boreholes pumping station

- ↑ Operating with meters
- ↑ Project

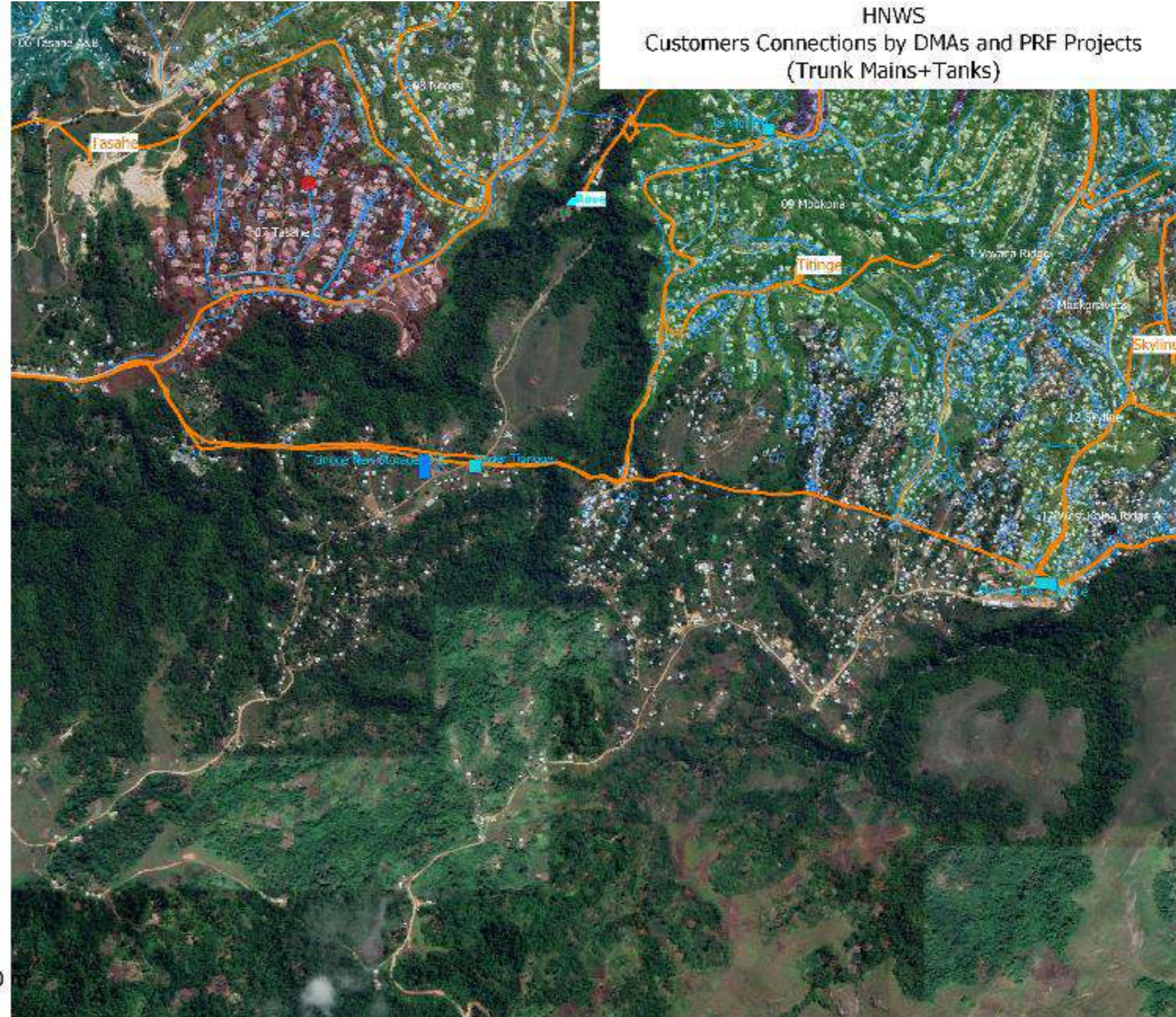
Pipes

Existing and project pipes

- Distribution Network
- Existing Trunk Mains
- New trunk mains
- WTP Project

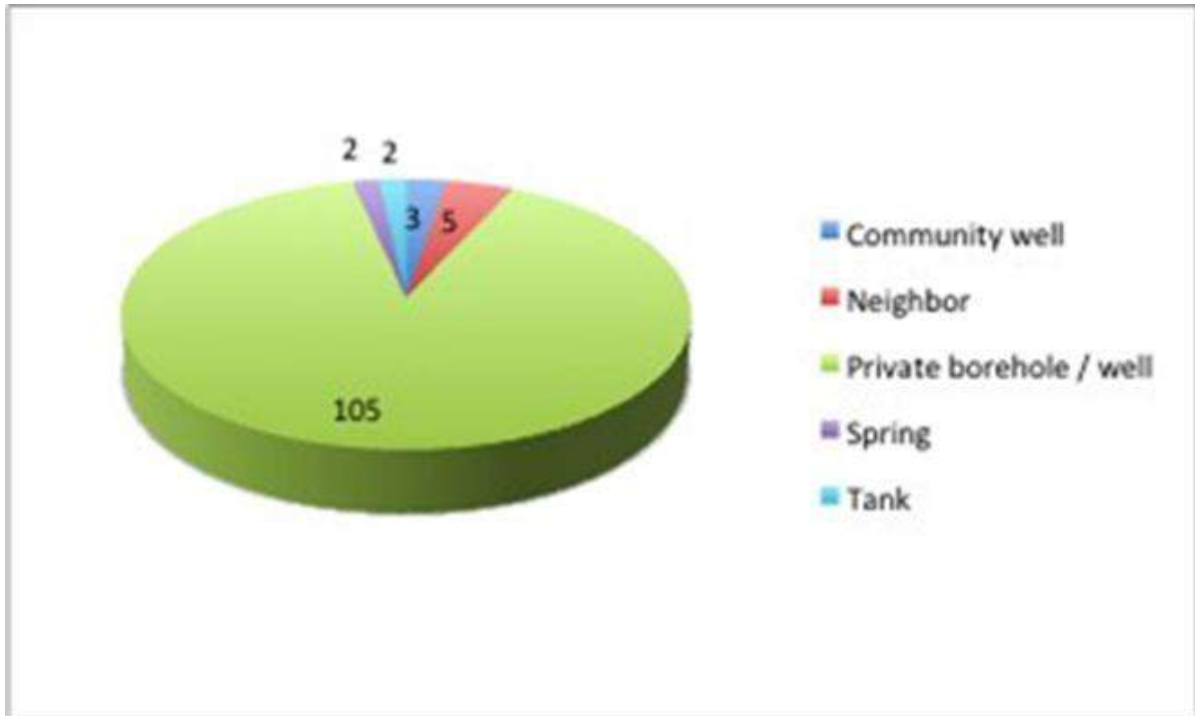


HNWS
Customers Connections by DMAs and PRF Projects
(Trunk Mains+Tanks)



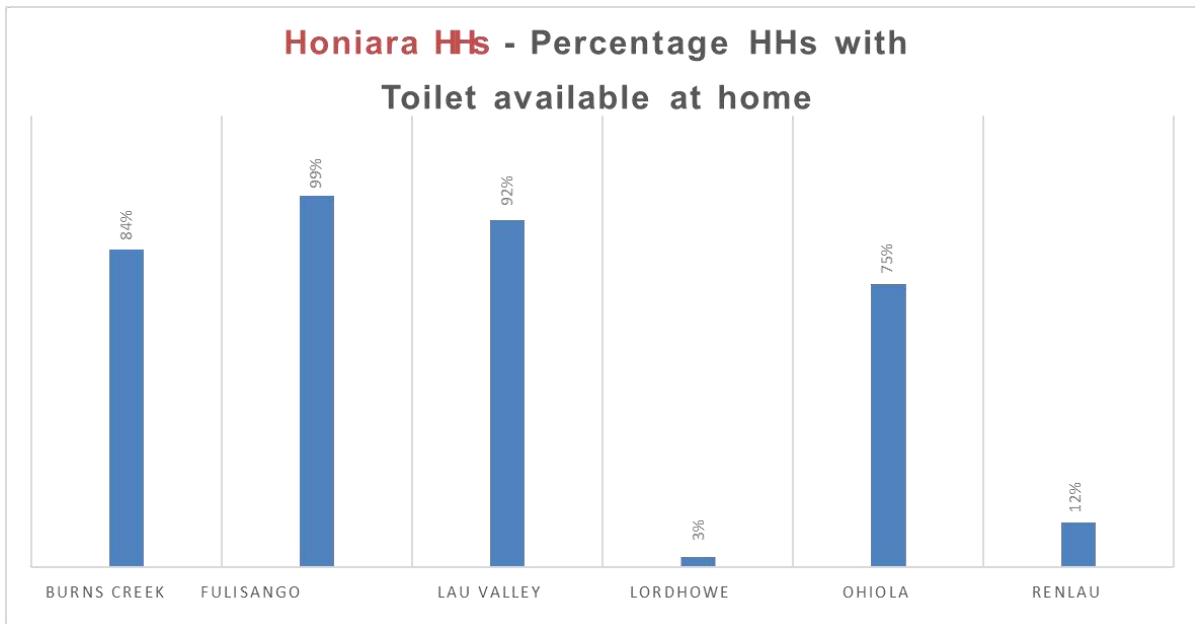
280. **Non-piped Water Sources:** This section of the survey is particularly relevant for households from the Burns Creek community, where there is no piped water supply. As can be seen in **Figure 4-25**, the primary water source for households surveyed from Burns Creek is private wells / boreholes. Most households have ready access to the resource, with the distance less than 50 meters for 82% of households. 7% reported having to fetch water from 50-100 meters away, 3% 100-200 meters away, and 5% with the water source over 200 meters distance from the house.

Figure 4-25: Water Sources for Households Surveyed in Burns Creek Honiara



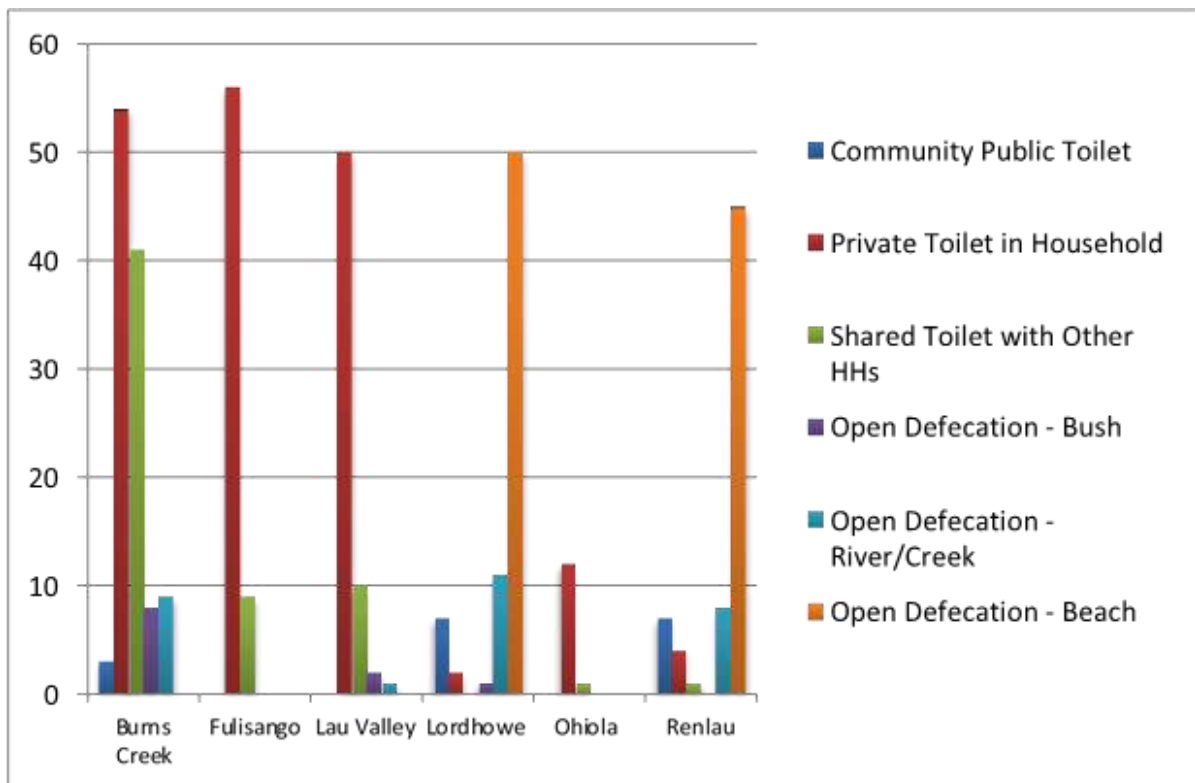
281. **Sanitation:** Sanitation in the Solomon Islands is an ongoing challenge, with the Solomon Islands National Development Strategy 2016-2035 aligning with the global Sustainable Development Goals (SDGs) aiming to achieve water and sanitation for all (universal access) by 2030. Currently it is estimated that access to an improved water supply is 90% in the urban area, and access to improved sanitation is 76%. However, this relatively high sanitation percentage hides the reality on the ground, with poor sanitation widespread within some communities, particularly the informal settlement areas. **Figure 4-26** provides an overall picture of the number of households with toilets within their home. It is clear that sanitation is particularly poor in Lord Howe and Renlau at 3% and 12% respectively.

Figure 4-26: Sanitation Status of HHs Surveyed in Honiara



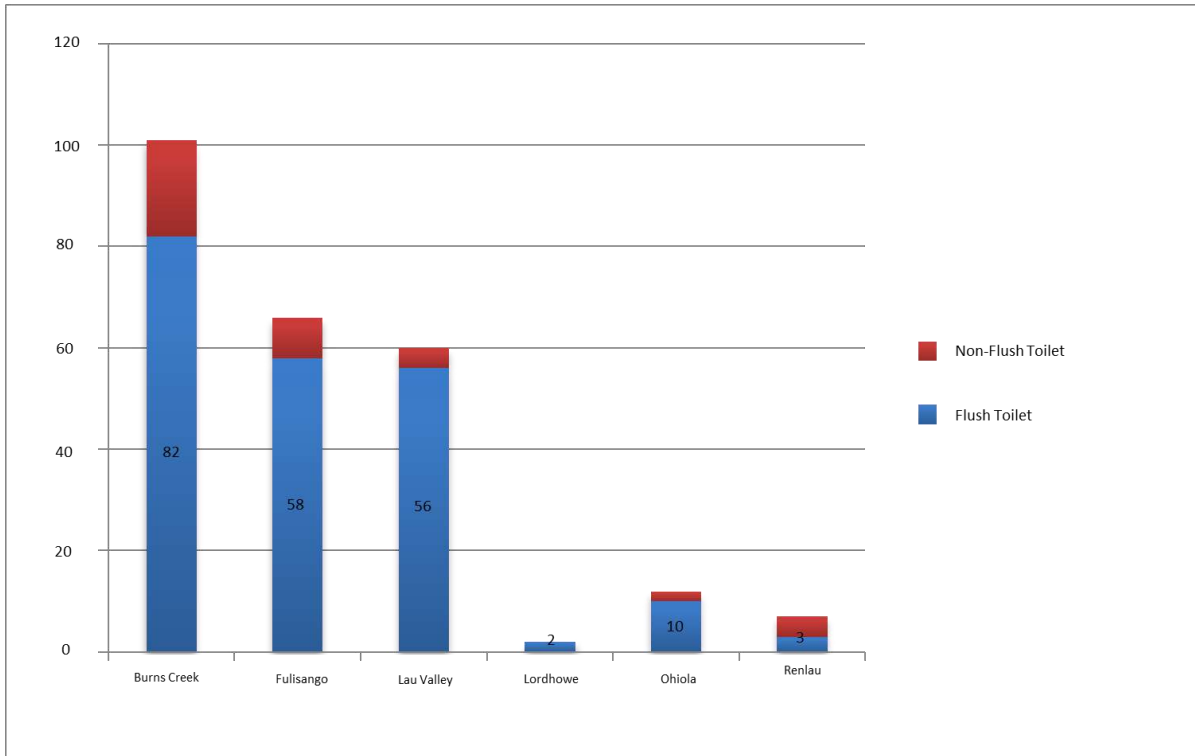
282. As depicted in **Figure 4-27**, households in the coastal areas of Lord Howe and Renlau rely on defecation in the sea as their sanitation practice. In Burns Creek, whilst there are a high number of private toilet facilities, there are almost as many households that rely on shared toilet facilities. Defecation in the sea, bushland or river/creek is practiced in all communities, with the exception of Ohiola (although this may be an anomaly with the smaller sample size).

Figure 4-27: Sanitation Practices of Each Survey Community in Honiara



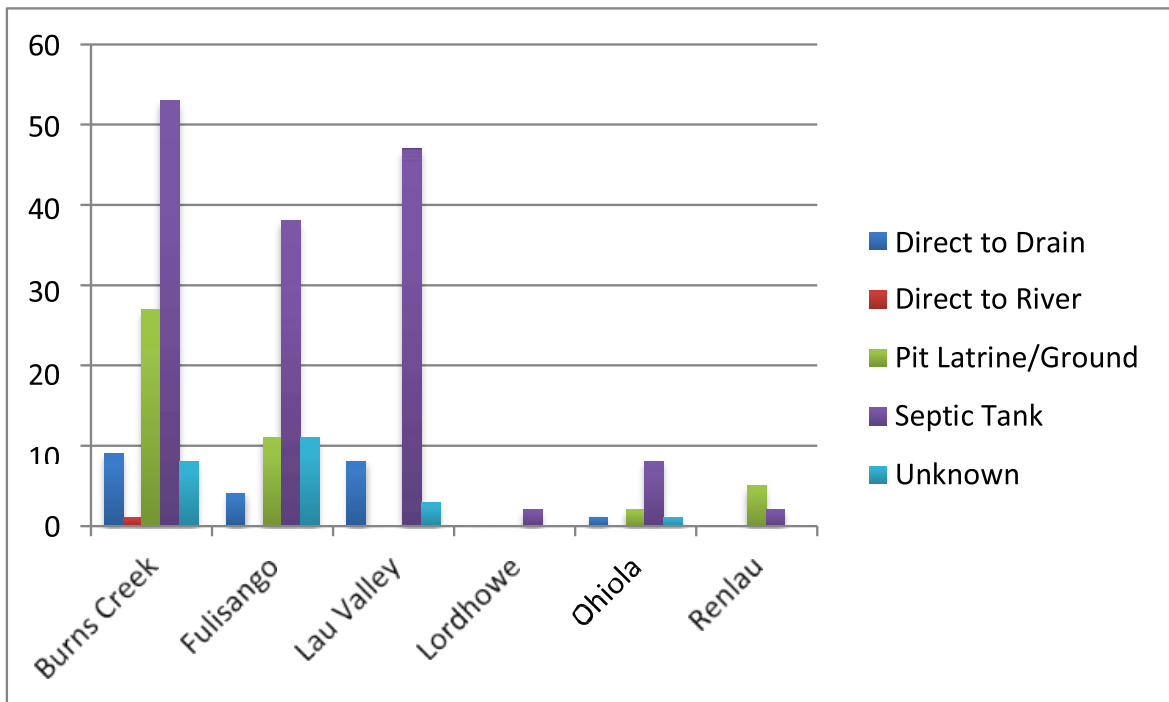
283. To gain an understanding of the performance of sanitation systems, households with toilets were asked a number of questions about their type of toilet facility. As portrayed in **Figure 4-28**, the majority of toilets within households were classed as water flush toilets. However, a number of these facilities include pour flush latrines, or water-flush toilets without adequate on-site wastewater treatment.

Figure 4-28: Type of Toilets Used in Honiara Survey HHs



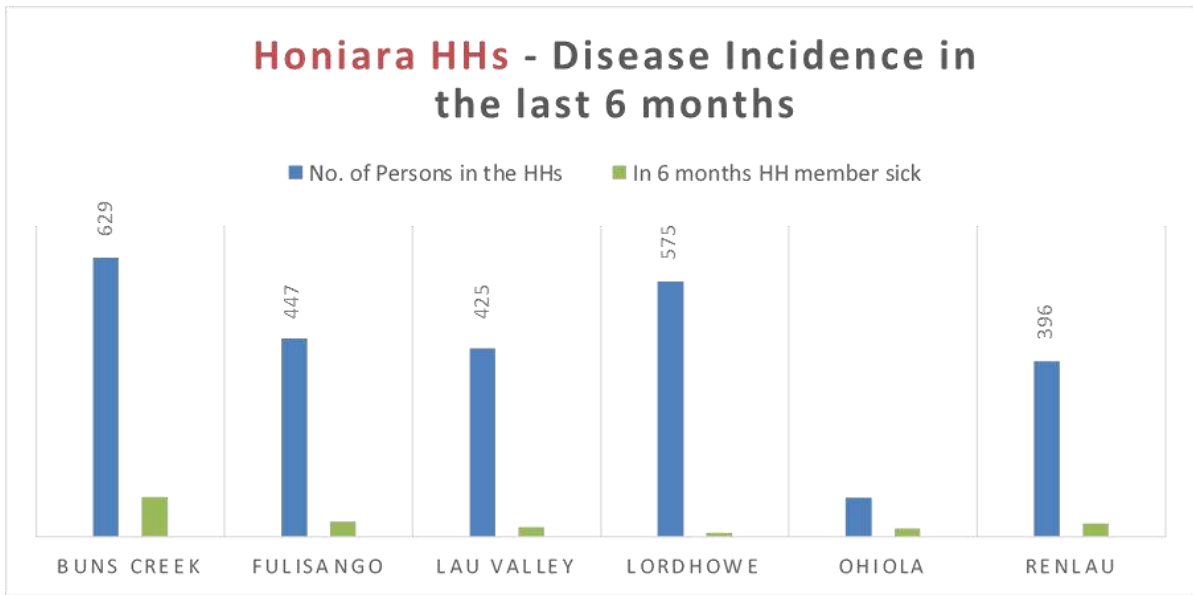
284. As shown in **Figure 4-29**, septic tanks are the most common means of on-site treatment of sanitation waste. None of the respondents reported connection to a piped sewage disposal network. A number of households use a pit latrine, often constructed from buried 200 L drums with raised toilet slabs and an outbuilding erected above the drum to provide privacy for the users. Of those households reportedly using a septic tank on-site treatment system, only approximately 30% report that the tanks have been emptied. This may be an indication of poor construction or damaged tanks, with wastewater seeping into the ground rather than being treated with sludge settling out and requiring pumping services every 5-10 years.

Figure 4-29: Disposal of Wastewater from HH Sanitation in Honiara



285. **Hygiene:** Poor hygiene is a causative factor in a number of preventable diseases such as diarrhea, typhoid, and skin diseases. Diarrhea is a common illness for more than a third of the people in Honiara, particularly in the informal settlements where poor sanitation and water supply are commonplace. The risk of diarrheal disease increases in the annual wet season, from November to April, with risk escalating further during floods and natural disasters. From the HH survey, the percentages of disease varied from 2% in Lord Howe to 22% in Ohiola. The overall incidence was reported at 8%, although this is considered to be on the conservative side, with it likely that under-reporting has occurred. Diarrhea is reported to be as high as 30% of Honiara residents at any time, with this rising steeply in times of heavy rain and flooding. With only 8% reporting disease in the past 6 months, it is likely that the perception of disease is not commensurate with the actual health data. Given the low rate of de-sludging of septic tanks, it is likely that a number of systems are not functioning well, increasing the risk of disease and the associated impacts in loss to productivity and education outcomes.

Figure 4-30: Incidence of Disease in Past 6 Months Reported by HHs in Honiara Survey



5.0 POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

286. **Significance of impacts:** The potential environmental and social impacts for the project have been identified and their significance assessed. The durations of the impacts are assessed with reference to the scope of work, the physical and socio-economic environment at the project site. Mitigation measures are designed to avoid and/or minimize each of the potential physical and socio-economic environment impacts. Impacts may be minor, moderate, major or negligible based on the scale of impact itself and whether it is mitigated or not.
287. The subprojects will create both common and site-specific impacts. This chapter provides a summary of these; ensuring chapters cover mitigation measures and the associated Sub-project.

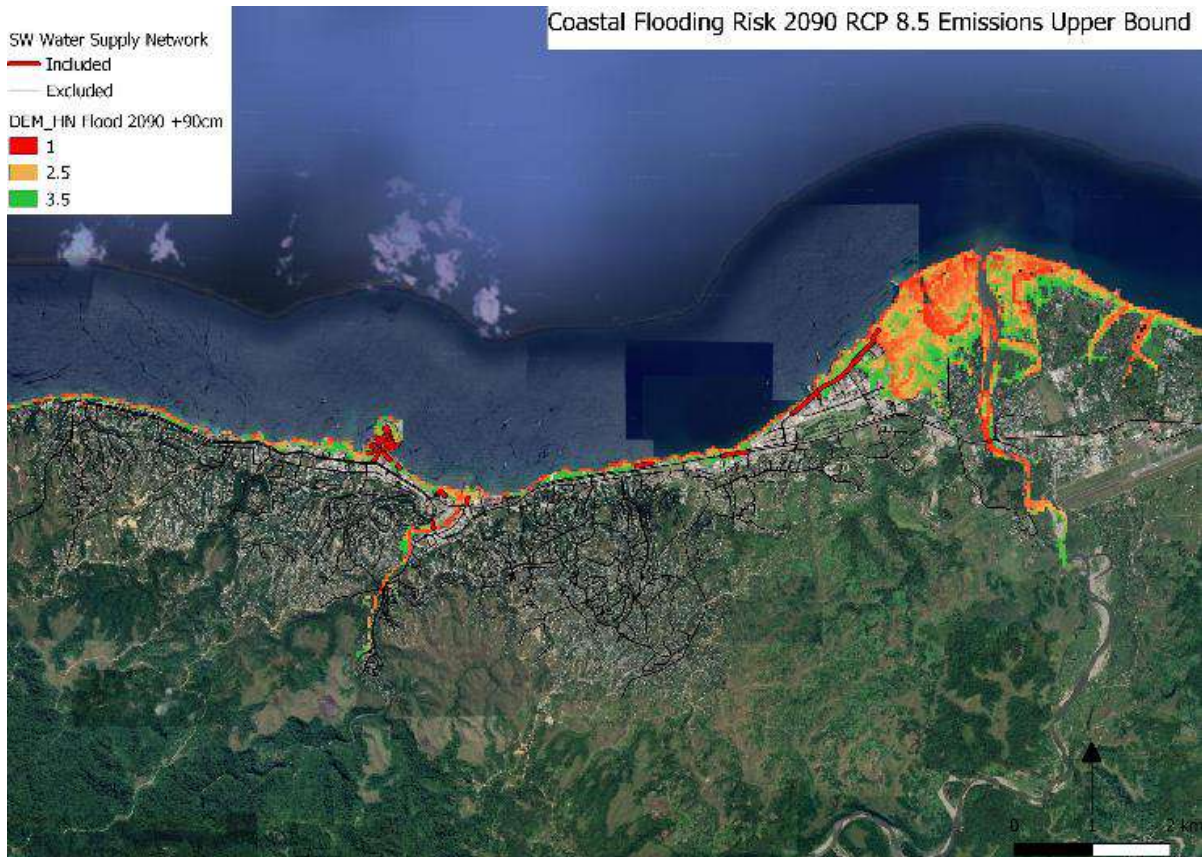
5.1 POTENTIAL PRE-CONSTRUCTION IMPACTS AND MITIGATING MEASURES

288. Pre-construction considerations include climate change vulnerability; updating of ESMP based on latest project design and components; integration of ESMP and Development Consents (DC) conditions in the bid and contract documents; update of the Project's communications and consultation plan (CCP); grievance redress and management; identification of materials sources, materials extraction and application for BMP; biosecurity issues and potential introduction of alien invasive species; identification of sensitive receptors, cultural resources identification; land access arrangements; and unexploded ordnance. Actions necessary to address pre-construction considerations will be included in tender documents and construction contracts.

5.1.1 Climate Change Vulnerability

289. Climate change resilience is a critical consideration because Honiara is vulnerable to the effects of climate change. Also, changes in the intensity of extreme weather events and gradual change in climate parameters such as precipitation could damage proposed water supply facilities. Flooding could be compounded by the effects of sea level rise to affect the structural integrity of the proposed structures and prevent the system operating effectively.
290. **Figure 5-1** shows the estimation of the potential impact of sea level change and wave action at 2090 using RCP 8.5 scenario. The future networks are not at risks except for some small parts eventually at risk from wave action.

Figure 5-1: Impact of Sea Level Change + Cyclonic Wave Action at 2090 (RCP 8.5)



291. As part of mitigation measures, a hydrology and onsite flooding study was conducted during the design phase. The study described the nature of the flood hazard and the degree of flood risk for the specific sites. Results of the study have been used in designing the proposed facilities and the preparation of engineering specifications to ensure that these facilities are less vulnerable to the predicted flood events.
292. Engineering assessment on potential site erosion has been made during the design phase for each site to determine the type of erosion protection that will be appropriate using in particular information from the site-specific geotechnical studies. This applies to the reservoir sites of the Service Reservoir Capacity Augmentation subproject and routes of water supply pipelines of the Trunk Mains subproject particularly to the Kongulai White River section.
293. In addition, the climate-proofing measures for water supply projects crafted by ADB are shown in **Table 5-1**.

Table 5-1: Climate-Proofing Measures for Water Supply Subprojects

COMPONENT	CLIMATE-PROOFING MEASURES
Water supply	<ul style="list-style-type: none"> ▪ Demand-side management with a view of decreasing water demand including reduction of nonrevenue water ▪ Water metering and water tariffs (which can contribute to reducing water demand) ▪ Low water use application ▪ Diversification of water sources ▪ Enhancing storage capacity ▪ Aquifer recharge using recycled water ▪ Relocation of flooded infrastructure

	<ul style="list-style-type: none"> ▪ Impounding reservoir to store freshwater
Water treatment and quality	<ul style="list-style-type: none"> ▪ Protection of the water source ▪ Integrated water resources management ▪ Prevention of saltwater intrusion into coastal zones
Water distribution	<ul style="list-style-type: none"> ▪ Adjustment to operation below design capacity

Source: EARF 2019.

5.1.2 Environmental Management System

294. Throughout the Project, for implementation of environmental safeguards to be effective, a robust environmental management and monitoring system will need to be established. The PMU will ensure that the ESMP 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 designating a full-time environmental, health and safety officer (EHSO) and deputy EHSO and recruiting a community liaison officer (CLO) from the local community and 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 each subproject site, the contractor will prepare and submit a site-specific construction ESMP (CESMP) to the PMU, the CESMP will be based on the project ESMP 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 clear the CESMP and advise the supervising engineer that the CESMP may be approved and no objection to commencement of works given.
295. Once works commence, the EHSO will conduct monitoring of compliance of activities with the approved CESMP and the PMU will undertake inspections and audits of the effectiveness of the contractor's implementation of the approved CESMP. The 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 environmental safeguard requirements.
296. As early as practicable after commencement, the project will operate 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.
297. The CESMP 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 be expected to 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.
298. Workers and sub-contractors will be inducted to the site and this will include awareness and training on the provisions and requirements of the CESMP and how it is to be implemented.

5.1.3 Land Access Arrangements

299. This impact includes permanent access to lands of the proposed subprojects either in public or private property.

Trunk Mains

300. **Land Requirement.** No land acquisition will be required for this project. Instead, land required for this component will utilize government land classified as Perpetual Estate, registered under the Commissioner of Lands. Also, SW will secure easement of 500 m² of leased land classified as fixed term estate (FTE). The transfer of land ownership to the owner is on-going as the heir to the land. SW has secured the written agreement to provide easement for the new pipeline route that veered off from the existing pipeline easement crossing his land for a total of 500 m².

301.

³⁰². Figure 5-2 shows the location of pipeline requiring easement in Kongulai-White River Route.

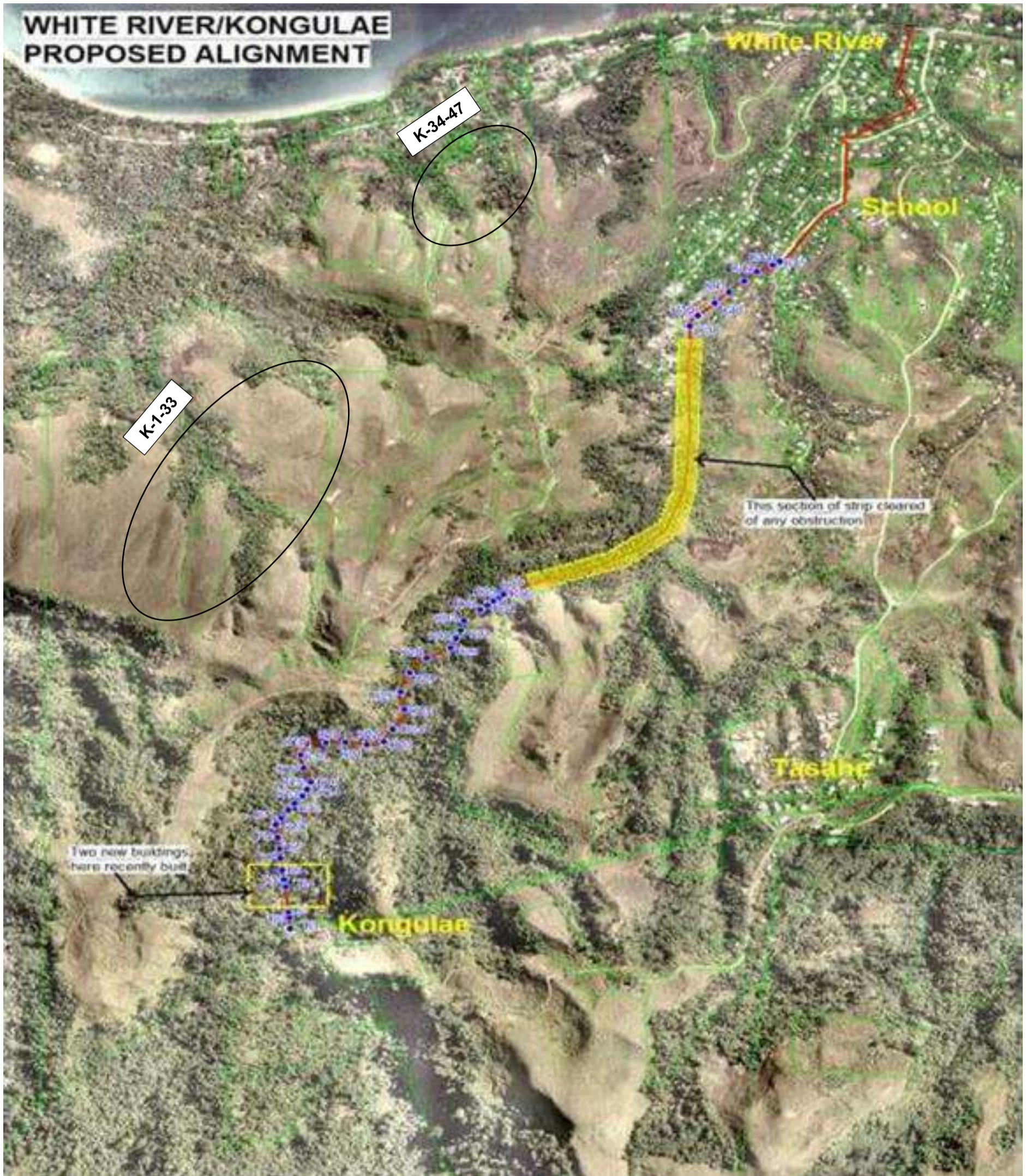
Figure 5-2: Location of Pipeline Requiring Easement in Kongulai-White River Route



Legend:
Blue line (left) – FTE land owned by Mamutei Kaite
Purple line – Perpetual Estate (PE) land owned by the government registered under the Commissioner of Land.
Source: LARP Honiara WS Trunk Main Subproject, 21 December 2020

303. **Affected Persons.** For the East-Kola and Panatina trunk mains, there are no affected persons as the pipeline is to be constructed along the road right-of-way. For the Kongulai-White River trunk main, there are 22 affected persons mostly belonging to extended families with at least 88 family members planting crops and trees along the proposed pipeline route which follows the existing pipeline easement along the Kongulai section. Also, two of the 22 affected households will lose a kitchen/dryer and an incomplete local house within the easement. Also, a separate FTE holder is required, and has agreed, to provide easement access for 500 m² of land in exchange of one-off payment from SW.
304. **Figure 5-3** shows the location of affected people along Kongulai-White River Trunk Main.

Figure 5-3: Location of Affected People along Kongulai-White River Trunk Main



Source: LARP Honiara WS Trunk Main Subproject, 21 December 2020

Reservoir

305. **Land Requirement.** No land acquisition is required for the Panatina and Tasahe reservoir. These two locations with a total land area of 1,170 m² are owned by SW. The site for Titinge reservoir will require the acquisition of 2,500 m² of perpetual estate (PE)-owned land required for the construction of a new tank to augment the existing tank located in the same location. The affected land is a registered customary land under a PE ownership thus ownership will not expire compared to a FTE leased land where the lease is required to be renewed between five years to 75 years. SW has already negotiated with the landowner and the land was already fully paid as of 7 August 2020.
306. **Affected Persons.** There are three groups of affected persons on the Titinge reservoir subproject site. These include (i) the registered landowner with four family members, (ii) the claimant sub-tribe, and the land occupier who paid a member of the claimant sub-tribe for a piece of land to build his house.
307. The landowner has over five hectares of registered land that includes the 2,500 m² land required by the Project. His dwelling will not be affected by the Project as it is located outside the area that has been purchased by SW. However, the land occupier with six household members occupying the land needs to be resettled elsewhere, and the assets on the land need to be compensated. The sub-tribe claimants, meanwhile, have a claim for a large swath of land around the site.
308. The full payment for the land has been completed for both registered landowner and sub-tribe claimants. The remaining assets to be paid by SW are those of the land occupier. The payment will be in the form of a house and land, chosen by the land occupier, and purchased by SW.
309. This form of payment is one of the options in the draft agreement between the land occupier and SW on 17 October 2020. Another option in the agreement is for land occupier to be paid in cash if finding a replacement house and land proved to be challenging.

Measures for Land Access Arrangements

310. Any requirements for permanent access to land will be governed by the Projects resettlement framework and resettlement plans or due diligence reports subsequently prepared. For unanticipated impact on loss of access during project implementation, SW will prepare correction plans and or amendments in Resettlement Plan to mitigate identified impact. Land acquisition and resettlement plans (LARP) were prepared for the proposed Honiara water supply projects.
311. For the trunk main subproject, the strategy for the Project is to use existing SW land and road easement to avoid or at least minimize involuntary settlement impact to the extent possible. The implementation of physical construction will involve the removal of crops, trees and structures along the Kongulai to White River pipeline section. Land acquisition will be avoided by the Project through successful negotiation with an FTE holder to provide an easement to construct and maintain the pipeline on his land.
312. This subproject will impact 22 affected persons and their households in one of the three main trunks (White River/Kongulai) where APs will lose plants, crops and trees, and structures within the five-meter-wide easement. To minimize impacts to their assets, the pipelines (existing and new) shall all be installed within the land easement belonging to

SW and that of the Commissioner of Lands. Thus, this subproject will not have significant involuntary resettlement impacts. The involuntary resettlement impacts of an ADB-supported project is considered significant if 200 or more persons will be physically displaced from their home or lose 10% or more of their productive or income-generating assets.

313. For the reservoir subproject, the project will impact on land and, in some instances, will require permanent acquisition of private land. The project and the SW PMU will monitor and manage the process with due diligence and ensure that a key factor on site selection and facility design is to avoid land acquisition and physical displacement wherever possible. A particular approach by SW is to use existing SW land to avoid or minimize land acquisition impacts to the extent possible.

5.1.4 Extraction of Local Construction Materials

314. Construction activities are expected to use local construction materials such as soil, sand, gravel, and rocks. The contractor will be required to obtain the local materials only from sources that have the required government environmental approvals.
315. Estimated amounts associated with each sub-project are provided in **Table 5-2**.

Table 5-2: Estimated amount of local construction materials

Subproject	Gravel	Cement	Fine Aggregate	Coarse Aggregate
	(T)	(T)	(T)	(T)
Reservoirs Sub Project	444	1 326	1 832	2 982
Trunk Mains Sub Project	-	-	5 657	2 573

316. Before the start of activities, the contractor will provide the PMU with a Materials Procurement Plan providing information on the sources of materials, transporting modes to sites, stockpiling schemes, and schedules of deliveries. The information will include locations, scale of operations, method of transport of materials, schedule of use relative to the overall construction schedule, and the associated environmental mitigation measures to be instituted in those locations.

5.1.5 Unexploded Ordnance (UXO)

317. During WWII, the project site was subjected to intense battles and while this occurred over 60 years ago, it is possible that a chance discovery of a UXO may occur.
318. Prior to construction a UXO survey (and subsequent clearance if necessary) will be undertaken notably for greenfield sites in the case of the Titinge Reservoir, Kongulai to White River water pipeline.
319. Provision in the contract BOQ will allow the contractor to carry out UXO survey prior to any construction and during construction. Should UXO be discovered, the contractor is to immediately cordon off the area and arrange the evacuation of nearby residences and inform the RSIPF of the find.

5.1.6 Potential Introduction of Alien Species

320. This impact includes the materials such as imported plant and equipment and vessels that import them. All construction equipment i.e., bulldozers, excavators, backhoes will be

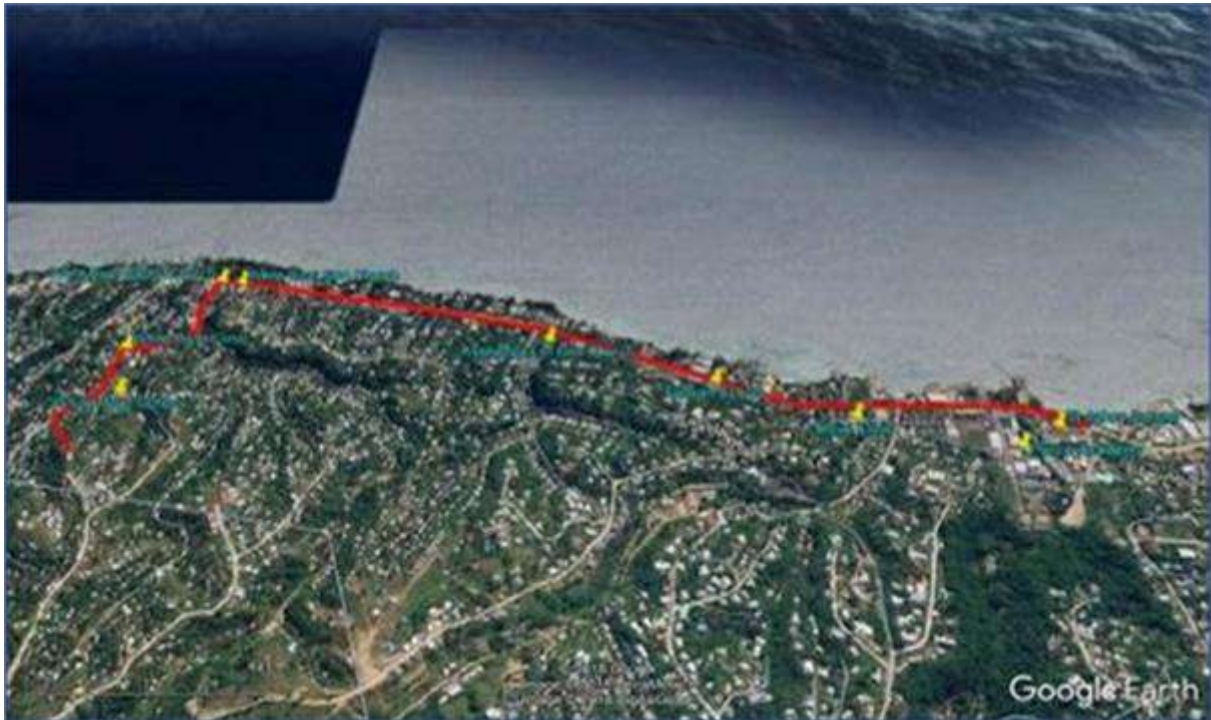
sourced locally i.e. from Honiara or nearby areas and as such will limit any bio-security concerns focusing on plant invasive species/disease control.

321. To prevent spread of alien and/or invasive species, imported plant, equipment and materials and the vessels that import them will be subjected to clearance procedures under the Bio-Security Act and Regulations and may require issuance of phytosanitary certificates from Biosecurity Solomon Islands. 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.

5.2 POTENTIAL CONSTRUCTION IMPACTS AND MITIGATING MEASURES

322. The construction phase considerations are site access and clearance including potential disruption of utilities (power and communication cables); soil erosion and sedimentation control; disposal of excavation spoils; oil and hazardous materials management; dust control ; site waste management including demolition ; construction noise and vibration; traffic management; community and occupational health and safety; potential social issues due to influx of workers; potential damage to hidden archaeological and cultural assets; and demolition of an existing reservoir. Contractors will be required to prepare Construction Environmental and Social Management Plan (CESMP) based on the ESMP included as part of the environmental and social assessment. This CESMP will reflect their construction approach and methodology to ensure appropriate environmental and social management during the construction period including COVID-19 preparedness and response.
323. The water supply pipelines will be installed along Mendana Avenue and Kukum Highway. Mendana Avenue is the main road connecting the western and eastern parts of Honiara. It is an urban road lined on both sides with various urban developments and passes to the central business district. It connects to Kukum Highway which is lined on both sides with various urban developments. Kukum Highway is main road connecting the western and central part of Honiara to the international airport at Lungga.
324. For the White River route, trunk mains start from Kongulai springs then to White River reservoir, then to Mendana junction up to Rove. Sensitive receptors along this route are: White River Mosque, White River School, White River Clinic, White River Baptist Church (indicated in **Figure 5-4**).

Figure 5-4: Sensitive Receptors of Kongulai to Rove



Source: PPA consultant. 2018; yellow pins = sensitive receptors

325. For the Service Reservoir Capacity Augmentation subproject, impact areas are the reservoir sites at Tasahe and Panatina. There are no sensitive receptors at the Titinge reservoir site.

5.2.1 Potential Construction Impacts and Mitigating Measures on Physical Resources

Soil Erosion and Sedimentation Control

326. Potential sources of sediment runoff are site clearing, ground leveling, excavations for structures' foundation, and pipe-laying. Soil materials can be carried by runoff to the natural drainage system or to adjacent lots during rainy periods.
327. For the service reservoir capacity augmentation subproject, construction activities will involve earthworks. The relatively flat terrain and small area requirement for each 3 ML tank will also generate little runoff during construction.
328. The contractor will be required to install 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, prevent sediments from moving offsite, and reduce the erosive forces of runoff waters.
329. For all subprojects, the contractor will be required to prepare an erosion and sediment control plan as part of their CESMP. 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.

River and Creek Crossings

330. The pipelines will pass under creeks in the Kongulai-White River section and also under/across culverts for the remaining road sections. Where feasible the pipeline will cross under these features thereby not disturbing flow during operations.
331. During construction, the contractor will be required to carry out temporary works to ensure flow continuity and where relevant particularly on the Kongulai-White river section ensure passage of fish. In these conditions temporary bypasses will be provided.
332. While many of the creeks are generally ephemeral that are being crossed, the contractor should avoid construction during rainy season for these areas so as not to exacerbate the flood risk of the Kongulai-White River section.

Disposal of Excavation Spoils

333. Construction activities of subprojects have the potential to generate excess excavation materials for the installation of water supply pipelines and other structures.
334. Improper disposal of excavation spoils can be avoided by addressing the issue prior to the start of construction activities. 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.

Storage, Use and Transportation of Hazardous Materials

335. 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 CESMP;
 - 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.
336. 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.

Dust and On-site Air pollution

337. On-site air pollution from 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. Intermittent episodes of localized air pollution from dark smoke emitting equipment may also occur. Wind blowing on large stockpiles of construction materials such as soil and aggregates.
338. 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, workers' camps as well as other project-related facilities and activities.

Generation of Solid Waste Including Demolition Materials

339. 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 be potential sources of contaminants for surface runoff and pollution of nearby water bodies. In addition, improper closure of temporary work sites may create impacts following subproject completion.
340. Contractors will be required to:
- Prepare a waste management plan as part of the CESMP;
 - 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;
 - encourage re-use of excavated excess soil (estimated at 8800 m³);
 - regularly dispose of wastes to an accepted disposal site (Ranadi Landfill) as approved by SW-PMU; and
 - prohibit burning of all types of wastes.
341. After completion of work activities, contractors will be required to remove construction wastes from sites, implement the required restoration of disturbed sites and ensure the proper closure of construction sites.
342. All these shall be reflected in the CESMP which shall contain a subproject specific 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.

343. 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.

Demolition of Existing Reservoir (Tasahe and Panatina) and Replacement of Existing Trunk Mains (Between Kongulai and White River)

344. The existing old steel tank will be demolished, and the site cleared for the construction of the new reservoir. Existing pipework within the footprint of the new reservoir will be removed or diverted and new connections will be made with existing RC reservoir. In addition, the proposed trunk main subproject will include replacement of an existing trunk main in the White River section. It is anticipated that there will be impacts to the water supply operation during decommissioning of the existing reservoir and trunk mains and the commissioning of the new reservoirs and trunk mains.
345. Majority of the waste associated with decommissioning can be reused to a certain extent or disposed at a designated site approved by HCC and ECD. The component parts can be dismantled using minimal impact approach. SW can either reuse or sell these materials as scrap to local companies. The PMU will require the contractor's demolition and disposal plan prior to work activity (including hazardous material assessment and management procedure in accordance with international industry practice). In case that the waste includes asbestos containing materials, the Contractor will be responsible for the preparation and implementation of a method statement for the safe removal, storage and disposal from the site. The statement should follow international best practice, for example, HSE A14 - Asbestos Essential¹². Asbestos materials will only be disposed of at a hazardous waste landfill site.
346. During decommissioning, access and mobility at the site will be restricted. SW will agree a work schedule with selected contractors before decommissioning activities commence.
347. To mitigate or avoid risks to operation during decommissioning of existing reservoir and trunk mains, the following measures must be implemented:
- Ensure that the structures to be decommissioned are physically disconnected from the operating structures;
 - Ensure that there will be no stagnant water that will support the growth of biofilms;

5.2.2 Potential Construction Impacts and Mitigating Measures on biological Resources

348. Construction Impacts on the Biological Environment are minimal. There are no Red Listed terrestrial or aquatic species in the Project influence area.

Terrestrial Habitat Alteration

349. Construction activities will not involve alteration of important terrestrial habitats since the sites are highly modified. An area of 2500 m² may be cleared during the construction of the new Titinge tank. Any remaining land cleared, and not required for construction, will be seeded with grass or native plants as required as part of the revegetation program to stabilize the areas from erosion.

¹² [HSE - Asbestos: Asbestos essentials](#) (HSE A14 is the guideline for removing asbestos cement (AC) sheets, gutters etc. and dismantling a small AC structure)

350. Clearing of vegetation along the pipeline route (6 river crossings will be developed but passing underneath the creeks) for a distance of 3 km and up to 1.5 m wide will be required for the Kongulai to White River Trunk Main. After the pipeline has been laid and backfilled, the site will be regularly maintained for access.
351. During stream crossings, mitigation measures adopted by the Contractor will include: temporary works to ensure flow continuity, by providing bypasses for water flow and avoiding construction during rainy season so as not to exacerbate the flood risk etc. Silt curtains downstream may be used to reduce sediment loads during construction.
352. Mitigation measures include:
- Limiting vegetation clearing to areas where necessary to reduce impact on natural vegetation in the upstream region and to limit impact on crops in the downstream section;
 - Provide temporary fencing to retained vegetation;
 - Promote restoration of damaged or destroyed vegetation by planting tree's seedlings.

5.2.3 Potential Construction Impacts and Mitigating Measures on socio-economic Resources

Disruption of Utilities and Services

353. Proposed subprojects may disrupt existing built environment during construction since water supply pipelines will be generally installed along roads in the urban area. Construction activities may affect the existing transportation, water supply system, solid waste management, electricity lines and communication lines, health services and building infrastructures. In particular, in the Kongulai-White River area decommissioning of the existing pipeline may lead to the disruption of water services to both legal and illegal customers along the existing route.
354. Prior to construction activities, SW and the contractors will:
- SW will coordinate with utility providers to obtain information about locations of built environment;
 - 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.
355. In the particular case of the Kongulai-White River section the contractor will provide connections to households along the pipe easement together with both legal and illegal connections in the adjacent DMA. Those not connected will also additionally be offered the possibility to connect to SW services. These measures will ensure the maintenance of services in the zone as well as contributing to the reduction of NRW.

Construction Noise and Vibration

356. Trucks and construction equipment, which can generate noise of 80 dB(A) from a distance of 30 meters are the potential sources of noise during construction. The issue is mostly applicable along the roads where water supply pipelines will be installed and the sites for reservoirs. Construction noise will largely increase the daytime noise levels of the roads which can be expected to be around 60 dB(A) during peak hours based on experience. Significant vibration from construction activities is not expected since pipeline installation will not involve heavy compaction activities.

357. 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 produces 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.

358. The contractor will be required to exert extra efforts in reducing the noise generation from their activities near residential areas and other sensitive receptors.

Vehicular Traffic Congestion Hindrance to Public Access

359. Construction activities and any temporary or partial road closures may cause traffic congestion and hinder public access.

360. Managing the traffic during works along Mendana Avenue and Kukum Highway will be critical given this is the main thoroughfare in Honiara town and central business district. The contractor will need to undertake a survey to fully understand peak times and flows and consultations will be required with all stakeholders along Mendana Avenue and Kukum Highway and adjacent routes which could be used as diversion during construction works.

361. Temporary areas, access paths/roads and ancillary facilities will need to be carefully planned to avoid traffic congestion. Pedestrian access through and around the work sites will be controlled and managed. Traffic management and control, especially during peak traffic times, will be required to ensure safe passage of vehicles and pedestrians. Stakeholders and communities will be notified in advance of the schedule and duration of activities and the access and traffic control arrangements.

362. Contractors will be required to:

- prepare a traffic management and control plan as part of the CESMP 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;
- provide prior notification to the community on schedule of construction activities;
- provide traffic signs in the vicinity of the construction sites to direct motorists and pedestrians;
- schedule construction activities with consideration to periods of heavy presence of people such as festivities, processions, parades, etc. to minimize disruption to local activities.

Occupational Health and Safety

363. 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.

364. 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.
365. 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.
366. Contractors will be required to:
- prepare and implement a health and safety plan (HSP) as part of their CESMP;
 - ensure that a properly equipped and resourced first aid station is available at all times;
 - provide potable water and adequate sanitation facilities including hand washing stations;
 - provide adequate and well-ventilated camps and clean eating areas;
 - provide separate sleeping quarters for male and female workers;
 - provide PPE suitable to tasks and activities undertaken to minimize exposure to a variety of hazards;
 - provide fire-fighting equipment and fire extinguishers in workshops, fuel storage facilities, construction camps, and any sites where fire hazard and risk are present;
 - ensure that all workers are aware of emergency response and medical evacuation procedures.
367. The contractor's health and safety plan (HSP) will provide guidance to its staff on how good work practices can be carried out on every activity in the construction site to prevent accidents to the workers and the general public. This will include emergency procedures and the required resources, clear description of responsibilities and management, specific requirements of occupational health and safety policies and regulations, training requirements, and site safety rules. The HSP is one of the inputs to the contractor's CESMP.
368. Considering the most recent COVID-19 threat, the following measures will be implemented to manage risks on construction sites and in workers' housing. The detailed guidance is provided as **Appendix 2** and **Appendix 3** of this document. The WB's ESF/Safeguards Interim Note: COVID-19 Considerations in Construction/Civil Works Projects is provided as **Appendix 4** of this document.
- Avoid physical interaction and maintain physical distancing requirements;
 - Limit the capacity of common areas;
 - Regular cleaning and disinfection particularly heavily traffic areas and common areas;
 - Promote good personal hygiene such as frequent hand washing with soap and water or alcohol gel;
 - Provide appropriate personal protective equipment (PPE) such as face mask, face shield, etc;
 - Monitoring of health status of workers and visitors before entering the site and housing

Community Health and Safety

369. The movement of construction vehicles, trench excavations, and various activities may pose hazards to the public, particularly along Mendana Avenue and Kukum Highway. Reservoir sites, including any deep excavations, may also pose hazards to the public.

370. Many of the measures to manage occupational health and safety will help mitigate the risk to the community. 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 constructions sites and excavation sites;
- provide prior notification to the community on schedule of construction activities;
- provide security personnel in hazardous areas to restrict public access;
- 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.

Potential Social Issues Due to Influx of Workers

371. Presence of workers from outside the Project area may cause some social issues such as potential for conflict with local residents, risk spread of communicable diseases including STIs and HIV and potential gender-based violence (GBV) related concerns.

372. Measures to mitigate such risks and impacts will include:

- 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;
- Contractor(s) to engage an approved service provider implementation a communicable disease awareness and prevention program;
- Priority be given to accommodating workers in existing hotels, motels, dormitories and the like and construction of a camp for workers only in the instance suitable existing accommodation is not available;
- No child labor will be employed in the project; 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)
- 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 camp and yard to control unauthorized access and prevent entry of the public (especially children);
- Handwashing facilities will be installed in all sites and workers camps;
- Women participation in addressing GBV issues will be set in an environment where women can openly converse with about these concerns.

Potential Damage to Hidden Archaeological and Cultural Assets

373. Detailed surveys were undertaken of the Kongulai to White River trunk main (the only site potentially to have archaeological and cultural assets). Impact on existing structures and graves has been avoided by routing of the trunk main. Other archaeological and cultural assets that may be affected by excavations works are described below.

374. Precautions to avoid potential damage to any archaeological and cultural assets include:

- As part of the detailed design of the Kongulai White River pipeline impact on identified assets (such as graves) have been avoided by re-routing the pipeline;
- inclusion of a chance finds procedure in the ESMP; 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.

5.3 POTENTIAL OPERATIONAL IMPACTS

375. Operational considerations of the water supply subprojects will include health and safety risks during operation and maintenance e.g. handling and storage of chlorine. Operational impacts will be addressed by incorporating the necessary measures, such as a water safety plan, use of appropriate operational procedures and ensure effective mitigation and monitoring plan for each subproject.

5.3.1 Potential Operation Impacts and Mitigating Measures on Physical Resources

Natural Disaster Impacts

376. It is anticipated that there are unforeseen events in the future due to extreme weather events.
377. SW will develop an emergency response plan in response to natural disasters. SW's staff including communities nearby will be trained on all SOPs associated with disaster management and implementation of the plan.

Generation of Site Waste

378. During operation, it is anticipated to generate solid and liquid waste from storage and office.
379. All solid and liquid waste generated from storage and office will be collected and disposed of in an approved manner and in an approved location. Such disposal will not be permitted to cause either pollution or nuisance.

5.3.2 Potential Operation Impacts and Mitigating Measures on Socio-Economic Resources

Health and Safety Risks During Operation and Maintenance

380. Reservoir do not inherently pose significant risk to workers. It must also be noted that the reservoir is being designed following the ANZ standards.
381. While the civil works for the new chlorine house will be constructed to accept gas chlorination in the future, initially it will be operated using the existing liquid chlorination system.
382. At a later date, the use of chlorine gas as a disinfectant may pose particular safety risks particularly in the new chlorine house in Panatina to treat the incoming water from the Panatina borefield. This will be mitigated by the training that operators will be provided as part of the implementation of the Kongulai Water Treatment Plant where gas chlorination will be implemented initially.

383. To reduce the operational risk and safety of water supply tank the following measures must be implemented:

- Workers will be trained on health and safety aspects of operating a water supply tank;
- In the case of the Panatina Reservoir only, existing liquid chlorination systems will be used initially, the handling of which SW staff have good experience. In the future when SW transfers to the use of gas chlorination, a facility health and safety manual will be prepared; chlorine gas cylinders will be kept in separate safety rooms and equipped with fully automated chlorine gas shutoff systems;
- Chemicals such as chlorine will be kept in a separate room;
- A system will be established for safe use and handling of chlorine materials in the workplace;
- Workers will be provided with the appropriate PPE for chlorine use and handling; and
- In the case of the Titinge reservoir a new five-foot-high fence will be erected to control access and avoid exposing the public to any hazard due to the presence of the reservoir. These fences are already existing in the case of the Panatina and Tasahe reservoirs.

Health Hazard Due to Unplanned Delivery of Poor Water Quality

384. Contamination in water sources may be due to the presence of bacteria, viruses, protozoa, or chemicals. It will result to unplanned delivery to customers of poor water quality from Project facilities.

385. The unplanned delivery to customers of poor water quality from Project facilities can be prevented in a broader scale by:

- Implementing SW's water safety plan as advocated by the WHO. The water safety plan enables SW to (i) prevent contamination of its water sources, (ii) treat the water to reduce or remove contamination that could be present to the extent necessary to meet the water quality targets, and (iii) prevent re-contamination during storage, distribution and handling of drinking water. It is a best practice approach in ensuring delivery of potable water to consumers. SW has updated its water safety plan to conform with WHO requirements;
- SW will continue to practice water chlorination and ensure that adequate residual disinfection will be maintained to control microbial contamination.

Unplanned Outages and Emergencies

386. Unplanned outages and emergencies in the water supply system will cause loss of adequate water pressure in the network or in worst cases will result to no water being delivered to customers. This may affect public health due to the lack of potable water. There is also the risk of bacterial contamination of the water supply network from contaminated seepages when water pressure is low or no water at all in the pipelines. Seepages may enter the water supply network through leaks, cracks, faulty seals, and other openings. When significant quantity of pathogens has entered the water supply network, chlorine residual normally sustained in the water supply network may not be enough to maintain the necessary water disinfection level. This will have adverse health effects to the consumers and in worst cases will result to outbreak of waterborne disease. Most common causes of unplanned outages and emergencies are lack of adequate backup power supplies, equipment failure, damage to WTP, reservoirs, water pipelines and appurtenances, and accidents.

387. To address the unplanned outages and emergencies of the water supply system:

- Identification of potential causes of unplanned outages and emergencies shall be conducted during operation of the water supply system and updated as necessary.
- Written management procedures for unplanned outages and emergencies as required by the water safety plan implementation (advocated by WHO).
- Regular inspection and maintenance of the backup power supplies and the associated automatic transfer switch of the backup power to ensure uninterrupted operation during power failure.
- Regular inspection and maintenance of pumping systems and emergency backup systems to ensure that these are in good working conditions.
- Implement flushing and disinfection, as necessary, during unplanned outages and emergencies to prevent microbial contamination of the water supply system.
- 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.
- Regular training of water supply system's staff on how to handle unplanned outages and emergencies.

6.0 ANALYSIS OF ALTERNATIVES

6.1 ALTERNATIVE AND OPTION FOR WHITE RIVER TRUNK MAIN

^{388.} For White River trunk main subproject, the pipe section from Bus stop to Rove is essentially used for the interconnection with Rove and Tasahe distribution. Therefore, this new line would be of little use in normal conditions since the offtake to White River DMA B would be located at Bus Stop. However, this pipe section enables to interconnect this area with adjacent DMAs, notably Rove, thus improving the resilience and flexibility of the system. Therefore, this section would appear to be of a lower priority should a prioritization be made. In addition, the requirements for this section shall be confirmed once a decision is made regarding the future configuration of the distribution system in relation with the road reinstatement project and associated impact. In any case, a reduction of the diameter for the section between Bus Stop and Rove would appear as a possible alternative.

6.2 ALTERNATIVE AND OPTION FOR EAST KOLA TRUNK MAIN

^{389.} Another option for this trunk main consists in extending the existing 200 mm pipeline to Kukum Highway and having the same interconnections points. Similar diameter as the existing one would be used. Accordingly, the length of the pipeline would be 1.2 km, 600 m less than original proposal. This alternative solution is presented in **Figure 6-1**.

^{390.} This option would significantly improve existing situation and enable to benefit better from the existing storage. However, the pipe capacity would be limited, thus offering less flexibility in terms of supply between areas.

^{391.} While this option would alleviate current issues and enable adequate supply in short and medium terms, it is seen as limitative in long term should the objective be to use it solely in order to supply East Kola reservoir.

6.3 ALTERNATIVE MATERIAL FOR RESERVOIR

^{392.} A comparison of the two materials and life cycle cost analysis has been developed. This analysis indicates that aside from reinforced concrete, glass fused steel tank is also a sound solution for the reservoirs and presents several advantages, such as implementation time and quality; in terms of present value costs, there is little difference between the two solution and other factors would pre-dominate. In addition, steel tanks are generally circular which may result in a reduction of the potential volume given the site configuration in the range of 10 to 15%. Albeit feasible, installation of steel tanks partly under the ground level (half-buried) can present additional difficulties. It is not recommended to implement a hybrid solution with a metallic roof. While enabling limited cost saving, this solution may jeopardize the durability of the reservoir and possibly compromise reservoir tightness.

Figure 6-1: Alternative for East Kola Trunk Main – 225mm

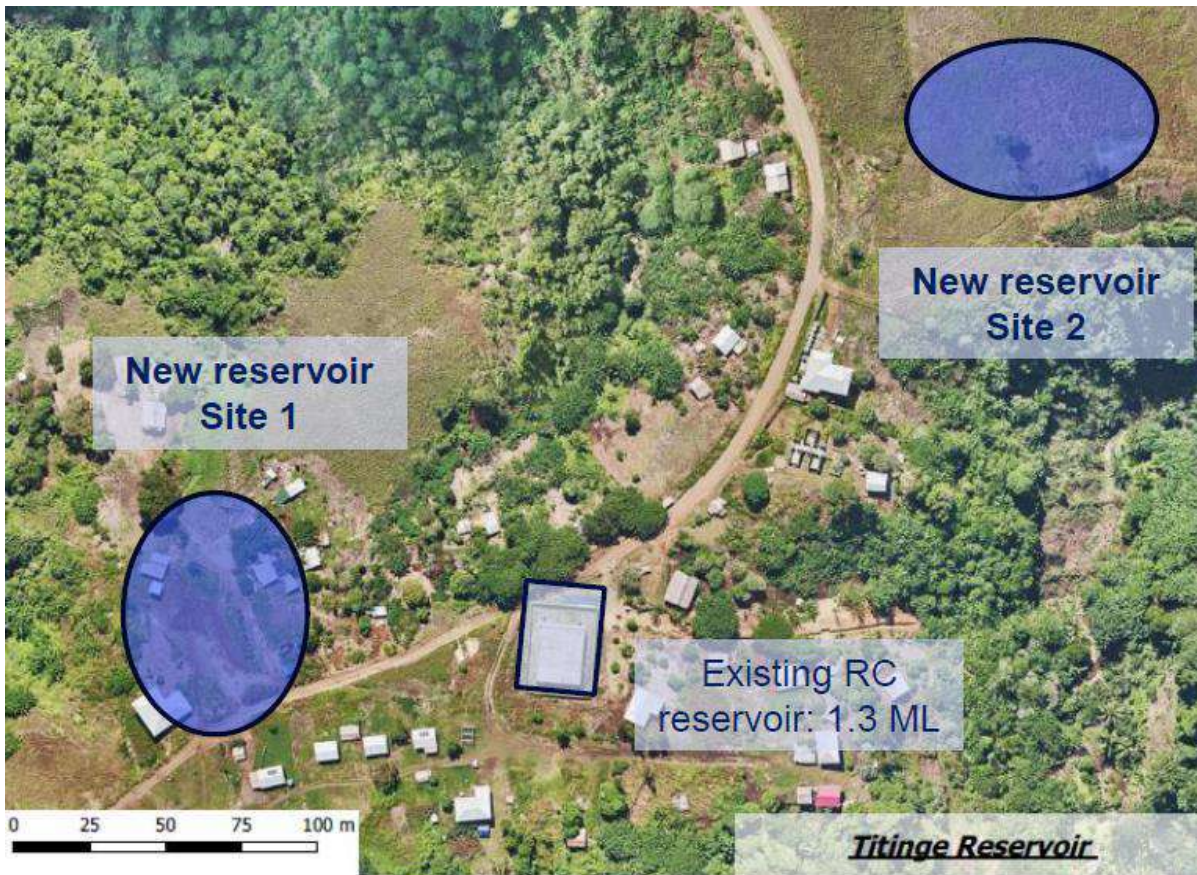


Source: SW PRF BOD Honiara WS, September 2019

6.4 ALTERNATIVE LOCATION FOR TITINGE RESERVOIR

- ³⁹³. The existing reservoir site is securely fenced but the compound is insufficient to provide for additional storage. Unlike the two other reservoirs, the reservoir capacity augmentation cannot be achieved using existing storage site and new site needs to be selected. Two sites have been studied and are presented in **Figure 6-2**. Both of which are located on privately owned land. The photograph of site 1 is provided in **Plate 6-1**. Site 1 has been selected as it is at a higher altitude enabling surrounding residents to be supplied and also to simplify operations with the existing reservoir.

Figure 6-2: Selected Sites for Titinge Reservoir



Source: SW PRF BOD Honiara WS, September 2019

Plate 6-1: Photograph of Site 1 for Titinge Reservoir



7.0 GRIEVANCE REDRESS MECHANISM

7.1 PURPOSE

395. This Grievance Redress Mechanism (GRM) is designed to deal with grievances from the public in relation to SW 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.
396. 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.
397. Inward communications to SW 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.
398. The GRM 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.
399. The Project Managers, as the delegated authority on the contracts will be responsible for managing grievances within the PMU.

7.2 PROCESS

400. The SW 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 provided as **Appendix 5** of this document.

7.2.1 Stage 1

401. 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.
402. 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.
403. 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.

404. 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

405. If the grievance is not resolved under Stage 1, the grievance should then be referred to the General Manager (GM) of SW.

406. The GM 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.

407. 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.

408. 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

409. If the grievance is not resolved under Stage 2 the grievance should then be referred to a three-member Grievance Tribunal¹³ 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.

410. 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.

411. 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.

412. The Tribunal's decision will be final.

7.3 MISCELLANEOUS

413. 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.

414. 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.

¹³ 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.

415. 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.
416. SW are responsible to maintain an accurate register of grievances and the way they are dealt with.
417. 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 SW encourages raising of grievances to any officer or contract staff regardless of station.
418. 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.
419. SW Projects Team must hold a grievance review meeting at least once every 6 months to report on all grievances received and in process.
420. 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 5**, and includes the type of problem or grievance:
- land related
 - compensation
 - construction
 - resettlement site
 - other (specify)

8.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 INTRODUCTION

421. The role of ESMP is to outline the mitigation measures to be considered during project implementation and operation to avoid or control adverse environmental and social impacts and the actions deemed necessary to implement these measures.
422. Environmental assessment has determined that the Project will have low significant impacts on the environment. Social impacts are not expected to be significant with land acquisition and resettlement impacts generally avoided and residual impacts mitigated as detailed in the individual LARP reports for the two sub-projects. The Project can be implemented in an environmentally acceptable manner provided that the mitigation measures to avoid or reduce the environmental impacts will be provided. This ESMP includes: (i) implementation arrangement, (ii) mitigating measures to be implemented; (iii) required monitoring associated with the mitigating measures. It also describes the institutional roles and responsibilities during pre-construction, construction, and operation phases.

8.2 INSTITUTIONAL ARRANGEMENT

423. **MOFT & SW:** The MOFT is the Project executing agency and SW is the implementing agency, operating through a PMU including in particular specialists associated with environmental and social safeguards.
424. **Project Management Unit:** SW has established a PMU to prepare and implement the Project. There are 7 staff in the PMU including 4 safeguard specialists. SW will increase numbers as required during implementation including E&S inspectors during the works. 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, RP and environmental assessments are prepared, and development consents are obtained, and compliance with each subproject ESMP and development consent conditions is monitored and reported.
425. **Construction Contractors:** The contractors undertaking the works will be responsible for ensuring that their activities comply with the environmental and social safeguard requirements of the contract including the technical specifications. The contractor will prepare a CESMP for review and approval by the PMU prior to any physical works. The CESMP will be activity, site and project-specific and detail how the contractor intends to meet the environmental and social management requirements identified in the ESMP. It will be designed to ensure that appropriate environmental and social management practices are applied throughout the construction period. The CESMP will include all the site-specific and sub-plans necessary to meet the standards and targets set out in the ESMP. The contractor will be required to employ a full-time health and safety officer and an environmental officer as necessary to ensure compliance with all requirements concerning environmental, health, safety, social and labor regulations during construction.
426. **Environmental Conservation Department:** The ECD will review the development consent applications and issue, either with or without conditions, the consents. The ECD will be invited to participate in joint inspections and audits during construction activities.

427. A summary of the environmental and social management responsibilities for the Project is presented in **Table 8-1**.

Table 8-1: Summary of Environmental and Social Management Responsibilities in the Project

Project Implementation Organization	Management Roles and Responsibilities
Asian Development Bank / World Bank	<ul style="list-style-type: none"> ▪ Review and clear IEEs/ESMPs ▪ 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 ▪ Provide environmental and social safeguards capacity building to the PMU during missions and remotely as required. ▪ Review semi-annual and annual environmental and social monitoring report
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 (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 Grievance Redress Mechanism (GRM) that have not been resolved at lower levels
SW Project Management Unit	<ul style="list-style-type: none"> ▪ Responsible for overall project management, implementation and monitoring ▪ Responsible for SW's application for a Development Consent ▪ Update the IEE and ESMPs 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 ▪ Submit monthly, quarterly, semi-annual, and annual monitoring report to SW Management ▪ Review and clear the CESMP 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 CESMP ▪ Issue the Community Advisory Committee guidelines to the contractor at Bid Award

Project Implementation Organization	Management Roles and Responsibilities
PMU Environment/Social Officer	<ul style="list-style-type: none"> ▪ Ensure IEE/ESMPs are updated based on the final detailed designs and their disclosure in locations and form accessible to the public ▪ Coordinate with the preparer of bid documents for the inclusion of IEE/ESMPs and CESMP frameworks in the bidding documents and civil works contracts ▪ Ensure required government permits and clearances acquired by SW prior to actual construction activities ▪ Establish system for monitoring environmental and social safeguards of the Project as described in the IEE/ESMPs ▪ 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 GRM is activated prior to the start of construction ▪ During construction, conduct monthly and additional <i>ad hoc</i> site visits as necessary and coordinate with the project engineers to ensure that required environmental and social mitigation measures are implemented at the construction sites, ▪ Provide training for contractors' environment and safety officers to ensure they understand the ESMP requirements; and ▪ Coordinate with the contractors' EHSO to ensure that environmental and social awareness trainings for workers are done.
PMU Land Officer	<ul style="list-style-type: none"> ▪ Responsible in dealing with land acquisition issues as detailed in LARP
Contractor	<ul style="list-style-type: none"> ▪ Prepare and submit the CESMP prior to construction for review and approval of PMU ▪ Understand the ESMP requirements and allocate necessary resources for implementation ▪ Employ a full-time health and safety officer and an environmental officer as necessary to ensure compliance with all requirements concerning environmental, health, safety, social and labor regulations during construction. In addition, the archaeological findings will be handled by environmental officer in consultation with PMU land officer. ▪ EHSO also provides capacity building and training for workers on CESMP requirements as needed ▪ Implement construction activities with the required mitigation measures ▪ Conduct environmental and social monitoring as required by ESMP ▪ Act promptly on complaints and grievances concerning the construction activities in accordance with the project's GRM ▪ Submit monthly progress reports on CESMP/ESMP implementation to PMU ▪ Publish a construction notice in local media and distribute the notice to affected community members prior to the commencement of construction on-site. ▪ Establish a Community Advisory Committee (CAC) within 4 weeks of the publication of the construction notice. ▪ Hold a minimum of three (3) CAC meetings at the start, during and at the completion of construction works.

Project Implementation Organization	Management Roles and Responsibilities
	<ul style="list-style-type: none"> ▪ Contractor’s Terms of Reference for the EHSO (Secretary for the CAC) will include the role, tasks and activities described in the CAC Guidelines.
ECD	<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 ESMP 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 BMP regarding mining and extraction of aggregates or gravel from rivers ▪ Monitors contractor’s compliance with the terms of the issued BMP

Source: Adapted from EARF, 2019.

8.3 CONSULTATION AND DISCLOSURE

428. In Solomon Islands, complaints about environmental performance of projects issued a Development Consent may also be brought to the attention of ECD of the MECDM. ECD is mandated by law (Environment Act of 1998 and the Environment Regulations of 2008) to monitor the projects issued with a development consent and address concerns, complaints, and grievances of the public regarding project performance.
429. The PER documenting the mitigation measures and consultation process will be submitted to MECDM and will be available for public review. The PER Report will be available to the public from SW website.
430. The Stakeholder Engagement Plan (SEP) for the project documents the information disclosure, consultation and public participation measures to meet ADB and World Bank standards for ongoing and meaningful consultation during construction and operational works.

8.4 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

431. The ESMP (including monitoring requirements) for Honiara water supply system subprojects are presented from **Table 8-2** to **Table 8-3**.

Table 8-2: Environmental and Social Management Plan for Trunk Mains Subproject

Activity/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	Climate change adaptation measures are: i. conduct of hydrology and onsite flooding study ii. engineering assessment on potential site erosion iii. appropriate erosion protection for the trunk mains will be determined	Part of detailed design cost	Design Consultant	SW's PMU	Engineering drawings and specifications	Verification of engineering drawings and specifications Once	Minimal cost (part of consultant's task)
Improper implementation of ESMP	Tender documents and construction contract will require the following: i. issuance of Contractor's Environmental and Social Management Plan (CESMP) framework to bidders ii. preparation of CESMP prior to construction activities iii. review and approval of CESMP by the PMU prior to site mobilization	Part of contractors' bid cost	Design Consultant and Contractor	PMU	CESMP	CESMP submission prior to commencement of site works	Minimal cost (part of contractor's task)
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	Part of contractors' bid cost	Contractor	PMU	<ul style="list-style-type: none"> ▪ Consultation meetings ▪ Tender documents ▪ GRM activated with community 	Verification of meeting documents, tender documents and in placed CACs	Minimal cost (part of contractor's task)

Activity/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>project's GRM through campaigns, website, billboards, etc.</p> <p>iii. ensure that the contact details are placed on notice boards and/or website.</p>				advisory committees (CACs)	<p>After completion of meetings</p> <p>Once after preparation of tender documents prepared</p>	
Extraction of local construction materials	<p>The contractor will provide sufficient information about the source of construction materials to be used in the project. Sources such as quarries and borrow pits should be:</p> <p>i. Licensed</p> <p>ii. Covered by required government permits</p> <p>iii. Not located within 300 meters of any urban sensitive receptors</p> <p>iv. Provided with drainage and sediment flow controls</p> <p>v. Provided with abandonment plan such as rehabilitation using topsoil and fencing and placing of warning sign</p>	Part of contractors' bid cost	Contractor	PMU	<p>Government permits, license of quarries and borrow pits</p> <p>Operational and abandonment plan</p>	<p>Visual inspection of source</p> <p>Verification of operational and abandonment plan</p> <p>Weekly</p>	Minimal cost to SW
Land Access Arrangements	SW will use existing land and road easement to avoid or at least minimize involuntary settlement impact. Land acquisition will be avoided through	To be part of the project cost. Estimated at 53,139 USD	SW	SW	Detail design minimizes relocation	No Relocation.	Minimal by PMU

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
	successful negotiation with an FTE holder to provide an easement. Costs for additional connections and replacement of illegal connections will be provided by the Project as a compensation to Affected persons.						
UXO Survey	Measures include: i. Provision to carry out UXO survey; and ii. Chance Find Provision in the contract	Part of contractors' bid cost	Contractor	PMU Land Officer	Survey has been carried out by approved personals	Certificate showing the project area is UXO free	Minimal cost to SW
Environmental Capacity Development	The contractor prior to mobilization will conduct orientation for its workers and subcontractors on the provisions of the CESMPs focusing of the mitigating measures to minimize impact of construction.	Part of contractors' bid cost	Contractor	PMU	Number of training conducted, and workers trained	Attendance sheets	Part of contractors cost
Introduction of Alien Species	All construction equipment will be sourced locally. In case that there are equipment and materials to be imported, these including the vessels that import them will be subjected to clearance procedures under the Bio-Security Act and Regulations and may require issuance of phytosanitary certificates from Biosecurity Solomon Islands	Part of contractors' bid cost	Contractor	PMU	Phytosanitary certificates from Biosecurity Solomon Islands	Verification of certificates	Minimal cost to SW

Activity/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							
Environmental impacts on the sensitive receptors (churches, schools, hospitals, etc.)	Use of right construction methodology which results in lesser disruption to public specially the sensitive receptors.	Part of contractors' bid cost	Contractor	PMU	Contractors' construction methodology Notification of affected stakeholders specially sensitive receptors	Verification of construction methodology Coordination meetings and notifications	Minimal cost to SW
Disruption of utilities and services	SW's PMU and the contractors will: i. coordinate with the other utility companies regarding the potential disruptions ii. make provisions to preserve the operation of current facilities; and iii. provide prior notification to affected households and establishments iv. re-establish water services once old networks are disconnected.	Part of contractors' bid cost	Contractor	PMU	Coordination with the other utility companies Notification of affected households and establishments	Verification of coordination meetings and notifications After completion of meetings and notifications	Minimal cost to SW
Soil erosion and sedimentation control	Earthworks and area to be exposed carefully planned; Measures to divert surface runoffs away from the exposed areas and to prevent sediments from moving offsite may include: i. small interceptor dikes, ii. pipe slope drains,	Part of contractors' bid cost	Contractor	PMU	<ul style="list-style-type: none"> ▪ Disturbed sites ▪ Use of appropriate sediment controls 	Visual inspection of sites Verification of plans Daily during rainy periods	Minimal cost to SW

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
	<ul style="list-style-type: none"> iii. grass bale barriers, iv. silt fence, v. sediment traps, and vi. temporary sediment basins; vii. replanting disturbed areas <p>The contractor will be required to prepare an erosion and sediment control plan as part of their CESMP</p>						
River and creek crossings	<p>The contractor will be required to carry out temporary works to ensure flow continuity. In addition, temporary bypasses will be provided.</p> <p>The contractor will avoid construction during rainy season so as not to exacerbate the flood risk. Silt curtains downstream may be used to reduce sediment loads during construction.</p>	Part of contractors' bid cost	Contractor	PMU	<p>Temporary facility to ensure flow continuity.</p> <p>Construction schedule during rainy season</p>	<p>Visual inspection of sites</p> <p>Verification of plans</p> <p>Daily during rainy periods</p>	Minimal cost to SW
Loss of vegetation	<p>SW's PMU and the contractors will:</p> <ul style="list-style-type: none"> i. Conduct bio-physical assessments ii. Limiting vegetation clearing iii. Provide temporary fencing to retained vegetation iv. Securing tree cutting permit 	Part of contractors' bid cost	Contractor	PMU	<p>Disturbed sites</p> <p>Plans and permits and clearances from relevant government agencies</p>	<p>Visual inspection of sites</p> <p>Verification of plans and permitting requirements</p>	Minimal cost to SW

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
	v. Promote restoration by planting trees near the project site						
Disposal of excavation spoils and other solid wastes	The PMU will: i. require waste management plan as part of the CESMP; ii. provision of garbage bins for temporary storage of waste iii. separate solid waste into hazardous, non-hazardous and reusable waste iv. regular disposal of wastes to an accepted disposal site v. require the contractor's disposal plan and inspection of disposal site prior to construction.	Part of contractor bid cost	Contractor	PMU	Contractor's disposal plan	Inspection of disposal site After submission of disposal plan	Minimal cost to SW
Oil and hazardous materials management	Measures for clean-up and handling of contaminated materials: i. Training on how to handle fuels/hazardous substances and how to contain spills ii. Provision of spill cleanup materials such as absorbent pads, iii. Immediate clean-up of spills iv. Collection and disposal of oil-stained wastes and used oil through	Part of contractors' bid cost	Contractor	PMU	Measures required to prevent accidental releases Records of accidental releases Measures for clean-up and handling of contaminated materials Training records of personnel for	Visual inspection of storage area; Verification of records Daily and as necessary	Minimal cost to SW

Activity/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>authorized waste handlers and waste facilities</p> <p>v. Restoration of temporary work sites will include removal, treatment, and proper disposal of oil contaminated soils,</p>				hazardous materials;		
Dust and on-site air pollution due to construction activities	<p>Measures for air pollution due to construction activities:</p> <p>i. regular water spraying of roads, work areas and other construction-related facilities to minimize dust generation</p> <p>ii. provision of cover in storage area of construction materials, stockpiles and spoils to prevent fine materials from being blown</p> <p>iii. Prohibit use of equipment and vehicles that emit dark sooty emissions</p> <p>iv. Provision of tight tarpaulin cover on delivery trucks to avoid spills and dust emission; and</p> <p>v. Prohibit burning of all types of wastes generated</p>	Part of contractors' bid cost	Contractor	PMU	<p>Dust generation</p> <p>Smoke emitting equipment,</p> <p>Open burning of materials</p>	<p>Visual inspection of sites</p> <p>Daily</p>	Minimal cost to SW
Construction noise and vibration	<p>Measures for construction noise and vibration:</p> <p>i. Prior notification to the community on</p>	Part of contractors' bid cost	Contractor	PMU	Noise level	<p>Noise meter</p> <p>Daily / as necessary</p>	Minimal cost to SW

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
	<ul style="list-style-type: none"> schedule of construction activities especially nighttime activities ii. Provision of noisy equipment with noise reduction covers iii. Position stationary noisy equipment (genset, compressors, batching and rock crushing plant, etc.) away from houses and other receptors iv. If possible, avoid working during nighttime (19:00-06:00) vi. Conduct regular noise level monitoring (the limits near residential area are 55 and 45 dB(A) during daytime and nighttime, respectively) 				Normal operation schedule		
Vehicular traffic congestion hindrance to public access	Measures for accessibility: <ul style="list-style-type: none"> i. Preparation of traffic management and control plan as part of the CESMP ii. Coordinate with local authorities for any closure of roads or rerouting of vehicular traffic iii. Provision of traffic signs in the vicinity of the construction sites 	Part of contractors' bid cost	Contractor	PMU	Traffic signs in vicinity of construction sites Schedule of festivities, processions, parades, etc.	Verification of traffic management plan Visual inspection of sites Daily	Minimal cost to SW

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/Monitoring	Aspects/Parameters to be monitored	Means of Monitoring/Frequency	Monitoring Cost
	iv. Consideration on schedules of festivities, processions, parades, etc.						
Community health and safety	Measures for community health and safety: i. Use barriers and install signage ii. Provision of security personnel in hazardous areas to restrict public access iii. Operate construction night light at the vicinity of construction sites; and iv. Provision of adequate safe passageways for the public crossing the construction sites v. Refer to Appendix for COVID measures vi. Advise local community of site health and safety site plans and seek feedback on appropriate mitigation measures via Community Advisory Committee meetings.	Part of contractors' bid cost	Contractor	PMU	Construction safety policy Hazards in the area Safety control such as signages, lightings, and barriers Health and safety records (near miss, first aide, lost time accident) Adherence to measures and ADB/WG COVID-19 guidelines	Verification of construction safety policy and health and safety record Visual inspection of site Daily	Minimal cost to SW
Occupational health and safety at work sites	Measures include: i. Implementation of a health and safety plan (HSP) as part of their CESMP	Part of contractors' bid cost	Contractor	PMU	Construction of health and safety plan First aid station, PPE, emergency	Verification of health and safety plan	Minimal cost to SW

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
	<ul style="list-style-type: none"> ii. Ensure that first aid station is always available iii. Provision of appropriate personal protective equipment (PPE), iv. Providing of emergency response equipment such as fire-fighting equipment, fire extinguishers, etc. v. Provision of potable water and adequate sanitation facilities, vi. Provision of workers with adequate and well-ventilated camps, clean eating areas, and separate sleeping quarters for male and female workers. vii. Refer to Appendix for COVID measures 				<p>response equipment and sanitation facilities</p> <p>Health and safety records (near miss, first aide, lost time accident)</p> <p>Adherence to measures and ADB/WG COVID-19 guidelines</p>	<p>Verification of health and safety record Visual inspection of site</p> <p>Daily</p>	
Potential social issues due to influx of workers	<p>Measures include:</p> <ul style="list-style-type: none"> i. Induction of the workers on community health and safety, grievance redress mechanism, and consultation and communications plan; ii. Implementation of protocols concerning the workers contact between the local communities; 	Part of contractors' bid cost	Contractor	SW's PMU	<p>Implementation of workers induction, required protocols, and disease awareness and prevention program</p> <p>Records of workers</p>	<p>Verification of records</p> <p>Visual inspection of site</p> <p>At start of work Monthly</p>	Minimal cost to SW

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
	<ul style="list-style-type: none"> iii. Implementation of a communicable disease awareness and prevention program on the risk of disease spreading including STDs and HIV; and iv. Provision of fence and warning signs to control unauthorized entry and prevent entry of the public v. Workers participation in addressing GBV issues will be set in an environment where workers can openly converse with about these concerns. vi. Implementation of GBV awareness training program for contractors vii. Ensure that no child labor will be employed in the project; ensure that all workers are adults above the age of 18 years. 						
Potential damage to hidden archaeological and cultural assets	<p>Tender documents and construction contract will require the following:</p> <ul style="list-style-type: none"> i. Immediate stoppage upon discovery of archaeological and cultural assets ii. Inform the local authorities and the 	Part of specs preparation cost	Design Consultant	PMU	Tender documents	<p>Verification of tender documents</p> <p>Once after preparation of tender documents</p>	Minimal cost (part of consultant's task)

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/Monitoring	Aspects/Parameters to be monitored	Means of Monitoring/Frequency	Monitoring Cost
	Solomon Island National Museum about the presence						
Replacement of existing trunk mains	<p>The PMU will:</p> <ul style="list-style-type: none"> i. require the contractor's disposal plan prior to work activity (including hazardous material assessment and management procedure in accordance with international industry practice); ii. Inspect the disposal site after submission of disposal plan iii. During decommissioning, access and mobility at the site will be restricted. iv. In case of waste includes asbestos containing materials, the Contractor will be responsible for the preparation and implementation of a method statement for the safe removal, storage and disposal from the site 	Part of contractor cost	Contractor	PMU	Contractor's disposal plan	<p>Inspection of site before and after replacement of trunk mains</p> <p>Inspection of disposal site after submission of disposal plan</p>	Minimal cost to SW
Improper closure of construction sites after subproject completion.	Site restoration and removal of all temporary facilities, excess materials, equipment, plant and excavated materials on site; all dumping shall	Part of contractors' bid cost	Contractor	PMU	Disturbed sites, staging areas and workers camps.	<p>Visual inspection of sites</p> <p>Review and "clear" site remediation</p>	Minimal cost to SW

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
	be to approved locations. Replanting of disturbed sites in accordance with replanting plan.					through issue of certificate Once when all site work is complete	
OPERATIONS							
Health and safety risks during operation and maintenance	Mitigating measures include: i. Identification of potential causes ii. Provision of written management procedures iii. Provision of written standard operating procedures (SOPs)	Part of SW's operational cost	SW's Operations Dept.	SW's Operations Dept. Mgt	Written management procedures SOPs	Verification of management procedures, SOPs and records Weekly verification Implementation of SOPs	Minimal cost (verification of documents only)
Health hazard due to unplanned delivery of poor water quality	Implementation of WSP to: i. prevent contamination of the water sources, ii. treat the water to 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 Department	SW's Operations Dept. Mgt.	WSP Physical, Chemical and Biological parameters	Verification of WSP implementation Water sampling and laboratory test Monthly for plan and for bacteria; Annual for physical & chemical	Part of SW's operational cost

Table 8-3: Environmental and Social Management Plan for Service Reservoir Capacity Augmentation Subproject

Activity/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	Climate change adaptation measures are: i. conduct of hydrology and onsite flooding study ii. engineering assessment on potential site erosion iii. appropriate erosion protection for the reservoir will be determined	Part of detailed design cost	Design Consultant	SW's PMU	Engineering drawings and specifications	Verification of engineering drawings and specifications Once	Minimal cost (part of consultant's task)
Improper implementation of ESMP	Tender documents and construction contract will require the following: i. issuance of CESMP framework to bidders ii. preparation of CESMP prior to construction activities iii. review and approval of CESMP by the PMU prior to site mobilization	Part of contractors' bid cost	Design Consultant and Contractor	PMU	CESMP	CESMP submission prior to commencement of site works	Minimal 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 campaigns, website, billboards, etc. iii. ensure that the contact details are placed on notice	Part of contractors' bid cost	Contractor and SW's PMU	PMU	Consultation meetings Tender documents GRM activated with CACs	Verification of meeting documents, tender documents and in placed CACs After completion of meetings Once after preparation of tender documents prepared	Minimal cost

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/Monitoring	Aspects/Parameters to be monitored	Means of Monitoring/Frequency	Monitoring Cost
	boards and/or website.						
Extraction of local construction materials	The contractor will provide sufficient information about the source of construction materials to be used in the project. Sources such as quarries and borrow pits should be: i. Licensed ii. Covered by required government permits iii. Not located within 300 meters of any urban sensitive receptors iv. Provided with drainage and sediment flow controls v. Provided with abandonment plan such as rehabilitation using topsoil and fencing and placing of warning sign	Part of contractors' bid cost	Contractor	PMU	Government permits, license of quarries and borrow pits Operational and abandonment plan	Visual inspection of source Verification of operational and abandonment plan Weekly	Minimal cost to SW
Land Access Arrangements	A particular approach by SW is to use existing SW land to avoid or minimize land acquisition impacts. In the case of Titinge there are three groups of affected persons on Titinge reservoir site: 1) landowner, 2) sub-tribe claimants, 3) land occupier. The full payment for the land has been completed for both registered landowner and sub-tribe claimants. The remaining	To be part of the project cost. A budget of 236,657 USD has been estimated	SW	PMU Land Officer	Detail design minimizes relocation	This will be managed closely by the SW PMU Land Officer.	Minimal cost to SW

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/Monitoring	Aspects/Parameters to be monitored	Means of Monitoring/Frequency	Monitoring Cost
	assets to be paid by SW is the land occupier.						
UXO Survey	Mitigation measures include: <ul style="list-style-type: none"> Provision to carry out UXO survey; and Provision in the contract 	Part of contractors' bid cost	Contractor	PMU	Survey has been carried out by approved personals	Certificate showing the project area is UXO free	Minimal cost to SW
Environmental Capacity Development	The contractor prior to mobilization will conduct orientation for its workers and subcontractors on the provisions of the CESMPs focusing of the mitigating measures to minimize impact of construction.	Part of contractors' bid cost	Contractor	PMU	Number of training conducted, and workers trained	Attendance sheets	Part of contractors cost
Introduction of Alien Species	All construction equipment will be sourced locally. In case that there are equipment and materials to be imported, these including the vessels that import them will be subjected to clearance procedures under the Bio-Security Act and Regulations and may require issuance of phytosanitary certificates from Biosecurity Solomon Islands	Part of contractors' bid cost	Contractor	PMU	Phytosanitary certificates from Biosecurity Solomon Islands	Verification of certificates	Minimal cost to SW
CONSTRUCTION							
Environmental impacts on the sensitive receptors (churches, schools, hospitals, etc.)	Use of right construction methodology which results in lesser disruption to public specially the sensitive receptors.	Part of contractors' bid cost	Contractor	PMU	Contractors' construction methodology Notification of affected stakeholders specially sensitive receptors	Verification of construction methodology Coordination meetings and notifications	Minimal cost to SW

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/Monitoring	Aspects/Parameters to be monitored	Means of Monitoring/Frequency	Monitoring Cost
Soil erosion and sedimentation control	<p>Earthworks and are to be exposed carefully planned; Measures to divert surface runoffs away from the exposed areas and to prevent sediments from moving offsite may include</p> <ol style="list-style-type: none"> i. small interceptor dikes, ii. pipe slope drains, iii. grass bale barriers, iv. silt fence, v. sediment traps, and temporary sediment basins; vi. Replanting disturbed areas <p>The contractor will be required to prepare an erosion and sediment control plan as part of their CESMP.</p>	Part of contractors' bid cost	Contractor	PMU	<p>Disturbed sites</p> <p>Use of appropriate sediment controls</p>	<p>Visual inspection of sites</p> <p>Verification of plans</p> <p>Daily during rainy periods</p>	Minimal cost to SW
Loss of vegetation	<p>SW's PMU and the contractors will:</p> <ol style="list-style-type: none"> i. Conduct bio-physical assessments ii. Limiting vegetation clearing iii. Provide temporary fencing to retained vegetation iv. Securing tree cutting permit v. Promote restoration by planting trees near the project site 	Part of contractors' bid cost	Contractor	PMU	<ul style="list-style-type: none"> ▪ Disturbed sites ▪ Plans and permits and clearances from relevant government agencies 	<p>Visual inspection of sites</p> <p>Verification of plans and permitting requirements</p>	Minimal cost to SW
Disposal of excavation spoils and other solid wastes	<p>The PMU will:</p> <ol style="list-style-type: none"> i. require waste management plan as part of the CESMP; 	Part of contractor bid cost	Contractor	PMU	Contractor's disposal plan	Inspection of disposal site	Minimal cost to SW

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
	<ul style="list-style-type: none"> ii. provision of garbage bins for temporary storage of waste iii. separate solid waste into hazardous, non-hazardous and reusable waste iv. regular disposal of wastes to an accepted disposal site v. require the contractor's disposal plan and inspection of disposal site prior to construction. 					After submission of disposal plan	
Oil and hazardous materials management	<p>Measures for clean-up and handling of contaminated materials:</p> <ul style="list-style-type: none"> i. Training on how to handle fuels/hazardous substances and how to contain spills ii. Provision of spill cleanup materials such as absorbent pads, iii. Immediate clean-up of spills iv. Collection and disposal of oil-stained wastes and used oil through authorized waste handlers and waste facilities v. Restoration of temporary work sites will include removal, treatment, and proper disposal of oil contaminated soils, 	Part of contractors' bid cost	Contractor	PMU	<p>Measures required to prevent accidental releases</p> <p>Records of accidental releases</p> <p>Measures for clean-up and handling of contaminated materials</p> <p>Training records of personnel for hazardous materials;</p>	<p>Visual inspection of storage area;</p> <p>Verification of records</p> <p>Daily and as necessary</p>	Minimal cost to SW

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Dust control and on-site air pollution due to construction activities	Measures for air pollution due to construction activities: <ol style="list-style-type: none"> i. regular water spraying of roads, work areas and other construction-related facilities to minimize dust generation ii. provision of cover in storage area of construction materials, stockpiles and spoils to prevent fine materials from being blown iii. Prohibit use of equipment and vehicles that emit dark sooty emissions iv. Provision of tight tarpaulin cover on delivery trucks to avoid spills and dust emission; and v. Prohibit burning of all types of wastes generated 	Part of contractors' bid cost	Contractor	PMU	Dust generation Smoke emitting equipment, Open burning of materials	Visual inspection of sites Daily	Minimal cost to SW
Construction noise and vibration	Measures for construction noise and vibration: <ol style="list-style-type: none"> i. Prior notification to the community on schedule of construction activities specially nighttime activities ii. Provision of noisy equipment with noise reduction covers iii. Position stationary noisy equipment 	Part of contractors' bid cost	Contractor	PMU	Noise level Normal operation schedule	Noise meter Daily / as necessary	Minimal cost to SW

Activity/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>(genset, compressors, batching and rock crushing plant, etc.) away from houses and other receptors</p> <p>iv. If possible, avoid working during nighttime (19:00-06:00)</p> <p>v. Conduct regular noise level monitoring (the limits near residential area are 55 and 45 dB(A) during daytime and nighttime, respectively)</p>						
Community health and safety	<p>Measures for community health and safety:</p> <p>i. Use barriers and install signage</p> <p>ii. Provision of security personnel in hazardous areas to restrict public access</p> <p>iii. Operate construction night light at the vicinity of construction sites; and</p> <p>iv. Provision of adequate safe passageways for the public crossing the construction sites</p> <p>v. Refer to Appendix for COVID measures</p> <p>vi. Advise local community of site health and safety site plans and seek feedback on appropriate mitigation measures via</p>	Part of contractors' bid cost	Contractor	PMU	<p>Construction safety policy</p> <p>Hazards in the area</p> <p>Safety control such as signages, lightings, and barriers</p> <p>Health and safety records (near miss, first aide, lost time accident)</p> <p>Adherence to measures and ADB/WB COVID-19 guidelines</p>	<p>Verification of construction safety policy and health and safety record</p> <p>Visual inspection of site</p> <p>Daily</p>	Minimal cost to SW

Activity/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 Advisory Committee meetings.						
Occupational health and safety at work sites	Measures include: i. Implementation of construction site health and safety management plan (CSHSMP), ii. Ensure that first aid station is always available iii. Provision of appropriate personal protective equipment (PPE), iv. Providing of emergency response equipment such as fire-fighting equipment, fire extinguishers, etc. v. Provision of potable water and adequate sanitation facilities, vi. Provision of workers with adequate and well-ventilated camps, clean eating areas, and separate sleeping quarters for male and female workers vii. Refer to Appendix for COVID measures	Part of contractors' bid cost	Contractor	PMU	Construction of health and safety plan First aid station, PPE, emergency response equipment and sanitation facilities Health and safety records (near miss, first aide, lost time accident) Adherence to measures and ADB/WB COVID-19 guidelines	Verification of health and safety plan Verification of health and safety record Visual inspection of site Daily	Minimal cost to SW
Potential social issues due to influx of workers	Measures include: i. Induction of the workers on community health and safety, grievance redress mechanism, and consultation and communications plan;	Part of contractors' bid cost	Contractor	SW's PMU	Implementation of workers induction, required protocols, and disease awareness and	Verification of records Visual inspection of site At start of work Monthly	Minimal cost to SW

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/Monitoring	Aspects/Parameters to be monitored	Means of Monitoring/Frequency	Monitoring Cost
	<ul style="list-style-type: none"> 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 STDs and HIV; and iv. Provision of fence and warning signs to control unauthorized entry and prevent entry of the public v. Women participation in addressing GBV issues will be set in an environment where women can openly converse with about these concerns. vi. Implementation of GBV awareness training program for contractors vii. Ensure that no child labor will be employed in the project; ensure that all workers are adults above the age of 18 years. 				<p>prevention program</p> <p>Records of workers</p>		
Potential damage to hidden archaeological and cultural assets	<p>Tender documents and construction contract will require the following:</p> <ul style="list-style-type: none"> i. Immediate stoppage upon discovery of 	Part of specs preparation cost	Design Consultant	PMU	Tender documents	<p>Verification of tender documents</p> <p>Once after preparation of tender documents</p>	Minimal cost (part of consultant's task)

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
	archaeological and cultural assets ii. Inform the local authorities and the Solomon Island National Museum about the presence						
Demolition and disposal of existing reservoir and associated facilities	The PMU will: i. require the contractor's demolition and disposal plan prior to work activity (including hazardous material assessment and management procedure in accordance with international industry practice); ii. inspect the existing reservoir site before and after demolition iii. inspect the disposal site after submission of disposal plan and prior to demolition iv. In case of waste includes asbestos containing materials, the Contractor will be responsible for the preparation and implementation of a method statement for the safe removal, storage and disposal from the site	Part of contractor cost	Contractor	PMU	Contractor's demolition and disposal plan	Inspection of existing reservoir site before and after demolition Inspection of disposal site after submission of disposal plan	Minimal cost to SW

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Improper closure of construction sites after subproject completion.	Site restoration and removal of all temporary facilities, excess materials, equipment, plant and excavated materials on site; all dumping shall be to approved locations. Replanting of disturbed sites in accordance with replanting plan.	Part of contractors' bid cost	Contractor	PMU	Disturbed sites, staging areas and workers camps.	Visual inspection of sites Review and "clear" site remediation through issue of certificate Once when all site work is complete	Minimal cost to SW
OPERATIONS							
Health and safety risks during operation and maintenance	Mitigating measures include: i. Identification of potential causes ii. Provision of written management procedures iii. Provision of written standard operating procedures (SOPs) iv. Controlling the access of unauthorized personnel in the reservoir by providing fence around the perimeter v. Regular training of workers on health and safety aspects of operating how to operate a water supply tank vi. Chlorine gas cylinders will be kept in separate safety rooms vii. Provision of safety control for chlorine gas cylinders like	Part of SW's operational cost	SW's Operations Dept.	SW's Operations Dept. Mgt	Written management procedures SOPs Facility fence	Verification of management procedures, SOPs and records Weekly verification Implementation of SOPs	Minimal cost (verification of documents only)

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/Monitoring	Aspects/Parameters to be monitored	Means of Monitoring/Frequency	Monitoring Cost
	automated shutoff system viii. Preparation of SOPs for chlorine handling ix. Provision appropriate PPE for chlorine use and handling						
Health hazard due to unplanned delivery of poor water quality	Implementation of WSP to: i. prevent contamination of the water sources, ii. treat the water to meet the water quality targets, and prevent re-contamination during storage, distribution and handling of drinking water Measures to avoid risks to operation during decommissioning of existing reservoir: <ul style="list-style-type: none"> ▪ Ensure that the structures to be decommissioned are physically disconnected from the operating structures; ▪ Ensure that there will be no stagnant water that will support the growth of biofilms; Measures to avoid risks to operation during pre-commissioning (new system will be connected to the old system):	Part of SW's operational cost	SW's Operations Department	SW's Operations Dept. Mgt.	WSP Physical, Chemical and Biological parameters	Verification of WSP implementation Water sampling and laboratory test Monthly for plan and for bacteria; Annual for physical & chemical	Part of SW's operational cost

Activity/Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/Monitoring	Aspects/Parameters to be monitored	Means of Monitoring/Frequency	Monitoring Cost
	<ul style="list-style-type: none"> ▪ Update WSP to incorporate the changes ▪ ensure that dead water is completely removed, and new fittings are flushed prior to commissioning. 						
Unplanned outages and emergencies	<p>Mitigating measures include:</p> <ul style="list-style-type: none"> i. Regular inspection and maintenance of pumping systems and emergency backup systems ii. Ensure that disinfection system is working iii. Regular training of water supply system staffs on how to handle unplanned outages and emergencies 	Part of SW's operational cost	SW's Operations Dept.	SW's Operations Dept. Mgt	<p>Records of inspection and maintenance of backup power and pumping systems,</p> <p>Records on flushing and disinfection during unplanned outages and emergencies</p> <p>Records on training of water supply system staffs</p>	<p>Weekly verification of records of inspection and maintenance</p> <p>Verification of records on flashing and disinfection after incidents</p>	Minimal cost (verification of documents only)

8.5 ENVIRONMENTAL MONITORING PLAN

432. The Environmental Monitoring Plan (EMoP) presents a set of critical environmental parameters that will allow SW to ensure environmental compliance and sustainability of the project operations.
433. 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).
434. The EMoP for Honiara water supply system subprojects are presented from **Table 8-4** to **Table 8-5**.
435. **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 ESMP 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.
436. **Construction monitoring.** Contractors are expected to implement the relevant aspects of each project's ESMP as per their approved CESMP during execution of the construction activities as stipulated in their contracts. The contractors' CESMP will detail the monitoring plan (based on the subproject ESMP and the attached monitoring plans) with details on staff, resources, implementation schedules, and monitoring procedures (parameters, frequency etc.).
437. Compliance with the approved CESMP will be the basis for inspections and audits by PMU and the ADB and WB. The bidding document will include provisions requiring the contractor to submit their CESMP which will include a section on monitoring which should be linked to allocation of budget and staff for implementation.
438. **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 CESMP, 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).
439. 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.

Table 8-4: Environmental Monitoring Plan for Trunk Mains Subproject

Concern	Parameter to be Monitored	Sampling & Measurement Plan			Responsible	Annual Estimated Cost
		Method	Frequency	Location		
Pre-construction and construction phase						
Solid and hazardous waste generation	<ul style="list-style-type: none"> Weight or volume of wastes generated 	Weighing/log-book recording	Daily	Construction areas	Contractor; PMU	Minimal cost to SW
Siltation of nearby surface water	<ul style="list-style-type: none"> Turbidity (to be calibrated against TSS for initial measurements) 	Grab sampling and use of turbidity tube	Monthly	Surface water upstream and downstream near project site	Contractor; PMU	\$50 per event per station
Air quality and noise	<ul style="list-style-type: none"> Dust and noise 	Noise meter and handheld PM ₁₀ dust meter	Monthly	Project Site	Contractor; PMU	Minimal cost to SW after purchasing of meter reader
Employment	<ul style="list-style-type: none"> Number of locally employed personnel 	Logbook/ database registration	Daily	Administration office of the project site	Contractor; PMU	Minimal cost to SW
Occupational health and safety	<ul style="list-style-type: none"> No. of work-related illnesses/injuries No. of safety man-hours 	Logbook/ database registration	Daily	Administration office of the project site	Contractor; PMU	Minimal cost to SW
Relation with local communities and authorities	<ul style="list-style-type: none"> Complaints from nearby community 	Logbook/ database registration	Daily	Administration office of the project site	Contractor; PMU	Minimal cost to SW
Operation Phase						
Solid waste generation	<ul style="list-style-type: none"> Weight or volume of wastes generated 	Weighing/log-book recording	Daily/Weekly	Project Site	SW's Operations Department	Minimal cost (verification of documents only)
Water Quality	<ul style="list-style-type: none"> Bacteria, Physical, Chemical Parameters 	Grab sampling and laboratory analysis	Monthly for bacteria; Annually for physical & chemical	Identified sampling locations	SW's Operations Department	Part of SW's operational cost
Occupational health and safety	<ul style="list-style-type: none"> No. of work-related illnesses/injuries 	Logbook/database registration	Daily	Administration Office of the Project	SW's Operations Department	Minimal cost (verification of documents only)

Table 8-5: Environmental Monitoring Plan for Service Reservoir Capacity Augmentation Subproject

Concern	Parameter To Be Monitored	Sampling & Measurement Plan			Responsible	Annual Estimated Cost
		Method	Frequency	Location		
Pre-construction and construction phase						
Solid and hazardous waste generation	<ul style="list-style-type: none"> Weight or volume of wastes generated 	Weighing/log-book recording	Daily	Construction areas	Contractor; PMU	Minimal cost to SW
Siltation of nearby surface water	<ul style="list-style-type: none"> Turbidity (to be calibrated against TSS for initial measurements) 	Grab sampling and use of turbidity tube	Monthly	Surface water upstream and downstream near project site	Contractor; PMU	\$50 per event per station
Air quality and noise	<ul style="list-style-type: none"> Dust and noise 	Noise meter and handheld PM ₁₀ dust meter	Monthly	Project Site	Contractor; PMU	Minimal cost to SW after purchasing of meter reader
Employment	<ul style="list-style-type: none"> Number of locally employed personnel 	Logbook/ database registration	Daily	Administration office of the project site	Contractor; PMU	Minimal cost to SW
Occupational health and safety	<ul style="list-style-type: none"> No. of work-related illnesses/injuries No. of safety man-hours 	Logbook/ database registration	Daily	Administration office of the project site	Contractor; PMU	Minimal cost to SW
Relation with local communities and authorities	<ul style="list-style-type: none"> Complaints from nearby community 	Logbook/ database registration	Daily	Administration office of the project site	Contractor; PMU	Minimal cost to SW
Demolition and disposal of existing reservoir	<ul style="list-style-type: none"> Demolition and disposal plan 	Site inspection	Before and After demolition activities	Project Site	Contractor; PMU	Minimal cost to SW
Operation Phase						
Solid waste generation	<ul style="list-style-type: none"> Weight or volume of wastes generated 	Weighing/log-book recording	Daily/Weekly	Project Site	SW's Operations Department	Minimal cost (verification of documents only)
Water Quality	<ul style="list-style-type: none"> Bacteria, Physical, Chemical Parameters, Chlorine Residual 	Grab sampling and laboratory analysis	Monthly for bacteria; Annually for physical & chemical	Identified sampling locations	SW's Operations Department	Part of SW's operational cost
Occupational health and safety	<ul style="list-style-type: none"> No. of work-related illnesses/injuries 	Logbook/database registration	Daily	Administration Office of the Project	SW's Operations Department	Minimal cost (verification of documents only)

9.0 PUBLIC CONSULTATION AND PARTICIPATION

9.1 CONSULTATION ACTIVITIES

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

9.1.1 During Feasibility Study Stage

441. In July 2018, SW conducted an initial public consultation to formally discuss the proposed subprojects with 24 stakeholders (six female and 18 male), including representatives of various civic organizations, community leaders and government officials. Stakeholders expressed support for the proposed subprojects and raised the following issues: (i) construction procedures affecting roads and the need to coordinate with other government agencies; and (ii) the need to address the procedural requirements for project implementation. Outcome of the consultation meetings is provided as **Appendix 6** of this document.

442. A second consultation was held during February 2019, which was attended by 48 stakeholders comprising of local and national government, CSOs, NGOs and landowners. Outcome of the consultation meetings is provided as **Appendix 7** of this document.

9.1.2 During Detailed Design Stage

443. For trunk mains subproject, SW held several consultations with the affected communities particularly the garden and structure owners. These consultations occurred on 22 and 24 July 2020 to discuss the project and conduct an inventory of losses resulting from the replacement of old pipes and improvement of pipe alignment. Other follow up consultations were held particularly prior to conduct of payment to the APs on 14 December 2020 and to secure an agreement from one FTE holder to provide an easement access. Consultation results indicated that the affected persons understood and expressed willingness to cooperate with the project activities due to the need for access to safe drinking water and payment of affected assets and easement to the owners. Outcome of the consultation meetings is provided as **Appendix 8** of this document.

444. For reservoir subproject, SW held individual consultations with the registered landowner, sub-tribe claimant, and land occupier. These consultations led to the agreement of the affected landowner and sub-tribe claimant to sell the land and the affected land occupier's agreement to move from the site. Outcome of the consultation meetings is provided as **Appendix 9** of this document.

445. Public consultations were undertaken on the 25 to 26 February 2021 as part of the process for the approval of the PER (national environment process) and to disclose and consult further on the RP. Comments from these consultations, notably in relation to the Titinge consultation have been taken into account in this IEE and mitigation measures included in the bidding document to enable the households in the immediate vicinity of Titinge to benefit from the project. Outcome of the consultation meetings is provided as **Appendix 10** of this document.

9.2 CONSULTATIONS DURING PROJECT IMPLEMENTATION

446. Due to the changes on project components, it is recommended for SW to update the stakeholders with the changes through consultation activities. In line with this, 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 particularly in resolving and mitigating project impact affecting any sector of the community. 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.

447. Community based information, education activities will be undertaken to increase community awareness and participation in water catchment protection. Community of elders, women and youth can be organized into a local management group that will lead in the community based -protection activities.

10.0 CONCLUSION

448. The subprojects covered in this assessment will offer benefits to Honiara by ensuring adequate supply of potable water and delivering high priority elements of SW's 30-Year Strategic Plan and 5-Year Action Plan.
449. The environmental and social screening process has highlighted the environmental and social issues and concerns of the proposed subprojects. Based on the screening for potential environmental and social impacts and risks of the proposed subprojects, there are no significant negative environmental and social impacts or risks that cannot be mitigated or managed. The ESMP prepared for each subproject will be updated and used as the basis for preparation of the CESMP to be prepared by the contractor. Monitoring and reporting of the approved CESMP will ensure that each subproject can be implemented in an environmentally acceptable manner. There is no need for further environmental assessment. This IEE will accompany the development consent application for each component.
450. Concerning identified social impacts, detailed Land Acquisition and Resettlement Plans have been developed for each sub-project and consultations have been undertaken with the communities, of which PER hearings and RP disclosure have been completed.
451. In addition, each subproject is hereby recommended with emphasis on the following:
- Tendering process will advocate environmentally responsible procurement by ensuring the inclusion of ESMP provisions in the bidding and construction contract documents.
 - Contractor's submission of a CESMP will be included in the construction contract.
 - Contract provisions on the creation and operation of the community advisory committees.
 - Training of SW's personnel on operation and maintenance before actual operation.
 - Monitoring of health and safety requirements will be given more importance during implementation to reduce risks to the public and to SW's personnel;
 - SW will continue the process of public consultation and information disclosure during detailed design and construction phases.
 - The existence of the Project's GRM will be publicized through public awareness campaigns, billboards, public notifications, etc. GRM procedures will be disclosed to the public in consultation meetings.

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12.0 APPENDICES

Appendix 1: Solomon Islands International Agreements

1. 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.
2. **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.
3. **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.
4. **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.
5. **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 (UNFCCC). Ratified 1994, and (iv) Kyoto Protocol. Ratified 2003. Reduce greenhouse gases especially CO₂ by an average of 5.2% by 2012.
6. **International agreements on culture and cultural heritage** include: (i) World Heritage Convention. Acceded 1992. Protection of sites of Outstanding Universal Values. (East Rennelle 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 2: Guidance on Managing Risk from COVID-19 on Construction Sites and in Worker's Camp

Introduction:

1. The COVID-19 outbreak represents significant health and safety risks that were not anticipated during the project appraisal stage and are not reflected in any projects safeguards documents, most importantly the Environmental and Social Management Plan which includes Health and Safety.
2. In accordance with the ADB Safeguard Policy Statement (2009), the Borrower is required to assess implications of unanticipated risks and impacts and to identify and implement necessary risk mitigation measures.
3. This guidance document sets out a series of recommended measures that can be implemented to manage the risk on construction sites from COVID-19. It also includes a specific set of measures for construction work camp management which relate to both the management of COVID-19 risk as well as general Health and Safety.
4. These are general guidelines recommended by the Asian Development Bank's Southeast Asia Department based on international good practice and should be used together with country-specific COVID-19 risk management regulations or directives. The guidance document may be used as part of EMP preparation and can be shared with works contractors should they request guidance on COVID-19 risk management.

Sources of Information:

5. Guidance is being updated regularly as knowledge of COVID-19 improves. This document is based on good international practice, using guidance from World Health Organization (WHO), International Labor Organization (ILO) and national guidance from the UK and Canada and a review of other national government public information on COVID-19.

Quarantine or Isolation for COVID-19:

6. Guidance is being updated regularly as knowledge of COVID-19 improves. This document is based on good international practice, using guidance from World Health Organization (WHO), International Labor Organization (ILO) and national guidance from the UK and Canada and a review of other national government public information on COVID-19.
7. Contractors must ensure the safe quarantine or isolation of workers and that this does not impact on their employment status.

Construction site working conditions Mitigation measures for COVID-19	
1. Form a joint team to plan and organize return to work	<ul style="list-style-type: none"> ▪ Develop or convene a joint occupational safety and health committee with members representing the employer and workers. ▪ Train team members on the basic principles for the formulation and implementation of occupational safety and health preventive and control measures. ▪ Develop and communicate a work plan on safe working for COVID-19. Such plan should be fully aligned with any government regulations and guidelines on COVID-19 prevention and control, or in the absence thereof, with international good practice guidelines as may be updated from time to time.
2. Risk assessment to decide when to work, who works and how	<ul style="list-style-type: none"> ▪ Undertake a risk assessment to determine the preventive and control measures. ▪ Ensure preventative measures are in place before resuming or beginning construction work.
3. Adopt engineering, organizational and administrative measures	<ul style="list-style-type: none"> ▪ Avoid physical interaction and maintain physical distancing requirements as prescribed by national policy, or in the absence thereof, international good practice. ▪ Ventilate enclosed workplaces including work camps and communal spaces. ▪ Avoid concentration of workers - limit the capacity of common areas such as work camp dining rooms and changing rooms to allow the minimum separation of 2 meters and organize one-way systems. This includes sleeping areas which must be a minimum of 2 meters between beds. ▪ Put in place training and information on COVID-19 and measures required for its management. ▪ The construction site is to be segregated to the extent possible in zones or other methods to keep different crews physically separated at all time. ▪ Stagger break and lunch schedules to minimize the number of people in close proximity to one another
4. Regularly clean and disinfect	<ul style="list-style-type: none"> ▪ Increase the frequency of cleaning and disinfection, in particular heavily trafficked areas and common areas, including work camps. ▪ All door handles, railings, ladders, switches, controls, eating surfaces, shared tools and equipment, taps, toilets, and personal areas are wiped down at least twice a day with a disinfectant. ▪ Discourage the sharing of items such as cups, glasses, plates, tools.
5. Promote personal hygiene	<ul style="list-style-type: none"> ▪ Provide workers with the conditions and means necessary for frequent hand washing (soap, water or alcohol gel) with a posted hand washing protocol at site entries, exits, bathrooms, communal areas, offices, and any other areas with commonly touched surfaces. ▪ Inform workers of the need to avoid physical contact when greeting, and avoid touching eyes, nose and mouth. ▪ Inform workers of the need to cover the mouth and nose with a disposable handkerchief when coughing or sneezing or the crook of their arm. ▪ Dispose of tissues in a lined and covered waste bin and wash hands afterwards
6. Provide personal protective equipment (PPE) and inform	<ul style="list-style-type: none"> ▪ Identify appropriate PPE related to the tasks and health and safety risks faced by workers according to the results of risk assessment and the level of risk, and provide it to workers free

workers of its correct use	<p>of charge and in sufficient number, along with instructions, procedures, training and supervision.</p> <ul style="list-style-type: none"> ▪ Non-medical face-coverings (such as homemade cloth masks) should be worn as mitigation for catching and transmitting the virus, but are not to be treated as substitutes for proper handwashing.
7. Health surveillance and insurance	<ul style="list-style-type: none"> ▪ Before entering the site, staff and visitors must confirm that they are not currently exhibiting flu-like symptoms. ▪ Monitor the health status of workers, develop protocols for cases of suspected and confirmed COVID-19. The protocol will state that: <ul style="list-style-type: none"> ○ workers with symptoms or confirmed cases must be isolated within the construction camp or stay at home for 7 days after symptoms started. ○ If symptoms persist after 7 days, the person must isolate until the symptoms stop. ○ People who have been in close contact with the person with confirmed COVID-19 be quarantined for 14 days. ▪ All workers in quarantine or isolation must be provided with adequate food, water, medical assistance and sanitation. ▪ Identify workers who have had close contact with people infected with COVID-19 and follow national medical guidance. ▪ Communicate confirmed cases of COVID-19 infection to the appropriate authorities. ▪ All workers should be provided with health insurance that includes COVID-19 treatment
8. Consider other hazards, including psychosocial	<ul style="list-style-type: none"> ▪ Promote a safe and healthy working environment free from violence and harassment. ▪ Encourage health promotion and wellbeing in the workplace through enough rest, balance of physical and mental activity and adequate work life balance. ▪ Implement prevention and control measures for the use and storage of chemicals, particularly those used for disinfection during COVID-19.
9. Review emergency preparedness plans	<ul style="list-style-type: none"> ▪ Develop an emergency plan adapted to COVID-19 and regularly review it
10. Review and update preventive and control measures as the situation evolves	<ul style="list-style-type: none"> ▪ Periodically monitor prevention and control measures to determine whether they have been adequate to avoid or minimize risk and identify and implement corrective actions for continuous improvement. ▪ Establish and maintain records related to work-related injuries, illnesses and incidents, worker exposures, monitoring of the work environment and workers' health.

Source: Adapted from ILO, WHO, Canada Construction Association, and UK Government

Worker Camp Siting and Management Mitigation Measures for Health and Safety and COVID-19	
1. Siting	<ul style="list-style-type: none"> ▪ Not in area liable to flooding, landslide or other natural disaster ▪ Not in area affected by construction dust, noise, sewage or other pollution ▪ Not in a residential area
2. Minimum housing standards	<ul style="list-style-type: none"> ▪ a separate bed for each worker ▪ beds should not be arranged in tiers of more than two; ▪ separate accommodation of the sexes or to accommodate couples ▪ adequate natural light during the daytime and adequate artificial light ▪ adequate ventilation to ensure sufficient movement of air ▪ adequate supply of safe potable water ▪ adequate sanitary facilities (see below); ▪ adequate drainage ▪ adequate furniture for each worker to secure his or her belongings, such as a locker. ▪ common dining rooms, canteens or mess rooms, located away from the sleeping areas ▪ appropriately situated and furnished laundry facilities ▪ reasonable access to plug sockets for charging telephones and other devices ▪ rest and recreation rooms and health facilities, where not available in the community.
3. Minimum accommodation sizes	<p>Sleeping space</p> <ul style="list-style-type: none"> ▪ Inside dimensions over 198 centimeters by 80 centimeters; <p>Sleeping room:</p> <ul style="list-style-type: none"> ▪ Headroom of over 203 centimeters allowing full free movement ▪ Beds minimum 2m apart for COVID-19 risk management
4. Sanitation Facilities	<ul style="list-style-type: none"> ▪ One toilet, one tap / basin, one toilet for every 6 people ▪ Convenient location to accommodation ▪ Provision of soap ▪ Separate facilities for men and women ▪ Ventilation to open air ▪ Fresh cold running water ▪ Clean and hygienic ▪ Septic tank / sewage treatment facility, or pit latrines located at least 200m from surface waters, and in areas of suitable soil profiles and above the groundwater levels
5. Health and Safety within worker accommodation	<ul style="list-style-type: none"> ▪ Separate area for sick workers to prevent transmission of disease ▪ Smoke detector in sleeping area ▪ Fire safety throughout accommodation such as fire extinguishers, fire alarms, fire blankets ▪ Worker training in fire prevention and procedures ▪ Fire exit sign, adequate means of escape and clearly maintained exit5 ▪ Security lighting within camp and for sanitation block and lighting for route from sleeping area to sanitation block. ▪ Electrical cables to be in safe condition, elevated and not in areas liable to flood
6. Inspection	<ul style="list-style-type: none"> ▪ 2 weekly inspection to inspect for cleanliness, state of repair of building, accommodation and fire equipment. ▪ Record inspection results and retain for review

Source: Adapted from ILO Workers' Housing Factsheet No. 6

Appendix 3: Safeguards Considerations for Project Implementation during Covid-19

I. INFORMATION DISSEMINATION AND PUBLIC CONSULTATIONS

1. Identify and review planned activities under the project requiring stakeholder engagement and public consultations.
2. Assess the level of proposed direct engagement with stakeholders, including location and size of proposed gatherings, frequency of engagement, categories of stakeholders (international, national, local) etc.
3. Assess the level of risks of the virus transmission for these engagements, and how restrictions that are in effect in the country / project area would affect these engagements.
4. Identify project activities for which consultation/engagement is critical and cannot be postponed without having significant impact on project timelines. For example, selection of resettlement options by affected people during project implementation. Reflecting the specific activity, consider viable means of achieving the necessary input from stakeholders (see further below).
5. Assess the level of ICT penetration among key stakeholder groups, to identify the type of communication channels that can be effectively used in the project context.
6. Based on the above, the Project Proponent needs to identify the specific channels of communication that should be used while conducting stakeholder consultation and engagement activities. The following are some considerations while selecting channels of communication, in light of the current COVID-19 situation:
 - Avoid public gatherings (taking into account national restrictions), including public hearings, workshops and community meetings;
 - If smaller meetings are permitted, conduct consultations in small-group sessions, such as focus group meetings. If not permitted, make all reasonable efforts to conduct meetings through online channels, including webex, zoom and skype;
 - Diversify means of communication and rely more on social media and online channels. Where possible and appropriate, create dedicated online platforms and chatgroups appropriate for the purpose, based on the type and category of stakeholders;
 - Employ traditional channels of communications (TV, newspaper, radio, dedicated phone-lines, and mail) when stakeholders do not have access to online channels or do not use them frequently. Traditional channels can also be highly effective in conveying relevant information to stakeholders, and allow them to provide their feedback and suggestions;
 - Where direct engagement with project affected people or beneficiaries is necessary, such as would be the case for Resettlement Action Plans or Indigenous Peoples Plans preparation and implementation, identify channels for direct communication with each affected household via a context specific combination of email messages, mail, online platforms, dedicated phone lines with knowledgeable operators;
 - Each of the proposed channels of engagement should clearly specify how feedback and suggestions can be provided by stakeholders;
 - An appropriate approach to conducting stakeholder engagement can be developed in most contexts and situations. However, in situations where none of the above means of communication are considered adequate for required consultations with stakeholders, consider if the project activity can be rescheduled to a later time, when meaningful stakeholder engagement is possible.

II. CIVIL WORKS

A. Responsibilities of the Project Proponent

1. The Project Proponent should request details in writing from the main Contractor of the measures being taken to address the risks. The construction contract should include health and safety requirements, and these can be used as the basis for identification of, and requirements to implement, COVID-19 specific measures. The measures may be presented as a contingency plan, as an extension of the existing project emergency and preparedness plan or as standalone procedures. The measures may be reflected in revisions to the project's health and safety manual.
2. The Project Proponent should require the Contractor to convene regular meetings with the project health and safety specialists and medical staff (and where appropriate the local health authorities), and to take their advice in designing and implementing the agreed measures.
3. Where possible, a senior person should be identified as a focal point to deal with COVID-19

issues. This can be a work supervisor or a health and safety specialist. This person can be responsible for coordinating preparation of the site and making sure that the measures taken are communicated to the workers, those entering the site and the local community. It is also advisable to designate at least one back-up person, in case the focal point becomes ill; that person should be aware of the arrangements that are in place.

4. On sites where there are a number of contractors and therefore (in effect) different work forces, the request should emphasize the importance of coordination and communication between the different parties. Where necessary, the Project Proponent should request the main contractor to put in place a protocol for regular meetings of the different contractors, requiring each to appoint a designated staff member (with back up) to attend such meetings. If meetings cannot be held in person, they should be conducted using whatever IT is available. The effectiveness of mitigation measures will depend on the weakest implementation, and therefore it is important that all contractors and sub-contractors understand the risks and the procedure to be followed.
5. The Project Proponent may provide support to projects in identifying appropriate mitigation measures, particularly where these will involve interface with local services, in particular health and emergency services. In many cases, the Project Proponent can play a valuable role in connecting project representatives with local Government agencies, and helping coordinate a strategic response, which takes into account the availability of resources. To be most effective, projects should consult and coordinate with relevant Government agencies and other projects in the vicinity.
6. Workers should be encouraged to use the existing project grievance mechanism to report concerns relating to COVID-19, preparations being made by the project to address COVID-19 related issues, how procedures are being implemented, and concerns about the health of their co-workers and other staff.

B. Responsibilities of the Contractor

1. The Contractor should prepare a detailed profile of the project work force, key work activities, schedule for carrying out such activities, different durations of contract and rotations (e.g. 4 weeks on, 4 weeks off). This should include a breakdown of workers who reside at home (i.e. workers from the community), workers who lodge within the local community and workers in on-site accommodation. Where possible, it should also identify workers that may be more at risk from COVID-19, those with underlying health issues or who may be otherwise at risk.
2. Consideration should be given to ways in which to minimize movement in and out of site. This could include lengthening the term of existing contracts, to avoid workers returning home to affected areas, or returning to site from affected areas.
3. Workers accommodated on site should be required to minimize contact with people near the site, and in certain cases be prohibited from leaving the site for the duration of their contract, so that contact with local communities is avoided.
4. Consideration should be given to requiring workers lodging in the local community to move to site accommodation (subject to availability) where they would be subject to the same restrictions.
5. Workers from local communities, who return home daily, weekly or monthly, will be more difficult to manage. They should be subject to health checks at entry to the site and at some point, circumstances may make it necessary to require them to either use accommodation on site or not to come to work.
6. Entry/exit to the work site should be controlled and documented for both workers and other parties, including support staff and suppliers. Possible measures may include:
 - Establishing a system for controlling entry/exit to the site, securing the boundaries of the site, and establishing designating entry/exit points (if they do not already exist). Entry/exit to the site should be documented.
 - Training security staff on the (enhanced) system that has been put in place for securing the site and controlling entry and exit, the behaviors required of them in enforcing such system and any COVID -19 specific considerations.
 - Training staff who will be monitoring entry to the site, providing them with the resources they need to document entry of workers, conducting temperature checks and recording details of any worker that is denied entry.
 - Confirming that workers are fit for work before they enter the site or start work. While procedures should already be in place for this, special attention should be paid to workers with underlying health issues or who may be otherwise at risk. Consideration should be

- given to demobilization of staff with underlying health issues.
 - Checking and recording temperatures of workers and other people entering the site or requiring self-reporting prior to or on entering the site.
 - Providing daily briefings to workers prior to commencing work, focusing on COVID-19 specific considerations including cough etiquette, hand hygiene and distancing measures, using demonstrations and participatory methods.
 - During the daily briefings, reminding workers to self-monitor for possible symptoms (fever, cough) and to report to their supervisor or the COVID-19 focal point if they have symptoms or are feeling unwell.
 - Preventing a worker from an affected area or who has been in contact with an infected person from returning to the site for 14 days or (if that is not possible) isolating such worker for 14 days.
 - Preventing a sick worker from entering the site, referring them to local health facilities if necessary or requiring them to isolate at home for 14 days.
7. Requirements on general hygiene should be communicated and monitored, to include:
- Training workers and staff on site on the signs and symptoms of COVID-19, how it is spread, how to protect themselves (including regular handwashing and social distancing) and what to do if they or other people have symptoms.
 - Placing posters and signs around the site, with images and text in local languages.
 - Ensuring handwashing facilities supplied with soap, disposable paper towels and closed waste bins exist at key places throughout site, including at entrances/exits to work areas; where there is a toilet, canteen or food distribution, or provision of drinking water; in worker accommodation; at waste stations; at stores; and in common spaces. Where handwashing facilities do not exist or are not adequate, arrangements should be made to set them up. Alcohol based sanitizer (if available, 60-95% alcohol) can also be used.
 - Setting aside part of worker accommodation for precautionary self-quarantine as well as more formal isolation of staff who may be infected.
 - Conducting regular and thorough cleaning of all site facilities, including offices, accommodation, canteens, common spaces. Review cleaning protocols for key construction equipment (particularly if it is being operated by different workers).
 - Providing cleaning staff with adequate cleaning equipment, materials and disinfectant.
 - Reviewing general cleaning systems, training cleaning staff on appropriate cleaning procedures and appropriate frequency in high use or high-risk areas.
 - Where it is anticipated that cleaners will be required to clean areas that have been or are suspected to have been contaminated with COVID-19, providing them with appropriate PPE: gowns or aprons, gloves, eye protection (masks, goggles or face screens) and boots or closed work shoes. If appropriate PPE is not available, cleaners should be provided with best available alternatives.
 - Training cleaners in proper hygiene (including handwashing) prior to, during and after conducting cleaning activities; how to safely use PPE (where required); in waste control (including for used PPE and cleaning materials).
 - Any medical waste produced during the care of ill workers should be collected safely in designated containers or bags and treated and disposed of following relevant requirements (e.g., national, WHO). If open burning and incineration of medical wastes is necessary, this should be for as limited a duration as possible. Waste should be reduced and segregated, so that only the smallest amount of waste is incinerated.
8. Consider changes to work processes and timings to reduce or minimize contact between workers, recognizing that this is likely to impact the project schedule. Such measures could include:
- Decreasing the size of work teams.
 - Limiting the number of workers on site at any one time.
 - Changing to a 24-hour work rotation.
 - Adapting or redesigning work processes for specific work activities and tasks to enable social distancing, and training workers on these processes.
 - Continuing with the usual safety trainings, adding COVID-19 specific considerations. Training should include proper use of normal PPE. While as of the date of this note, general advice is that construction workers do not require COVID-19 specific PPE, this should be kept under review.
 - Reviewing work methods to reduce use of construction PPE, in case supplies become scarce or the PPE is needed for medical workers or cleaners. This could include, e.g. trying

- to reduce the need for dust masks by checking that water sprinkling systems are in good working order and are maintained or reducing the speed limit for haul trucks.
 - Arranging (where possible) for work breaks to be taken in outdoor areas within the site.
 - Consider changing canteen layouts and phasing meal times to allow for social distancing and phasing access to and/or temporarily restricting access to leisure facilities.
 - At some point, it may be necessary to review the overall project schedule, to assess the extent to which it needs to be adjusted (or work stopped completely) to reflect prudent work practices, potential exposure of both workers and the community and availability of supplies, taking into account Government advice and instructions.
9. Consider whether existing project medical services are adequate, taking into account existing infrastructure (size of clinic/medical post, number of beds, isolation facilities), medical staff, equipment and supplies, procedures and training. Where these are not adequate, consider upgrading services where possible, including:
- Expanding medical infrastructure and preparing areas where patients can be isolated. (Guidance on setting up isolation facilities is set out in WHO interim guidance on considerations for quarantine of individuals in the context of containment for COVID-19). Isolation facilities should be located away from worker accommodation and ongoing work activities. Where possible, workers should be provided with a single well-ventilated room (open windows and door). Where this is not possible, isolation facilities should allow at least 1 meter between workers in the same room, separating workers with curtains, if possible. Sick workers should limit their movements, avoiding common areas and facilities and not be allowed visitors until they have been clear of symptoms for 14 days. If they need to use common areas and facilities (e.g. kitchens or canteens), they should only do so when unaffected workers are not present and the area/facilities should be cleaned prior to and after such use.
 - Training medical staff, which should include current WHO advice on COVID-19 and recommendations on the specifics of COVID-19. Where COVID-19 infection is suspected, medical providers on site should follow WHO interim guidance on infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected.
 - Training medical staff in testing, if testing is available.
 - Assessing the current stock of equipment, supplies and medicines on site, and obtaining additional stock, where required and possible. This could include medical PPE, such as gowns, aprons, medical masks, gloves, and eye protection. Refer to WHO guidance as to what is advised.
 - If PPE items are unavailable due to world-wide shortages, medical staff on the project should agree on alternatives and try to procure them. Alternatives that may commonly be found on construction sites include dust masks, construction gloves and eye goggles. While these items are not recommended, they should be used as a last resort if no medical PPE is available.
 - Ventilators will not normally be available on work sites, and in any event, intubation should only be conducted by experienced medical staff. If a worker is extremely ill and unable to breathe properly on his or her own, they should be referred immediately to the local hospital.
 - Review existing methods for dealing with medical waste, including systems for storage and disposal.
10. Given the limited scope of project medical services, the project may need to refer sick workers to local medical services. Preparation for this includes:
- Obtaining information as to the resources and capacity of local medical services (e.g. number of beds, availability of trained staff and essential supplies).
 - Conducting preliminary discussions with specific medical facilities, to agree what should be done in the event of ill workers needing to be referred.
 - Considering ways in which the project may be able to support local medical services in preparing for members of the community becoming ill, recognizing that the elderly or those with pre-existing medical conditions require additional support to access appropriate treatment if they become ill.
 - Clarifying the way in which an ill worker will be transported to the medical facility, and checking availability of such transportation.
 - Establishing an agreed protocol for communications with local emergency/medical services.
 - Agreeing with the local medical services/specific medical facilities the scope of services to

- be provided, the procedure for in-take of patients and (where relevant) any costs or payments that may be involved.
- A procedure should also be prepared so that project management knows what to do in the unfortunate event that a worker ill with COVID-19 dies. While normal project procedures will continue to apply, COVID-19 may raise other issues because of the infectious nature of the disease. The project should liaise with the relevant local authorities to coordinate what should be done, including any reporting or other requirements under national law.
11. WHO provides detailed advice on what should be done to treat a person who becomes sick or displays symptoms that could be associated with the COVID-19 virus (for further information see WHO interim guidance on infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected). The project should set out risk-based procedures to be followed, with differentiated approaches based on case severity (mild, moderate, severe, critical) and risk factors (such as age, hypertension, diabetes) (for further information see WHO interim guidance on operational considerations for case management of COVID-19 in health facility and community). These may include the following:
- If a worker has symptoms of COVID-19 (e.g. fever, dry cough, fatigue) the worker should be removed immediately from work activities and isolated on site.
 - If testing is available on site, the worker should be tested on site. If a test is not available at site, the worker should be transported to the local health facilities to be tested (if testing is available).
 - If the test is positive for COVID-19 or no testing is available, the worker should continue to be isolated. This will either be at the work site or at home. If at home, the worker should be transported to their home in transportation provided by the project.
 - Extensive cleaning procedures with high-alcohol content disinfectant should be undertaken in the area where the worker was present, prior to any further work being undertaken in that area. Tools used by the worker should be cleaned using disinfectant and PPE disposed of.
 - Co-workers (i.e. workers with whom the sick worker was in close contact) should be required to stop work, and be required to quarantine themselves for 14 days, even if they have no symptoms.
 - Family and other close contacts of the worker should be required to quarantine themselves for 14 days, even if they have no symptoms.
 - If a case of COVID-19 is confirmed in a worker on the site, visitors should be restricted from entering the site and worker groups should be isolated from each other as much as possible.
 - If workers live at home and has a family member who has a confirmed or suspected case of COVID-19, the worker should quarantine themselves and not be allowed on the project site for 14 days, even if they have no symptoms.
 - Workers should continue to be paid throughout periods of illness, isolation or quarantine, or if they are required to stop work, in accordance with national law.
 - Medical care (whether on site or in a local hospital or clinic) required by a worker should be paid for by the employer.
12. Ensure continuity of supplies and project activities with the following measures:
- Identify back-up individuals, in case key people within the project management team (PIU, Supervising Engineer, Contractor, sub-contractors) become ill, and communicate who these are so that people are aware of the arrangements that have been put in place.
 - Document procedures, so that people know what they are, and are not reliant on one person's knowledge.
 - Understand the supply chain for necessary supplies of energy, water, food, medical supplies and cleaning equipment, consider how it could be impacted, and what alternatives are available. Early pro-active review of international, regional and national supply chains, especially for those supplies that are critical for the project, is important (e.g. fuel, food, medical, cleaning and other essential supplies). Planning for a 1-2 month interruption of critical goods may be appropriate for projects in more remote areas.
 - Place orders for/procure critical supplies. If not available, consider alternatives (where feasible).
 - Consider existing security arrangements, and whether these will be adequate in the event of interruption to normal project operations.
 - Consider at what point it may become necessary for the project to significantly reduce activities or to stop work completely, and what should be done to prepare for this, and to

- re-start work when it becomes possible or feasible.
13. Ensure proper training and communication with workers through the following:
 - Workers need to be provided with regular opportunities to understand their situation, and how they can best protect themselves, their families and the community. They should be made aware of the procedures that have been put in place by the project, and their own responsibilities in implementing them.
 - It is important to be aware that in communities close to the site and amongst workers without access to project management, social media is likely to be a major source of information. This raises the importance of regular information and engagement with workers (e.g. through training, town halls, tool boxes) that emphasizes what management is doing to deal with the risks of COVID-19. Allaying fear is an important aspect of work force peace of mind and business continuity. Workers should be given an opportunity to ask questions, express their concerns, and make suggestions.
 - Training of workers should be conducted regularly, providing workers with a clear understanding of how they are expected to behave and carry out their work duties.
 - Training should address issues of discrimination or prejudice if a worker becomes ill and provide an understanding of the trajectory of the virus, where workers return to work.
 - Training should cover all issues that would normally be required on the work site, including use of safety procedures, use of construction PPE, occupational health and safety issues, and code of conduct, taking into account that work practices may have been adjusted.
 - Communications should be clear, based on fact and designed to be easily understood by workers, for example by displaying posters on handwashing and social distancing, and what to do if a worker displays symptoms.
 14. Relations with the community should be carefully managed, with a focus on measures that are being implemented to safeguard both workers and the community. The community may be concerned about the presence of non-local workers, or the risks posed to the community by local workers presence on the project site. The project should set out risk-based procedures to be followed, which may reflect WHO guidance (for further information see WHO Risk Communication and Community Engagement (RCCE) Action Plan Guidance COVID-19 Preparedness and Response). The following good practice should be considered:
 - Communications should be clear, regular, based on fact and designed to be easily understood by community members.
 - Communications should utilize available means. In most cases, face-to-face meetings with the community or community representatives will not be possible. Other forms of communication should be used, posters, pamphlets, radio, text message, electronic meetings. The means used should take into account the ability of different members of the community to access them, to make sure that communication reaches these groups.
 - The community should be made aware of procedures put in place at site to address issues related to COVID-19. This should include all measures being implemented to limit or prohibit contact between workers and the community. These need to be communicated clearly, as some measures will have financial implications for the community (e.g. if workers are paying for lodging or using local facilities). The community should be made aware of the procedure for entry/exit to the site, the training being given to workers and the procedure that will be followed by the project if a worker becomes sick.
 - If project representatives, contractors or workers are interacting with the community, they should practice social distancing and follow other COVID-19 guidance issued by relevant authorities, both national and international (e.g. WHO).

Appendix 4: World Bank's ESF/Safeguards Interim Note: COVID-19 Considerations in Construction/Civil Works Projects

This note was issued on April 7, 2020 and includes links to the latest guidance as of this date (e.g. from WHO). Given the COVID-19 situation is rapidly evolving, when using this note it is important to check whether any updates to these external resources have been issued.

1. Introduction

The COVID-19 pandemic presents Governments with unprecedented challenges. Addressing COVID-19 related issues in both existing and new operations starts with recognizing that this is not business as usual and that circumstances require a highly adaptive responsive management design to avoid, minimize and manage what may be a rapidly evolving situation. In many cases, we will ask Borrowers to use reasonable efforts in the circumstances, recognizing that what may be possible today may be different next week (both positively, because more supplies and guidance may be available, and negatively, because the spread of the virus may have accelerated).

This interim note is intended to provide guidance to teams on how to support Borrowers in addressing key issues associated with COVID-19, and consolidates the advice that has already been provided over the past month. As such, it should be used in place of other guidance that has been provided to date. This note will be developed as the global situation and the Bank's learning (and that of others) develops. This is not a time when 'one size fits all'. More than ever, teams will need to work with Borrowers and projects to understand the activities being carried out and the risks that these activities may entail. Support will be needed in designing mitigation measures that are implementable in the context of the project. These measures will need to take into account capacity of the Government agencies, availability of supplies and the practical challenges of operations on-the-ground, including stakeholder engagement, supervision and monitoring. In many circumstances, communication itself may be challenging, where face-to-face meetings are restricted or prohibited, and where IT solutions are limited or unreliable.

This note emphasizes the importance of careful scenario planning, clear procedures and protocols, management systems, effective communication and coordination, and the need for high levels of responsiveness in a changing environment. It recommends assessing the current situation of the project, putting in place mitigation measures to avoid or minimize the chance of infection, and planning what to do if either project workers become infected or the work force includes workers from proximate communities affected by COVID-19. In many projects, measures to avoid or minimize will need to be implemented at the same time as dealing with sick workers and relations with the community, some of whom may also be ill or concerned about infection. Borrowers should understand the obligations that contractors have under their existing contracts (see Section 3), require contractors to put in place appropriate organizational structures (see Section 4) and develop procedures to address different aspects of COVID-19 (see Section 5).

2. Challenges with Construction/Civil Works

Projects involving construction/civil works frequently involve a large work force, together with suppliers and supporting functions and services. The work force may comprise workers from international, national, regional, and local labor markets. They may need to live in on-site accommodation, lodge within communities close to work sites or return to their homes after work. There may be different contractors

permanently present on site, carrying out different activities, each with their own dedicated workers. Supply chains may involve international, regional and national suppliers facilitating the regular flow of goods and services to the project (including supplies essential to the project such as fuel, food, and water). As such there will also be regular flow of parties entering and exiting the site; support services, such as catering, cleaning services, equipment, material and supply deliveries, and specialist sub-contractors, brought in to deliver specific elements of the works.

Given the complexity and the concentrated number of workers, the potential for the spread of infectious disease in projects involving construction is extremely serious, as are the implications of such a spread. Projects may experience large numbers of the work force becoming ill, which will strain the project's

health facilities, have implications for local emergency and health services and may jeopardize the progress of the construction work and the schedule of the project. Such impacts will be exacerbated where a work force is large and/or the project is in remote or under-serviced areas. In such circumstances, relationships with the community can be strained or difficult and conflict can arise, particularly if people feel they are being exposed to disease by the project or are having to compete for scarce resources. The project must also exercise appropriate precautions against introducing the infection to local communities.

3. Does the Construction Contract Cover this Situation?

Given the unprecedented nature of the COVID-19 pandemic, it is unlikely that the existing construction/civil works contracts will cover all the things that a prudent contractor will need to do. Nevertheless, the first place for a Borrower to start is with the contract, determining what a contractor's existing obligations are, and how these relate to the current situation.

The obligations on health and safety will depend on what kind of contract exists (between the Borrower and the main contractor; between the main contractors and the sub-contractors). It will differ if the Borrower used the World Bank's standard procurement documents (SPDs) or used national bidding documents. If a FIDIC document has been used, there will be general provisions relating to health and safety. For example, the standard FIDIC, Conditions of Contract for Construction (Second Edition 2017), which contains no 'ESF enhancements', states (in the General Conditions, clause 6.7) that the Contractor will be required:

- to take all necessary precautions to maintain the health and safety of the Contractor's Personnel
- to appoint a health and safety officer at site, who will have the authority to issue directives for the purpose of maintaining the health and safety of all personnel authorized to enter and or work on the site and to take protective measures to prevent accidents
- to ensure, in collaboration with local health authorities, that medical staff, first aid facilities, sick bay, ambulance services and any other medical services specified are available at all times at the site and at any accommodation
- to ensure suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics

These requirements have been enhanced through the introduction of the ESF into the SPDs (edition dated July 2019). The general FIDIC clause referred to above has been strengthened to reflect the requirements of the ESF. Beyond FIDIC's general requirements discussed above, the Bank's Particular Conditions include a number of relevant requirements on the Contractor, including:

- to provide health and safety training for Contractor's Personnel (which include project workers and all personnel that the Contractor uses on site, including staff and other employees of the Contractor and Subcontractors and any other personnel assisting the Contractor in carrying out project activities)
- to put in place workplace processes for Contractor's Personnel to report work situations that are not safe or healthy
- gives Contractor's Personnel the right to report work situations which they believe are not safe or healthy, and to remove themselves from a work situation which they have a reasonable justification to believe presents an imminent and serious danger to their life or health (with no reprisal for reporting or removing themselves)
- requires measures to be in place to avoid or minimize the spread of diseases including measures to avoid or minimize the transmission of communicable diseases that may be associated with the influx of temporary or permanent contract-related labor
- to provide an easily accessible grievance mechanism to raise workplace concerns

Where the contract form used is FIDIC, the Borrower (as the Employer) will be represented by the Engineer (also referred to in this note as the Supervising Engineer). The Engineer will be authorized to exercise authority specified in or necessarily implied from the construction contract. In such cases, the Engineer (through its staff on site) will be the interface between the PIU and the Contractor. It is important therefore to understand the scope of the Engineer's responsibilities. It is also important to recognize that in the case of infectious diseases such as COVID-19, project management – through the

Contractor/subcontractor hierarchy – is only as effective as the weakest link. A thorough review of management procedures/plans as they will be implemented through the entire contractor hierarchy is important. Existing contracts provide the outline of this structure; they form the basis for the Borrower to understand how proposed mitigation measures will be designed and how adaptive management will be implemented, and to start a conversation with the Contractor on measures to address COVID-19 in the project.

4. What Planning Should the Borrower Be Doing?

Task teams should work with Borrowers (PIUs) to confirm that projects (i) are taking adequate precautions to prevent or minimize an outbreak of COVID-19, and (ii) have identified what to do in the event of an outbreak. Suggestions on how to do this are set out below:

- The PIU, either directly or through the Supervising Engineer, should request details in writing from the main Contractor of the measures being taken to address the risks. As stated in Section 3, the construction contract should include health and safety requirements, and these can be used as the basis for identification of, and requirements to implement, COVID-19 specific measures. The measures may be presented as a contingency plan, as an extension of the existing project emergency and preparedness plan or as standalone procedures. The measures may be reflected in revisions to the project's health and safety manual. This request should be made in writing (following any relevant procedure set out in the contract between the Borrower and the contractor).
- In making the request, it may be helpful for the PIU to specify the areas that should be covered. This should include the items set out in Section 5 below and take into account current and relevant
- guidance provided by national authorities, WHO and other organizations. See the list of references in the Annex to this note.
- The PIU should require the Contractor to convene regular meetings with the project health and safety specialists and medical staff (and where appropriate the local health authorities), and to take their advice in designing and implementing the agreed measures.
- Where possible, a senior person should be identified as a focal point to deal with COVID-19 issues. This can be a work supervisor or a health and safety specialist. This person can be responsible for coordinating preparation of the site and making sure that the measures taken are communicated to the workers, those entering the site and the local community. It is also advisable to designate at least one back-up person, in case the focal point becomes ill; that person should be aware of the arrangements that are in place.
- On sites where there are a number of contractors and therefore (in effect) different work forces, the request should emphasize the importance of coordination and communication between the different parties. Where necessary, the PIU should request the main contractor to put in place a protocol for regular meetings of the different contractors, requiring each to appoint a designated staff member (with back up) to attend such meetings. If meetings cannot be held in person, they should be conducted using whatever IT is available. The effectiveness of mitigation measures will depend on the weakest implementation, and therefore it is important that all contractors and sub-contractors understand the risks and the procedure to be followed.
- The PIU, either directly or through the Supervising Engineer, may provide support to projects in identifying appropriate mitigation measures, particularly where these will involve interface with local services, in particular health and emergency services. In many cases, the PIU can play a valuable role in connecting project representatives with local Government agencies, and helping coordinate a strategic response, which takes into account the availability of resources. To be most effective, projects should consult and coordinate with relevant Government agencies and other projects in the vicinity.
- Workers should be encouraged to use the existing project grievance mechanism to report concerns relating to COVID-19, preparations being made by the project to address COVID-19 related issues, how procedures are being implemented, and concerns about the health of their co-workers and other staff.

5. What Should the Contractor Cover?

The Contractor should identify measures to address the COVID-19 situation. What will be possible will

depend on the context of the project: the location, existing project resources, availability of supplies, capacity of local emergency/health services, the extent to which the virus already exist in the area. A systematic approach to planning, recognizing the challenges associated with rapidly changing circumstances, will help the project put in place the best measures possible to address the situation. As discussed above, measures to address COVID-19 may be presented in different ways (as a contingency plan, as an extension of the existing project emergency and preparedness plan or as standalone procedures). PIUs and contractors should refer to guidance issued by relevant authorities, both national and international (e.g., WHO), which is regularly updated (see sample References and links provided in the Annex).

Addressing COVID-19 at a project site goes beyond occupational health and safety and is a broader project issue which will require the involvement of different members of a project management team. In many cases, the most effective approach will be to establish procedures to address the issues, and then to ensure that these procedures are implemented systematically. Where appropriate given the project context, a designated team should be established to address COVID-19 issues, including PIU representatives, the Supervising Engineer, management (e.g., the project manager) of the contractor and sub-contractors, security, and medical and OHS professionals. Procedures should be clear and straightforward, improved as necessary, and supervised and monitored by the COVID-19 focal point(s). Procedures should be documented, distributed to all contractors, and discussed at regular meetings to facilitate adaptive management. The issues set out below include a number that represent expected good workplace management but are especially pertinent in preparing the project response to COVID-19.

(a) ASSESSING WORKFORCE CHARACTERISTICS

Many construction sites will have a mix of workers e.g. workers from the local communities; workers from a different part of the country; workers from another country. Workers will be employed under different terms and conditions and be accommodated in different ways. Assessing these different aspects of the workforce will help in identifying appropriate mitigation measures:

- The Contractor should prepare a detailed profile of the project work force, key work activities, schedule for carrying out such activities, different durations of contract and rotations (e.g. 4 weeks on, 4 weeks off).
- This should include a breakdown of workers who reside at home (i.e. workers from the community), workers who lodge within the local community and workers in on-site accommodation. Where possible, it should also identify workers that may be more at risk from COVID-19, those with underlying health issues or who may be otherwise at risk.
- Consideration should be given to ways in which to minimize movement in and out of site. This could include lengthening the term of existing contracts, to avoid workers returning home to affected areas, or returning to site from affected areas.
- Workers accommodated on site should be required to minimize contact with people near the site, and in certain cases be prohibited from leaving the site for the duration of their contract, so that contact with local communities is avoided.
- Consideration should be given to requiring workers lodging in the local community to move to site accommodation (subject to availability) where they would be subject to the same restrictions.
- Workers from local communities, who return home daily, weekly or monthly, will be more difficult to manage. They should be subject to health checks at entry to the site (as set out above) and at some point, circumstances may make it necessary to require them to either use accommodation on site or not to come to work.

(b) ENTRY/EXIT TO THE WORK SITE AND CHECKS ON COMMENCEMENT OF WORK

Entry/exit to the work site should be controlled and documented for both workers and other parties, including support staff and suppliers. Possible measures may include:

- Establishing a system for controlling entry/exit to the site, securing the boundaries of the site, and establishing designating entry/exit points (if they do not already exist). Entry/exit to the site should be documented.

- Training security staff on the (enhanced) system that has been put in place for securing the site and controlling entry and exit, the behaviors required of them in enforcing such system and any COVID - 19 specific considerations.
- Training staff who will be monitoring entry to the site, providing them with the resources they need to document entry of workers, conducting temperature checks and recording details of any worker that is denied entry.
- Confirming that workers are fit for work before they enter the site or start work. While procedures should already be in place for this, special attention should be paid to workers with underlying health issues or who may be otherwise at risk. Consideration should be given to demobilization of staff with underlying health issues.
- Checking and recording temperatures of workers and other people entering the site or requiring self- reporting prior to or on entering the site.
- Providing daily briefings to workers prior to commencing work, focusing on COVID-19 specific considerations including cough etiquette, hand hygiene and distancing measures, using demonstrations and participatory methods.
- During the daily briefings, reminding workers to self-monitor for possible symptoms (fever, cough) and to report to their supervisor or the COVID-19 focal point if they have symptoms or are feeling unwell.
- Preventing a worker from an affected area or who has been in contact with an infected person from returning to the site for 14 days or (if that is not possible) isolating such worker for 14 days.
- Preventing a sick worker from entering the site, referring them to local health facilities if necessary or requiring them to isolate at home for 14 days.

(c) GENERAL HYGIENE

Requirements on general hygiene should be communicated and monitored, to include:

- Training workers and staff on site on the signs and symptoms of COVID-19, how it is spread, how to protect themselves (including regular handwashing and social distancing) and what to do if they or other people have symptoms (for further information see [WHO COVID-19 advice for the public](#))
- Placing posters and signs around the site, with images and text in local languages.
- Ensuring handwashing facilities supplied with soap, disposable paper towels and closed waste bins exist at key places throughout site, including at entrances/exits to work areas; where there is a toilet, canteen or food distribution, or provision of drinking water; in worker accommodation; at waste stations; at stores; and in common spaces. Where handwashing facilities do not exist or are not adequate, arrangements should be made to set them up. Alcohol based sanitizer (if available, 60-95% alcohol) can also be used.
- Review worker accommodations, and assess them in light of the requirements set out in [IFC/EBRD guidance on Workers' Accommodation: processes and standards](#), which provides valuable guidance as to good practice for accommodation.
- Setting aside part of worker accommodation for precautionary self-quarantine as well as more formal isolation of staff who may be infected (see paragraph (f)).

(d) CLEANING AND WASTE DISPOSAL

Conduct regular and thorough cleaning of all site facilities, including offices, accommodation, canteens, common spaces. Review cleaning protocols for key construction equipment (particularly if it is being operated by different workers). This should include:

- Providing cleaning staff with adequate cleaning equipment, materials and disinfectant.
- Review general cleaning systems, training cleaning staff on appropriate cleaning procedures and appropriate frequency in high use or high-risk areas.
- Where it is anticipated that cleaners will be required to clean areas that have been or are suspected to have been contaminated with COVID-19, providing them with appropriate PPE: gowns or aprons, gloves, eye protection (masks, goggles or face screens) and boots or closed work shoes. If appropriate PPE is not available, cleaners should be provided with best available alternatives.
- Training cleaners in proper hygiene (including handwashing) prior to, during and after

conducting cleaning activities; how to safely use PPE (where required); in waste control (including for used PPE and cleaning materials).

- Any medical waste produced during the care of ill workers should be collected safely in designated containers or bags and treated and disposed of following relevant requirements (e.g., national, WHO). If open burning and incineration of medical wastes is necessary, this should be for as limited a duration as possible. Waste should be reduced and segregated, so that only the smallest amount of waste is incinerated (for further information [see WHO interim guidance on water, sanitation and waste management for COVID-19](#)).

(e) ADJUSTING WORK PRACTICES

Consider changes to work processes and timings to reduce or minimize contact between workers, recognizing that this is likely to impact the project schedule. Such measures could include:

- Decreasing the size of work teams.
- Limiting the number of workers on site at any one time.
- Changing to a 24-hour work rotation.
- Adapting or redesigning work processes for specific work activities and tasks to enable social distancing, and training workers on these processes.
- Continuing with the usual safety trainings, adding COVID-19 specific considerations. Training should include proper use of normal PPE. While as of the date of this note, general advice is that construction workers do not require COVID-19 specific PPE, this should be kept under review (for further information see [WHO interim guidance on rational use of personal protective equipment \(PPE\) for COVID-19](#)).
- Reviewing work methods to reduce use of construction PPE, in case supplies become scarce or the PPE is needed for medical workers or cleaners. This could include, e.g. trying to reduce the need for dust masks by checking that water sprinkling systems are in good working order and are maintained or reducing the speed limit for haul trucks.
- Arranging (where possible) for work breaks to be taken in outdoor areas within the site.
- Consider changing canteen layouts and phasing mealtimes to allow for social distancing and phasing access to and/or temporarily restricting access to leisure facilities that may exist on site, including gyms.
- At some point, it may be necessary to review the overall project schedule, to assess the extent to which it needs to be adjusted (or work stopped completely) to reflect prudent work practices, potential exposure of both workers and the community and availability of supplies, taking into account Government advice and instructions.

(f) PROJECT MEDICAL SERVICES

Consider whether existing project medical services are adequate, taking into account existing infrastructure (size of clinic/medical post, number of beds, isolation facilities), medical staff, equipment and supplies, procedures and training. Where these are not adequate, consider upgrading services where possible, including:

- Expanding medical infrastructure and preparing areas where patients can be isolated. Guidance on setting up isolation facilities is set out in [WHO interim guidance on considerations for quarantine of individuals in the context of containment for COVID-19](#) Isolation facilities should be located away from worker accommodation and ongoing work activities. Where possible, workers should be provided with a single well-ventilated room (open windows and door). Where this is not possible, isolation facilities should allow at least 1 meter between workers in the same room, separating workers with curtains, if possible. Sick workers should limit their movements, avoiding common areas and facilities and not be allowed visitors until they have been clear of symptoms for 14 days. If they need to use common areas and facilities (e.g., kitchens or canteens), they should only do so when unaffected workers are not present and the area/facilities should be cleaned prior to and after such use.
- Training medical staff, which should include current WHO advice on COVID-19 and recommendations on the specifics of COVID-19. Where COVID-19 infection is suspected, medical providers on site should follow [WHO interim guidance on infection prevention and control during health care when novel coronavirus \(nCoV\) infection is suspected](#).

- Training medical staff in testing, if testing is available.
- Assessing the current stock of equipment, supplies and medicines on site, and obtaining additional stock, where required and possible. This could include medical PPE, such as gowns, aprons, medical masks, gloves, and eye protection. Refer to WHO guidance as to what is advised (for further information see [WHO interim guidance on rational use of personal protective equipment \(PPE\) for COVID-19](#)).
- If PPE items are unavailable due to world-wide shortages, medical staff on the project should agree on alternatives and try to procure them. Alternatives that may commonly be found on construction sites include dust masks, construction gloves and eye goggles. While these items are not recommended, they should be used as a last resort if no medical PPE is available.
- Ventilators will not normally be available on work sites, and in any event, intubation should only be conducted by experienced medical staff. If a worker is extremely ill and unable to breathe properly on his or her own, they should be referred immediately to the local hospital (see (g) below).
- Review existing methods for dealing with medical waste, including systems for storage and disposal (for further information see [WHO interim guidance on water, sanitation and waste management for COVID-19](#), and [WHO guidance on safe management of wastes from health-care activities](#)).

(g) LOCAL MEDICAL AND OTHER SERVICES

Given the limited scope of project medical services, the project may need to refer sick workers to local medical services. Preparation for this includes:

- Obtaining information as to the resources and capacity of local medical services (e.g. number of beds, availability of trained staff and essential supplies).
- Conducting preliminary discussions with specific medical facilities, to agree what should be done in the event of ill workers needing to be referred.
- Considering ways in which the project may be able to support local medical services in preparing for members of the community becoming ill, recognizing that the elderly or those with pre-existing medical conditions require additional support to access appropriate treatment if they become ill.
- Clarifying the way in which an ill worker will be transported to the medical facility, and checking availability of such transportation.
- Establishing an agreed protocol for communications with local emergency/medical services.
- Agreeing with the local medical services/specific medical facilities the scope of services to be provided, the procedure for in-take of patients and (where relevant) any costs or payments that may be involved.
- A procedure should also be prepared so that project management knows what to do in the unfortunate event that a worker ill with COVID-19 dies. While normal project procedures will continue to apply, COVID-19 may raise other issues because of the infectious nature of the disease. The project should liaise with the relevant local authorities to coordinate what should be done, including any reporting or other requirements under national law.

(h) INSTANCES OR SPREAD OF THE VIRUS

WHO provides detailed advice on what should be done to treat a person who becomes sick or displays symptoms that could be associated with the COVID-19 virus (for further information see [WHO interim guidance on infection prevention and control during health care when novel coronavirus \(nCoV\) infection is suspected](#)). The project should set out risk-based procedures to be followed, with differentiated approaches based on case severity (mild, moderate, severe, critical) and risk factors (such as age, hypertension, diabetes) (for further information see [WHO interim guidance on operational considerations for case management of COVID-19 in health facility and community](#)). These may include the following:

- If a worker has symptoms of COVID-19 (e.g., fever, dry cough, fatigue) the worker should be removed immediately from work activities and isolated on site.
- If testing is available on site, the worker should be tested on site. If a test is not available at site, the worker should be transported to the local health facilities to be tested (if testing is available).
- If the test is positive for COVID-19 or no testing is available, the worker should continue to be

isolated. This will either be at the work site or at home. If at home, the worker should be transported to their home in transportation provided by the project.

- Extensive cleaning procedures with high-alcohol content disinfectant should be undertaken in the area where the worker was present, prior to any further work being undertaken in that area. Tools used by the worker should be cleaned using disinfectant and PPE disposed of.
- Co-workers (i.e., workers with whom the sick worker was in close contact) should be required to stop work, and be required to quarantine themselves for 14 days, even if they have no symptoms.
- Family and other close contacts of the worker should be required to quarantine themselves for 14 days, even if they have no symptoms.
- If a case of COVID-19 is confirmed in a worker on the site, visitors should be restricted from entering the site and worker groups should be isolated from each other as much as possible.
- If workers live at home and has a family member who has a confirmed or suspected case of COVID-19, the worker should quarantine themselves and not be allowed on the project site for 14 days, even if they have no symptoms.
- Workers should continue to be paid throughout periods of illness, isolation or quarantine, or if they are required to stop work, in accordance with national law.
- Medical care (whether on site or in a local hospital or clinic) required by a worker should be paid for by the employer.

(i) CONTINUITY OF SUPPLIES AND PROJECT ACTIVITIES

Where COVID-19 occurs, either in the project site or the community, access to the project site may be restricted, and movement of supplies may be affected.

- Identify back-up individuals, in case key people within the project management team (PIU, Supervising Engineer, Contractor, sub-contractors) become ill, and communicate who these are so that people are aware of the arrangements that have been put in place.
- Document procedures, so that people know what they are, and are not reliant on one person's knowledge.
- Understand the supply chain for necessary supplies of energy, water, food, medical supplies and cleaning equipment, consider how it could be impacted, and what alternatives are available. Early pro-active review of international, regional and national supply chains, especially for those supplies that are critical for the project, is important (e.g., fuel, food, medical, cleaning and other essential supplies). Planning for a 1–2-month interruption of critical goods may be appropriate for projects in more remote areas.
- Place orders for/procure critical supplies. If not available, consider alternatives (where feasible).
- Consider existing security arrangements, and whether these will be adequate in the event of interruption to normal project operations.
- Consider at what point it may become necessary for the project to significantly reduce activities or to stop work completely, and what should be done to prepare for this, and to re-start work when it becomes possible or feasible.

(j) TRAINING AND COMMUNICATION WITH WORKERS

Workers need to be provided with regular opportunities to understand their situation, and how they can best protect themselves, their families and the community. They should be made aware of the procedures that have been put in place by the project, and their own responsibilities in implementing them.

- It is important to be aware that in communities close to the site and amongst workers without access to project management, social media is likely to be a major source of information. This raises the importance of regular information and engagement with workers (e.g. through training, town halls, tool boxes) that emphasizes what management is doing to deal with the risks of COVID-19. Allaying fear is an important aspect of work force peace of mind and business continuity. Workers should be given an opportunity to ask questions, express their concerns, and make suggestions.
- Training of workers should be conducted regularly, as discussed in the sections above, providing workers with a clear understanding of how they are expected to behave and carry out

their work duties.

- Training should address issues of discrimination or prejudice if a worker becomes ill and provide an understanding of the trajectory of the virus, where workers return to work.
- Training should cover all issues that would normally be required on the work site, including use of safety procedures, use of construction PPE, occupational health and safety issues, and code of conduct, taking into account that work practices may have been adjusted.
- Communications should be clear, based on fact and designed to be easily understood by workers, for example by displaying posters on handwashing and social distancing, and what to do if a worker displays symptoms.

(k) COMMUNICATION AND CONTACT WITH THE COMMUNITY

Relations with the community should be carefully managed, with a focus on measures that are being implemented to safeguard both workers and the community. The community may be concerned about the presence of non-local workers, or the risks posed to the community by local workers presence on the project site. The project should set out risk-based procedures to be followed , which may reflect WHO guidance (for further information see [WHO Risk Communication and Community Engagement \(RCCE\) Action Plan Guidance COVID-19 Preparedness and Response](#)). The following good practice should be considered:

- Communications should be clear, regular, based on fact and designed to be easily understood by community members.
- Communications should utilize available means. In most cases, face-to-face meetings with the community or community representatives will not be possible. Other forms of communication should be used, posters, pamphlets, radio, text message, electronic meetings. The means used should take into account the ability of different members of the community to access them, to make sure that communication reaches these groups.
- The community should be made aware of procedures put in place at site to address issues related to COVID-19. This should include all measures being implemented to limit or prohibit contact between workers and the community. These need to be communicated clearly, as some measures will have financial implications for the community (e.g., if workers are paying for lodging or using local facilities). The community should be made aware of the procedure for entry/exit to the site, the training being given to workers and the procedure that will be followed by the project if a worker becomes sick.
- If project representatives, contractors or workers are interacting with the community, they should practice social distancing and follow other COVID-19 guidance issued by relevant authorities, both national and international (e.g., WHO).

6. Emergency Powers and Legislation

Many Borrowers are enacting emergency legislation. The scope of such legislation, and the way it interacts with other legal requirements, will vary from country to country. Such legislation can cover a range of issues, for example:

- Declaring a public health emergency
- Authorizing the use of police or military in certain activities (e.g., enforcing curfews or restrictions on movement)
- Ordering certain categories of employees to work longer hours, not to take holiday or not to leave their job (e.g., health workers)
- Ordering non-essential workers to stay at home, for reduced pay or compulsory holiday

Except in exceptional circumstances (after referral to the World Bank's Operations Environmental and Social Review Committee (OESRC)), projects will need to follow emergency legislation to the extent that these are mandatory or advisable. It is important that the Borrower understands how mandatory requirements of the legislation will impact the project. Teams should require Borrowers (and in turn, Borrowers should request Contractors) to consider how the emergency legislation will impact the obligations of the Borrower set out in the legal agreement and the obligations set out in the construction contracts. Where the legislation requires a material departure from existing contractual obligations, this should be documented, setting out the relevant provisions.

Annex

WHO Guidance

Advice for the public

WHO advice for the public, including on social distancing, respiratory hygiene, self-quarantine, and seeking medical advice, can be consulted on this WHO website: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>

Technical guidance

[Infection prevention and control during health care when novel coronavirus \(nCoV\) infection is suspected](#), issued on 19 March 2020

[Coronavirus disease \(COVID-19\) outbreak: rights, roles and responsibilities of health workers, including key considerations for occupational safety and health](#), issued on 18 March 2020

[Risk Communication and Community Engagement \(RCCE\) Action Plan Guidance COVID-19 Preparedness and Response](#), issued on 16 March 2020

[Considerations for quarantine of individuals in the context of containment for coronavirus disease \(COVID-19\)](#), issued on 19 March 2020

[Operational considerations for case management of COVID-19 in health facility and community](#), issued on 19 March 2020

[Rational use of personal protective equipment for coronavirus disease 2019 \(COVID-19\)](#), issued on 27 February 2020

[Getting your workplace ready for COVID-19](#), issued on 19 March 2020

[Water, sanitation, hygiene and waste management for COVID-19](#), issued on 19 March 2020

[Safe management of wastes from health-care activities](#) issued in 2014

[Advice on the use of masks in the community, during home care and in healthcare settings in the context of the novel coronavirus \(COVID-19\) outbreak](#), issued on March 19, 2020

ILO Guidance

[ILO Standards and COVID-19 FAQ](#), issued on March 23, 2020 (provides a compilation of answers to most frequently asked questions related to international labor standards and COVID-19)

MFI Guidance

[IDB Invest Guidance for Infrastructure Projects on COVID-19: A Rapid Risk Profile and Decision Framework](#)

[KfW DEG COVID-19 Guidance for employers, issued on 31 March 2020](#)

[CDC Group COVID-19 Guidance for Employers, issued on 23 March 2020](#)

Appendix 5: Grievance Log Information



SOLOMON WATER: GRIEVANCE REDRESS REGISTERING AND MONITORING FORM

ANNEX 1 – 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 6: Initial Public Consultation and Information Disclosure held at Star Events, Tongs Building, Point Cruz, Honiara City, 13 July 2018

Minutes of the Meeting

Opening/ Presentations:

The public consultation started at 9:30 A.M with Ian Gooden, SW's General Manager, welcoming the participants and encouraged them to participate actively in the meeting. He gave a brief presentation regarding the proposed project. This was followed with a presentation by Mark Waite, SW's PMU, on SW's strategic plan and information regarding the Solomon Islands Urban Water Supply and Sanitation Development Sector Project. The PPA consultants presented the details of each proposed subproject. The participants were informed that this is only an initial public consultation and SW will conduct more consultations in the future.

Comments, Views, Issues and Concerns

Comment and Question No. 1. Dennis Meone, Chief Executive Officer, Solomon Islands Chamber of Commerce and Industry (CEO, SICCI)

Dennis had three points to make:

That the Information in the presentations be dispersed and made available to the wider public. For example, SICCI has 200 members, therefore it (SICC) is an avenue through which information can be channeled and made available to its members.

Information such as the next phase of the project should be made known and available, specifying who might be directly affected by any new infrastructure Solomon Water plans to install in Honiara. e.g. digging of drains or laying of pipes. Some members of the Chamber and the Business Community might or will be directly affected so these are the types of Information Dennis thinks should be made available to SICCI members so they can plan accordingly to accommodate these future changes.

His second point was a concern about the road works. The road is currently being constructed and improved. Should new infrastructure be laid, will it mean laying pipes across the newly built road?

The answer to that concern was that any new infrastructure laid will be alongside the road, not across it and if it requires crossing the road, that it will be underneath the road, not directly across the road.

Dennis would like Solomon Water to share any of its initiatives in any of the phases with SICCI so these can be shared to the Business community and the Private sector.

Comment and Question No. 2. Charles Kelly, City Clerk, Honiara City Council (HCC)

Charles is optimistic and hopeful that the study currently being undertaken will not end up being shelved as some other past studies have been done. From the presentations, he can discern that ADB, EU and World Bank are interested and if that interest continues, it will have a positive impact on the City and the Council.

Charles thinks there is a lot of work to do regarding the logistics. At this stage however, he has not laid eyes on any plans regarding logistics yet.

However, there is much to do in the city right now. The City is growing very fast and rapidly and the more people there are, the more problems and challenges they will bring. For example, more people mean more people needing more water to drink and more water to use.

Charles is of the opinion that the HCC needs to be more involved in the logistics and the plans of construction and looks forward to seeing the Council being more involved right up until the completion of the Solomon Water project.

Something worth considering is how these plans will affect the greater Honiara. The city is moving eastwards as more people shift and build towards the east. The greater Honiara has been mapped

and marked.

One of the issues as more people move and shift eastwards will be the issue of provision of Water for all these people.

However, within the city itself, people are not accessing water. Some of the people are still collecting water from boreholes, even though they have already been living in these areas for the last ten to twenty (10 to 20) years. *(So how do you plan to address the issue of water in the greater Honiara especially as the city grows and shifts towards the east, if the issue of access to water within the city itself is still not being addressed?)*

Part of the study shows this can be improved on.

Charles would like to see more flexibility in the current Solomon Water (Solomon Islands Water Authority) SW)) policy especially with regards to allowing more people to have access to water. The current Policy states one must be the owner of a piece of land or one must have title to the land before water is made accessible. Because of these stringent policies, many people are not able to access water. For example, people who live in informal settlements such as Gilbert Camp and the Border line area and communities have been living in these settlements for the last 10 to 20 years and they are still collecting water from streams. They have been continually approaching HCC to support their requests and pleas for more access to piped water. Although these may be minor points, Charles hopes Solomon Water will take these minor points into account so that a document that is more practical and workable will be produced.

The City Clerk also looks forward to the Wastewater treatment plant. In the presentations, it was identified where the Outfalls are, and the City Clerk now realizes that the whole city does not know but that the whole sea-front in front of Honiara is 100% polluted. Yet People are still using the sea water to wash their fish.

The solution to these challenges would be through improved technology and although it is going to be an expensive exercise, the City clerk hopes ADB, EU and the World Bank will be able to resolve the challenge of pollution through the construction of a Waste- Water Treatment Plant.

Answer Mark Waite Project Manager- Project Management Unit- Solomon Water

Mark thanked Charles Kelly for his comments and mentioned that there is a plan to construct a Wastewater treatment plant, but it will be later in the project, not in the first five years of the strategic plan.

Ian Gooden- General Manager Solomon Water

Ian agreed with Charles on the fact that people have been using creeks and streams for many years. However, he has also noticed in his many walks through parts of the city that people have been siphoning off water through little pipes and gadgets connected to the main pipes.

From Ian's observations, one of the biggest problems and challenges Solomon Water faces is that people generally are reluctant to pay for water and rather expect water to be delivered freely. Should people want free water, they will have to collect it themselves from the streams using their buckets but if they want Solomon Water to pump the water, treat it and deliver it to their houses, they will have to pay for the added service.

He has noticed though that most people are able to afford to pay for water, because when they make calls to complain about their water disconnections, they are using a cell phone to make the call. So, it seems as if they are prioritising buying cell phones overpaying water for their families because they can purchase a cell phone but are not prepared to pay for water which they would rather steal. This is quite a big and challenging issue which Solomon water is confronted with.

The Solomon Water Communications team headed by Michelle will be communicating the message to people and letting them know that, "People who steal water are actually stealing money from you and I because we are subsidising and paying for that water for them! It is therefore, the paying

customer/client who ends up paying more as a result of people stealing water from illegal water connections.”

In addition to what Mark had rightly said with regards to the wastewater, Ian added that future Outfalls will be extended further out into the ocean where there are more ocean currents which will take the effluent away and give better flushing and dilution. Screens will also be put on the outfalls to screen out plastics and larger solids so that the actual biological loading into the ocean is reduced.

While the construction of the wastewater treatment plant is still many, many years away, the upgrades planned for the pump stations will have a major effect on the quality of the effluent. Because the Outfalls will be extended further out, it means the effluent will not be coming back on to the foreshore and we should be expecting these significant improvements within a year or two.

The City council has planned the city into zones with conditions on building sites for people to adhere to. The SW General Manager sought the support of the City Clerk in enforcing legislation and managing the water catchment areas in the city.

For example, Solomon Water has a catchment area in Panatina and another one in the Rove area. SW has not been actively managing and enforcing legislation in these areas but if they are to start activating legislation, they will be evicting people from these areas. There will be no point in building a house with a septic tank quite close to a bore hole because there will be direct contamination of the water source/table. It will be in enforcing the legislation around the management of the boreholes and water sources that SW is seeking the support of the City Clerk and the Honiara City Council.

With regards to Informal settlements, Solomon Water is seeking solutions as to how it could be more inclusive and accommodating of these areas. Donors such as the European Union and the ADB are showing interest in Solomon Water’s approach.

One of the major challenges Solomon Water has encountered with informal settlements is people refusing to pay their water accounts and bills. For example, two years ago, Solomon Water officers were chased out of Burns Creek and threatened with weapons because they had gone into the area to disconnect water meters from lack of payment of bills. A lot of Solomon Water infrastructure was also smashed and damaged. For safety purposes, Solomon Water has had to withdraw their services from the area but are still optimistic and if settlers in the Burns Creek area have a changed attitude and are willing to pay for Solomon Water’s services, Solomon Water is open to further discussions and negotiations.

A probable solution to the above challenge in informal settlements would be to install Cash water. Like Cash Power and the use of cell phones, people disconnect themselves when they choose not to pay for top ups. It would therefore be a case of, No top up for cash water, no water!!

Solomon Water has found though, that people use less water and are a lot more conscious of the cost of water when they have to pay for Cash Water. Everyone including the ‘wantoks’ and relatives in the house can all chip-in, each contributing \$50.00 to buy more water if the water stops. This will work better than paying for water through a water metre in which users will keep using the water and just taking it for granted until they have accumulated an account of say \$5000.00 which they will not be able to pay. In the long run, installing Cash water would be a win-win situation for everyone.

The SW General Manager again appealed to the City Clerk and the Lord Mayor to communicate, collaborate and work together with SW in dealing with and managing people in the informal settlements. If there were less people in the informal settlements or if SW had more control over how the informal settlements are developing and growing, or even if the settlers could be moved to formal settlements, SW would be able to work better to supply water.

Concern and Question No. 3 by Andrew Mua, Mayor of Honiara City Council

The Mayor of Honiara City Council had three points and concerns to raise.

The Mayor is concerned that the Sea in front of Honiara is totally contaminated and he feels that Solomon Water is ignoring the pollution of the sea in front of the city. Although it is polluted, people continue to use the sea water to wash fish that is being sold in the main Honiara market including fish sold at the Fishing village market. HCC usually carries out sampling of the sea water every two

days and it has been proven repeatedly that the sea water is 100% contaminated.

Due to this concern, the Mayor is asserting that rather than waiting for five years before constructing the Sewerage Treatment Plant or delaying the construction of one until the second Phase of the project, he would like to see that Solomon Water sees it as Priority to install a simple sewage treatment plant with extended outfalls further out to sea that will help to alleviate the current polluted waterfronts. He asserts that Solomon Water is ignoring the pollution caused along the sea front for example the Kukum sea front that is polluted by effluent from the GG's valley right down to Naha out into the Kukum sea front. So, what he is asking for is not to wait for the second phase before constructing the Sewerage treatment plant but to prioritise it during the first phase and to deal with what is a prevalent health challenge and risk right now.

Secondly, the Mayor is concerned about the cutting of the road again if new infrastructure is constructed under the Solomon Water project. Two years ago there were some consultations on the construction of the road and if Solomon Water had come on board then, there would have been some understanding by everyone as to where the new infrastructure under the Solomon Water could be installed. The mayor asserts that all the damage to the roads in Honiara are done by three (3) companies, SW (Solomon Water), Telekom and SIEA (Solomon Power) and this all the way to Didao refilling station.

If everyone puts their heads together and these future developments are mapped out by all stakeholders and partners, there would be less damage done. Currently HCC does not have the machines to repair roads that are being dug up to make way for new infrastructure such as laying down of new pipes.

The Mayor's third concern is that Solomon Water activate and enact the Solomon Islands Water Authority (SW) Act. The General Manager of Solomon Water raised the issue of where SW is going to put in bore holes but to the Mayor's knowledge, he has not seen Solomon Water enforcing the SW Act which is a very powerful Act especially to evict people who build close to the bore holes. All the Mayor has seen is the disconnection of water metres in times of no payment of water. He uses the example of the Botanical Gardens where the Honiara City Council has moved in and demolished houses built in that area because they are too close to the water source. However, it was easy for HCC to do that because HCC had jurisdiction, title and ownership over the area, so they were able to move in and enforce the demolition of houses and move people elsewhere. In like manner, the Mayor would like SW to take authority and enforce the SW Act especially in the Panatina Area that SW has title and ownership.

The Mayor's fourth concern was that he thinks the cost of the Consultancy and the Project package for the Project Management Unit is almost as much as much as the future project itself. So, in his opinion, these would have been funds better utilized for the project itself.

Answer from Ian Gooden, General Manager (GM), Solomon Water (SW)

Solomon Water is doing the best it can with the resources it has. The GM showed his appreciation over the specific directives outlined by the Lord Mayor and conceded that there is contamination of the sea water with some of the outfalls. (The GM showed on a map, the areas SW is responsible for in the city, about a 1/4 of the total city) whereas the rest of the city is either on septic tanks, long drops, open defecation and use of the bush.

The GM pointed out firstly, that streams and rivers in the city have become brown and black due to contamination from pig pens built over rivers and streams and secondly, from all the houses that have very poor septic tanks and exacerbated by the geology of the city which does not attenuate effluent well.

He acknowledges that in some areas, Solomon Water is putting in more sewage, but there is a very large area, about 80% of the city made up of the domestic parts of the city which is contaminating the river and the water courses as well.

Solomon Water is trying, over time, to improve the collection of sewage in the areas its work is based in, for example, in the Rove area. Rove is still not up to standards yet, but SW is trying to pump the

Sewage from Rove to the foreshore right next to the cinema and it will eventually find its way to Point Cruz. Eventually, the Outfalls will be extended further out into the sea which will enable better flow and dilution.

At the moment, Solomon Water is financially constrained, and it is trying to negotiate an increase in its fees with the government, but this will take a couple of months. An increase in the fees would enable SW to make more improvements because at the moment, SW is absolutely reliant on donors and its own small contributions. The other areas which are priority to Solomon Water are the Tuvaruhu and the Vara Creek areas in which there is direct discharge of sewage into the Mataniko River.

Comment and Question No.4 by Henry from Climate Change, Ministry of Environment

Henry's concern was about the Sewage. Henry understands, 15% of the population living in Honiara already have access to running water.

As for sewage, it is the first time Henry has heard of the Sewage Treatment Plant that Solomon Water operates and that there is a central point of collection for sewage. As far as Henry knows, all the houses he has ever lived- in in Honiara, (and he has moved four houses since he has lived in Honiara), only use local septic tanks built purposely for those houses and not connected to any main sewage lines.

His question was whether there will be plans or future regulations for every single house in Honiara to be connected to the main sewage treatment plant? Does Solomon Water, in the future, plan to increase the number of people connected to the main sewage treatment plant?

Answer from Ian Gooden, General Manager (GM), Solomon Water (SW)

Thirty percent (30%) of the city's population will be connected to the Sewage Treatment Plant. Now, Solomon Water's area of responsibility is relatively small in terms of the entire city and will increase to about 30% of the total city while the rest will be the responsibility of the Honiara City Council. While it may be small area, Solomon Water is still seeking the support of the City Council. Over time, responsibilities might change but currently, that is where SW responsibilities are.

Part of the project includes some septage facility which Mark has mentioned, but most of the city will use septic tanks which is the responsibility of the City Council to monitor and manage. Septic tanks will need regular cleaning which people need to pay for. If a septic tank is not cleaned out, the overflow will seep out and be discharged into the ground, and into the streams. In Honiara, the septic system is further exacerbated by its topography and geology, made up of coral rock which is not permeable and does not provide good biological treatment and attenuation.

Ian explained that with a septic system, a septic tank is constructed and fitted with pipes about two feet long and extended into the ground. It is covered with gravel all around and is shallow, enabling aeration and oxygen flow which allows biofilm and bugs to grow. When effluent comes into the septic tank at a very low rate, the bugs will eat the sewage.

The septic tanks built in Honiara are usually constructed with an end chamber at the bottom with no disposal fuel which will allow for vaporization and transpiration. When the effluent is discharged into the septic tank, it goes directly into the ground and because the coral rock does not attenuate it, the wastewater finds its way into the water course. This is the reason why Solomon Water is very concerned about human development taking place near its boreholes.

Comment and Question No.5 by Mike from Ministry of Industry and Development (MID)

Mike had three (3) comments to make:

Mike wanted more knowledge about Solomon Water's 30-year Strategic plan because he now understands that most of the infrastructure and contractors will be working along the main highways. Similarly, MID has plans for the next 10 years and Mike wonders whether Solomon Water plans to do the construction within the next ten (10) years.

The new highway being constructed is from the Honiara City Council to the Ministry of Fisheries at

Kukum. The next phase of improvement will be from Ministry of Fisheries to the Airport after the development of the new International Airport which will be in three to four years' time. MID has initiated talks with ADB about funding a project for the improvement of the road from the roundabout at the Ministry of Finance right up to White river on which a new four (4) lane road is being planned.

If all these plans, (MID's plans as well as Solomon Water's plans) can be better coordinated, the work could be implemented at around the same time frame so that issues such as relocation can be avoided. MID has learnt from past experience and with the current road works that a big chunk of money has been spent just for relocation and reacquisition of land, which has been quite a considerable cost to the government and for which MID is still carrying the cost now.

If MID is aware of Solomon Water's 30-year Strategic plan, especially of future activities being planned, MID can also align their work plans and programmes with Solomon Water's. It will save MID having to lay down infrastructure and later having the infrastructure being dug up by Solomon Water when it needs to construct and lay its own infrastructure.

As the Mayor has pointed out when he mentioned the new section of road from the HCC roundabout to the Ministry of Fisheries in Kukum, the type of material being used on the road is not available here, so it will be a big challenge to repair and clean up the mess if it is dug up later after it has been newly constructed and completed. Access to Solomon Water's 30-year Strategic plan will enable MID to coordinate its work plans and programmes together and in tandem with each other. The life span of the currently constructed road will be from ten (10) to twenty (20) years so MID and Solomon Water all need to think along the same lines to avoid future costs and challenges.

Mike's second point was on the Outfall and Sewage. He is aware of local planning schemes being put together by Honiara City Council, Ministry of Lands and the Guadalcanal Province.

Mike wants to know whether Solomon Water is aware that the location for the proposed site for the Outfall in Rove is being planned for a recreational area. It would not be very pleasant to have an outfall located next to a planned recreational site, so Mike is asking if these plans have been considered by Solomon Water as they plan where to locate the Outfalls.

Mike's third concern was about the sewage line that is being planned to run from Tuvaruhu, Vara creek the Mataniko area and connect to the National Referral Hospital Pump station. His concern is about the China Town area and whether it can be included along the way with the Mataniko and Vara Creek areas. It is a commercial area with lots of activities happening in its location and vicinity. Currently, most of the rubbish and solid waste from this area is being dumped in the Mataniko River creating an environmental hazard. Mike, therefore, would like to see that China Town is captured along with Tuvaruhu, Vara Creek and Mataniko with the main sewage line that will be connected to the National Referral Hospital pump station.

Answer from Ian Gooden, General Manager (GM), Solomon Water (SW)

Ian expressed his appreciation for Mike's comments about the road interment and also acknowledged the Lord Mayor's comments on the subject as well.

He shared his experience in working with a big roading company in New Zealand and agreed from experience, that the biggest problems his company encountered was from Water, Electricity, Telekom and companies digging the road especially if they must dig across or over the road. If they dug along the road it was not too bad, but when they cross the road, it might mean some interment.

Ian does not want Solomon Water to dig up the brand-new road in the next twenty five years. If there is a need to place pipes across the road, a tunnel dug underneath the road will probably be the best solution. Pipes can be pushed underneath the ground using a technique called the "Thrust." Solomon Water will do all it can to protect the road.

In the Rove Area, there are Sewage main trunks that will run from Rove to Point Cruz and Solomon Water will certainly be working with MID in advance on this. If there are pipe lines that Solomon Water needs to install in future, they will have them prepared for when the MID road project will be concentrated in the Rove area to White river area so that Solomon Water does not need to come

back to work in the area after MID has done the work but the two organisations can complete the work together.

With regards to the China town area, Solomon Water will look more into the issue and could pick up areas along the way but currently, these areas of responsibility come under the Honiara City Council to manage.

Comments and Question No. 6, by Charles Kelly, HCC Clerk.'

HCC is in the process of reviewing its City Council Building Ordinance which was developed thirty (30) years ago. It is still being used but the council wants to improve on it by inserting a Risk and Disaster Assessment clause. In particular, the current Building Ordinance lacks a Risk Assessment regarding Water. For example, building on the slopes or building too close to riverbeds and so forth. The Ordinance is silent on the system and process of water and the risks of contamination.

SW is on the Town and Country Planning Board and a member of SW usually attends the Board meetings. As the Building Ordinance is in the process of being reviewed, the HCC Clerk would like SW to contribute to improving the Building Ordinance by working in partnership with HCC in strengthening and improving the Ordinance. If HCC and SW can work together in partnership, they could come into agreement and be on the same page on whether those planning to build are meeting the criteria or not meeting the disaster risk assessments. If anyone does not meet all the Risk Assessments, then they will not be issued with permits to build. It would be ideal if SW and HCC could forge a partnership to achieve this.

The other concern the City Clerk has is the issue of Public toilets which is not enough for the city. Because of lack of land, there are not enough Public toilets being built. The City Clerk is appealing to Solomon Water to work with HCC to identify land so that more public toilets can be built. He reiterated, the more people there are, the more problems there are to be dealt with.

Comment and Question No. 7, by Kenneth, Property Manager, Solomon Islands National University, (SINU)

Kenneth emphasised the importance of Water quality and that the quality of water will be an issue as more students are enrolled and accommodated at the Solomon Islands National University (SINU).

In a Student Protest which took place earlier in the year, one of the issues highlighted in the student's petition presented to the SINU Management was the quality of water in the students' hostels. It is an important issue because the quality of water will have impacts on the health of the students.

The second issue for Kenneth is about land. Kenneth mentioned development because he had sighted the communications about using SINU land. He asserted that he is aware of Solomon Water's proposal to use SINU land under the Solomon Water Project. However, if Solomon Water is interested in using SINU land, both SINU and Solomon Water need to continue with discussions because both SINU and Solomon Water each have their own plans. More discussions will enable both organisations to coordinate and align each other's plans together so that both are on the same page, otherwise, it will end up in a situation where each organisation just gets on with its own plans which would not be to the advantage of both.

His third point was on Sewage. Currently, the houses and buildings on each of the three SINU campuses, Panatina, Ranadi and Kukum are all using septic tanks connected to each building. However, SINU is interested in Solomon Water's future plans of linking the sewage to a Wastewater Treatment plant and that SINU would consider being linked to the sewage treatment plant as well.

Answer from Ian Gooden, General Manager (GM), Solomon Water (SW)

It was clarified that the water quality being referred to by Kenneth was about the piped water coming into the houses.

Ian explained that once the water goes through the water metre on to other people's property Solomon Water cannot guarantee the quality of water.

Even water collected from roofs into tanks could be dirty, however, the water provided at the water metre by Solomon Water meets World standards at about 98% of the time. Water supplies in Honiara from the Kongulai water source are chlorinated and Solomon Water is doing some extra work to improve the quality. This is because when it rains, the Kongulai water source gets some sediment and silt so it has to be shut down. Although it sounds silly, the water supply is shut down when it rains because the Kongulai gets dirty including over Kobito as well for the same reason. Solomon water is considering putting in filters on the Kongulai water supply so water can be supplied at twenty four hours a day.

However, Solomon Water does test and monitor the quality of the water. The Ministry of Health also does a bit of testing on the water so generally, about 98% of the time, Solomon water meets the World Health Standard in terms of e-coli and coliforms which may cause stomach aches and problems. So generally, Solomon Water is compliant with World Health Standards.

Solomon Water has a separate dedicated water quality team whose only role is to manage the water quality. If there is any concern by the Solomon Islands National University (SINU) on the quality of water, SINU can approach SW who could conduct some tests on SINU's property and locations and identify where the source of the problem might be.

Kenneth mentioned that tests had been done on the water in preparation for the Melanesian Arts festival, and the Police who did the tests found the water was very clean.

Comments and Question No. 8, by Janet Tuhaika from the National Council of Women (NCW)

Janet's concern was that information presented by Solomon Water needs to be communicated across to all levels of the community/society especially to the ordinary household.

Although Janet has been living in Honiara for many years, much of the information presented is new to her and is quite technical. Janet though, is better educated and literate than most of those in her community. It is these ordinary people who really need to understand the information being presented so they will be able to appreciate not only the work that SW is doing but also the challenges that SW faces in trying to provide water.

In Janet's opinion, it is the issue of Access and Affordability to clean water that are major issues. A number of people in her community usually buy bottled water for drinking from the shops because they do not trust the water that comes from SW.

Janet also understands that SW has had issues with the Kongulai water source which is sometimes shut down by the landowners. Water source shutdowns affect people, so how will the project address these issues? Janet reiterated again the issue of Access and Affordability because it affects the communities, and she hopes the issues highlighted will be addressed by the sub-projects mentioned in the presentation.

Answer from Ian Gooden, General Manager (GM), Solomon Water (SW)

Ian explained that it is the heavy rain catchment that usually affects the quality of water as the water gets dirty.

In terms of the Kongulai source, Solomon Water has been facing land issues at Kongulai and if the Lunga plant water source is up and running or is in operation, Kongulai may have to be shut down because of the land issues. Solomon Water has experienced issues with the landowners but if they are interested in providing an ongoing solution, then Solomon Water might be prepared to continue using that water source.

Solomon Water has also had lengthy discussions and representations with the Government and its various Ministers. It has been working with the Ministry of Land to hold the lease to Kongulai which is currently leased by the government through the Ministry of Lands. Land ownership over water sources is a contentious issue and is the same with all Solomon Water's sources such as in Ziata in Noro, Tulagi and most of the places in which Solomon Water does not own the land. Solomon Water is working with the government to resolve these issues, but it is a slow process and will take time to finalise.

Concerns and Question No.9, by Debra from the Ministry of Environment

Debra noted that the Solomon Water project will have impacts on the environment, and she emphasized the importance of the project to include an Environmental Impact Assessment (EIA).

Other issues of importance highlighted by Debra are the legal requirements of obtaining land ownership and land issues as these will be of importance in considering where infrastructure will be constructed.

Answer from Ian Gooden, General Manager (GM), Solomon Water (SW)

Ian thanked Debra for raising the issue and reassured Debra that the Environmental Impact Assessments and the legal requirements in obtaining land ownership will be closely adhered to.

Concerns and Question No.10 by Charles Kelly

Charles understands that although the project is a National Project the discussions have been very Honiara focused and there has been little mention of other towns outside of Honiara. He wants to know if the project mentions towns such as Noro, Auki and so forth. Charles also wants to know how much has been allocated to improve access to water in the other towns.

Charles also wants to see more tangible outcomes as he thinks there is sometimes too much talk and discussion on the process but little on deliverables and tangible outcomes.

Answer from Ian Gooden, General Manager (GM), Solomon Water (SW)

Ian thanked Charles for his comments and remarked that Solomon Water is also interested in ensuring more action takes place. To this end, Solomon Water's first physical works and contracts will be based in Auki which Solomon water will be conducting within the next two months.

With regards to the construction of wastewater plants, there is secure funding from European Union which has been available for the last three years. Secondly, Funding from ADB has also been secured and confirmed but it still needs to be signed off by the Government as the Government will be the entity overseeing/managing the funding. Some of that funding will be in the form of loans and some will be in grants.

Thirdly, Solomon Water has also been assured of the World Bank funding facility. It is not much, and Solomon water will be going back to them in three years' time during WB's next funding cycle to seek more funding.

I do not want to make promises and assurances that I will not be able to carry through but since I have been here for the last three years, I have been able to deliver on some of the things I said I would deliver. I am therefore assuring you today, that I will be here for the next three years, so you are stuck with me!!But I can assure you we will do everything we can to get these projects into action, so that we can turn words into projects and projects into something that we can all see!

At the end of the day, if the donor funding does not come through, then we are in big trouble, but that is a risk that we will take. From the number of customers, we have who are registered in Honiara, there are about 9,000 registered customers. If the average Honiara household comprises of five to seven people, then in total, Solomon Water is servicing about eighty thousand people.

In Auki, Noro and Tulagi, Solomon Water's customer base is much smaller and is therefore only servicing a couple of thousands which is why ALL of Solomon Water's attention is in Honiara. Because of the spurt of growth in Honiara, water and wastewater are important.

That is the reason, Honiara takes up about 98 % of my time and also why all of our establishment and focus is on Honiara. There are Solomon Water officers looking after the Provinces, otherwise, most of the attention is on Honiara.

Charles Kelly,

Thank you because you know, I know the system of the World Bank and the EU, it takes a long process and sometimes when they've got stuck somewhere until they go so I put my trust in you.

Ian Gooden Response

Although we will have access to European Union money/funding, it will be channelled through ADB which will be administering it.

The World Bank money will come as a separate source of funding which will come later so it is a little bit more unsecure, but we are doing everything we can to secure it.

The other one is Green Climate fund. We are putting together an application which will be submitted to the Green Climate fund. So Solomon Water is not putting everything in one basket and relying on just one single donor, but it is working with several donors. Ian and Solomon Water are even talking, for example, to Taiwan because they have offered to build the stadium for the Pacific games. A while ago, Taiwan was talking to Solomon Water about Water and Wastewater at the National Stadium for the Pacific games (2024?) So I negotiated with them and discussed that instead of constructing only a treatment plant just for the games, how about supporting SW improve our infrastructure and then it will be there for the long term.

Question No. 11 by Mike of MID

In the first presentation, it was mentioned that there would be a reduction of 15 Outfalls to 4. Mike wants to know if that plan, to reduce the number of outfalls, would be the same for the sewage treatment plants.

Comment and Question No. 12 by City Mayor- Andrew Mua,

Andrew made the comment that HCC does daily checks of water and HCC has found that bottled waters e.g such as Blue Water's bottled Water is not as clean or as safe as Solomon Water's piped water. HCC has found that Solomon water's piped water is cleaner than water bottled by local companies and sold in the shops because these water companies in particular, Blue Water, actually get their water from bore holes which is pumped from bore holes in the ground. The water which is being bottled is not necessarily clean and safe whereas, Solomon water's piped water is cleaner and safer to drink than bottled water sold in the shops. On the other hand, water from SW and Solomon Water line is checked and it has been proven that it is clean and safe to drink.

Answer from Ian Gooden, General Manager (GM), Solomon Water (SW)

Ian was appreciative of the comments made by the Lord Mayor on the quality of Solomon Water's piped water.

Comment and Question No. 13 by City clerk, Charles Kelly.

Charles shared information on how the Honiara City Council had engaged JICA to share their knowledge and demonstrate a technology from Japan which allows for effluent to enter a chamber, pass through a soak away or soak hole before passing through a mat which absorbs and sucks in the waste water while the solids are retained in the chamber. The water can be used to water grass, flowers and trees. An example of the technology and system being used is at the Public toilet next to the Public Library. The Public Toilet system is not connected to a septic but uses the soak away method. If one goes to the Public Library, one will be able to see nice gardens and there is no odour or smell.

If this technology from Japan can be used, and the criteria for its construction is included in the City's Risk Assessment and the Building Ordinance, this sort of technology can be used when building and constructing houses in Honiara. Most houses in Honiara are usually designed with small families in mind, including the septic tanks which are designed for small families. The reality though, is these small houses can be filled by ten (10) or more people or the whole population of one's village can come and reside with the house owner, with all of them all using a septic tank designed for small families. It is the reason small septic tanks fill up very quickly, within a span of three to four months.

In Charles opinion, it is a matter of choosing to be connected to the main sewage line or introducing the system and technology used by the Japanese.

The Building Ordinance is studying the various systems and will be determining which best suits a building plan for certain locations.

Answer from Ian Gooden, General Manager (GM), Solomon Water (SW)

Ian knows one of these systems is set up in Saint Nicholas College. The system is ideal for an isolated area which is not near to another water source and in which land is available and one has ownership over the land.

One of the things not included in the Strategic plan is costing out the life of and the cost of the septic tank system which has to be dug every seven (7) to ten (10) years.

Solomon water has since worked out the cost of the last cycle of septic tanks versus the reticulation system and it has found a sewage system is a lot cheaper per property over a reticulated system.

The system and technology described by the City Clerk is very good technology and does work well, but in an environment such as Honiara where there is usually a lot of rain with a lot of trees, there might not be enough transpiration taking place which is most needed. Additionally, in a city environment in which people are living very close to each other, it might not be the most suitable system. However, there will be places where this system will be useful and successful to have this type of technology.

Mike MID

Mike was asking again if he could have a copy of Solomon water's 30-year Strategic plan.

He was assured by Ian Gooden that a copy would be made available to him and also the website he could go to access a soft copy. Ian also assured Mike that Solomon water will be communicating what the priorities of the project are.

Mark's role entailed turning the Strategic Plan into actual Projects, and an example is the consultancy work currently conducted by Egis which concentrates on five (5) projects:- Honiara Water, Waste Water, the Trunk Mains, Gizo Water and the Reservoir. Mark's role is to oversee all these projects. The rest of the Strategy has not been turned into a priority plan yet so Solomon water would not be able to provide MID with a definite work priority plan but in the next year or so, it should be able to come up with more work priority plans based on the Strategic plan which it can share with MID. Solomon Water will certainly work with MID so it does not need to dig up the new road again.

Charles Kelly

Charles wanted to know about the situation in Gizo. Since this is a National Project, Charles wanted to know if it also includes Gizo and what the situation in Gizo is like.

Answer from Ian Gooden, General Manager (GM), Solomon Water (SW)

Solomon Water has been talking to the Western Province for the past two years, with the Solomon Water board agreeing in principle as to what will happen in Gizo.

Solomon Water has secured donor funding for Gizo with part of the funding including salaries for staff when Solomon Water moves in to manage the facilities.

Solomon Water has not gone into Gizo yet, because it can't create water and if it does go in tomorrow, it would create an embarrassing situation for itself and the Government because people will be asking where the water is.

If Solomon Water does move into Gizo, it will have to be Cash water right from day one!

Solomon Water has been doing a lot of work with the Ministry of Mines and Energy and they have been looking at some short-term solutions in Gizo. The short-term solutions may include building dams at Tirokogu, Mile 2. Some water is coming through into the town, but it is either lost or stolen before it comes into the town. The rural WASH programme has also been supplying tanks and roofs to service some villages on the other side of Gizo.

In 2012, a brand new, highly automated plant was built in Gizo. Since then, it has not been used because no water is coming to it and through it.

Solomon Water therefore believes in long term solutions.

A long-term solution would be to build a dam on Kolombangara, bring the water down in pipes into the ocean and bring it up to Gizo.

The other option is desalinisation. Desalinisation could also supply water to Gizo. However, while a desalinisation plant is cheaper to build, it will be more expensive to operate and run therefore making the water more expensive. Desalinisation plants will need high maintenance costs such as replacing membranes and other parts that may break down and need replacing.

A dam built on Kolombangara on the other hand will initially be expensive to build and construct and will mean running two pipes on the ocean bed and surfacing in Gizo but in the long run will be less expensive to maintain making the water landed in Gizo much, much cheaper.



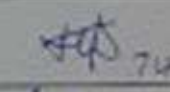
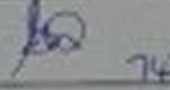
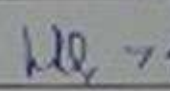
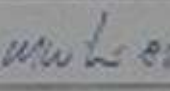

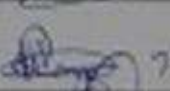

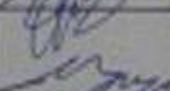
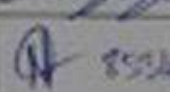

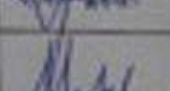
It will be similar to how Tulagi is supplied with water. In Tulagi, water is taken from the main island of Gela, and it is piped and comes on the reef and landed at Tulagi. This is all done by gravity feed and Tulagi has water twenty-four hours a day. So, this is one of the solutions to be looking into.

Meeting closed at 11:50 AM.

Meeting Notes Prepared by Elsie Wickham (Egis Eau)

Attendance Sheet of Initial Public Consultation and Information Disclosure (13 July 2018)

Date: 13 July 2018
Venue: Star Events

No.	Name / Designation / Organization	M/F	Signature / Phone
1	RUEL JANDINO ENV. SPECIALIST - EGIS	M	
2	MARVIC COMPETENTE PRIC. SPECIALIST - EGIS	F	
3	JANET TUTHANIKA National Council of Women	F	 7440948
4	Sally Pita National Resettlement Specialist	F	 7432587
5	Charles Wera	M	 7533196
6	MANU WATIF - Solomon Water	M	 852022
7	Solomon Water Env. (Egis Env)	M	
8	MARY RAMO (Telikom)	F	 7494413
9	Eddie Waiher (SINPF)	M	 7493497
10	Mike. Bagara (MID)	M	 7475813
11	Noel Oudiana (Solomon Water)	M	 8534816
12	Charles Kastaneanu (S/Star)	M	 7310798
13	HENRY TUPAH (CCD)	M	 7403757

No	Name / Designation / Organization	M / F	Signature / Phone
14	KENNETH BOO / ^{Division} Business / SINU	M	 17494103
15	BERNARD MAXINI / EGIS	✓ M	 863856
16	AUBREY WUA / HCC	✓ M	7700020
17	Mitchelle Madaya (SW)	F	 8556550
18	Dennis Moore ^{LED} (Speaker)	M	 8887116
19	BRYAN PITAKIA	M	
20	Kennedy Folasi	M	
21	C. Kelly (HCC) ^{Charles Kelly}	M	
22	Peter Banka (SDA)	M	 7522
23	Mathew Korimbia ^{Distribution} Manager SEA	M	7496693
24	Delvo Kereseka ^{Chief Financial} / officer / Meron	F	26036

Photographs of Initial Public Consultation and Information Disclosure



Photo No.1: Registration of participants for the initial public consultation [13 July 2018]



Photo No.2: SIWA's GM discussed SIWA's strategic plan on water supply and sanitation during the initial public consultation [13 July 2018]



Photo No.3: Project consultant discussed details of the proposed subprojects [13 July 2018]



Photo No.4: Honiara City Mayor raised some issues [13 July 2018]

Appendix 7: Second Consultation Meeting (February 2019)









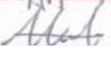
Stakeholder Questions and Answers








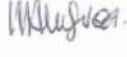

No.	Question/Comments	Raised By	Response	Response By
1	<ul style="list-style-type: none"> Ongoing Consultations 	Atenasi Ata - SICCI	<ul style="list-style-type: none"> This is start of the process; there will be further consultations during the detailed design process and approvals for designs. 	IG
2	<ul style="list-style-type: none"> Will illegal settlers be compensated more than Landowners 	John Tupe - Tintage Landowner	<ul style="list-style-type: none"> Will depend on assessment and evaluation as per resettlement plan and as per SIG rates for resettlement and compensation 	Lulu
3	<ul style="list-style-type: none"> Coordination with phase 2 road consultants on design Pre-treatment at outfalls Industrial/Business waste and discharges 	Mike Qaqara - MID	<ul style="list-style-type: none"> Noted and will coordinate with road consultants Designs as per AS/NZ Dispersion standards for appropriate dilution and dispersion. EIA Report Assess application and type of discharge, pre-treatment if necessary 	MW MW MW
4	<ul style="list-style-type: none"> High installation cost 	Jessica Warahiru- SIWIBA	<ul style="list-style-type: none"> SIG is reviewing submissions to reduce the different fees Pre-paid meters 	
5	<ul style="list-style-type: none"> ADB policy and compensation focus on women and not youths 	Duddley Teuwauri - HCC	<ul style="list-style-type: none"> ADB policy refers to vulnerable households which includes female, youth and male that are on low income 	Lulu, Sonia
6	<ul style="list-style-type: none"> Delivery of WASH and coordination with MID 	Mike Qaqara - MID	<ul style="list-style-type: none"> International NGO to be engaged for delivery of wash in collaboration with local NGO's Happy to support coordination at design stage especially in the provinces IWC to help identify delivery mechanisms of WASH in informal settlements. 	MW
7	<ul style="list-style-type: none"> Why is water in SI expensive compared to Fiji or PNG 	Ellen – Ex SW and candidate for National Parliamentary Elections	<ul style="list-style-type: none"> Government subsidies in Fiji is about 80% whilst in SI it is about 2% Current cost reflects cost for providing the service 	IG

No.	Question/Comments	Raised By	Response	Response By
8	<ul style="list-style-type: none"> ▪ Meter reading based on estimates ▪ High water bills ▪ Schools and Churches should not be classed as Commercial customers 	Holmes - SICA	<ul style="list-style-type: none"> ▪ Raise issue with to Customer Care through Michelle to address ▪ Was considered but not allowed under SW policy/classification rules 	IG
9	<ul style="list-style-type: none"> ▪ Consideration for climate proofing of infrastructure ▪ Were environmental issues addressed in the design 	Gareth - OXFAM	<ul style="list-style-type: none"> ▪ Climate change report compiled and will support the detailed design input. ▪ GCF application will be submitted next month that addresses adaptation and not mitigation 	Sonia
10	<ul style="list-style-type: none"> ▪ Was the previous JICA improvements ineffective 	Mike Qaqara - MID	<ul style="list-style-type: none"> ▪ No but this project will build on improvements by JICA from Supply Duration of 5hrs to 22hrs, target is 24 hrs. 	MW
11	<ul style="list-style-type: none"> ▪ Note logging activities around Kongulai area 	Tautele Kongulai Landowner rep.	<ul style="list-style-type: none"> ▪ SW is aware and is working with relevant authorities such as Forestry and ECD to address. 	Ray Andresen
12	<ul style="list-style-type: none"> ▪ Coordination and working together with SIPA for future demand ▪ Outfall at Port area 	Spencer Ala – SI Ports Authority (SIPA)	<ul style="list-style-type: none"> ▪ Agree to consult and work in close collaboration with SIPA ▪ SIPA to provide a forecast for future requirements 	IG
13	<ul style="list-style-type: none"> ▪ PPP and capacity building opportunity for local contractors ▪ Could local contractors bid for works 	Mathew - MOFT	<ul style="list-style-type: none"> ▪ Major projects would require international expertise and experience because of the value, nature and complexity of projects ▪ SW want to encourage local participations as subcontractors or JV ▪ Propose contractor's forum for information sharing in April this year 	MW
14	<ul style="list-style-type: none"> ▪ Challenges for water access to informal settlements and peri-urban areas 	Elma – Live and Learn	<ul style="list-style-type: none"> ▪ IWC work to help identify delivery mechanisms of WASH in informal settlements. ▪ SW will be consulting with NGO's working in this area to support effective project design and delivery. 	IG, MW
15	<ul style="list-style-type: none"> ▪ Propose boring option over open cut construction methods for roads 	Mike Qaqara - MID	<ul style="list-style-type: none"> ▪ Noted as a key issue and concern and will look into exploring boring options 	IG

No.	Question/Comments	Raised By	Response	Response By
16	<ul style="list-style-type: none"> ▪ Any support to village/rural supplies to support SIDT's 'Helpem Village People' theme 	Beven - SIDT	<ul style="list-style-type: none"> ▪ SW is legislated to provide for urban areas including peri-urban areas only and not rural areas 	IG

Attendance Sheet of Second Public Consultation and Information Disclosure (20-21 February 2019)

FULL NAME	ORGANIZATION/POSITION	EMAIL/CONTACT	SIGN
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Noel Oudiana	Solomon Water	noel.oudiana@solomonwater.com.sb	
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Bever Taulakavania	SI D T	taulakavania@gmail.com	
Leotuna Akwai	Solomon Star	leotunakwai@gmail.com	
Dudley Tovuauri	HCC-YO	Dudley.tovuauri@gmail.com	
John Tupe	Titinge Landowners	MOB 739580	
TOUTELE KIATAKARE	KONGULAI	B 7475257	
Jessica Warakiriti	SIWIBA	97639847	
Leah Alufocua	SIWIBA member	7500780	
Spencer Ala	SIPA Parts	7398583	

FULL NAME	ORGANIZATION/POSITION	EMAIL/CONTACT	SIGN
Holmas Seese	SICA	7575635 saese.holmas@gmail.com	
Catherine Konepa	World Union	7845315 Catherine_Konepa@wus.com	
Bruno Mishack	Solomon Power	7243077 BrunoT@solomonpower.com.sb	
Nigel Tutuo	Solomon Power	7466630 Nigel.Tutuo@solomonpower.com.sb	
Atenasia Ata	SICCI	ceo@solomarchamber.com.sb 39542	AA
Ellen Manuoga	Westside Lodge	794511	

DATE: 21st FEBRUARY 2019 – HONIARA STAKEHOLDERS CONSULTATION

Name
organ got







DATE	ORGANIZATION/POSITION	CONTACT/EMAIL	SIGN
21.02.2019	John KALAMINI Solbren / QC Manager	8435916 / nicola.kalamini@solbren.com.sb	
21.02.2019	John Las Tasimeti Kongulae Water Source	7489051	
21.02.2019	ADRA SI / Pmanager Landsbury / Tasehe	7737837 Pmesia@adrasia.org.sb	PTasimeti
21.02.2019	DAVID AVISA	7486082	David Avisa
21/02/19	SUEZ RICHARD BAKER	8423590	Richard Baker
21/02/19	MDPAC	8463722	
21/02/19	(Manueta) UNICEF / WASH Specialist	7225836	
21/02/2019	COH - Partners LENT DONNE	7477063	
21/02/2019	TRUDY RAMO MDPAC	7548292	

Tramo@mdpac.gov.sb

NAME??

DATE	ORGANIZATION/POSITION	CONTACT/EMAIL	SIGN
21/02/2019	SINU/STO (FRANK)	8579786	
"	HCC-Youth division Whitew (Lore)	7459032	
"	Solomon Islands LEONARD AVIATION	7494625 leonard@solomonislands.com	
"	Augustine OmegaFO KVI Schol	7900642	 aomearo@gmail.com
21/02/2019	HCC-Youth division Dudley Tawakoni	8546201	
21/02/2019	HCC-Admin Utaev Solo	7844545	
21/2/2019	Ken Popota Ltd/Director	7688888 kwandavid@popotaltd.com	
21/2/2019	General Secretary (SICA)	7575635 sica@solomonislands.gov.sb	 HOLMES SAOUC
✓	SICCI CEO Hicashi Atc	ceo@solomonislands.gov.sb	AA

NAME/

DATE	ORGANIZATION/POSITION	CONTACT/EMAIL	SIGN
21/02/19	Nolan, Hara Sina/MIA	services@nolan-hara.com.sb	
21/02/19	Rod Ouedema / SW	rod.ouedema@solomonislands.gov.sb	
20/02/19	AE Enterprises Ltd - Japhet Lasepa	jlasepa@yahoo.com 7468975	
21/02/19	Bruno Mistrack SOLOMON POWER	Bruno@solomonpower.com.sb 7243077	
21/02/19	Ray ANDRESON SW	4981945	
21/02/19	Asnos Atkin, SW	7419097	

Photographs of Second Public Consultation and Information Disclosure (20-21 February 2019)



Appendix 8: Consultation with Four Kongulai Communities and APs (22 and 24 July 2020)





Consultation Meeting Held Highlights on the 22nd July 2020

Venue 1: Old Dam Kongulae

<p>Attendees</p> <p>52 (*with 7 children in attendance)</p> <p>Male 30 Female 15</p>	<p>Discussion Items by SW and Consultants</p> <p>Objectives of the consultation:</p> <ol style="list-style-type: none"> 1. To inform community of the project 2. To gather feedback from the community 3. To conduct inventory of losses for affected gardens in along the pipeline easement 4. To gather socio economic profile of the community <p>The team comprised of the following:</p> <ul style="list-style-type: none"> • Kenneth Bulehite Deputy Team Leader SUEZ • Hilda Rade Tango Community Specialist • Agnes Atkin Lands officer Solomon Water • Relinta Manaka Communications officer Solomon Water <p>Highlights on Project presentation:</p> <p><i>Hilda</i> welcomed all the residents of the community for attending the meeting. Elder <i>Wate</i> offered a word of prayer and the meeting began with introductions by the team members</p> <p><i>Relinta</i>: outlined a brief history of Solomon Water and its vision for clean, quality safe water.</p> <p><i>Kenneth Bulehite</i>: then introduced the UWSSP and its current status as well as the work that is currently being undertaken in the community. The important points highlighted is the issue of affected persons who have either gardens or root crops within the easement or structures within the easements.</p> <p><i>Agnes</i> the Lands officer from Solomon water also reiterated that the project and the criteria that the project must fulfil in the area of safeguards for the people.</p> <p>After the presentations the team allowed time for Questions and Answer sessions from the community.</p>
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Consultation Meetings Results Old Dam Kongulae

Questions/Comments	SW Response
Question 1: Victoria Calvin: My crop is outside of the area but close to the peg, can I record that as an affected person item or no?	Response: Agnes: not do not record because it is outside the easement markets however, if the pipe works does destroy your crop then we can address the later.
Question 2: Edwin Wate: How many meters is the easement?	Response: Agnes: currently it's not confirmed but the markings width is 10 mtrs but this will be confirmed with the surveyor.
Question 3: Elizabeth Supa: Any new agreement with Solomon Water with new landowners (title was transferred from old owner to new owner due to death)	Response: Agnes: Any issues with new ownership and new agreement, the new owners must liaise with the Commissioner of Lands. I understand this is also due for review.
Comment 1: Edwin Wate: We are now the current owners and we have the legal registration documents.	Response: Kenneth Bulehite: The filters will be installed up at the Kongulai area where the catchment is and not here down at your place.

<p>Comment2: Selo Sasi: Please consider the Law, Church and & Custom.</p>	
<p>Question 4: Charles Norman (Land owner) Will there be any strainer constructed in our area so that we know and not work in that particular area of land?</p>	<p>Response: There are 2 pipelines in your area, an old one and a new and there are two leases in your area. Our team will have to confirm and then let you know.</p>
<p>Question 5: Charles Norman: will the project works not extend into our areas? How perfect will the works be to ensure that it does not go outside the easement?</p>	<p>Response: There are 2 pipelines in your area, an old one and a new and there are two leases in your area. Our team will have to confirm and then let you know.</p>
<p>There were no other questions and the session was closed with a word of prayer by Elder Edwin Wate at 11:10 am</p>	<p>Hilda thanked the community on behalf of the team and reiterated that the team will do a next visit in the coming week to meet with affected persons.</p>
<p>Old Dam Kongulae</p>	
	
<p>Old Dam Kongulae</p>	
	

Venue 2: Upper Namoruka

Attendance	Presentation/ Discussion by SW/ Project Consultants
Women 10 Men 20	<p>Objectives of the consultation:</p> <ol style="list-style-type: none"> 5. To inform community of the project 6. To gather feedback from the community 7. To conduct inventory of losses for affected gardens in along the pipeline easement 8. To gather socio economic profile of the community <p>The team comprised of the following:</p> <ul style="list-style-type: none"> • Kenneth Bulehite Deputy Team Leader SUEZ • Hilda Rade Tango Community Specialist • Agnes Atkin Lands officer Solomon Water • Relinta Manaka Communications officer Solomon Water <p><i>Hilda</i> welcomed and thanked the community participants for attending this general meeting. The community elder Mr Joseph Aloisio (Sepo Loisio) opened the meeting with a word of prayer.</p> <p>A brief introduction was done by Hilda on the aims and objectives of the meeting with the community and then team members introduced themselves and their work.</p> <p><i>Kenneth Bulehite</i>: started the presentation by taking about the project, its status and what we are doing in the community in relation to the project. He did a general overview of the project so that its clearly understood by the community.</p> <p><i>Relinta</i>: did a brief presentation on Solomon Water and its vision and Mission and reiterated that it's because of this that Solomon water is embarking on the project.</p> <p><i>Agnes</i> did a brief presentation too and then the community was invited to question and answer session.</p>

Discussion Results at Upper Namoruka – July 22, 2020

Questions/ Comments	SW/ Project Response
<p><i>Question 1: Oliver Pongi</i>: I understand that in the agreement with LO that SW will do maintenance on pipes however, this has not happened and the leak from the pipeline has formed a swamp on the land.</p> <p><i>Oliver Pongi</i>: Will road access be provided as part of the project?</p>	<p><i>Response: Agnes</i>: Oliver let's keep old agreement separate from this project as these are two separate works and we will address that issue separately.</p> <p><i>Response: Agnes</i>: We cannot confirm as of now, but the project will deal with it during the course of the construction of the pipes because materials will be brought to site for construction and will need access road.</p>
<p><i>Question 2: Joseph Aloisio</i>: What if those people hearing about payments for root crops and began to plant within the easement?</p>	<p><i>Response: Hilda</i>: Its time we are citizens of Solomon Islands to be honest and do the right thing. However, as of today's date there should be no more planting within the easement. Today is the cut-off date of all inventoried crops and plants. After this recording of inventory, this will not be included in the project.</p>
<p><i>Question 3: Are we prepared to meet the diseases due to the sewerage dumped into the sea?</i></p>	<p><i>Response: Kenneth</i>: Sewerage will be treated before its being disposed of into the sea.</p>
<p><i>Question 4: Gloria Konare</i>: The peg is right outside my door; will I be affected?</p>	<p><i>Response: Kenneth Bulehite</i>: We will need to confirm once we do a verification and let you know.</p>

<p><i>Question 5: Yingling Yim: Will our access be still accessible for us in the community?</i></p>	<p><i>Response: Agnes: We will confirm as project rolls.</i> <i>Response: Kenneth: There is possibility of Improving road to bring in materials for the work on the project.</i> <i>Response: This is the first community consultation, some of your questions will be answered as we progress.</i> <i>Response: Kenneth: There is possibility of Improving road to bring in materials for the work on the project</i></p>
<p><i>Question 6: Joseph Aloisio: I think the road was developed before the old gravity pipe was layed, maybe a similar approach will be taken by the project?</i></p>	<p><i>Response: Agnes: It is to early to say but there is a possibility.</i></p>
<p><i>Question 7: Tony Kale: Who has the power to say who to build or plant?</i></p>	<p><i>Response: Agnes: You should not plant crops on the easement land since it is leased to Solomon Water.</i></p>
<p><i>Question8: Kosue Aloisio: It would be good if the team comes in uniform so that its easy to identify and differentiate your team from other people?</i></p>	<p><i>Response: Kenneth: We will not promise but will try to wear some form of identification when we come in the community.</i></p>
<p>There was no other questions or comments and Joseph Aloisio thanked the team on behalf of the community and then offered a word of prayer.</p>	<p>Hilda acknowledge the community and thanked them for attending the general meeting</p>



Upper Namoruka



Venue 3: Kwaeota's residence 1:15 pm 22nd July 2020

Attendance	Presentation/ Discussion by SW/ Project Consultants
Women 20 Men 11 Children 4	<p>Objectives of the consultation:</p> <ol style="list-style-type: none"> 9. To inform community of the project 10. To gather feedback from the community 11. To conduct inventory of losses for affected gardens in along the pipeline easement 12. To gather socio economic profile of the community <p>The team comprised of the following:</p> <ul style="list-style-type: none"> • Kenneth Bulehite Deputy Team Leader SUEZ • Hilda Rade Tango Community Specialist • Agnes Atkin Lands officer Solomon Water • Relinta Manaka Communications officer Solomon Water <p><i>Hilda welcomed everyone to the general meeting and thanked them for seeing the importance of the meeting</i> <i>A word of prayer was offered by Mrs Maeva and then the objectives and aims of the meeting was highlighted by Hilda.</i></p> <p><i>Kenneth started the session off by explaining to the community the project background and timelines.</i> <i>Agnes then did a short presentation to explain the requirements of the project as well as the importance of consultations so that affected people can understand the process. After the presentation , the team opened up for questions and answers sessions</i> <i>Relinta did a brief presentation on Solomon Water and its vision and Mission and reiterated that it's because of this that Solomon water is embarking on the project.</i> <i>Agnes did a brief presentation too and then the community was invited to question and answer session.</i></p>

Questions/Comments	SW Response
Question 1: Luke Berry: Why do we have to write our names down?	Response: It's a requirement and its evidence to prove that the meeting was actually conducted in the community.
Question 2: Dominic Kwaeota Alick; Will the land issues be solved before work starts?	Response: Agnes: The team is organising another meeting for affected persons to deal with issues related to the land.
	There were no other questions so Hilda thanked the community on behalf of the team



Kwaeota's residence

Minutes of Meeting Held at Kongulai Area with Community Members last 24th of July at 2:00 p.m.

Team:

Relinta Manaka, Solomon Water

Kenneth Bulehite, SUEZ

Hilda Rade, SUEZ

Hilda welcomed everyone and thanked Jai Logino for inviting everyone to attend the general meeting and introducing the team members.

Kenneth then – updated the community on the UWSSSP and the current stage of works that are going on in the community specially with the Surveyor doing the markings along the main trunk. He reiterated that the markers and the easement area which is about 5.4 meters is the area that is under the title of the commissioner of lands and this is where replacement of bigger pipes will happen. Therefore, according to World Bank requirements any gardens or structures within the easement area needs to be documented and correctly verified so that compensation can be addressed with the affected persons. However, it also means that effective of today's date, no one should construct or build any new gardens or structures above the marked easement area. The current red markers in the community are the area marked during the topographic survey and the easement is within the marked area.

Kenneth also clarified that the project will only address current issues relating to the main trunks and not any old issues the community may have with Solomon Water.

Questions 1:

Jai Logino: When will the work start?

Kenneth B: Work is starting on the recording of gardens etc now.

Question 2:

Peter Kutu: Peter suggested that community will do works on the main trunk that is in their area and contractor will continue on the other side. This is because they have tambu sites on this side and would like to it to be accorded respect.

Kenneth: This request will be noted and taken up as part of the tender so that whoever the successful contractor must consider this important issue.

Question 3:

Cyrilla Utukae: A piece of my land has been pegged at the site for Tasahe tank. Will I be compensated for that under the project?

Kenneth: Please write it down and then bring copy of title and map to us because its your land and this must be considered.

Question 4:

Jai Logino: Is there a title on the route of the pipeline? I am asking because as far as we know there is no title.

Kenneth Bulehite: Yes, there is a title in the name of the Commissioner of Lands. It is good if you consult the Commissioner of Lands regarding the title. However, we will try to get a copy of the title too to show you.

Jai: We are surprised that Michael from another tribe hold PE over our land.

Kenneth B: We are not able to make any comments on that.

Question 5:

Simonia Lauhana: Will the properties and crops damaged of the affected people be paid or will it be similar as before where we were not paid?

Hilda: We will be considering all affected persons crops etc because it is a World Bank requirement. Any crops damaged will be valued at the Ministry of Agriculture rates and owners compensated.

Question 6:

Jai: There is a cross not sure if its inside the easement. Will it be compensated? But it can be shifted after consulting and getting permission from the bishop of priest.

Kenneth Bulehite: We will verify the location of the cross and if permission needs to be obtained from the Catholic Bishop or Priest then the project must comply.

There were no other questions raised. It was agreed that the members of the community will come to the catchment site on Monday to do the walk with SUEZ, Solomon Water team and an agricultural officer to do the verification of crops etc.

There was no other business or question. Hilda and team thanked the members of the community and Kenneth offered a word of prayer and the meeting was closed.

Attendance Sheet of Consultation Meetings at Kongulai (22 July 2020)

PARTICIPANTS LIST: COMMUNITY CONSULTATIONS : WOMENS PARTICIPANT LIST

DATE: 22/07/20

VENUE: CENTRAL W/RIVER
KUMECOM RESIDENCE

	NAME	CONTACT	COMMUNITY	SIGNATURE
①	Angelina Sami	7282168	White River	
②	Anna Paikai	7413287	White River	
③	Iry Taika	778700	White River	
④	Meva			
⑤	Wendy Riba			
⑥	Hilda			
⑦	Katty Kaelanga			
⑧	Marry Hendry	74-76341	White River	
⑨	Minami Seda	7323612	White River	
⑩	Freda Hillian Rosa	7881321		
⑪	Nicana Joe	7263693	White River	
⑫	Susun Denis			
⑬	Rose Ulaoua	7421666	White River	
⑭	Diana Maedia	7422731	White River	
⑮	Meva Hoiens	7449036	WR	

PARTICIPANTS LIST: COMMUNITY CONSULTATIONS : MENS PARTICIPANT LIST

DATE: 22/07/20

VENUE: CONRAD W/RW/R
KWAECOTA RESIDENCE












	NAME	CONTACT	COMMUNITY	SIGNATURE
①	NELSON AUNA		W/R	<i>[Signature]</i>
②	DAVID MORO		W/R	<i>[Signature]</i>
③	CARLOS MORRISON		W/R	<i>[Signature]</i>
④	NADSY PAISIE		W/R	<i>[Signature]</i>
⑤	ANISIE TUNGA		W/R	<i>[Signature]</i>
⑥	LUKE SHAKVL		W/R	<i>[Signature]</i>
⑦	GORGE MOKE		W/R	<i>[Signature]</i>
⑧	FOLISELY STANLEY		W/R	<i>[Signature]</i>
⑨	DANIEL MAKABO		W/R	<i>[Signature]</i>
⑩	DODIE HENZ		W/R	<i>[Signature]</i>
⑪	JON KUKA		W/R	<i>[Signature]</i>
⑫	JUNIOR GARELO		W/R	<i>[Signature]</i>
⑬	DECDERIO		W/R	<i>[Signature]</i>
⑭	BRADLEY STEPHEN		W/R	<i>[Signature]</i>

①

PARTICIPANTS LIST: COMMUNITY CONSULTATIONS : WOMENS PARTICIPANT LIST

DATE: 22/07/20

VENUE: Old Dam

NAME	CONTACT	COMMUNITY	SIGNATURE
Josephine Maekeni	7941288	Kakabona	
Conem Houtoro	7850663	"	
Elizabeth Waitoro	7578361	"	
Felistus Houimo	7744273	"	
Sarah Maekeni	7773231	"	
Lovelga Halukeni	7556422 7522	Old dam	
Alice Charles	—	Old dam	
Naomi Horawai	7259998	"	
Lois	—	"	
Joy Hou	—	"	
Ellen Hou	—	"	
Joysetta	7535685	"	
Mesiel Tai		"	
Mary Weisa		"	

2

women's

PARTICIPANTS LIST: COMMUNITY CONSULTATIONS : MENS PARTICIPANT LIST

DATE: 22/07/20

VENUE: old dam

NAME	CONTACT	COMMUNITY	SIGNATURE
Serah Rai Sango		olddam	
Hellen Hou		"	
Edlyni wate		"	
Serah Horouei		"	
Emily Hou	7410363	"	EA
Victoria calwin	7813996	RAC "	
Gowisa Hou		"	
Margaret chakale	7500511		
Peter chakale	7500511		

Appendix 9: Consultation Meeting Conducted for Reservoir Subproject

Minutes of the Meeting, Draft Agreement Between SW and Land Occupier



MINUTES

Final resettlement discussion with Teddy Douglas Menesa

Attendees: Teddy, Ray and Agnes
Venue: SW Office Mataniko
Date: 13-10-20
Time: 11:50 am - 12:50 pm

The following were discussed:

1. SW discuss with Teddy regarding the inventory of loss and resettlement estimates options and calculations
2. SW discuss with Teddy fair and reasonable resettlement options :-
 - a) Cash compensation to value of buildings in which SW does not favour the option because of issue around vacating the site within the required time
 - b) The rebuilding or replacement of current houses to a new site in which SW does not prefer as well because of timing and cost
 - c) Buying house and land equivalent or more to current existing cost of house and land
 - d) Foregone other Titinge applicable Inventory of Loss (IOL) compensations for SW to buy of property at Mbaranaba

Further Discussion and outcome

SW and Teddy have further discussed options c and d.
Following the many times both parties looking, searching and doing consultations with various Real Estate companies and further following Teddy identifying a land with 2 buildings at Baranaba, parcel number is 191-043-33, Teddy requests SW to resettle him to this parcel of land.
The land was put on public notice for sale through tender and Teddy submit a bid for the parcel of Land
Discussion was made around the costing and both parties agreed for **resettlement option d**
Both parties then agree that SW will pay the property once Teddy's bid is successful and that Teddy will forgone other compensation entitlements
SW will prepare a Resettlement Agreement based on both parties discussion Agreed outcome.

Meeting ends 12.45 pm

Teddy Menesa: 

Agnes Atkin:

Ray Andresen: 

Photographs of Meeting with Mr. John Tupe (Owner of Parcel Land in Titinge) last 6 July 2019



Photographs of Initial Proposed Resettlement Site for Land Occupier on Titinge Land



Attendees:

Mr. John Tupe, landowner,
Mr. Ray Andresen and Ms. Agnes Atkins, Solomon Water Representatives
Project DED Consultants

Note: The proposed relocation site is in a 200 m² lot and approximately 70 m² floor area. This location has been selected by the affected household and their family and is being negotiated by SW to the property owner. However, another similar residential structure is being investigated by SW.

Appendix 10: Public Hearing & RP Consultation/Disclosure 25 to 26 February 2021

Minutes for Public Hearing at Namoruka at 10:00am 25th February 2021

Welcome: Hilda welcomed all the participants from the community who came to listen to the meeting.

Opening Prayer: Community Representative Elder Edwin Wate

Introduction of Team members:

Edward Danitofea MECDM

Hatlee MECDM

Joshua Kera SW Environment officer

Kenneth Bulehite: D Team Leader SUEZ

Agnes Atkin: SW Lands Officer

Relinta Manaka SW

Hilda Rade SUEZ

Opening Presentation: Edward Danitofea – WHY PUBLIC HEARING?

Edward presented that it's a requirement under the Environment Act and not an ordinary meeting of any sort. It's for the public to give them an opportunity to hear and ask questions relating to the project. A report has been produced and this is the report that identifies the baseline on the ground and the impacts that will affect the lives of the people and the mitigation that will be undertaken to address the impact. This is the report that will be shared here today.



Mitigation is how they will address your issue. For example, if a tambu site is identified, then they will divert the pipeline from the tambu site so as not to disturb the site. These are the things that will be identified in the report. Social will affect lives and Environmental will affect the surroundings of the people.

Environment means everything that surrounds us human beings. PER deals with upgrades of the facilities. If it's a bigger project, then it will need an Environment Assessment Report. For example, logging is in the bush; however, those of us in Honiara are affected by the logging in the bush when our water is contaminated.

This presentation is brief but if anything is related to the project then this is your chance.

Objection period is 30 days, so it starts on 15th Feb and expires on 15th March 2021. If you feel you have any issues relating to the project this has to be raised within this time frame. We encourage the public to make us of this time period so as to avoid any other unnecessary issues.



Questions: Joseph Meke (Kongulae Community) :

After the surveys until now I want to know who of us will benefit from the project or easement? This will enable us to stop people from squatting all over the place.

Edward Danitofea (MECDM): this is a social safeguards issue and will be addressed later in Hilda's next presentation. However, if any development at the same location that will interfere with this national project then we as the national regulators will certainly stop the application.

Agnes (SW): Joseph wants to know who will be affected. The survey team have collected data of affected persons in the community. The project will follow the current pipeline or easement and is registered under some trustees.

This project will just follow the current existing easement and not outside. However, if it is outside the easement SW will liaise with persons concerned. Affected persons Inventory of losses have been completed and all settled.

Edward (MECDM): The 30 days started Monday 15th February and will expire on the 15th March 2021. The people can write to the Director if they are shy to ask questions as required by law. The law does not specify if it excludes the weekend. The Director will not consider any posts on Facebook; all submissions must be in written form because it is our evidence should this be required in a court of law.

PROJECT PRESENTATION: KENNETH BULEHITE

Kenneth (Deputy Team Leader/Suez): presented information on the project, its components, the findings, impact, and mitigations to be undertaken to manage the impacts.



The project aims to improve the quality and quantity of water. Kenneth then proceeded to do the PER presentation to the community.

Please if you have any other questions or would like to know more, you are invited to the Auditorium hearing at the Museum at 10:00am.

Question and Answer time based on the Presentation by Kenneth



Question1:

Sua Meke: This project means if completed that water will not be turned off during rainy season as we are currently facing with the current water supply.

Kenneth: The project will end the issue of turning off water during rainy season because the project will treat water and then send water to the other tanks for distribution to the pipeline.

Sua Meke2: For more than 10 years a private borehole next to my house has been serving the people in the community. Any possibility the Ministry of Environment can assist us to improve it?

Edward (MECDM): Under this project anything relating to one family will not be considered. Please ask questions relating to the presentation. The Ministry of Health under the RWASH might be help in this area.

Kenneth: Some NGOs and other Ministry can assist, however if you can write a letter to them.

Sua Meke3: It's just a question or concern regarding the local situation because when SW was down, this where the whole community rely on.

Hilda: Sua try check out some of the Embassies that they might assist if your member of Parliament cannot help.

John Tasima4: Now we eat all sorts of chemical in food eg fertiliser in our cabbage and the air. Is there any other alternative chemical besides chlorine to use to treat our water?

Kenneth: Chlorine is used to treat the Eccoli in the water which is from human, animal and birds wastes. The project aims to treat the water at all places so that we can have clean water for us. SW has a monitoring system to check and monitor the doses of chlorine. There is no alternative chemical since other options are expensive.

Sua5: What time will be the last meeting, is this the last meeting?

Kenneth: This meeting is organised by the Ministry of Environment. There will still be other meetings to be conducted.

Sua6: What time will the project start?

Kenneth: We will start later this year, if the Ministry accepts this we will proceed to next stage of Tender. The tender is open for 6 months.

Sua7: I have garden and houses in the project site? How will you asses this?

Kenneth: This will be further addressed in Hilda's presentation.

Joshua: Before any works, SW will come to the community to form a Community Advisory committee to work with SW and the host community. The purpose is that if any concerns arise during construction the committee will raise the issue with SW.

Edward: When construction starts, the Ministry will be monitoring during the construction phase to ensure that the contractor upholds all that has been stated in the submission or report. Ministry will continue in its role to monitor.

Kenneth: the project will benefit us all in the community.

SOCIAL SAFEGUARDS: HILDA did a presentation on the project, the people impact, people affected and the mitigations to be undertaken or already undertaken. The project cannot just come and remove people and gardens without compensating people were due.

Hilda outlined the process, the cut off dates etc and clarified the time periods and how the grievance process addresses issues raised. Hilda encouraged and invite people to feel free to ask questions on the project.

Hilda responds to Joseph Meke question of who will benefit from the project?

A lot of time when we look at benefit we always think of money. Good health is a benefit from using quality safe water and its important than money.

Edward: I can see from people not asking a lot of questions because the presentation is clear. Thank you everyone for attending, we have taken note of the questions and recommendations. Thank you for supporting this important project.

Kenneth thanked everyone too for attending the public hearing and for participation.

Closing Prayer: Community Rep Joseph Meke.

PARTICIPANTS LIST: COMMUNITY CONSULTATIONS : ~~MENS~~ PARTICIPANT LIST

DATE: ²⁵ / 02 / 21
 VENUE: ^{Alicia Toki Residence} NAMORUKA
 10:00 am

	NAME	CONTACT	COMMUNITY	SIGNATURE
1	Ruelto Harold		NAMORUKA	RH
2	EDWIN WATE	7428533	NAMORUKA	EWATE
3	Andrew Rahill	7571700	NAMORUKA	A. Rahill
4	Jennifer Paulai	"	NAMORUKA	J. Paulai
5	Alick K	7484246	NAMORUKA	Alick
6	LOLAH TUPE	7158037	NAMORUKA	LA
7	SANTUS Paulai		NAMORUKA C/W RIVER	
8	ELIZABETH NEMO		NAMORUKA	EN
9	JUNIOR ALICK KWAETA		CENTRAL W/RIVER	J. Kweta
10	Anna	7413237	NAMORUKA	Anna
11	FRANCIS MOAH	7356264	LOWER KONGULAI	F. Moah
12	Paul Tango	748509		P. Tango
13	Sue Melke	7202495	LOWER Kongulai	Sue Melke
14	John Taserias	7489001	"	J. Taserias
15	Charles Gzilabu	7929605	"	C. Gzilabu

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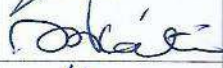
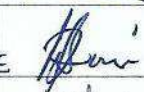

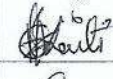

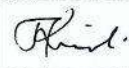

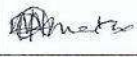

PARTICIPANTS LIST: COMMUNITY CONSULTATIONS : MENS PARTICIPANT LIST

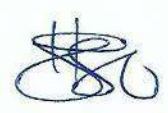
ALICE TEIOKI RESIDENCE

DATE: 25/02/21

VENUE: NAMORUKA

10:00 am

	NAME	CONTACT	COMMUNITY	SIGNATURE
16	JOSEPH MEKE	7221703	KONGULAE	
17	MAMUTEI KAIETI	7985943	NAMORUKA	
18	REGINA TD WEI	748777	KANGKULAE	
19	Cynthia Nisa	7282748	Namasuka	
20	NOLETA KAIETI	7502134	Namoruka	
21	WANETA KAIETI	7249415	Namoruka	
22	JOSHUA KONA	7393180	SW	
23	Agnes Athia	8136183	Sw	
24	Relinta Manaka	8503730	Sw	
25	Hilda Rede	7505505	SWCZ	



Minutes for Public Hearing at Titinge at 2:00pm 25th February 2021

Welcome: Hilda welcomed all the participants from the community who came to listen to the meeting.

Opening Prayer: Community Representative: Pastor from SSEC Church Selwyn

Introduction of Team members: Edward introduced the program this afternoon and allowed the team to introduce themselves so that the Public know who are present here.

Edward Danitofea, MECDM

Hatlee, MECDM

Joshua Kera, SW Environment officer

Kenneth Bulehite, Deputy Team Leader SUEZ

Agnes Atkin, SW Lands Officer

Relinta Manaka, SW

Hilda Rade, SUEZ

Opening Presentation: Edward Danitofea – WHY PUBLIC HEARING?

Edward presented and explained to the public the reason for the public hearing. This is a requirement under the Environment Act that this is done before a Development Consent is given to the Developer or Solomon Water in this project.

The project is about upgrades to current existing pipelines as well as replacement of old storage tanks and some new pipelines towards the east of Honiara City.



PROJECT PRESENTATION: KENNETH BULEHITE



Kenneth (Suez) outlined the components of the project. There will be work on the main trunk (replacement of old) as well as construction of new storage water tanks. This scope of works will improve the quality and quantity of water supplied to the Honiara City.

Edward (MECDM) –Clarified that questions should be asked based on the Environment report which Kenneth presented.

Question and Answers:

Peter Tero- teacher of Titinge Primary School: How sure are you that the tank will not compromise the safety of the children (200) attending the school?

Kenneth: Kenneth responded and said that his team drilled (twice) 10 meters down and they found that the ground is strong and its safe for the construction of the storage water tank at the identified site. I also did the current tank for JICA in 2008 so safety is not an issue, it is safe.

Heinz Koga: resident of Titinge:

Quality and Quantity: Almost every house in Titinge we find it hard. I think that the quantity of water at the storage tank would be enough to also serve us. As a resident we are asking the question, what is the use of having a big storage tank here at Titinge when we the residents of Titinge are not benefiting from access to it. Now that quantity is not going to be an issue, how will we benefit?

Kenneth: That is the whole idea of the water tank to service the community so SW will have to decide if it is going to do this. The design of the tank is projected on population up to 2047. It is SW decision.

Peter Tero: Kenneth, I hear you say that in the project if it needs to divert the design due to structures etc it can do that. What if the project can consult with Landowners to divert the pipes from Kongulai up over the hills to reach us here at Titinge because since the existing water has been installed, we have not benefitted from any access to water?

It is up to SW but there are issues that needs to be cleared, even access through land is an issue too on the existing infrastructure.

Edward: if the pipes are going to be diverted from the hills, then it is going to be another project issue and it will need an EIS because lots of earthworks etc will need to be carried out to cater for this.

It is good for SW to take note so that it will address the issue of us residents and if this can be factored into any new project. SW is a government SOE.

Heinz Koga- We the residents don't see the value of the project because we have not benefitted from the water project. We have nothing much to say, one or two people are affected, and I do hope the SW had discussed with them already. The story of the water tank is not news to us, it's an old story. Our priority is that this tank gives us hope that we will have access to water so I hope this can be considered.

Kenneth: the idea is that SW to increase connections and access to water.

Heinz Koga: People know that water is not free today. People want water to be piped to their houses, currently we all queue to access water at the 2 standpipes even up into the night because the 2 standpipes cannot serve all of us here at Titinge. The issue of water is close to our heart.

Edward, so you are saying is there any consideration to increase the number of standpipes for the community?

Agnes Atkin: We will take note of this and bring it up to our other officers responsible, so we are unable to give you an answer right now at this point in time. I agree that this is the first time we have a general consultation with the wider community of Titinge. We only consulted and dealt directly with the 2 affected persons in Titinge. SW then simplified the 30-year strategic plan which is broken down into 5-year plans.

Under this project there are a lot of policies that SW has to comply with under this project. No work or construction will start unless agreements are signed and are in place. I just wanted to explain what stage of the project we are in.

Kenneth: The project document says additional expansion of services to reach 40,000 people to be connected, the question is where? For Honiara the plan is to increase water so that more people can have access to water. The expansion plan is there but the quantity is the challenge.

Hilda asked questions on behalf of the women who is shy to ask the question.

We know that Titinge is in the site where WW2 is fought, how sure are you that there will be no explosions if work is done here?

Kenneth: We initially thought that Honiara is free of bombs but since the recent discovery of live ammunitions at the ITA area in Honiara, it is now a requirement that any project must have scanning or UXO survey. People's mentality has switched back that any place or work must be scanned.

Heinz Koga: A lot of questions in our head, e.g., what is the use of the water tank if it will not benefit us? What is the use of the tank if we are not going to drink out of it? I watch our women and children having to travel some distance to go and find water every day to their homes and families and it is heart breaking.

Kenneth: There will be water, SW have to decide on this issue. If water is here, I am sure – increase more connections for business.

Henry Koga: Its funny the tank is going to be here, is it just for us to look longingly at the tank and wish we have access to clean water?

Agnes: We will take this back to our responsible staff.



SOCIAL SAFEGUARDS: HILDA

Hilda thanked previous presenters and everyone for questions and then proceeded into doing the safeguards presentation.

Consultations will still continue with the community. SW will establish a committee in every community where construction work is going to happen. This is to save people to travel long distances and waste a lot of time.

Question and Answers

Caroline Belande Head Teacher: I am concerned about the school, already we have a tank that supply water to the school, we fear that during construction our tank water supply might be cut off and thus affect us- students. The tank is important to us students and teachers. What will you do for the school to address this during construction How is this managed?

Kenneth: Maybe it will be relocated, I don't think they will remove the whole tank. We identified this during the survey we noted the pipes. Pipe is not hard to shift around. Don't worry too much since the project will take this into consideration and will include this issue for contractor to take note.

Allan Malasa: I am concerned about noise pollution and air (cement mixing and dust from road) pollution? Any management plans to contain this?

Kenneth: We will expect noise during construction. School only goes on for half a day. This can be minimised however we have to inform contractor to take note. I believe dust from the road could be an issue, however, there are management plans that will be in place to manage such situation, e.g. using concrete mixers etc or using tanker trucks to ensure no dust on the road. This will be included in the tender consideration.

Edward: Contractor need to have a management plan, and this is mentioned. The contractor should have their own management plan and I will put this as a recommendation.

Joshua SW: I understand Public hearing is a requirement for Development Consent. A requirement to be included is an environment and social viable plan. This plan will be used to manage the concerns or issues raised. SW will also do monitoring during construction phase to ensure effective management.

This project will have a community advisory committee which is voluntary, and this team will assist also with monitoring in the community. This committee will be established once contractor is identified and its only functional for that period of time.

Heinz Koga: What time will construction start?

Kenneth: It will be probably the last quarter of 2021.

Caroline(teacher): Since the big tank will be installed here, if anyone on the other ridge wants water connection, this means that they will have to dig through the school area. Who will be responsible for the damage to the school area?

Kenneth: It is cheaper to avoid areas where infrastructures have already been built. Most piping as much as possible in the project we follow the road where existing pipeline or where there are not structures.

Peter: I understand ground will be dug out from the tank site. How about if the project can help the community through giving the ground back to the school to be used as fill for the land at the school where future infrastructure can be built?

Edward: If it's a government project this is possible but due to the World Bank and Donor guidelines it will be a lot of issues involved eg, will run offs affect people living below, what are the mitigations etc etc. They will require plan to ensure that these considerations must be undertaken. It's not in the footprint of the project because here at Titinge- it's only the site where the tank will be built. Technically, it will be another process.

Joshua thanked the community participants and mentioned that there will be other consultations happening in the community.

There were no other questions. Edward on behalf his Ministry thanked all for attending the Public Hearing and reminded that this is an important national project so the Ministry will continue to monitor the project during its implementation. If you are not satisfied today, please come to the National Auditorium tomorrow.

Peter teacher: thanked the team on behalf of the community for the Public Hearing.

Closing prayer: Pastor Selwyn SSEC Church



Summary/Final Remarks: Edward Danitofea
















Closing Prayer: Community Rep

PARTICIPANTS LIST: COMMUNITY CONSULTATIONS : ~~MENS~~ PARTICIPANT LIST

2:00pm

DATE: 27/02/21

VENUE: TITINGE Primary

NAME	CONTACT	COMMUNITY	SIGNATURE
Caroline Belande	7426155	Titinge School	
Florence Kabui	7389149	Titinge Ridge	
Peter Tero	7192640	Titige School	
Banabas Hoai	7882526	Titige	
JEFFERY - PERO	7308894	Titige	
Salob Kitoto	7850876	TITISE	
Esilyn. Sai	7219749	TITISE	
Manamuy	7782958	TITISE	
Selwyn saro	7110701	TITISE	
Robert X	7127005	" "	
ALAN. MALASA	712/2021	" "	
Evana Dewesi	7451232	" "	
LINA PEGO	7610068	" "	
MERILYN MINI	7310669	" "	
Regina Tupe	7913732	" "	

PARTICIPANTS LIST: COMMUNITY CONSULTATIONS : ~~WENS~~ PARTICIPANT LIST

DATE: 25/02/21

VENUE: TITIGE Reimay

NAME	CONTACT	COMMUNITY	SIGNATURE
Crystal	7103017	Titige	[Signature]
Hannah Maetawa	—	"	[Signature]
John. Nesily			[Signature]
ABRAHAM Sigetax	7380190		[Signature]
Ivalyn Savino	—	"	[Signature]
Salome Tome	—	"	ST
Henry Konga	7469532	"	[Signature]
Florence Konga	✓	"	[Signature]
Simon ululu	7249101		[Signature]
Mark more	7325989		[Signature]

Minutes of Public Hearing at the National Auditorium – Friday 26th February 2021.

Welcome: Edward Danitofea welcomed all the participants for attending

Presentation: Why Public Hearing?

Edward Danitofea from the Ministry of Environment did a short presentation on why we need a Public Hearing for the Project.

It is a requirement under the Environment Act under the Ministry of Environment Conservation.

Edward reminded the participants that the period for objection is 30 days.

Questions:

Samuel Au Ramosaea: Namoruka, White River (Resident)

My question is regarding boreholes (omitted). This is not part of the project.

Kenneth: water source diversification is another option to support the population of Honiara.



Kenneth Bulihete (Suez, Deputy Team Leader): Made a presentation of the project, the findings, environmental impact, the mitigations for the Honiara Water Supply Network.

Sam Ramosaea: We have abundance of water; water management is our problem. We have some water source in the community which SW should look at using.

Kenneth: explained that the water source is selected according to the capacity of pumping water (8 litres) per second and if it can sustain the bigger population of Honiara.

Sam Ramosaea: is there any chance of building additional reservoirs if finances and technology permit to divert those water into the reservoirs?

Kenneth: White River, Mataniko and Lungga rivers are wasted flowing into the sea every day. We have explored the Mataniko river, but it has tambu sites, and infrastructure to design for those is very expensive, desalination is expensive too, and treatment of Lungga water is also expensive. Currently SW deals with white River because they have existing agreement with Kongulai source. The current project is suitable to cater for up to 2047.

Benjamin Afuga: lumi Tok Tok Forum: Thank you for the presentations. Water is important because our human body is made up of 60% water, so water is critical to life. Water is a very important subject and because our body force people to complain about water. The presentation is very comprehensive and covers a lot of areas which I did not expect too. I will ask few questions; I want to acknowledge Urban Wash is included in this and sewage system is another aspect that's included as key infrastructure for Honiara.

Question: SW covers whole of Solomon Islands and why are some provinces missing out under this project?

Focus is East Honiara going up and stops at Henderson. Why did the project not extend into Guadalcanal Province because we can utilise our abundance of water? Why doesn't the project utilise Tina Hydro Project?

Kenneth: SW does not operate at Lata Temotu, Kira Kira, Buala. It's up to the Provincial government; they must make a request to SW. For example, in Gizo the people don't want to pay for water until the Province stepped in. Auki, Tulagi and Noro allowed SW to operate there. Western Province is now requesting Munda and Gizo under this project. Choiseul is requesting SW to go to Taro. It's the general belief by our people that they don't want to pay water.

Currently existing water is at Kongulae and channelling it East wards. Tina Hydro – too big flow and its design to optimise the water source there. The design will be stable at 15kw and if too much water it will produce 20 kw. It's going to be a challenge.

G Plains water potential is there but because of the use of fertilisers this is quiet challenging for underground water. Burns Creek to Henderson connection is already there so this is the one that is going to be utilised.

Ray Andresen, SW: SW has a 30-year plan that guides the project. The Guadalcanal Province has a government process to go through. The Ministry will have to declare areas for operation. If a request is received, SW will have to do some assessment whether it's feasible to expand into those provincial centres. Previously Lata and Gizo SW were there but it has become un-sustainable so therefore it withdrew. A lot of issues also is to do with land and whether it is feasible to operate. There are some grey areas the SW Act only stipulates urban areas. SW has gone beyond this requirement too so its something the Minister need to look into. Tina Hydro – has some technical challenges and initial assessments did not recommend it. The strategic plan wants to narrow down on main boreholes. JICA boreholes are very expensive (two times pumping – from underground and to the tanks) to manage and they are short midterm plans after the ethnic tension (it was more of a security issue). Besides Kongulae Lungga is the next water source to be developed.

Benjamin Afuga: I noted in your presentation that water goes under some people's house. Water "pirating" is happening too in Honiara. Can you tell us how many percent is lost through water piracy? Its important for people to understand this that as much as SW want to provide water, its also must deal with issues relating to water piracy.

Ray SW: Non-revenue water is about 55 % currently which includes leakages and water piracy. SW estimates leaks account for 40% of water loss and wate piracy amounts to 15-20%. The best water authority in the world is about 25% in Non-Revenue Water, no water authority can get to 0%.

Social safeguards Presentation: Hilda Rade

Hilda did presentation on the project on the findings regarding affected people and their structures and gardens on the route of the pipelines and the status of the mitigations. She also outlined the grievance process and how to go about it.

Questions must be related to the presentations.

Sam Ramosaea: SW need to take extra precautionary measures in dealing with land. Have you done your checks on this?

Hilda: The project team has done that especially on land ownership and access through various areas and affected persons.

Edward Danitofea: Me and my colleague will only take back questions relating to the presentations and we will not take unnecessary comments or questions outside of the project.

Doreen from National Council of Women: Thank you for the 2 persons doing the presentations, we all know that most times women and girls are the ones using water. Most women in Honiara City are affected by lack of access to water.

Hilda: just to inform your office - A Key area of the project too is Gender and Social Inclusion. It's the language of the donors who are interested if women and vulnerable groups are consulted. We have undertaken Gender and Social Inclusion as well as focus group discussions during our consultations since this is a key area that must be addressed by the project.

John, Reporter from Sunday Isles: Most of our boreholes are located in the valley, currently most settlers build close to our boreholes. How confident are you that our boreholes are safe?

Ray, SW: A very good question indeed and I am happy that Honiara City Council representative is here because they are the ones monitoring our work. Our water is basically disinfected with chlorine and you all know that during heavy rain, SW issues instructions to boil water. Ground water contamination is a very important issue and at the moment several of the boreholes used in Honiara are out of service with only Tuaruhu and Panatina functioning. We have other boreholes under JICA. The only mitigation is the design of the boreholes and you will notice that the ground water is extracted at about a depth of 100 metres into the ground. Current designs have concrete structure and casing. Testing regime is the only way and SW is being monitored closely by HCC. SW controls are contained in a document called Water Safety Plans.

Fred Atu (Student at Fiji National University): We know people are building close to boreholes. What is the safe distance if they are building close to boreholes? We know that SI we don't have a sewage treatment system. We know there are sewage outlets eg Rove, and most of this places are flooded and sewage flows directly into the sea or streams or river where people are using it downstream. Chinatown sewage goes out to the water so how do we reduce the impact on our environment.

Kenneth: Boreholes does its own filtration in the way it operates. The closer they build the houses there is a risk. A Pump test is undertaken to determine the rate of water coming into the borehole at different angles. The SI system of septic system is that it is fully plastered inside. It is the soak that releases water into the ground. When the septic is full, they pump it out, the design allows all solid to stay in the septic and only the water in the soakpit is released. If the septic is close to the borehole, then it is risky. We use sand treatment for boreholes and the same is used in Australia. Pump test is usually done both night and day to find out what rate is the best to be used – using various rates etc and monitor what chemicals come out.

The presentation for the Honiara Sewage or waste treatment will hopefully be done next week so please come and listen since it is a component of the project.

Pongi Tangia: Thank you for the professional presentation. Questions or concern.

Domestic one: Fresh water, this building is using fresh water delivered by truck. We tried applying for cash water but it's too much bureaucracy.

I am concerned for 2023 which will have 3 stadiums because most of the facilities will be in the Eastern End. Have you taken into consideration the demand that will be serviced direct because in 2023 most of the facilities will require a lot of water? Have you considered this?

Kenneth: The design of the project is for 2047, it not only caters for the infrastructure for the Pacific Games. Panatina currently has one in place, the other one is an addition. The infrastructures in the East side most currently services by the current water, the industrial area.

Pongi: I am concerned because in the 2000 Olympics in Australia they had to suspend the games for one day due to the influx of athletes and people. Have you consulted with the Games Committee? We don't want this to happen.

Kenneth: We have actually met with the Committee. Our main area of concern is where the swimming pools are to be located, where lots of water will be used. The additional storage tank at Panatina will cater for that. We have considered all the infrastructure on the Eastern side of Honiara unless there is one that we are not aware off.

Ella, Honiara City Council: Just to add on to Ray's comments that we have been monitoring them and they are on track. Our people are aware not to build close to the boreholes, but our people continue to disobey. So far continuous testing of water by SW and monitoring by HCC we are satisfied - it's not perfect but we are working towards our goal. We do weekly testing of the boreholes.

Sam Ramosaea: Will SW consider bring in any special equipment for us in the future to test water? I remember one man from Israel used special equipment under Lunga Bridge and its drunk immediately.

Ray SW: We are aware of that entrepreneur who wanted to sell his products. SW looks at larger scale and to use conventional water treatment plan. An issue is that we must be able to manage and maintain the equipment so a lot of things must be considered before any options is undertaken.

The preference is conventional equipment and something that can be managed locally.

Hilda thanked Ray for his response.

There were no other questions from the participants, so Edward thanked all the participants for their attendance and reminded them about the 30-day window period.

There was no other business and the meeting ended.





Solomon Water STAKEHOLDER REGISTER - National Authority PER Meeting - 28 February 2021

No	Name	Signature	Phone	Company/Organization
1	[Signature]	[Signature]	718700	National Authority
2	DELTA MUSA	[Signature]	7517411	MTE
3	Francis Maudena	[Signature]	721649	National Authority
4	[Signature]	[Signature]		Handwritten with R.P.O.
5	Prince Nakken	[Signature]	793622	MIS
6	[Signature]	[Signature]	749255	WATER CAREK
7	John Gude	[Signature]	791825	A/R/K/W
8	[Signature]	[Signature]	711649	Handwritten with Media
9	[Signature]	[Signature]	7828120	SIPOL
10	[Signature]	[Signature]	39100	HCC
11	[Signature]	[Signature]	7182125	SIPOL
12	[Signature]	[Signature]	2611	WATER/SO
13	[Signature]	[Signature]	719181	SW

Solomon Water STAKEHOLDER REGISTER - National Authority PER Meeting - 28 February 2021

14	Mr ANDREOV	[Signature]	5781795	SOLOMON WATER
15	Crispin Sama	[Signature]	999936	Water 2
16	Eddie Rade	[Signature]		White River
17	Sopha Tonga	[Signature]	897131	SW
18	Relita Namp	[Signature]	8528750	SW
19	Hilda Rade	[Signature]	2809509	SW2
20	Willy Tetti	[Signature]	7555040	Tufan Timbers
21	STUART TATHA	[Signature]	7449610	