



Diagnostics of Pacific Water and Wastewater Association Water Utilities

PART B: SOLOMON WATER
SDG-6 STRATEGIC ACTION PLAN



Pacific Region
Infrastructure Facility

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This report was prepared by external consultants, Jan Willem Overbeek, David Cox, and Nuulopa Pereira-Hill, with the support of the Pacific Region Infrastructure Facility (PRIF). PRIF is a multi-partner coordination and technical assistance facility for improved infrastructure in the Pacific region. PRIF partners are the Asian Development Bank, Australia's Department of Foreign Affairs and Trade, the European Investment Bank, the European Union, the Japan International Cooperation Agency, New Zealand's Ministry of Foreign Affairs and Trade, the United States Department of State, and the World Bank Group.

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For more information, contact:

PRIF Coordination Office

c/o Asian Development Bank
Level 20, 45 Clarence Street
Sydney, NSW 2000, Australia

Phone: +61 2 8270 9444

Email: enquiries@theprif.org

Website: www.theprif.org

Published November 2022.

Photos courtesy of the Asian Development Bank.

The currency of Solomon Islands is the Solomon Islands Dollar (SI\$). The exchange rates are as follows:

- SI\$1 = \$0.12
- SI\$1 = A\$0.17

The currency used in this report is US dollars unless specified otherwise.



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LIST OF ABBREVIATIONS

PRIF	Pacific Region Infrastructure Facility
PCO	PRIF Coordination Office
PWWA	Pacific Water and Wastewater Association
SDG	Sustainable Development Goal
SOE	State-owned enterprise
SI UWSSSP	Solomon Islands Urban Water Supply and Sanitation Sector Project
SWA	Samoa Water Authority
SWOT	Strength, Weakness, Opportunity and Threat
USD	US dollar
WaSH	Water, Sanitation and Hygiene
WSS	Water Supply and Sanitation

1 INTRODUCTION

This report is part of the study “Diagnostics of PWWA Water Utilities” and is intended to formulate recommendations, propose measures, and develop tools to assist Pacific Island Countries, water utilities and the Pacific Water and Wastewater Association in achieving universal access to safe water and sanitation, as per the United Nations Sustainable Development Goal 6 (SDG-6).

This Strategic Action Plan outlines a broad strategy for Solomon Water to expand its services to new areas and assist with achieving the targets under SDG-6.

Solomon Water has a mandate to supply water and sewerage services in urban areas in the Solomon Islands and is currently operating in Honiara, Noro, Auki, and Tulagi, and is planning to extend services to Gizo and Munda.

This plan uses a prioritized process that endeavors to reach the highest number of people at the lowest possible cost.

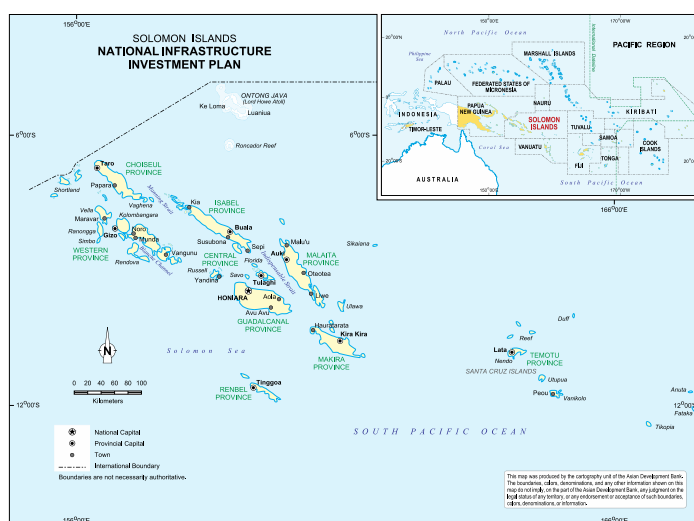
Because there are several data gaps and uncertainties regarding the accuracy of information, the document is intended to be the starting point for further investigation and incorporation into five-, ten- and twenty-year plans.

2 COUNTRY AND UTILITY CHARACTERISTICS

2.1 Solomon Islands

The Solomon Islands is an archipelagic state in the southwest Pacific Ocean, approximately 2,000 km northeast of Australia. Its land mass of 28,400 km² extends over nine main island groups comprising nearly 1,000 islands. The capital, Honiara, is located on Guadalcanal, the largest island.

Figure 1: Map of Solomon Islands



Source: Solomon Islands National Infrastructure Investment Plan 2013.

The Solomon Islands faces many infrastructure challenges. In particular, the country's geography presents enormous problems for meeting demands for municipal services and related infrastructure. A summary of provincial characteristics is shown in Table 2.1.

Table 2.1 Provincial Characteristics

Province*	Land Area km ²	Population	Characteristics
Choiseul	3,837 (13.5%)	35,037 (5.1%)	Capital: Taro (492 km from Honiara) No other urban areas One major island, many small islands Nickel mining, Logging
Western	5,475 (19.3%)	102,363 (14.9%)	Capital: Gizo (366 km from Honiara) Other urban areas: Munda, Noro and Seghe Several islands of differing size Primary tourist destination in Solomon Islands Major logging area Tuna processing - SolTuna
Isabel	4,136 (14.6%)	35,037 (5.1%)	Capital: Buala (152 km from Honiara) No other urban areas One large island, many small islands Logging, mining, fisheries, agriculture Tourism growing in north
Central	615 (2.2%)	34,350 (5.0%)	Capital: Tulagi (37 km from Honiara) No other urban areas Two groups of small islands - Florida and Russell Big copra operation in Russell Islands, logging Tourist resorts in Florida Islands
Rennell- Bellona	671 (2.4%)	4,122 (0.6%)	Capital: Tinggoa (232 km from Honiara) No other urban areas Two small islands Tourist resorts and logging
Guadalcanal	5,358 (18.5%)	210,909 (30.7%)	Honiara main urban area, government, and commercial center Many small urban settlements along north coast One large island, a few small ones Important agricultural area in eastern part of island Major gold mining and palm oil operations
Malaita	4,225 (14.9%)	183,429 (26.7%)	Capital: Auki (102 km from Honiara) Other urban areas: Maluu, Apio One large island, a few small ones Major copra and cocoa areas and palm oil Major tuna processing plant proposed at Bina harbor
Makira-Ulawa	3,188 (11.2%)	53,586 (7.8%)	Capital: Kirakira (235 km from Honiara) No other urban areas One large island, a few small ones Cocoa, logging
Temotu	895 (3.2)	28,167 (4.1)	Capital: Lata (664 km from Honiara) No other urban areas A few small islands and very remote
Total	28,400	687,000	

Note: The order of the provinces in the table follows that used in the National Census (which is west to east).
Source: Ministry of Development Planning and Aid Coordination 2013, Solomon Islands National Infrastructure Investment Plan (SI NIIP); UN Population Office 2020: provincial figures updated based on percentages SI NIIP.

2.2 The Solomon Islands Water Supply and Sanitation Sector Performance in Achieving SDG-6

SDG-6, i.e., “improved access to water and sanitation”, has quantitative and qualitative aspects and is currently monitored by the UNICEF-WHO managed Joint Monitoring Program. The status of achieving universal access to water, sanitation, and hygiene (WaSH) is presented in Figure 2.1.

Figure 2.1: Solomon Islands Access to Water and Sanitation
(% of total population)

Solomon Islands	Drinking water			Sanitation			Hygiene		
	National*	Rural*	Urban*	National*	Rural*	Urban*	National	Rural	Urban
	2017	2017	2017	2017	2017	2017	2017	2017	2017
Safely managed	-	-	-	-	-	-	-	-	-
Basic service	68	61	91	34	20	78	36	29	59
Limited service	6	6	4	6	2	18	36	40	24
Unimproved	15	18	4	7	9	0	-	-	-
No service	12	15	1	54	69	4	28	31	17

Source: WHO/UNICEF JMP 2019.

3 SOLOMON WATER - SDG-6 STRATEGIC ACTION PLAN

3.1 Rationale

Based on the data collection and the SWOT analysis described in previous chapters, Solomon Water outlined its strategic priorities to enhance its contribution to achieving SDG-6, as follows:

1. 2022–2030: Further develop, expand, and maintain WSS facilities and services in Honiara, Auki, Noro, and Tulagi and construct new WSS systems in Gizo and Munda (2020–2025) to maximize coverage
2. 2025–2030: Develop new WSS systems in Bina Harbor and Choiseul Bay (including Taro and Spizozae islands)
3. 2030 and beyond: Plan for and prioritize extending WSS services to other provincial towns
4. 2030 and beyond: Identify potential support to operations and management of rural WaSH systems in the vicinity of urban centers currently served by Solomon Water

The above priorities are based on the following considerations:

- a. Solomon Water’s mandate extends to providing water supply and sewerage services in urban areas only. The Solomon Islands WSS Policy and Implementation Plan of the Ministry of Mines, Energy and Rural Electrification charges Solomon Water with extending services to areas that are currently not served. It is therefore logical for Solomon Water, in enhancing SDG-6 achievement, to expand services in the (parts of) provincial towns and urban areas which are currently not served.
- b. Solomon Water is a state-owned enterprise and is obliged to recover most of the costs of the services it provides from its customers. This is another justification for Solomon Water to focus on urban areas, as in these areas there is, in most cases, an economic basis for operations.
- c. Solomon Water has a large ongoing project aimed at developing and enhancing the capacity of WSS systems in Honiara, Auki, Noro, Gizo, Tulagi, and Munda. This project is expected to occupy most of its resources until 2025.
- d. Feasibility studies for WSS projects in Taro, Buala, Tinggoa, Kirakira, Binu Harbour, and Lata are being planned or under preparation, and implementation of these projects has priority for 2025–2030.
- e. As Solomon Water is the only WSS utility in Solomon Islands, it has the technical and organizational skills to support ongoing efforts in expanding WSS services to rural areas. This would apply for the period beyond 2030. To satisfy the commercial obligations of Solomon Water as a state-owned enterprise, these services would somehow have to be compensated for by, e.g., civil society organization contracts or contributions from customers.

3.2 Priority 1: Enhance capacity and extend coverage for WSS services in Honiara, Auki, Noro, Tulagi, Gizo, and Munda

Currently, Solomon Water provides water supply services in Honiara, Auki, Tulagi, and Noro and sewerage services to part of Honiara. The Solomon Island Urban Water and Sanitation Sector Project is ongoing to develop and/or enhance the capacity and rehabilitate WSS systems in these towns. The most effective and efficient means of making progress towards delivering SDG-6 goals is by making maximum use of the extended capacity in these WSS systems.

The advantages of making optimal use of existing water supply and sanitation capacity include the following:

- Low cost (extension of services effectively “adds onto” existing systems and uses existing mains to assist in delivering the new services, resulting in economies of scale)
- The largest unserved populations are generally on the outskirts of these centers and could be reached economically through expansion of services
- Access to future skilled operations and maintenance (Solomon Water already has maintenance capacity and this can be increased more effectively than training an entirely new team)
- Access to (increased) revenue (generally willingness and ability to pay for services) is higher in major urban centers as compared to very remote areas
- Access to skilled water management (Solomon Water already manages water supply and sewerage systems and can increase that capacity when expanding into new areas)

3.3 Priority 2: Extending WSS Services to Choiseul Bay (Taro and Sipozae) and Bina Harbor (Malaita)

At present there are plans under the ADB-funded Urban Water Supply and Sanitation Sector Project, Detailed Engineering Design Phase 2 to undertake the Feasibility Studies and Detailed Design of water and sewerage at Choiseul Bay, including Taro and Sipozae Islands (Choiseul Province). Given the present funding support, future construction of the proposed works may also be funded by development partners.

At present, the Bina Harbor (Malaita Province) tuna factory project is being implemented. To support this large-scale development, a WSS feasibility study is also being proposed. This economic development increases the priority and feasibility of providing WSS services in this area.

As mentioned above, the future expansion of water and sanitation services into the above locations will have a sizeable impact on achieving SDG-6 goals.

Recommendations:

- a) Water and sewerage services shall be extended as far as possible in these areas with utilization of donor funding
- b) Solomon Water to enhance its operational capacity to ensure that these new areas can be sustainably serviced

3.4 Priority 3: Extending WSS Services to Other Provincial Towns

The following key provincial towns do not currently have an operational piped water or sewerage system and no current initiatives exist to provide them.

- Seghe (Western Province)
- Buala (Isabel Province)
- Tigoa (Rennell-Bellona Province)
- Maluu (Malaita Province)
- Apio (Malaita Province)
- Kirakira (Makira-Ulawa Province)
- Lata (Temotu Province)

As part of this study, a high-level technical review of each town was undertaken to prepare a prioritized action plan for the delivery of WSS services. The results of this review are presented in Part

B of this report. The review has taken place at the conceptual level to allow for prioritization. The purpose of the technical reviews is to outline possible servicing arrangements. Each town will require a detailed feasibility study to determine appropriate solutions. In particular, the lack of hydrogeological data on water sources means that these will need to be investigated in detail as part of a future project.

Regarding sanitation, the provision of conventional sewerage systems in the towns is likely to be a phased process that will evolve over many years due to the high cost of such systems. The implementation of the improvements in sanitation may therefore be as follows:

- a) installation of septic tanks in unserved areas in combination with the implementation of awareness campaigns and hygiene educational programs;
- b) rehabilitation/replacement of damaged septic tanks and pit latrines;
- c) making adequate arrangements for emptying and maintenance of septic tanks in collaboration with municipal authorities;
- d) construction of conventional sewerage system in densely populated sections of town (such as the central business district) and adjacent areas; and
- e) extension of sewerage system to the wider town area.

3.4.1 Seghe (Western Province) Water Supply and Sanitation Options

The layout of the Seghe urban development is located close to the airport as shown below:



Seghe: Town Overview

Source: Google Earth and author, 2022

a) Water Supply Options

There is no obvious surface water source adjacent to the settled area; however, there appears to be a significant river running to the northwest of Seghe, and which is served by the catchment south of the steep ridgeline. This river then flows toward Tambiko Island, as shown below.



Seghe: Potential Water Source

Source: Google Earth and author, 2022

The urban area of Seghe has a low zone south of the airstrip at approximately 1 to 5 m above sea level.

The settled area north of the airstrip ranges in elevation from 5 to approximately 38 m.

Assuming that the water source is adequate, one possible water supply solution would be to:

- a) pump water from a raw water pump station at the water source at approximately 20 m elevation to ensure adequate yield but reduce the risk of saline intrusion;
- b) provide a water treatment plant at approximate elevation of 60 m. This plant could be located alongside the access road (approximately 450 m from the raw water pump station), which runs along the ridge line;

- c) provide a treated water tank at approximate elevation of 60 m adjacent to the water treatment plant;
- d) use a trunk main down the access road to Seghe to provide water under gravity to the high and low elevation reticulation zones either side of the airstrip

The proposed option is shown below:



Seghe: Water Supply Zones Option

Source: Google Earth and author, 2022

There may be many alternative options developed as part of a future feasibility study. Providing reliable power to the river intake and treatment plant would be a key consideration. The raw water pump station and treatment plant are located approximately 2.3 km from the airstrip, which is not a significant distance.

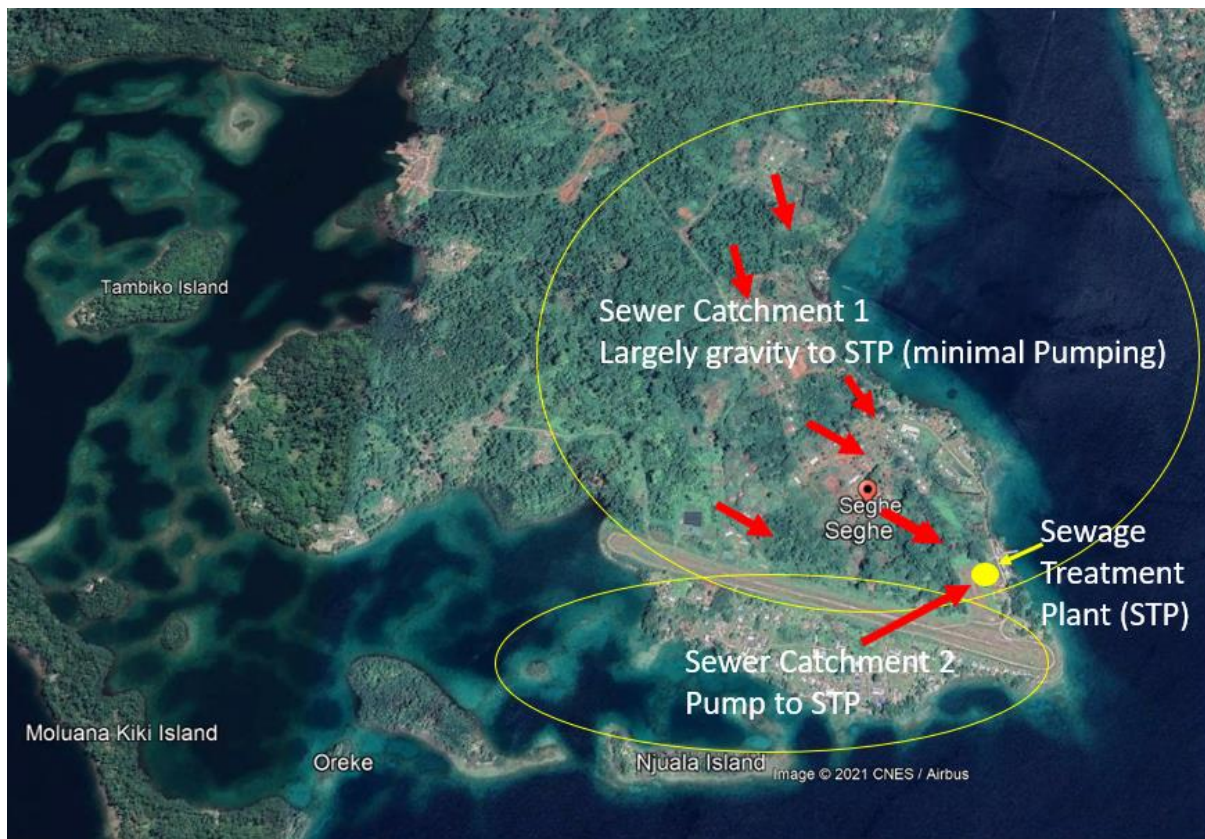
b) Sewerage Options

An overview of the potential sewerage system is included below:

Sewage Catchments

The topography of the land for the sewerage system is conducive to draining towards the ocean in a similar way as the water supply system described above.

The town can be divided into two main catchments as shown below:



Seghe: Sewerage Catchments

Source: Google Earth and author, 2022

Within Catchment 1, the higher elevation properties would drain effectively towards the shoreline under gravity. Although there would be pumping required to the sewage treatment plant (STP) from Catchment 1, pumping within Catchment 1 could be minimized by effectively making use of the prevailing topography.

Catchment 2, which is significantly smaller (and lower) than Catchment 1, will require additional pump stations to service the properties.

Sewage Treatment Plant and Ocean Outfall Locations

The location of a suitable site for an STP and ocean outfall is key considerations.

The following locations were identified, as shown below:



Seghe: Potential STP and Sewer Outfall Locations

Source: Google Earth and author, 2022

The following factors for the siting of an STP are important:

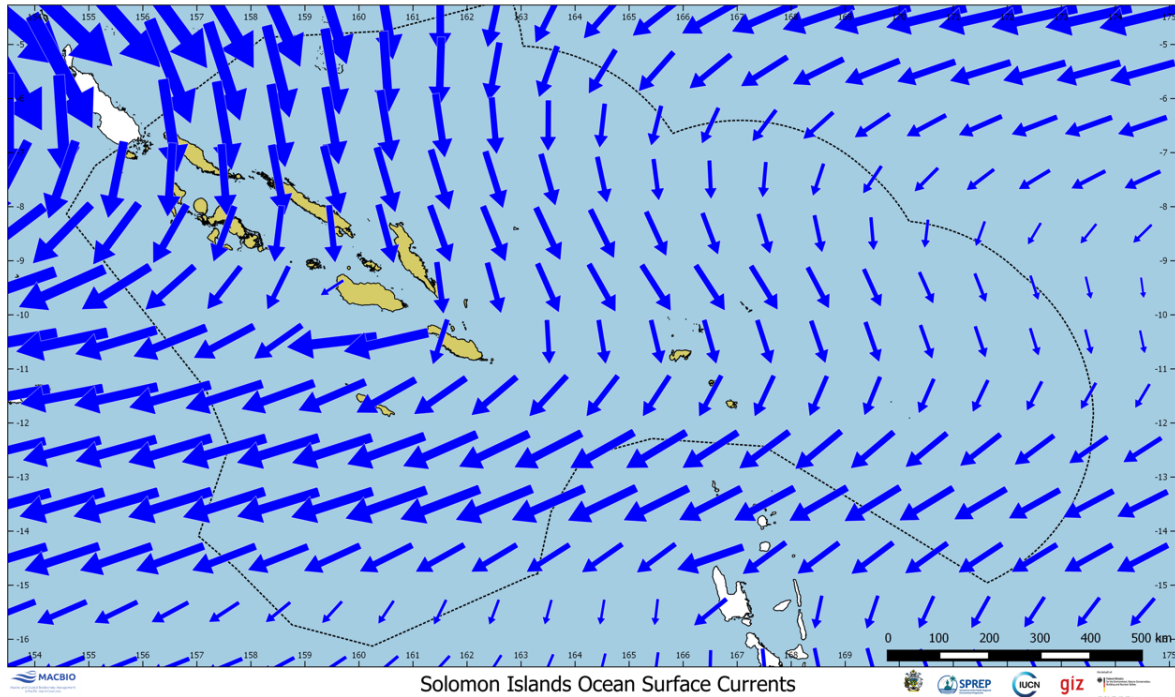
- Land ownership
- Separation from residential areas and impact on amenity
- Flat land preferable (especially for sewage lagoon systems)

It was observed that there was an area of flat land at low elevation, which may be part of the government airstrip. As such, land ownership issues could possibly be avoided. The land could be utilized for a variety of treatment plants, although the possible use of a lagoon system would need to be investigated in the light of its proximity to the airstrip (breeding of birds risk).

There will be other site options available and various sewage treatment plant processes that would be considered at the feasibility stage.

The ocean outfall should also consider the prevailing currents. A high-level overview of the prevailing currents in the Solomon Islands is shown below.

Generally, the currents run north to south and north to southwest near Seghe.



- ↑ Current Vector
- ▭ Province Boundaries
- ⋯ Exclusive Economic Zone
- ▭ Coastline

An ocean current is a continuous, directed movement of seawater generated by forces acting upon this mean flow, such as breaking waves, wind, the Coriolis effect, cabbeling, temperature and salinity differences. Depth contours, shoreline configurations, and interactions with other currents influence a current's direction and strength. The South Equatorial Currents of the Atlantic and Pacific straddle the equator. Though the Coriolis effect is weak near the equator, water moving in the currents on either side of the equator is deflected slightly poleward and replaced by deeper water. Thus, equatorial upwelling occurs in these westward flowing equatorial surface currents. Upwelling is an important process because this water from within and below the pycnocline is often rich in the nutrients needed by marine organisms for growth. By contrast, generally poor conditions for growth prevail in most of the open tropical ocean because strong layering isolates deep, nutrient rich water from the sunlit ocean surface.

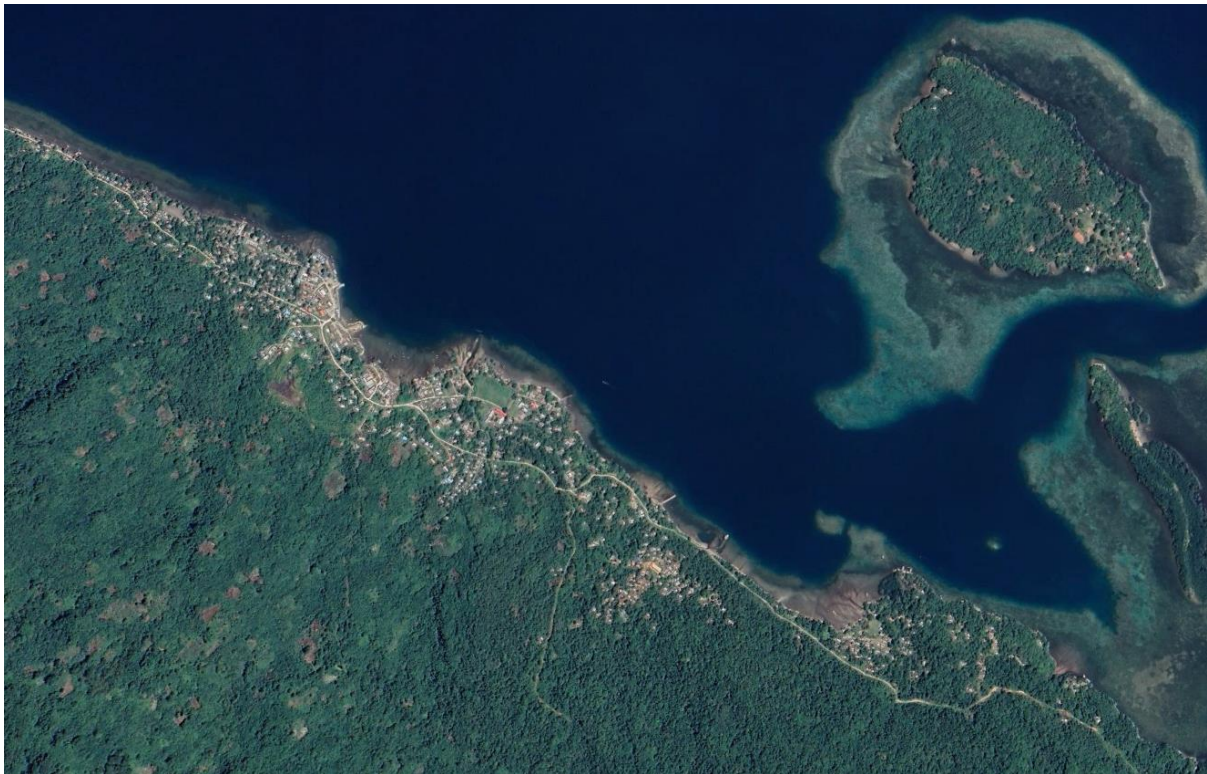
Data Sources:
 Land outlines: Ministry of Lands and Survey
 Currents: NOAA Ocean Surface Current Analysis - Real Time, <http://www.oscar.noaa.gov/>

For the outfall, it is important to reach adequate depth, thus ensuring dilution and mixing in the current. Approximately 100 m from the potential STP site, there is an existing jetty; the new outfall could be attached to the jetty and extended into the deep water. The effluent would then be swept with the current in a southerly direction and away from the site.

3.4.2 Buala (Isabel Province) Water Supply and Sanitation Options

Buala is the capital of Isabel province and, as such, would be a priority town for further development. The province has several economic activities, such as logging, mining, fisheries, and agriculture, and tourism is growing in the northern part. Solomon Water has also been approached by the provincial government about developing a water supply for Gozaruru, which is about 10 km up the coast from Buala. This option is not considered in this report.

The layout of the Buala urban development area is shown below:



Buala Urban Area

Source: Google Earth and author, 2022

There are also additional villages that run along the coastal road to the northwest and southeast of Buala. For the purpose of this assessment, we have assumed that the area in the image above would be supplied by a future water and sewerage system.

Buala borders on the ocean at the eastern side and steep hills on the western side of the town.

a) Water supply options

There appears to be no large water source immediately adjacent to the town although there are most likely multiple streams in the hills that could potentially be harvested. From satellite mapping, two rivers were located; River 1, approximately 6 km north west of the town, and River 2, approximately 9 km southeast of the town. It is likely that one (or both) of these sources could be used to meet the water demand.

The town and coastal strip are generally settled with dwellings up to a maximum elevation of approximately 50 m. An exception to this is a localized pocket of properties extending up to an elevation of approximately 110 m (includes nearly all houses in that cluster).

Due to the difference in elevation, it would make sense to have the water supply system servicing at least two zones, namely

- Zone 1 – town and coastal strip; and
- Zone 2 – high elevation zone

A reservoir (Reservoir 1) located at approximately elevation 72 and a high-level reservoir (Reservoir 2) located at approximately elevation 120 m would service the two zones. It is possible that the two zones would operate independently.

The proposed arrangements are shown below.



Buala Reservoir Locations

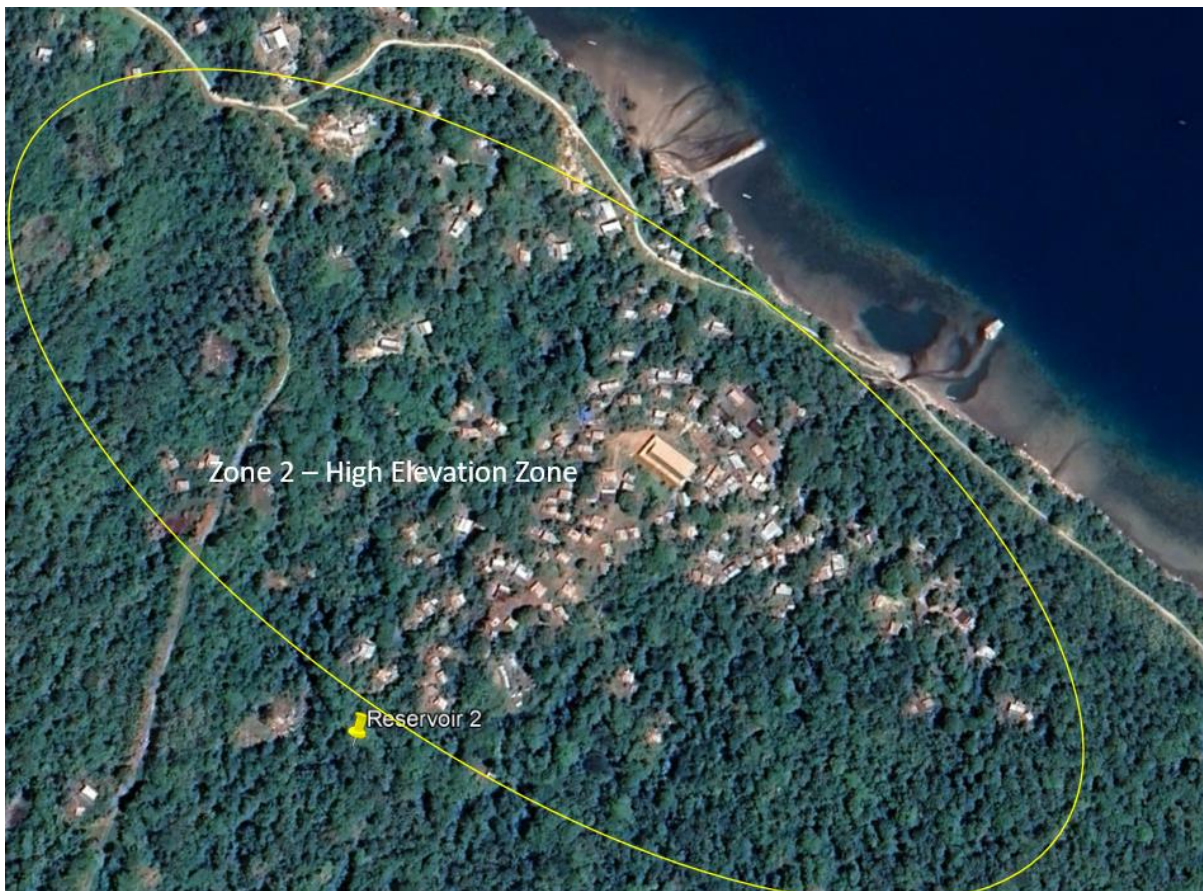
Source: Google Earth and author, 2022



Buala Water Supply Zones

Source: Google Earth and author, 2022

For added clarity, Zone 2, the high elevation zone, is shown below:



Buala: High Elevation Supply Zone

Source: Google Earth and author, 2022

The water supply system would consist of the following:

- a) Raw water pumped from River 1 and/or River 2 (subject to hydrological assessment) to a WTP
- b) The WTP would be suitably located depending on the raw water source(s)
- c) Treated water pumped from WTP to Reservoirs 1 and 2
- d) Water supply from Reservoir 1 to Zone 1
- e) Water supply from Reservoir 2 to Zone 2

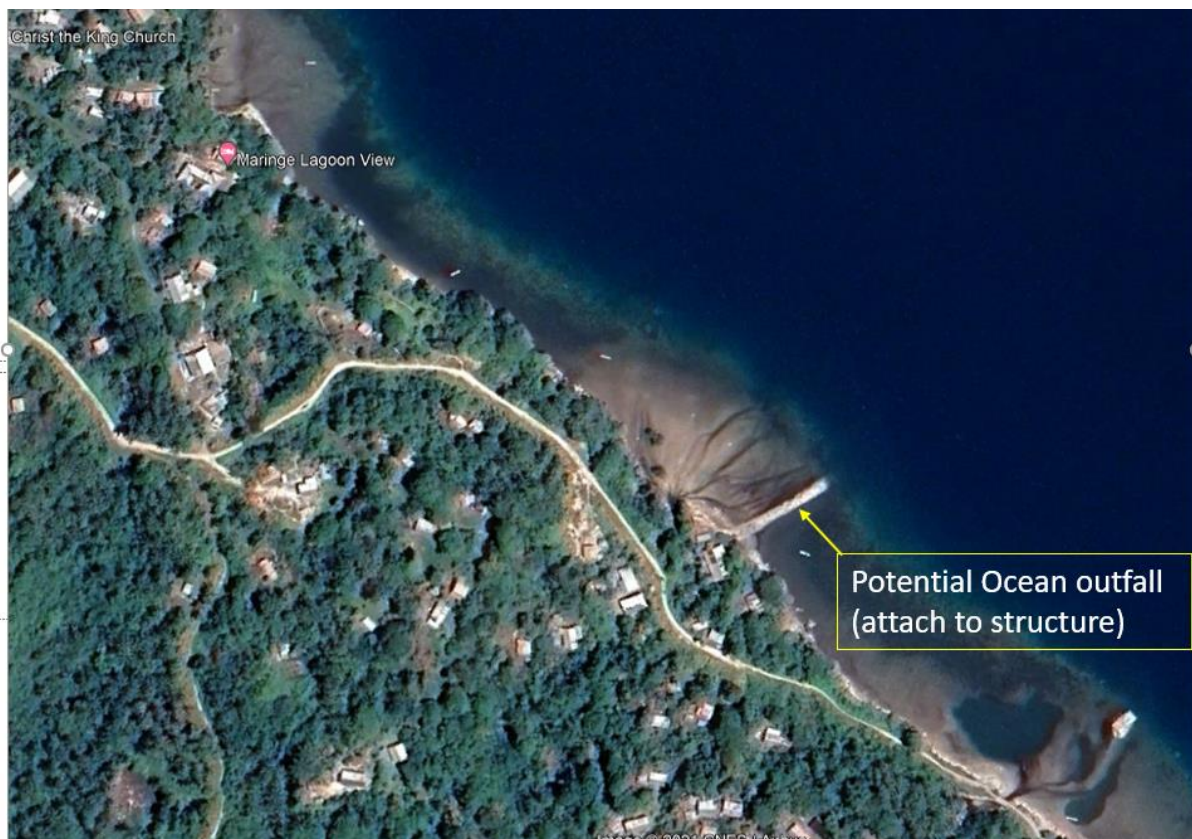
b) Sewerage options

Sewerage Catchments

Due to the town extending along the coastline and the hills to its western side, the sewerage catchment would be able to drain towards the main coastal road and generally towards the sea.

There would be considerable effort (and cost) to sewer the entire area, as highlighted in the figures above and it would most probably need to be done in phases.

The main town area as shown below and neighboring residential areas could form part of the first phase, in this way, the higher density of housing could be incorporated cost effectively. In addition, trade wastes from the industrial areas could be managed more effectively.



Buala Main Town Area

Source: Google Earth and author, 2022

The selection of a suitable Sewerage Treatment Plant site would still need to be determined; however, there is a marine structure which may be suitable for a potential ocean outfall.

3.4.3 Tigoa (Rennell-Bellona Province) Water Supply and Sanitation Options

The town of Tigoa (Tingoa also commonly used) is located on the northwest part of Rennell Island some 40 km from Lake Tenganu and 230 km from Honiara. The 2013 population of Tigoa was estimated at 613. The small town has developed around the airport as shown below. Economic activities include logging and there are some tourist resorts.



Tigoa Town Overview

Source: Google Earth and author, 2022

a) Water supply options

There is no obvious surface water source adjacent to the settled area and an investigation into surface/groundwater options is required.

The houses in the settlement appear to have a maximum elevation of approximately 20 m. As such, a reservoir located at approximately 40 m elevation could service the town. A potential location is shown below.



Tigoa Reservoir Location

Source: Google Earth and author, 2022

The satellite image for parts of Tigoa is poor and there may be many alternative options for siting a reservoir at the required elevation.

The annual rainfall at Tigoa is approximately 4,000 mm, which is extremely high. As such, multiple rainwater harvesting opportunities exist as a possible alternative to a conventional water supply system. Similarly, a hybrid of the two systems may be appropriate.

b) Sewerage options

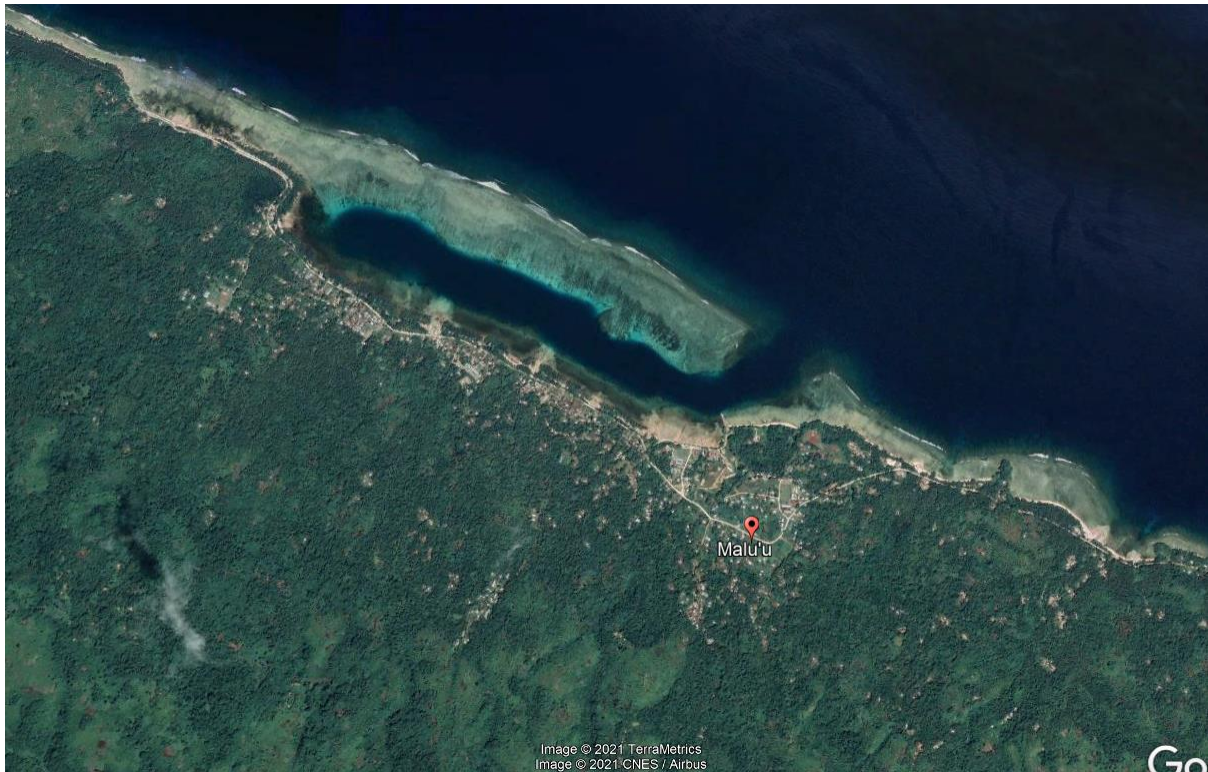
The settled area is relatively flat with some fall towards the airstrip – the midpoint of the runway being lower than the two ends of the runway. With available space between dwellings and a gentle fall across the area, a gravity sewer system would be relatively easy to install.

There are many locations near the airport that could accommodate a new sewage treatment plant. With copious available space and the remoteness of the town, a lagoon treatment system may be the most suitable option.

3.4.4 Maluu (Malaita Province) Water Supply and Sanitation Options

The town of Maluu is located on the northwestern region of Malaita Island. The town spreads out

along the coastal road and extends to the west with additional settlements also to the east along the coastal road. Economic activities include copra and cocoa growing and palm oil. Solomon Water received an informal request from the provincial authorities to assist with water supply in this area. The approximate extent of the town is as shown below.



Maluu Town Overview

Source: Google Earth and author, 2022

a) Water supply options

There are no obvious surface water sources adjacent to the settled area; however, there are rivers reaching the sea located approximately 5 to 10 km from the town itself as shown below.

Groundwater is also an option that should be assessed in a future feasibility study. The river source identified would most likely be viable; however, groundwater (if available) may be a cheaper option.



Maluu Surface Water Sources

Source: Google Earth and author, 2022

An investigation into the yield from these sources would be undertaken and one or more of these sources utilized to provide raw water to the town. In addition, groundwater sources closer to the town may also be investigated as part of a future feasibility study.

The developed area has a range of elevations with residential elevations at varying elevations up to 100 m. The nature of the distribution of the dwellings is such that multiple pump stations and reservoirs will be required to serve the town and surrounding areas.

b) Sewerage options

The hills to the east of the coastal road provide adequate elevation to direct sewer flows towards the coastal road where they can be collected and pumped to a new STP. The land between the road and the sea could also form a separate sewer catchment and would convey the flows to the proposed new STP.

There is potential to construct a future sewer outfall alongside the existing jetty to ensure that the effluent discharges to deep water. In addition, the location of the jetty would ensure that tidal currents would sweep effluent away from the town through the channel during outgoing tides.



Maluu: Potential STP and Ocean Outfall Locations

Source: Google Earth and author, 2022

A potential STP site would be on the vacant land adjacent to the existing jetty.

3.4.5 Apio (Malaita Province) Water Supply and Sanitation Options

The town of Apio is in the southern region of Malaita Island. The town spreads out along the coastal road and extends to the west with additional settlements also to the east along the coastal road. Economic activities include copra and cocoa growing and palm oil.

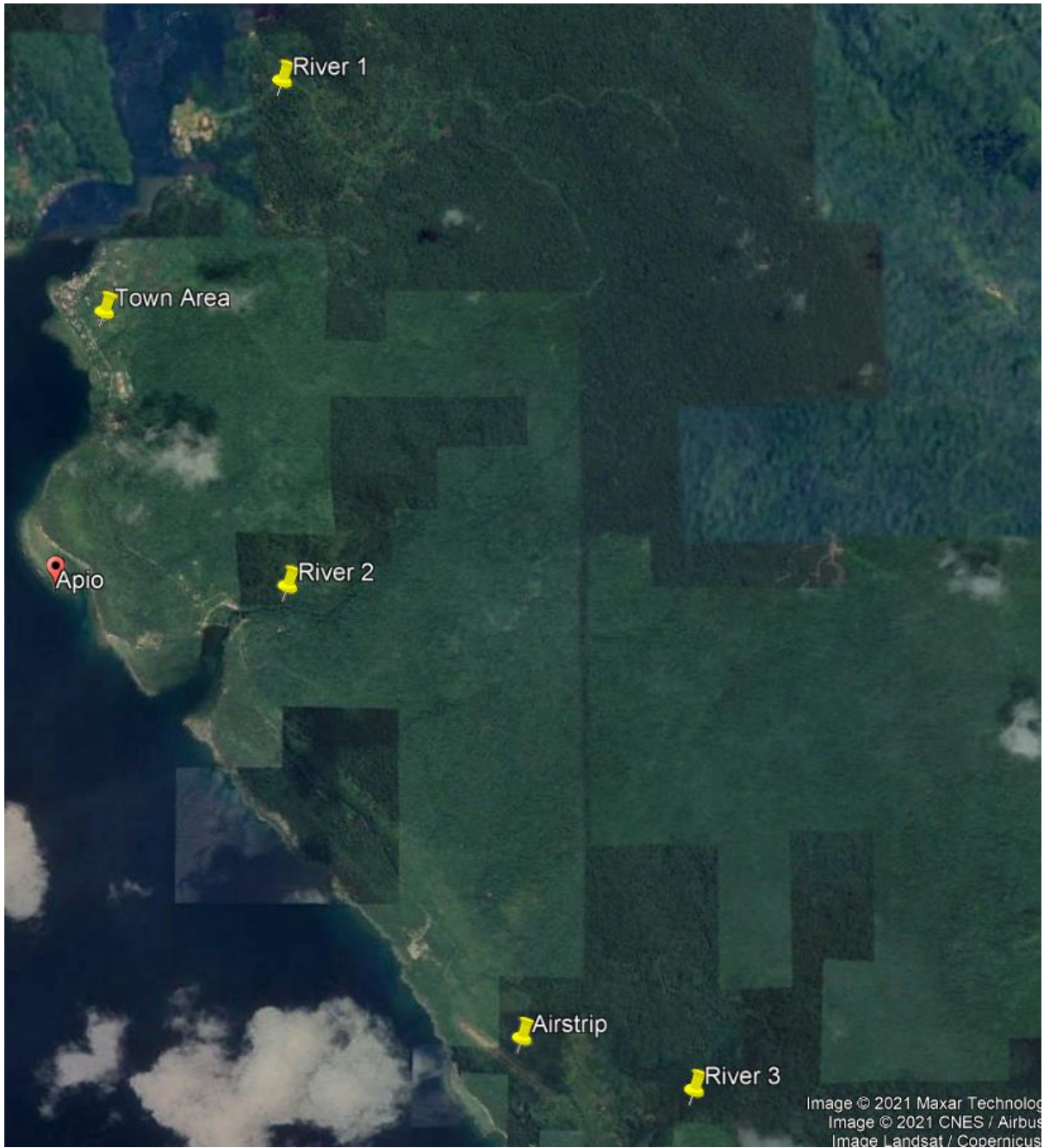


Apio Town Overview

Source: Google Earth and author, 2022

a) Water supply options

There are two rivers close to the town: River 1 is located to the northeast of the town approximately 1.5 km from the edge of town, while River 2 is approximately 2km southeast of the town. River 3 is located approximately 100 m from the airstrip. The locations are shown below.



Apio River Locations

Source: Google Earth and author, 2022

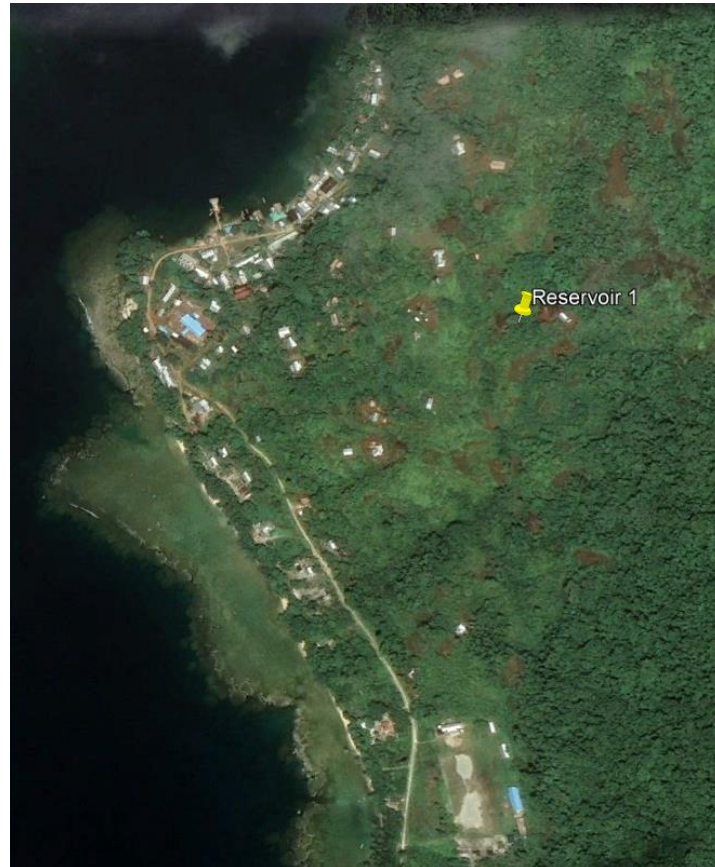
Based on the presence of these three sources and the small size of the town, it is probable that adequate raw water exists to service the town using one or more of the available nearby rivers.

River 1 has the advantage that gravity supply to the town may be achievable, although the terrain and accessibility may be problematic. If feasible, the WTP would be in or near to town where there is available power.

In the event of Rivers 2 or 3 being selected based on the hydrological assessment, the raw water intake(s) and pump station(s) would be accordingly located.

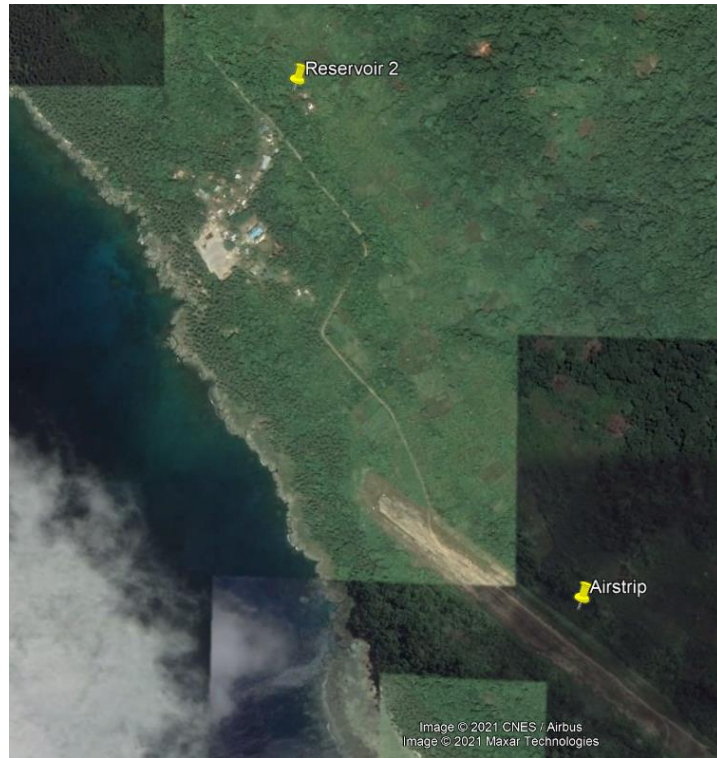
It is feasible to locate one reservoir (Reservoir 1) to serve the town area itself and a second reservoir (Reservoir 2) to service the settlements near the airstrip and surrounding areas. Reservoir 1 would be located at approximate elevation 60 m and Reservoir 2 located at an approximate elevation 35 m.

The approximate proposed locations are shown below:



Apio Reservoir 1 Location

Source: Google Earth and author, 2022



Apio Reservoir 2 Location

Source: Google Earth and author, 2022

b) Sewerage options

In the town area, the hills to the east of the town ensure that the land falls to the coastal road as shown below.



Apio Potential Sewer Drainage Direction

Source: Google Earth and author, 2022

As such, the flows from the properties to the east of the coastal road can be well served by a sewer main running along the coastal road. Properties between the coastal road and the sea, however, also fall towards the sea and the sewage will need to be collected in many cases between the houses and the sea. These houses which appear to be on large allotments may require individual small stations to pump effluent to the main sewer(s).

There is an abundance of vacant land in the area and a suitable parcel would need to be identified for the STP. With the small town size and availability of land, a lagoon-based treatment system may be appropriate and practical. An ocean outfall option may be used to discharge effluent alongside the existing jetty as shown below.

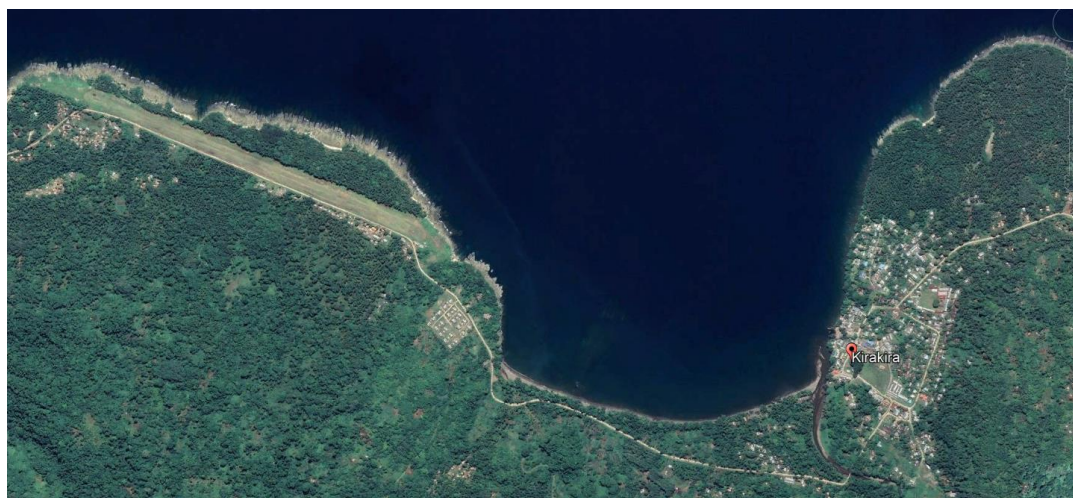


Apio Potential Ocean Outfall Location

Source: Google Earth and author, 2022

3.4.6 Kirakira (Makira-Ulawa Province) Water Supply and Sanitation Options

Kirakira town is serviced by the airstrip located to the west of the town, which is located at 235 km from Honiara. Cocoa and logging are the main economic activities. There is an old water supply serving the town, but it is understood that this has fallen into disrepair.

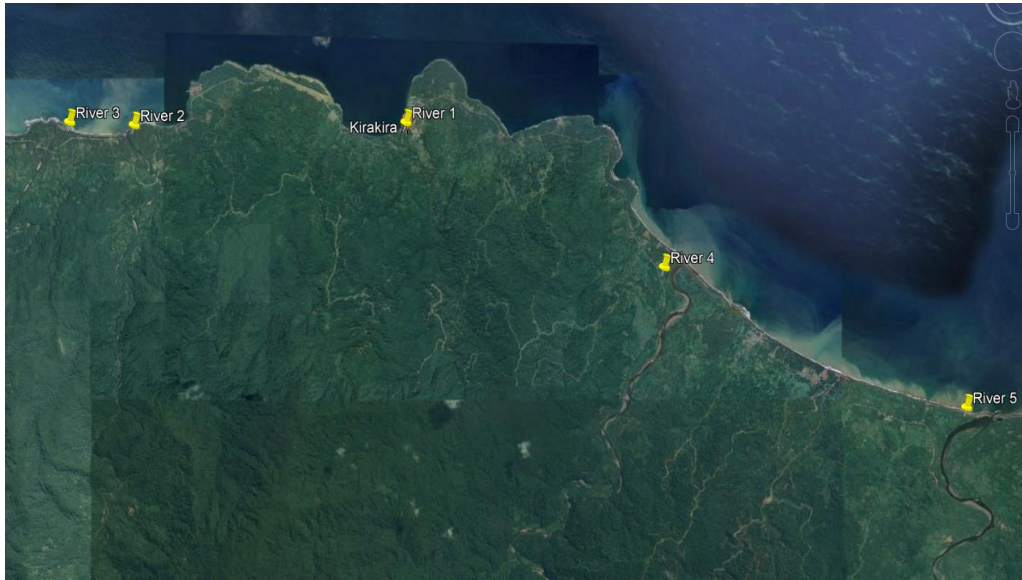


Kirakira Town Layout

Source: Google Earth and author, 2022

a) Water supply options

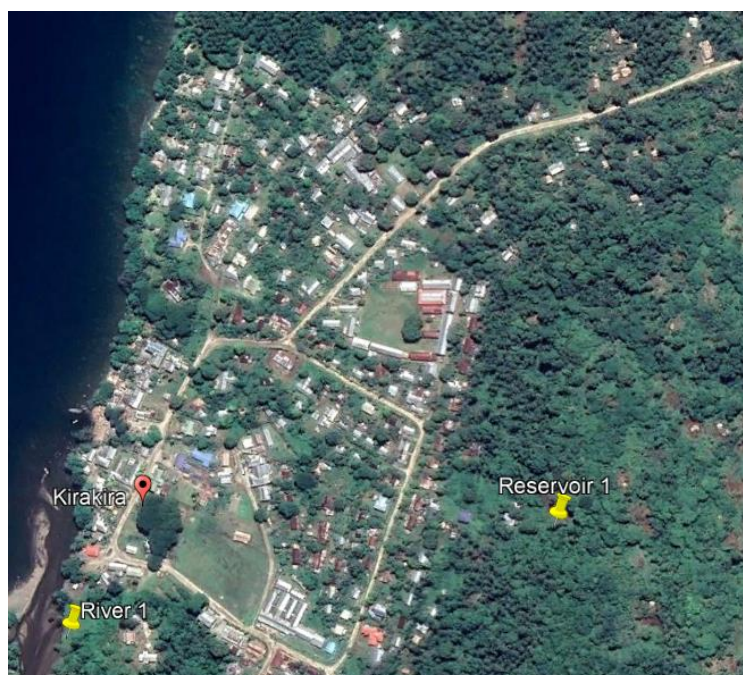
The first option would be to rehabilitate the old water supply system; this option should be investigated during a feasibility study. In addition, there are several river water sources in the adjacent area to the town, as shown below.



Kirakira River Sources

Source: Google Earth and author, 2022

One of the river sources (“River 1”) is located adjacent to the town itself; however, it may be inadequate for the demand and additional sources may need to be utilized. It may be possible to construct a reservoir at approximate elevation 50 m to supply the town and along the coastal road to the west and east as shown below:



Kirakira Reservoir 1 Location

Source: Google Earth and author, 2022

b) Sewerage options

The land appears to fall towards the road and the large open grassed area in town as shown below.



Kirakira Drainage Path

Source: Google Earth and author, 2022

A conventional sewer system could be constructed to take advantage of the topography with a sewage pump station to be located adjacent to the grassed area. Sewage would then be pumped to the treatment plant.

There is the opportunity to site an STP on the headland to the northeast of the town. An ocean outfall could be constructed extending from the rocky shores, as shown below.

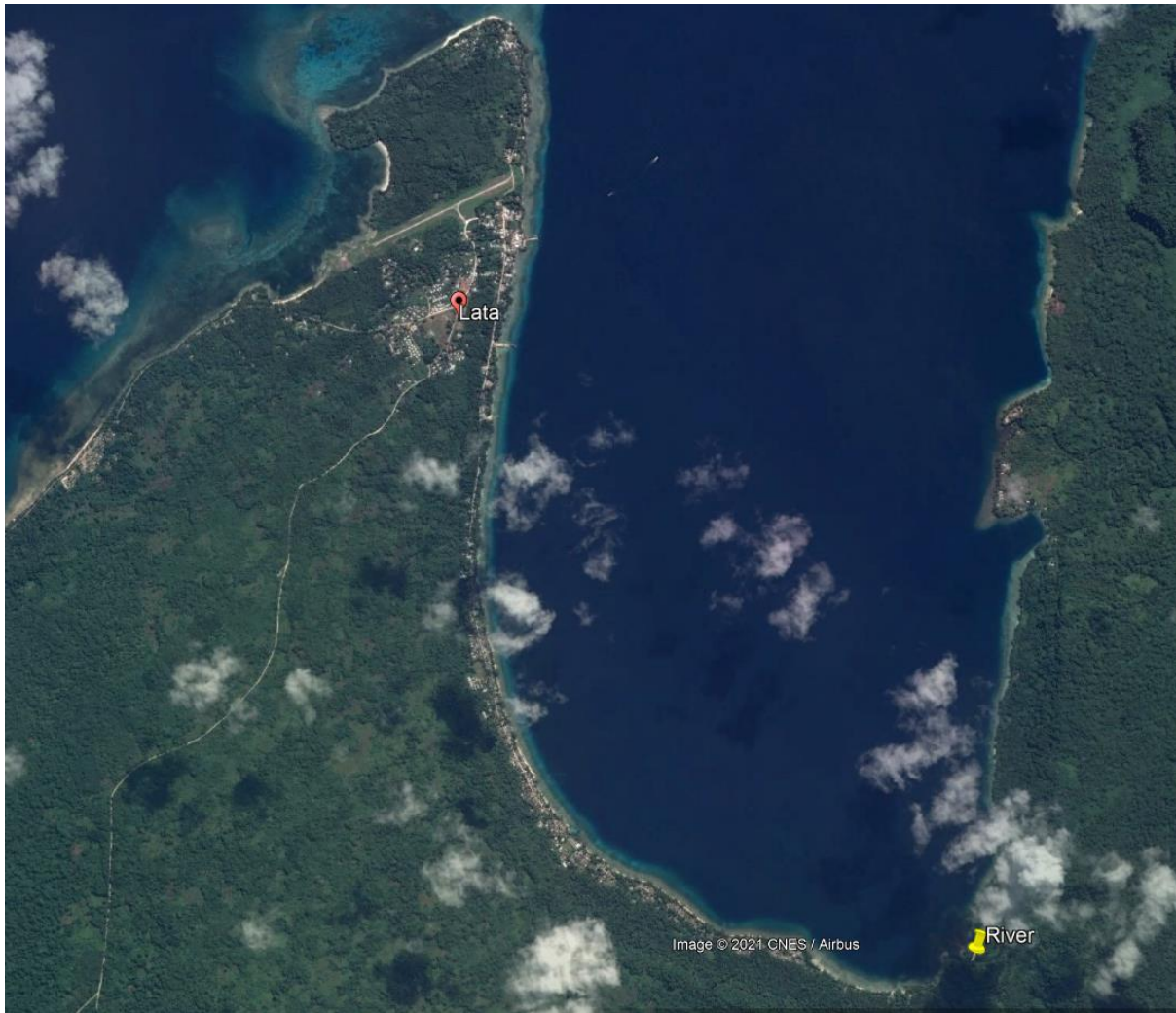


Kirakira Potential STP and Outfall Sites

Source: Google Earth and author, 2022

3.4.7 Lata (Temotu Province) Water Supply and Sanitation Options

Lata town is located on a headland and is serviced by an airstrip. Lata is some 664 km from Honiara. The town area is located to the south of the airstrip and development extends all the way along the coastline to the southeast of the town.



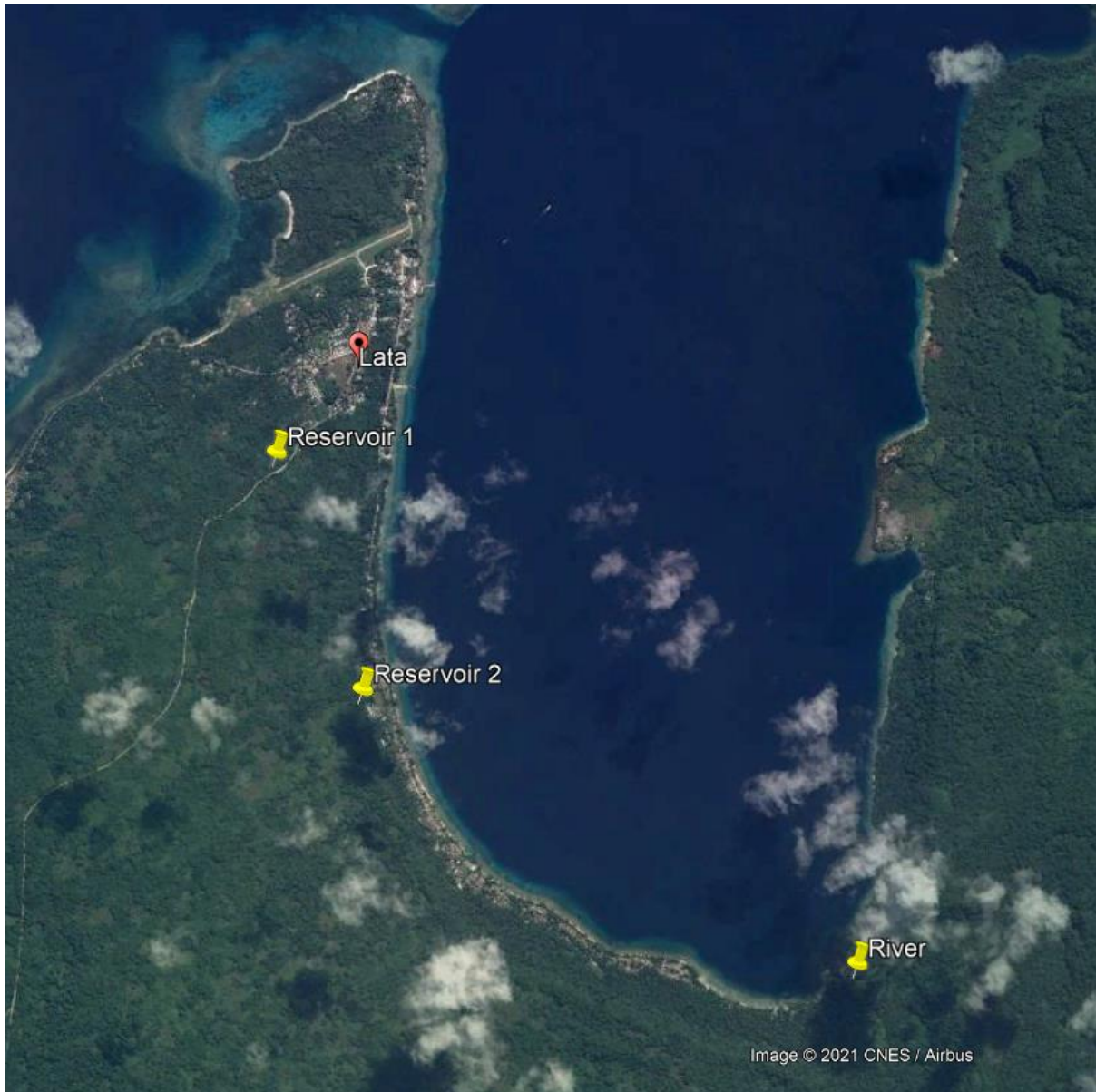
Lata Town Overview

Source: Google Earth and author, 2022

a) Water supply options

The closest water source is the large river located to the southeast of the town approximately 7 km from the town. It would be possible to service the bulk of the extended town supply by providing two reservoirs:

- Reservoir 1, at approximately 60 m elevation; and
- Reservoir 2, also at approximately 60 m elevation



Lata Proposed Reservoir Locations

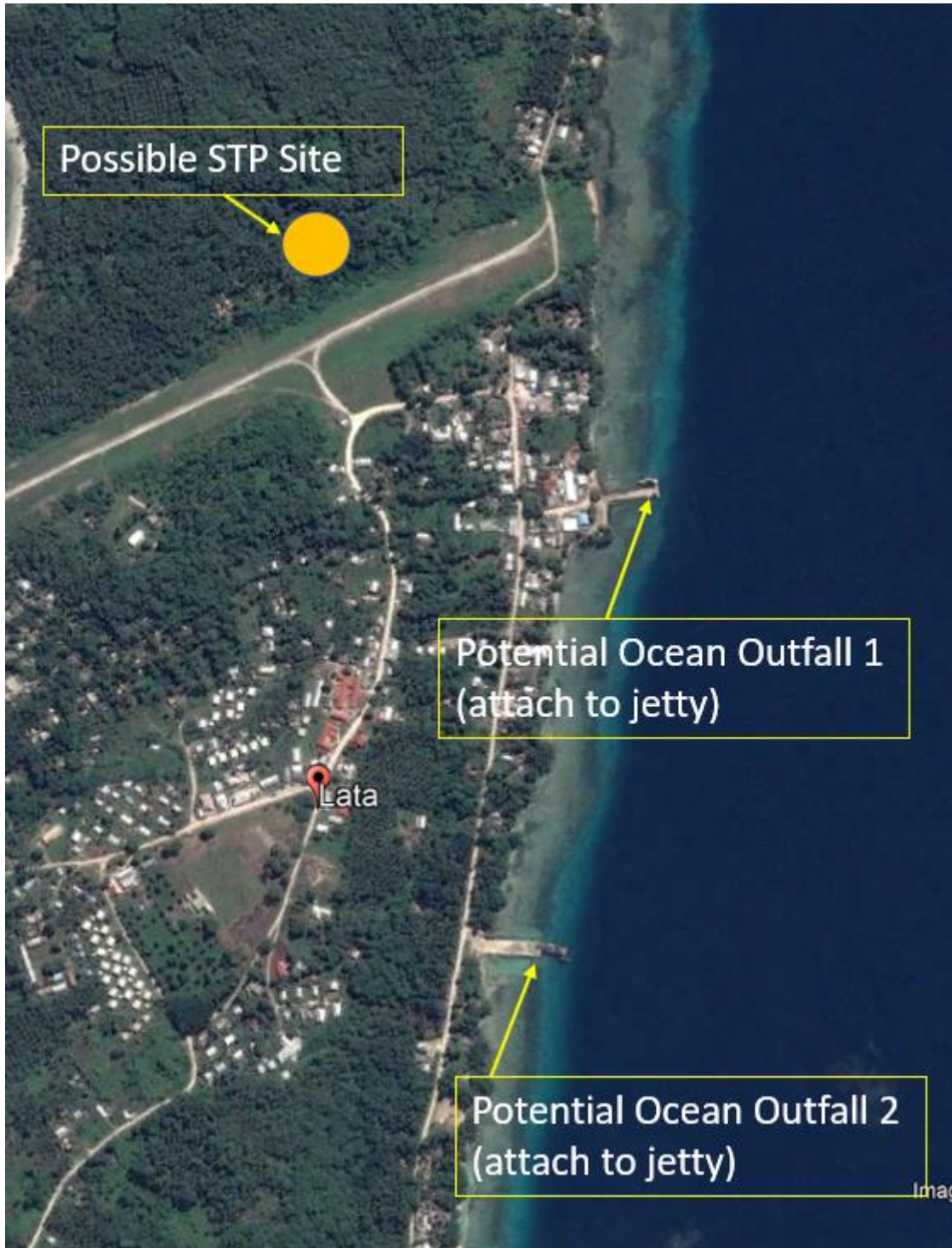
Source: Google Earth and author, 2022

Reservoir 1 would service the town area and Reservoir 2 would service the coastal strip to the southeast of the town.

b) Sewerage options

The town sewerage system would be graded to fall towards the airstrip and the developments along the coastal strip sewage collected along the coastal road and pumped to the STP.

A potential STP site was identified adjacent to the airstrip. Depending on the type of treatment process adopted, the use of lagoon systems will need to be considered regarding the possible impact on water birds inhabiting the ponds close to the airstrip. Two possible ocean outfall sites were identified close to the town and airstrip as shown below:



Lata Potential STP and Ocean Outfall Locations

Source: Google Earth and author, 2022

4 PRIORITIZATION FOR ACHIEVING SDG-6

4.1 Ongoing Projects

Under the Solomon Islands Urban Water and Sanitation Sector Project (funded by the Asian Development Bank, European Union, and World Bank), plans exist for the rehabilitation, upgrading and development of WSS infrastructure and part of these plans are already being implemented. These projects are largely focused on the rehabilitation of existing infrastructure and expansion of services in the larger urban centers such as Honiara and Auki or for the provision of new, rehabilitated or expanded services in several small provincial towns, including Auki, Noro, Tulagi, Munda, and Gizo. In some towns feasibility studies are planned or ongoing.

Item	Town	Province	Action	UEWSS
1	Honiara	Honiara City Council	Expansion of water supply system into additional areas	UWSSP
2	Auki	Malaita	Expansion of water supply system into additional areas	UWSSP
3	Choiseul Bay, Taro and Sipozae	Choiseul Province	Feasibility Study for Water and Sewerage	UWSSP
4	Gizo	Western Province	Water Supply system	UWSSP
5	Munda	Western Province	Water Supply system	UWSSP
6	Tulagi	Central Province	Water Supply system	UWSSP
7	Bina Harbour	Malaita Province	Water Supply System	Not confirmed

SI UWSSP - Solomon Islands Urban Water Supply and Sanitation Sector Project

Source: Authors.

The most efficient and cost-effective way for Solomon Water to increase access to safe WSS services (SDG-6) is to fully utilize the increased capacity of infrastructure and to maximize coverage in the above urban areas and connect the maximum number of households to the water supply and sewerage network.

4.2 Remaining Provincial Towns – Water Supply Prioritization

The remaining provincial towns were investigated for prioritization, as follows:

- Seghe (Western Province)
- Buala (Isabel Province)
- Tigoa (Rennell-Bellona Province)
- Maluu (Malaita Province)
- Apio (Malaita Province)
- Kirakira (Makira-Ulawa Province)
- Lata (Temotu Province)

To prioritize water supply development in these towns, an evaluation matrix was developed in consultation with Solomon Water. The proposed evaluation criteria are shown below:

Nr	Evaluation Factor
1	Population size
2	Current waterborne disease risks – use past health records if available
3	Economic viability (industrial activity and employment)
4	Available water resources – river/borehole/other
5	Reliability of raw water supply (large rivers or just rainwater harvesting, etc.)
6	Raw water quality
7	Proximity and ease of staff and supplies access from Honiara
8	Availability of skilled potential operators in town
9	Existing water supply system-piped system/wells/other
10	Potential for gravity-based water supply
11	Estimated capital costs to provide water supply to town
12	Estimated operational costs to run water supply system
13	Ability to pay for water
14	Willingness to pay for water
15	Government and community willingness for Solomon Water to provide services

Source: Authors.

As part of this brief study, it became apparent that it would not be possible to acquire sufficient information on each of these centers to complete a full evaluation, including all the proposed 14 factors. Issues such as the lack of available information, requirement for surveys at the towns (not possible within project timeframe), and financial analysis requirements has led to the exclusion of several proposed criteria.

A simplified evaluation matrix was therefore adopted for water supply which included:

- Population to be served
- Raw water availability (reliability)
- Relative complexity of water supply system
- Logistical issues (distance from Honiara for support)

A rating system and weighting of the factors were applied as follows:

Each category was rated using a 1-to-5-point score as follows:

Table 4.1: Prioritization Criteria and Rating for Water Supply

Score	Population	Raw Water Availability	Relative Complexity of Water Supply System	Logistical (Technical Support) Factor
1	1 to 1,000	No surface water (needs boreholes or desalination plant)	More than four treated water pump stations to reservoirs and multiple water supply zones	> 400km from Honiara
2	1001 to 3,000	Limited surface water and > 10km from town	Three to four treated water pump stations to reservoirs	300 to 400km from Honiara
3	3,001 to 6,000	Adequate surface water available within 10km	Maximum two treated water pump stations to reservoirs	200 to 300km from Honiara
4	6,001 to 10,000	Abundant raw water within 10km of town	Single treated water pump station to single reservoir	100 to 200km from Honiara
5	> 10,000	Abundant raw water within 5km of town	Simple gravity supply system from source through to reservoir(s) then to town	Within 100km of Honiara

Source: Authors.

In addition to the scoring above, the scores were weighted as follows:

- Population – 40%
- Raw water availability – 30%
- Complexity of water supply system – 20%
- Logistical (remoteness) – 10%

As the SDG-6 goals target universal access to water and sanitation, the population weighting needs to be a significant factor in the evaluation process.

The assessment process was undertaken as per Table 4.2.

Table 4.2: Prioritization Scores of Provincial Towns for Water Supply

Item	Town	Population Score	Raw Water Availability Score	Complexity of Water Supply System Score	Logistical Factors (From Honiara) Score	Final Score (out of 100)
1	Seghe (Western Province)	1	3	5	2	50
2	Buala (Isabel Province)	3	4	3	4	68
3	Tigoa (Rennell-Bellona Province)	1	1	4	3	36
4	Maluu (Malaita Province)	3	3	1	4	54
5	Apio (Malaita Province)	1	5	3	4	58
6	Kirakira (Makira-Ulawa Province)	3	4	4	3	70
7	Lata (Temotu Province)	1	4	3	1	46
	<i>Weighting</i>	<i>40%</i>	<i>30%</i>	<i>20%</i>	<i>10%</i>	

Based on the water supply assessment above, the prioritized implementation of the provincial towns to achieve SDG goals would be:

1. Kirakira (Makira-Ulawa Province)
2. Buala (Isabel Province)
3. Apio (Malaita Province)
4. Maluu (Malaita Province)
5. Seghe (Western Province)
6. Lata (Temotu Province), followed by
7. Tigoa (Rennell-Bellona Province)

It should be noted that the above simplified assessment was conducted on a conceptual level and with a lack of key data. Further investigation and feasibility studies are required to confirm a suitable implementation schedule.

4.3 Remaining Provincial Towns – Sewerage Prioritization

A sewerage assessment was also carried out for the remaining provincial towns:

- Seghe (Western Province)
- Buala (Isabel Province)
- Tigoa (Rennell-Bellona Province)
- Maluu (Malaita Province)
- Apio (Malaita Province)
- Kirakira (Makira-Ulawa Province)
- Lata (Temotu Province)

To prioritize the proposed development of these towns, a high-level evaluation matrix similar to the water supply assessment was developed.

A simplified evaluation matrix was therefore adopted for sewerage which included:

- Population to be served
- Complexity of sewerage system
- Sewage treatment plant site
- Ocean outfall (or watercourse) discharge location
- Logistical issues (distance from Honiara for support)

A rating system and weighting of the factors were applied as follows:

Each category was rated using a 1-to-5-point scoring system as presented in Table 4.3.

Table 4.3: Prioritization Criteria and Rating for Sewerage

Score	Population	Complexity of Sewerage System Score	STP Site Score	Ocean/Watercourse Outfall Score	Logistical (Technical Support) Factor
1	1 to 1,000	Difficult terrain and multiple sewer catchments	No obvious location for STP	Will require remote ocean outfall or watercourse discharge >5km from town	>400km from Honiara
2	1001 to 3,000	More than four sewer catchments	Possible STP site but in highly developed area	Will require remote ocean outfall or watercourse discharge >3km from town	300 to 400km from Honiara
3	3,001 to 6,000	Three or four sewer catchments	Possible STP site but within town area	Will require remote ocean outfall or watercourse discharge >1km from town	200 to 300km from Honiara
4	6,001 to 10,000	Two sewer catchments	Suitable open land near town	Will require remote ocean outfall or watercourse discharge <1km from town	100 to 200km from Honiara
5	> 10,000	Single sewer catchment to low point	Government owned land close to town but suitably separated from town	Existing jetty to attach outfall pipeline or suitable watercourse nearby	Within 100km of Honiara

STP = sewage treatment plant.

Source: Authors.

In addition to the scoring above, the scores were weighted as follows:

- Population – 40%
- Sewerage system complexity – 30%
- STP site – 10%
- Ocean/watercourse – 10%
- Logistical issues (remoteness) – 10%

The assessment process was undertaken as per Table 4.4:

Table 4.4: Prioritization Scores of Provincial Towns for Sewerage

Item	Town	Population Score	Complexity of Sewerage System	STP Site Score	Ocean Outfall Score	Logistical Factors (From Honiara) Score	Final Score (out of 100)
1	Seghe (Western Province)	1	4	5	5	2	56
2	Buala (Isabel Province)	3	3	1	5	4	62
3	Tigoa (Rennell-Bellona Province)	1	5	4	4	3	60
4	Maluu (Malaita Province)	3	1	4	5	4	56
5	Apio (Malaita Province)	1	4	3	5	4	56
6	Kirakira (Makira-Ulawa Province)	3	4	3	4	3	68
7	Lata (Temotu Province)	1	3	5	5	1	48
	<i>Weighting</i>	40%	30%	10%	10%	10%	

Source: Authors.

Based on the assessment above, the prioritized implementation of the provincial towns for sewerage to achieve SDG goals would be:

1. Kirakira (Makira-Ulawa Province)
2. Buala (Isabel Province),
3. Tigoa (Rennell-Bellona Province)
4. Maluu (Malaita Province) and Apio (Malaita Province) and Seghe (Western Province), followed by
5. Lata (Temotu Province)

It should be noted that the above simplified assessment was conducted on a conceptual level and with a shortage of key data. Further investigation and feasibility studies are required to confirm a suitable implementation schedule.

5 CONCLUSIONS AND RECOMMENDATIONS

The achievement of the SDG-6 goal, providing universal access to water and sanitation in the Solomon Islands by 2030, remains a significant challenge for both the government and Solomon Water.

Table 5.1 presents a Strategic Action Plan for Solomon Water to reach the SDG-6 objectives. The Chapter summarizes the current initiatives and outlines a strategic path in a prioritized order for servicing currently unserved areas. It is noted that the methodology adopted in the assessment process can be refined as more and improved data become available and specific technical assessments are undertaken for the nominated areas.

It should be noted that, traditionally, water supply systems are installed prior to sewerage schemes. Where feasibility studies are conducted, it is advisable to simultaneously assess the water supply and sewerage feasibility (item 3 activity) so that the planning is already in place for rapid implementation if funding becomes available.

As mentioned, because the construction of sewerage systems involves high capital investments, it may be appropriate to first investigate and possibly implement the improvement of on-site sanitation systems such as septic tanks and pit latrines instead of constructing sewerage systems.

Table 5.1: Solomon Water Summary of SDG-6 Action Plan

Item	Town	Water Supply	Sewerage	Recommendations
1. CURRENT WATER AND SEWERAGE PROJECTS IN KEY TOWNS				
1.1	Honiara	Current SI UWSSSP funding to expand system	Current SI UWSSSP funding to rehabilitate and expand system	Keep expanding Honiara water and sewerage systems to achieve full coverage
1.2	Auki	Current SI UWSSSP funding to expand system	Not yet provided	Keep expanding Auki water supply system and investigate new sewerage system for Auki
1.3	Noro	Current SI UWSSSP funding to expand system	Not yet provided	Keep expanding Auki water supply system and investigate new sewerage system for Auki
1.4	Gizo	Current SI UWSSSP funding to expand system	Current SI UWSSSP funding to expand system	Upgrade Gizo Water and Sewerage Systems under SI UWSSSP funding
1.5	Munda	Current SI UWSSSP funding to expand system	Current SI UWSSSP funding to expand system	Upgrade Gizo Water and Sewerage Systems under SI UWSSSP funding
1.6	Choiseul Bay (Taro and Sipozae)	Current SI UWSSSP funding to expand system	Current SI UWSSSP funding to expand system	Provide new water and sewerage systems under SI UWSSSP funding
1.7	Bina Harbour	Funding to be confirmed	Funding to be confirmed	Provide new water and sewerage systems
SI UWSSSP = Solomon Islands Urban Water Supply and Sanitation Project				
2. PROVINCIAL TOWNS - PRIORITISED WATER SUPPLY SYSTEMS IMPLEMENTATION				
2.1	Kirakira (Makira-Ulawa Province)	No funding allocation yet	N/A	Undertake Feasibility Study
2.2	Buala (Isabel Province)	No funding allocation yet	N/A	Undertake Feasibility Study
2.3	Apio (Malaita Province)	No funding allocation yet	N/A	Undertake Feasibility Study
2.4	Maluu (Malaita Province)	No funding allocation yet	N/A	Undertake Feasibility Study
2.5	Seghe (Western Province)	No funding allocation yet	N/A	Undertake Feasibility Study
2.6	Lata (Temotu Province)	No funding allocation yet	N/A	Undertake Feasibility Study
2.7	Tigoa (Rennell-Bellona Province)	No funding allocation yet	N/A	Undertake Feasibility Study
3. PROVINCIAL TOWNS - PRIORITISED SEWERAGE SCHEMES IMPLEMENTATION				
3.1	Kirakira (Makira-Ulawa Province)	N/A	No funding allocation yet	Undertake Feasibility Study
3.2	Buala (Isabel Province)	N/A	No funding allocation yet	Undertake Feasibility Study
3.3	Tigoa (Rennell-Bellona Province)	N/A	No funding allocation yet	Undertake Feasibility Study
3.4	Maluu (Malaita Province)	N/A	No funding allocation yet	Undertake Feasibility Study
3.5	Seghe (Western Province)	N/A	No funding allocation yet	Undertake Feasibility Study
3.6	Apio (Malaita Province)	N/A	No funding allocation yet	Undertake Feasibility Study
3.7	Lata (Temotu Province)	N/A	No funding allocation yet	Undertake Feasibility Study

SI UWSSSP = Solomon Islands Urban Water Supply and Sanitation Sector Project

Source: Authors.



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