Metropolis Pacific

Telios Corporate and Consultancy Services

Mamara New Capital City Development Phase 1 Environment Impact Statement (EIS)

Chapter 2: Project Location, Description and EIS Approach

Fred Siho Patison

August 2020

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1.0 THE DEVELOPER, INVESTORS AND CONSULTANT

1.1 Company Name and Address

The Company supporting the formulation of this Environment Impact Statement (EIS) and the subsequent development of Mamara-Tasivarongo is a foreign-owned company duly registered under the Companies Act of 2009.

Metropolis Mamara Development Limited.
C/- P O Box 966, Honiara
Ranadi Industrial Area
Mendana Avenue
Office Phone number
Mobile phone: +677 8668999
Email address: lingwl.solomon@gmail.com
Contact person: Mr Willian Ling

1.2 The Investors/Contractors and Experience

Foshan An Mei Jie Light Steel House Co., Ltd (website: http://www.amjhouse.com/)

Foshan An Mei Jie Light Steel House Co., Ltd is a pilot in the field of light steel construction industry in China, with the dream of popularization and application of green and energy - saving light steel structure to users, we are engaged in designing, manufacturing, construction and marketing. Our products include: modular sandwich panel house, light steel villas, container houses, sentry boxes, additional layers, partitions, large factory buildings and steel warehouses etc., we have been exported to over 80 countries and regions worldwide such as Angola, Ethiopia, Nigeria, South Africa, Somalia, Morocco, Russia, Kyrgyzstan, the United Arab Emirates, Saudi Arabia, Iraq, Iran, Maldives, Vietnam, Malaysia, Ecuador, Peru etc. We are continuously cooperating with many International renowned designing and construction companies to promote the global housing industrialization.

Covers about over 30,000 square meters, with over 600 skilled workers, An Mei Jie now runs two manufacturing bases and one research and development center, while possess one fully automatic powder- coating line and two steel sandwich panel production lines we have production capacity for 1 million square meter light steel house annually. We have now succeeded in passing IS09001:2008 Enterprise Quality Management Authentication, and besides, our products also obtain Guangdong Province's Outstanding Product Quality Certificate. An Mei Jie takes "Fabricating a harmonious living space" as its mission, conducts "Safe, artistic, convenient, superexcellent" as management philosophy, uses "diligent for survival, united as power, strategy for victory, innovation for development as the management guidelines, with these bases, we have cultivated a large team of professional technicist and on-site installation team, which enable us to provide all- around service to our clients with our enterprising and practical spirits. In the complete process of CDIO and installation, we are always taking our esteemed customer's needs as our orientation, consistently committing ourselves to provide the most scientific, reasonable, and effective solutions to our clients' maximum satisfaction. Our company is now sincerely hoping to join hands with our clients to create a better future together in the principle of win-win cooperation.

AS manufacturing plant for steel structure building materials. AMJ will supply all the steel structure building materials for the entire project. The company will also consider to setup its part of the manufacturing facilities in Mamara boundary to directly support the development project six months after the launch of the Mamara project. **It is expected to drive the direct investment between 3 million to 5 million US dollars.**

China International Marine Containers & Construction Group Co., Ltd.

(Hereinafter abbreviated as CIMC Construction Group Co., Ltd), Guangzhou

Branch Website: https://www.cimc.com/en/

CIMC Construction Group Co., Ltd. is an enterprise directly under the Construction Association of the Ministry of Construction of the People's Republic of China. Its establishment was approved by the State Administration for Industry and Commerce and it was registered in January 1996 with a registered capital of CNY 150 million. The Company has the following qualifications: Grade one building construction projects main contractor qualification, grade one building decoration and renovation engineering professional contractor qualifications, grade one public works and municipal facilities construction main contractor qualifications, grade one steel structure engineering professional contractor qualifications, grade two geotechnical and foundation engineering professional contractor qualification and grade two intelligent building systems and construction engineering professional contractor qualification. The company has passed the quality, environmental management, occupational health, and safety management system certification. The company's credit rating grade is AAA.

CIMC construction Group Co., Ltd. has established twenty-eight branches and project management offices in major provinces and cities in China such as Beijing, Shanghai, Tianjin, Guangzhou, Shanxi, Shaanxi, Henan, Guangxi, etc.

The Guangzhou Branch of CIMC construction Group Co., Ltd. was established in June 1996 with the approval of the Guangdong Provincial Construction Committee. Yanfeng LI is the legal representative of CIMC Construction Group Co. Ltd., and Yaochi HUANG is the head of the Guangzhou branch.

The main construction projects completed by the Guangzhou Branch of CIMC Construction Group Co., Ltd. in recent years are: Guangzhou Baiyuan International Airport International Freight Warehouse Project, the commercial and residential building project of Guangzhou Huihuang Mansion, the commercial and residential building of Guangzhou Haojing Garden, Huadu Hehe New City residential building project, Zhengjia Plaza, Guangzhou Shun'anMansion residential building project, electrical installation, engineering project for ZhaoqingNanguang NEW Material Technology Co . Ltd, Heyuan Power Plant Project, office building renovation project for GuangxiNanpuSugar Industry Group, Shenzen Minzhi Temporary Commodity Exhibition Hall Project, LuogangHuafeng Ancient Temple, ZhengchengZhengguo Temple Stupa, ZhengchengYanta Temple, Guangzhou Haindong Temple and many other ancient garden construction projects.

The Company always adheres to the value of "treating business contracts seriously, maintaining company's integrity and trust, delivering high-quality projects and building famous and iconic projects". With the goal of "creating first-class projects and striving for the best

benefit", the company effectively serves the society and is willing to cooperate with the friends in Solomon Islands to create better future.

They are responsible for the construction project management and all the infrastructure construction, such as roads, water supply, power supply, sewage discharge, and housing infrastructure construction for the entire Mamara project. ***It is estimated that the working capital required for infrastructure construction is US $30 million.***

Guangzhou LiJiacheng Development Co., Ltd. Website (https://www.dnb.com/business-directory/company-profiles.guangzhou_lijiacheng_trading_co.62d68ae0490dd69d47621e7aca192814.html)

Guangzhou LiJiacheng Development Co., Ltd. was established on July 17, 2000 with a registered capital of 6.5 million yuan and legal representative Xie Guozhen. Its main business includes wholesale and retail of food and general merchandise, commodity information consulting services, property management, venue rental, import and export of goods, etc.

Since its establishment, the company has successfully developed 7 large-scale comprehensive department stores, 4 university campus supermarket franchise stores and 2 – large scale agriculture trade markets, with a total business area of nearly 40,000 square meters, a total number of more than 400 employees, more than 10,000 business items, an annual sales volume of more than 300 million yuan, and fixed assets of nearly 80 million yuan.

With the business philosophy of "politeness + integrity" and the goal of building a retail brand and enhancing the competitiveness of the market, the company has steadily developed in the increasingly fierce market competition. "Courtesy plus sincerity" has established a good reputation in the industry and has gradually become the leader of Guangzhou retail enterprises.

In 2009 and 2010, the company was awarded the title of "contracting abiding and credit abiding" by Guangzhou Administration of industry and Commerce for two consecutive years.

In 2011 and 2012, it was rated as "Guangzhou ease consumer store". The company has been operating supermarkets for nearly 20 years and has established good cooperative relations with various suppliers and large-scale brand chains. The shopping malls are distributed in all districts of Guangzhou, providing high-quality services for community residents in Guangzhou. We are willing to cooperate with Solomon's friends to provide good business services for your community residents.

GLDCL will assist our developers to build several supermarkets in the Mamara area and at least one large comprehensive shopping mall. GLDCL provides the solution for purchasing and supply of daily living goods such as clothing, food, and others for residents in the area. ***It is estimated that more than 10 million US dollars will be needed for the construction of shopping malls and supermarkets and the investment of working capital.***

1.3 Consultant Name and Address

Telios Corporate and Consultancy services Ltd
Heritage Park Hotel
P.O.BOX 2239
Honiara,
Phone: 7498982
Email: teliosenviron@gmail.com

The following are the lead consultants;

1. **Fred Siho Patison (*Team Leader, Environment and Climate Change Expert*) – MA International Environmental Law Macquarie University, Australia**
    - BSc Environmental Science USP,
    - PGCert International law and negotiations- UNITAR
    - with over 15 years of experience in EIA, Environment Policy, Community Engagement and Climate Change.
2. **Winston Lapo (*Assistant team leader Environment and Social Expert*) – BSc Environment Science - Chemistry Emphasis, University of the South Pacific**
    - with 10 years of experience in EIA with ADB and World Bank Projects.
    - Chemistry Knowledge and Experience;
    - Heavy Metal Determination using Atomic absorption Spectroscopy
    - Team Leader Mataniko river environmental baseline survey 2014-2015
    - Environment and Social Safeguards Expert - ADB road and infrastructure programme - 2010 - 2015
    - April 2008 to 27 June 2009 Maraghoto Holdings Limited (Assistant Environmental Consultant).
3. **Warwick Sitana (*Geologist, Soil and Engineer*)- BSc (Geology) - University of Auckland, NZ,**
    - PGDip EngGeol (Engineering Geology) - University of Canterbury, NZ,
    - PGDip (Mining Engineering) – Curtin University, WA, (on-going)
    - with over 18 years of experience in Geology, Mining and Environmental Assessments.

4. **Jimmy Kereseka (*Biodiversity, Marine, Freshwater and Coastal Expert*) - MSc in Conservation and International Wildlife Trade – Sept 2017 – Sept 2018, University of Kent**

    - Postgraduate Diploma in Climate Change – 2015 – 2017, University of South Pacific (USP)
    - Advance Diploma in Teaching Secondary Science – 2005, Solomon Islands College of Higher Education
    - BSc in Biology and Chemistry - 1997- 2001, USP
    - With over 20 years of experience in Marine and Coastal Resources management, community engagement and environmental sciences.

5. **Steve Ereinao (*Health, Vector Borne Disease and Social Expert)* - Bachelor of Environmental Health - Fiji National University (FNU)**

    - Diploma certificate in Public Health Studies – SICHE
    - More than 11 years of relevant work experience
    - RWASH Program coordinator in Guadalcanal Province for more than 8 years
    - Implement major water supply, sanitation projects and conduct hygiene practice program in the communities throughout Solomon Island
    - Member of the public health surveillance team in Guadalcanal province health services
    - Member of the monitoring and evaluation team, environmental health department (MHMS)

2.0 PROJECT RATIONAL AND DESCRIPTION OF THE PROJECT

2.1 Identification of the Project

The proposed Mamara Development Project covered under this EIS is a real estate development consisting of a residential, commercial and recreation construction and supporting infrastructure and utilities covering a total land area of about 100 Hectares. The development is part of a broad development plan known as the "**MAMARA NEW CAPITAL CITY".**

The Mamara development proposal is a result of a development agreement signed by the Solomon Government and the Department of lands (Minister of land and resources) and Mamara Metropolis Pacific Limited (MPPL) on November 20, 1995. On March 1, 1996, the agreement was formally reviewed and approved by the national council and formalised under the agreement and subsequent legislation the ***Mamara – Tasivarongo – Mavo Development Agreement Act 1997.*** The total area covers more than 1166 hectares.

The Act allows for the land to be leased to the developer for 75 years as of 1995 and to date over 22 years have passed. The developer having lost some time due to recent civil unrest now has about 53 years remaining and are confident that it is enough time for them to develop the site.

The Act also established the Mamara- Tasivarongo Mavo Development Council that has seven members as follows;

1. Minister of Finance – SIG
2. Minister of Commerce (SIG)
3. Minister for Provincial Government (SIG)
4. Premier of Guadalcanal Province
5. Metropolis Mamara Development Ltd rep 1
6. Metropolis Mamara Development Ltd rep 2
7. Metropolis Mamara Development Ltd rep 3

The council is responsible for approval of major development within the area and has responsibility to ensure that it is in the interest of the country. The proposed development concept and design for which this EIS is prepared is approved by the council and supported by the Solomon Island Government.

2.2 Category of the Project – Real Estate and Support Infrastructure Construction

Schedule two of the Environment Act 1998 identified construction of real estate, roads construction, water treatment and bottling and sewage treatment and power generation facilities as **prescribed development**. The proposed development covered under this EIS study covers all the stated development covering an area of 100 hectares. The development covered under the this EIS includes;

1. Gravel extraction and reclamation
2. Road construction and buffers
3. Construction of residential and commercial buildings
4. Construction of a water treatment and bottling facility
5. Construction of a sewage treatment facility
6. Construction of power generation facility
7. Operation of the residential estate and supporting infrastructure and utilities

2.3 Description of Location and Nature of the Project

The project is located on the northwest of Honiara city, 7 kilometres away from the administrative centre of the city centre and 15 kilometres away from Honiara International Airport. Honiara is the capital of Solomon Islands and is located on Guadalcanal Island, the largest island of the Solomon Islands archipelago. The city is located on the north-western coast of the island and is flanked inland by steep hills that have largely been cleared of forest (UN-Habitat 2012). The boundary of Honiara City Council is approximately 11.5 km by 2.7 km at its longest and widest (total area is around 23 square kilometres), extending from 9°25'30.68"S, 159°54'52.88"E to 9°25'25.44"S, 160° 1'22.61"E.

The Mamara project site extends from southeast to northwest along the coastline, with a coastline of 8km. There are hills, two major rivers the Mamara river and Poha river on the side of the proposed development. In addition, there are also WWII shipwrecks of Japanese and American naval ships along the coastline of the proposed site.

The proposed development will cover 100 hectares of disturbed land from Poha river, bordering the LDA land and westwards reaching the Mamara river and then going for about 2 kilometres inlands along both the Mamara and poha river. It also includes inland hills just above the Mamara river source eastward towards Poha and Borosughu village.

The proposed development does not include any intrusion into community or modification of waterways. However, it will involve significant excavation work of the hills for backfilling for the proposed development.

The proposed development as earlier stated includes;

1. Gravel extraction and reclamation
2. Road construction and buffers
3. Construction of residential and commercial buildings
4. Construction of a water treatment and bottling facility
5. Construction of a sewage treatment facility
6. Construction of power generation facility
7. Operation of the residential estate and supporting infrastructure and utilities

There will be three major phases with many occurring simultaneously. The major phases include;

1. Gravel extraction and reclamation phase (phase1)
2. Construction of buildings, roads, and utility infrastructure (phase 2)
3. Operation of residential, commercial, and supporting utilities (phase 3)

Development Phase 1 – Gravel Extraction and Reclamation Phase

The proposed development area is a flat alluvial plain laying between two major waterways and is a flood plain area. Therefore, geo-tech studies recommended the need to undertake intensive land reclamation with limestone from a nearby quarry and hillsides to stabilise the whole land area. The reclamation will start with road access and then will spread to the whole site. Details on reclamation and road development will be further discussed.

Development Phase 2 – Roads, Drainage and Building Construction

The construction of roads and buildings is an important component of the development. This will involve transport of materials, increase in labour as construction workers will be on site. It will involve a large volume of movement of vehicles, materials, and humans.

Development Phase 3 - Operational phase – Residential, commercial and Supporting Utilities

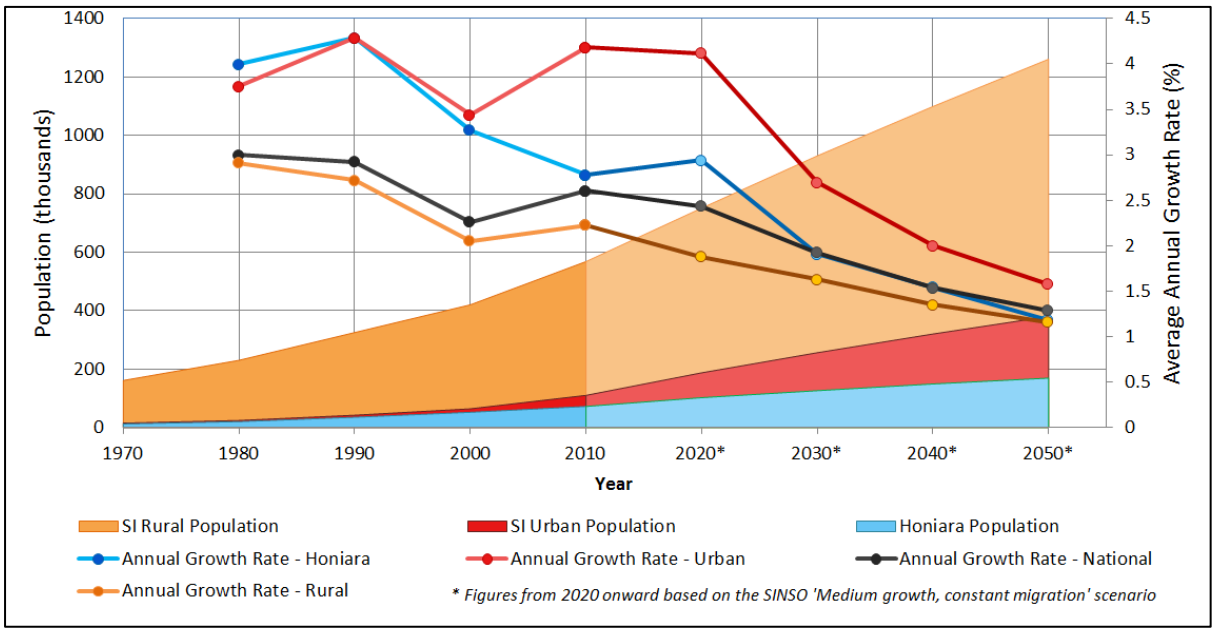
The actual operational phase of the project will include a new population arriving to occupy the new residential houses and commercial houses. It will also include the operation of

associated and supporting utilities and businesses that will transform the Mamara area from being a town outskirt to a new town and suburb.

2.4 Justification and Need for the Project

Honiara is a highly populated urban centre; it is Solomon Islands' hub of commercial enterprises and government operations and is the major air and sea connection to the rest of the world. Honiara is experiencing rapid rural-urban migration, predominantly in informal settlements, which are exposed to multiple natural hazards, are overcrowded, and lack basic services. Honiara's population growth rate exceeds the national growth rate, these activities will only intensify and are likely to have an increased detrimental effect on the communities and economies of Honiara.

Honiara is also an unplanned city and many attempts to plan the infrastructure have been hampered by lack of effective enforcement of development by laws and relevant planning schemes. The population of Honiara in 2015 was reported to be 87,000 (UN-Habitat 2016a) which is a 35% increase from the 2009 population of 64,609 (2009 census data). Honiara's annual growth rate slowed from 1990 to 2010, but recent statistics indicate a growth rate of 2.7% in 2010 and a projected annual growth rate of 2.9% until 2020 (SINSO 2015; UN-Habitat 2016a). This spike in annual growth is expected to slow again from 2020 to 2050 to approximately 1.2%. The demand for town expansion and real estate housing is increasing at an exponential rate. This need for housing and proper urban planning is the key reasons for the Mamara development.



Solomon Islands historical and SINSO-projected population & average annual growth rates

The development of the Mamara new capital city residential estate and supporting utilities and infrastructure is approved by the Mamara-Tasivarongo Mavo Development Council in response to the urgent demand for residential housing in Honiara city. The development is known as the *Solomon Mamara New Capital City Development*. The Solomon Islands government spent millions of dollars annually on rental for public officials and workers. The lack of enough residential houses also means that many government officials end up residing in informal settlements.

The development of the residential estate will include a mixture of affordable houses and high-end residence. The proposed construction of 1234 houses and associated infrastructure and utilities means that effectively this will be new town with associated commercial and recreation sites.

The lack of urban city planning for Honiara city means that this is an opportunity for a pre-planned and designed city with associated utilities and infrastructure. The developer on the outset will also directly manage the utilities under a governance mechanism that will be established for the Mamara city. Basically, the new town city will have its own city council to manage the affairs of people residing in the new city. The structure and governance arrangements for the new city council is not a subject of this EIS but will be important for a lot of environment management actions and future considerations.

Solomon Islands is now emerging from the civil unrest, the global financial crises and ongoing COVID19 pandemic means that such investment is urgently needed. As a developing country, the SIG is very keen to see development being undertaken to drive economic growth and create jobs, infrastructure development and investment in the Tourism sector.

The broader development plan for the site includes investment in the following areas;

1. Administrative Centre District - Planning and construction of the administrative office for Central government, including: parliamentary comprehensive office building for various ministries and commissions and potentially Guadalcanal Province.

2. Business District - Building large form of shopping mall. At present, there is no such form of shopping centre in the capital city area. It is planned to build a new shopping district that integrating leisure shopping, supermarket, catering, entertainment, Cinema, children's playground, and other facilities. The Developer will build and operate the mall.

3. National Education Centre - Building Universities, professional and technical schools, Secondary schools, primary schools, child-care, and other educational facilities. The investment is based on the local government and the schools demand, constructed, and delivered by developer's charitable sponsorship. Private schools are built and operated according to the market business model.

4. Sports centre area - building stadiums and Arena. The main stadium will be funded by the government; other facilities such as golf courses, marinas will be constructed by the developer, open to the public, and charge for usage.

5. National Health Medical Centre - Planning and construction of the National Centre for Disease Control and Prevention. Build a central hospital, for at least 3,000 households'

capacity. Developer will seek to collaborate with the Solomon Islands Government to build the facilities.

6. International Convention and Exhibition Centre - build an international convention centre, hotels, including duty-free shopping malls for tourists. one Casino (the project has been licensed for a franchise casino license). The facilities for tourism experience will be integrated with natural environment. It will also include World War II historical tours, coral reef diving, beach swimming, diving, surfing, water sports etc. After completion of the facilities, it will attract more tourists to the country for business and holiday; it will push the tourism industry into the new era for Solomon Islands.

7. Public Servant Residential Areas - It is planned to build more than 5,000 servant houses (lifted-houses) in staging of five years to meet the country's long-term demand of housing shortage. At present, most of the public servants are renting in private houses with limited facilities, and the rents are expensive.

8 Other citizens and foreign residential area, People working and living in Solomon can also purchase in the master plan to improve the living conditions. The new properties will be built and sold by the developers based appropriate market value. The buyer can use cash, mortgage, or super fund to purchase the properties.

9. High end residential area - will plan and build high-end residential areas near the coast and mountain. Providing a standard 18-hole mountain and ocean view golf course; building a marinas-yacht club to attract overseas investors for purpose of immigration, and travel.

All these properties will be built and put for sale by developer according to the market value and industrial standard. Locals and foreign investors can purchase with cash or mortgage.

10. Duty-free/export processing industrial zone - building an industrial factory and warehouses, attracting foreign manufacturers to transfer their labour-intensive industries and logistics services into Solomon Islands. Using the tax exemption policy in the region, to help exporting the local products to Europe, the United States, Australia, New Zealand global wide. Especially if granted the “Import tax-free” policy that promoting the Solomon national economic image for triggering investors to purchase and lease.

The new residential estate properties will be built and put for sale by developers in accordance with market value. The Solomon government or interested investor can repurchase all the developed properties and shall distribute to the civil servants and those interested. The priority is for civil servants use the provident fund and apply for mortgage loans from banks and other financial companies.

3.0 THE EIS OBJECTIVE, METHODOLOGY AND STRUCTURE.

3.1 The Objectives of the EIS

- Comply with Solomon Islands legal requirements for the formulation of an Environment Impact Statement under the *Environment Act 1998* since the Mamara Development is a prescribed development under schedule 2 (section 16)

- Undertake baseline study of the environment and broad social condition at Mamara and the impacts of the development
- Inform the final design of the project regarding how to avoid or manage the assessed impacts
- Understand the social impacts and benefits of the project within the Mamara area.

3.2 The Mamara EIS Methodology

The proposed site for development is a highly modified environment and has been disturbed for nearly a century. This land has been subject to changes since the first explorers, the colonial rulers, WWII, lever plantation and recently ownership and subsequently the Mamara Tasivarongo Mavo Agreement Act 1997.

The EIS study is therefore to understand the existing baseline conditions and how the proposed development will affect both the physical and social environment. The EIS assessment is undertaken in several phases.

A. Understanding the Baseline Conditions

The first stage of the process involved collecting and assembling information on baseline environment and social conditions. It includes a description of the physical environment, aquatic ecosystem (e.g., fish and aquatic habitat), terrestrial ecosystem (e.g., fauna and flora), and the social and socio-economic environment. The information collected include;

- identifying baseline natural environment and social conditions and the sensitive areas to inform stakeholders and project affected communities;
- understand how these baseline environmental conditions will be affected by the proposed development
- informing stakeholders and communities about the project and the EIS.

B. Desktop and Literature Review of the Site

Information was obtained from several secondary data sources through a literature review processes are also used to understand the context of the site. The approach is to understand the proposed development within the context of Guadalcanal Island, its recent history and recent development.

C. Onsite Field Studies and Surveys

Field studies have also been undertaken to determine the baseline physical environment and the socio-economic conditions of the site.

Physical Environmental - Field surveys and visits and sampling took place in the month June and July 2020

Social and Socio-economic survey - Household, socio-economic surveys and community workshops were also carried out in June and July 2020.

Combined Environmental and Social - Mitigation workshops are also organised in July 2020.

D. Identification of Impacts and Mitigation Measures

The baseline studies assessment then identified what the environmental and social impacts the development is and the proposed mitigation measures. The following are the steps followed to identify potential impacts and select mitigation measures:

Impact Assessment Matrix - The following steps were used to identify and analyse environmental and social impacts focusing on the three phases of development which are excavation and reclamation, construction, and operation. The following is the simplified process to assess the impacts;

1. **Identify Impact Sources** - identify the project actions or activities (impact sources) likely to affect environmental or social attributes. An impact identification matrix was used for this purpose.
2. **Assess Impacts** – assess each impact according to a set of impact criteria, including: duration (temporary vs permanent); reversibility (reversible vs irreversible); extent (site specific vs local vs regional); magnitude or intensity (minor, moderate, major), and probability of occurrence (**low, moderate, high**).
3. **Assess Impact Significance** - assess significance of each identified impact. Impacts can be both positive and negative. Negative or adverse impacts are rated using the criteria of duration, extent, magnitude/intensity (**major, moderate, or minor**); and probability of occurrence.
4. **Proposed mitigation measures** – identify measures to avoid or reduce negative or adverse impacts.

Structure of the EIS Report - this EIS report is divided in to five major sections as follows;

Part A – Non-Technical Summary

Part B – Project Background, EIS Approach and Legal Frameworks

Part C. Baseline Environment, Impacts and Mitigation Measures

Part D – Project Alternatives, Disclosure and Cumulative Impacts

Part E – Environmental Management Plan

3.3 EIS Scope and Location

EIS Development Scope

The EIS scope whilst covering 100 hectares of land is very specific to several developments. The proposed development covered under the scope of this EIS includes three major phases with many occurring simultaneously. The major phases include;

1. Gravel extraction and reclamation phase
2. Construction phase (buildings and roads)
3. Operational phase – Residential, commercial and Supporting Utilities

The main activities include;

1. Excavation and Reclamation
2. Construction of sealed road network and drainage
3. Construction of 1234 prefabricated residential houses
4. Construction of water treatment and bottling facility including a couple of water tanks
5. Construction of wastewater treatment plant and associated infrastructure
6. Construction of power plant to house generator and associated infrastructure
7. Operation of the residential properties and associated infrastructure and utilities

4.0 PROJECT BOUNDARY AND PROJECT SITE LAYOUT

The proposed development will occur within a 100 Hectares area shown below. The red line shown on map covers the scope for this EIS. Most of the development will occur on the southern side/inland side of the main road going west. This means any hotel or new commercial development on the northern side/or coastal side of road will not be covered under this EIS. The proposed sewage treatment is the only development occurring on the coastal side of the road. However, the baseline environment conditions have been described under this EIS will pave the way for future development.

Figure 1: Development Location - EIS Study Area

Figure 2: Area within Proposed Development

5.0 MAMARA NEW CAPITAL CITY DEVELOPMENT PHASE 1

5.1 Development Components Plans and Technical Drawing

The major phases of the development include;

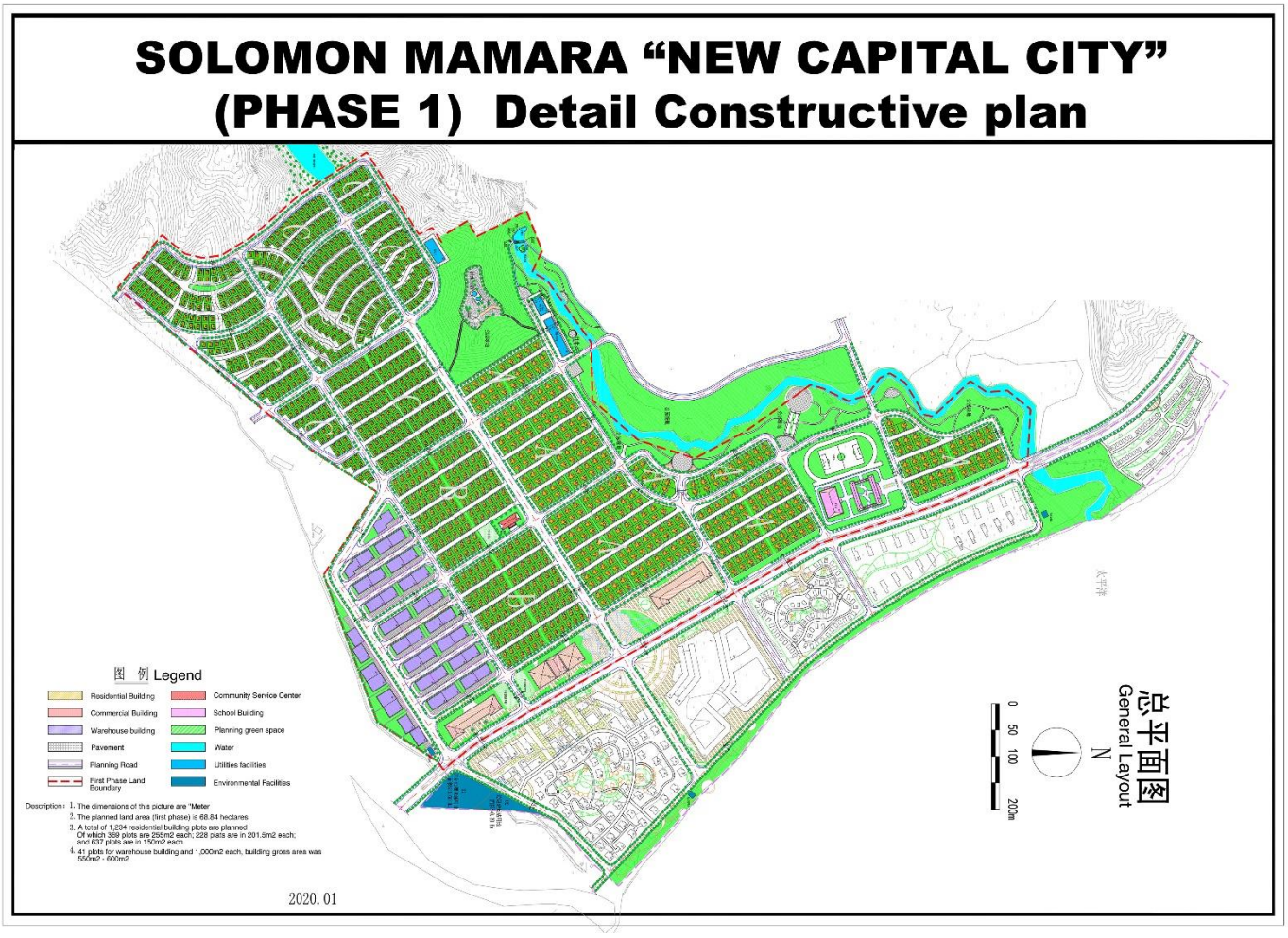
1. Gravel extraction and reclamation phase
2. Construction phase (buildings, plants, and roads)
3. Operational phase – Residential, commercial and Supporting Utilities

The major activities are;

1. Excavation and Reclamation
2. Construction of sealed road network and drainage
3. Construction of 1234 prefabricated residential houses
4. Construction of water treatment and bottling facility including water storage tanks
5. Construction of wastewater treatment plant and associated infrastructure
6. Construction of power plant to house generator and associated infrastructure

The development when completed will be as reflected in the design below;

Figure 3: Mamara Capital City



1. Excavation and Reclamation

The geotechnical studies of the site show that there is just over 10m of alluvial layer of soil above a mixture of gravel which means that there is a need for some reclamation work to occur before construction can happen. The location of the site between Mamara and Poha River also means that the site is likely to be flooded during extreme rainfall events especially from the Poha river. Future sea level rise is also a factor considered for the reclamation although that is a more long-term threat and applicable to any proposed coastal development.

The excavations and reclamation have started by the time this EIS baseline assessment is undertaken. There are attempts by the Environment and Conservation Division to stop the development but to date that has not occurred.

The excavation work currently takes gravel from a nearby quarry about 400 meters east of the Mamara river just beside the main road. There is no indication that an environment assessment has been done for the quarry.

The gravel excavation and reclamation are happening simultaneously daily and involves excavators and dump trucks. Vehicles and machines used for excavation and reclamation includes;

1. Excavators – 4 Units
2. Dump Trucks – 3 Units

The expected amount of excavation will result in seven hundred thousand (700,000) cubic meters of gravel to be extracted and reclaimed for the 1st Phase development - 100 hectare.

The current quarry will not be the only source of gravel but also the back hills of the area towards the south. The sloping hills approximately 20 meters high will be levelled with the soil used to back fill the area.

2. Construction of sealed road network and drainage

The construction of roads networks and associated drainage will occur once reclamation compaction is completed. The construction of the road and drainage will utilise some of the machines used for the excavation and reclamation.

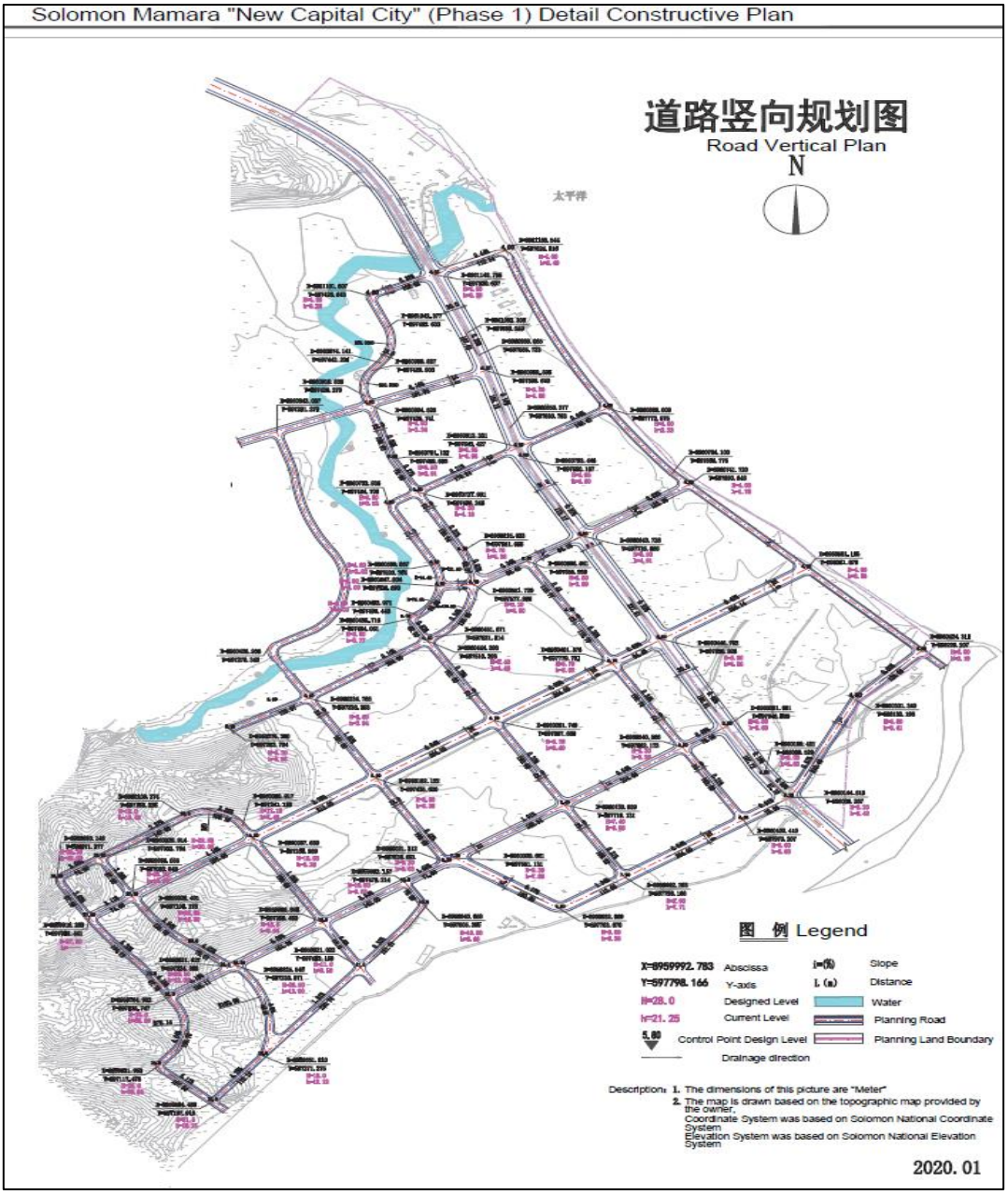


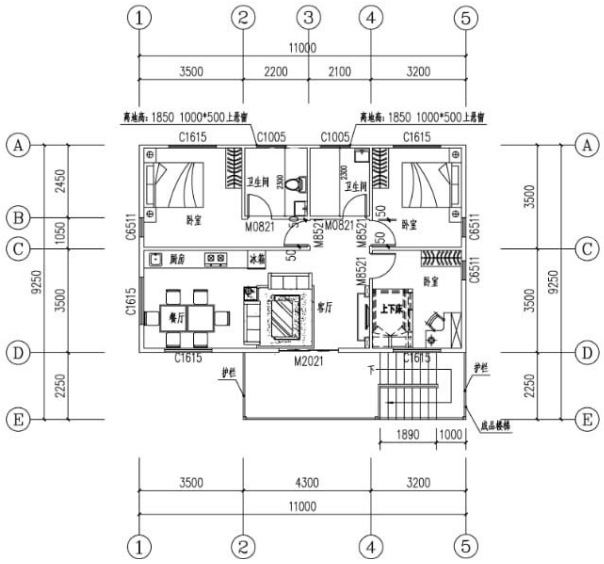
Figure 4: The map above shows the road network that is will be developed for the new development.

3. Construction of 1234 prefabricated residential houses – there will three types

The construction of 1234 house will be the centre piece of the proposed development. Associated water and power infrastructure are to support this new real estate development referred to as the Solomon Mamara New Capital City.

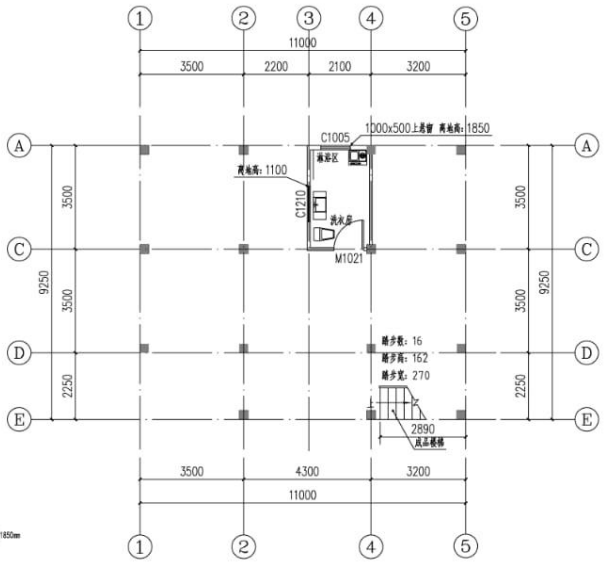
There will three types of housing designs designated to three different zones and the designs as follows;

Figure 5: House Type A – Designs and Specifications below



A户型平面图 1:100

层高：2850



首层平面图(首层架空) 1:100

架空层高：2600

架空层净高：2100

说明：

1. 外墙边线为地块尺寸边界线
2. 未标注的门洞尺寸为100mm
3. 未注明的窗台高度为1000mm，房间窗窗台高1400，卫生间窗台高1650mm
4. 阳台、露台、卫生间楼板结构面比所在楼层结构面低50mm
5. 图中门窗编号所注"M"为门，"C"为窗，数字表示洞口的宽度与高度（例如：M0921表示该门洞尺寸为900mm宽*2100mm高）
6. 基础梁外边线为地块边界往外扩200mm处
7. 排水排污管道需穿地梁与市政管道连接的，请确认好市政接入口标高及线坡，提前预埋。
8. 化粪池及管道连接由业主施工安装，

门窗表

类型	设计编号	洞口尺寸(mm)	数量	备注
洗手间门	M0821	800X2100	2	平开门
内房木门	M8521	850X2100	3	平开门
入户大门	M2021	2000X2100	1	铝合金推拉门
一层洗衣房门	M1021	1000X2100	1	钢木平开门
房间主窗	C1615	1600X1500	5	平开窗
上悬窗	C1005	1000X500	3	平开窗
一层洗衣房窗	C1210	1200X1000	1	平开窗
房间副窗	C6511	650X1100	3	平开窗

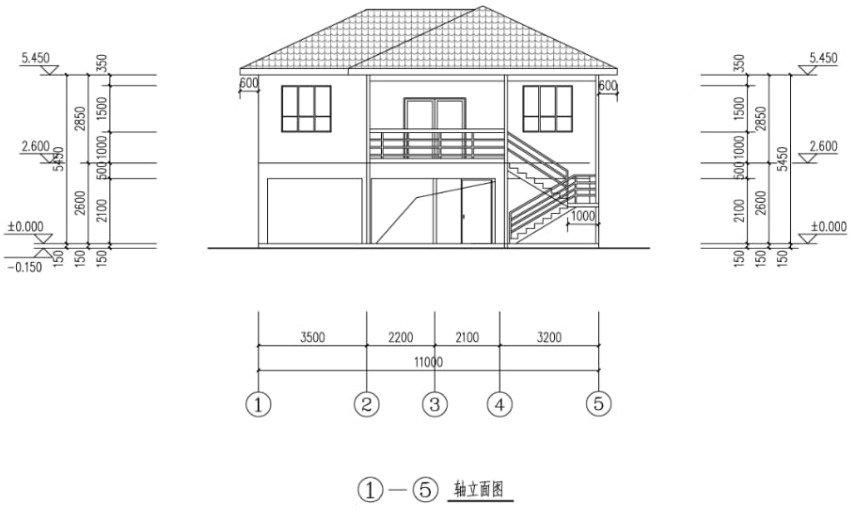
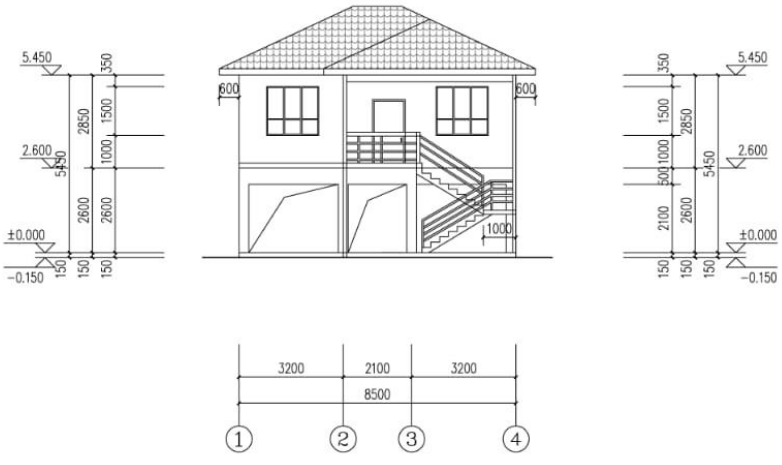


Figure 6: House Type B – **Design and Specifications**


5.450
2.600
±0.000
-0.150
350
1500
2850
1000
2600
2600
150
150
150
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④

①—④ 轴立面图

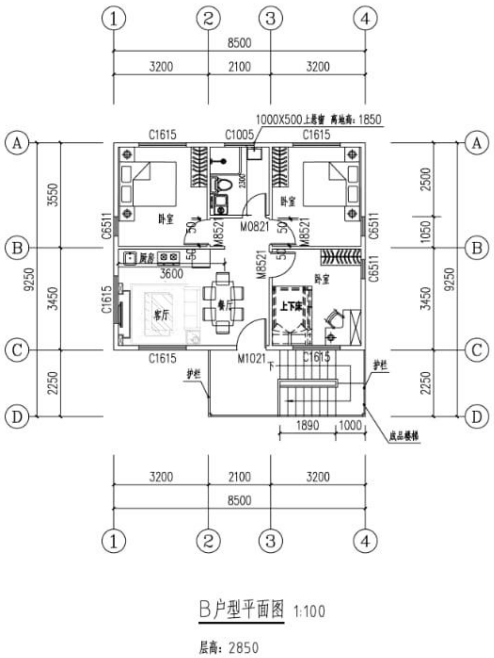
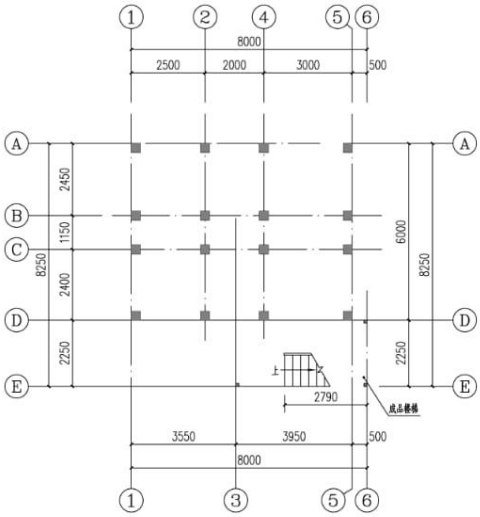


Figure 7: House Type C – Design and Specifications



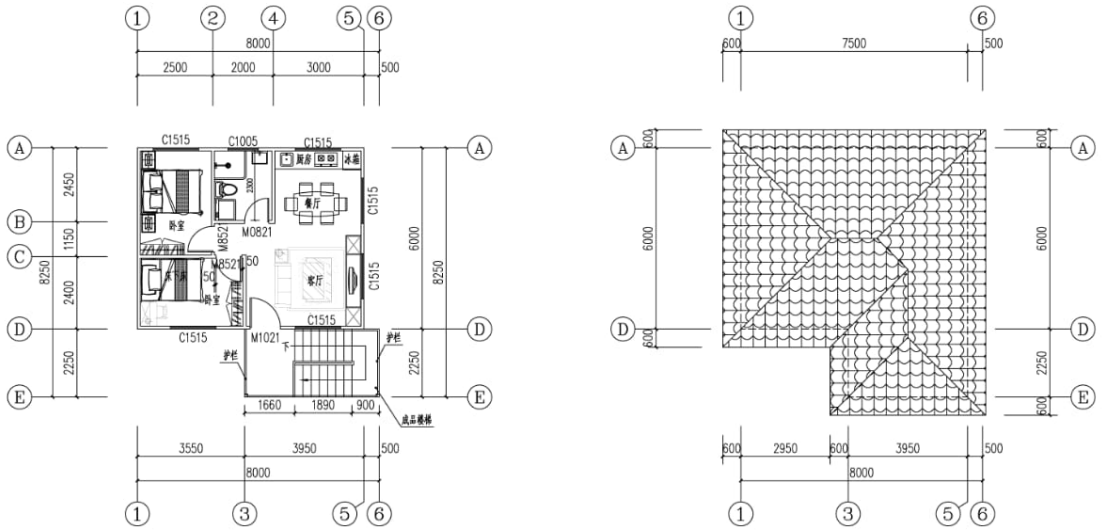
首层平面图(首层架空) 1:100

架空层高：2600
架空层净高：2100

说明：
1. 外墙边线为地块尺寸边界线
2. 未标注的门垛尺寸为100mm
3. 未注明的窗台高度为1000mm，房间副窗窗台高1400，卫生间窗台高1850mm
4. 阳台、露台、卫生间楼板结构面比所在楼层结构面低50mm
5. 图中门窗编号所注"M"为门，"C"为窗
6. 基础梁外边线为地块边界线
7. 排水排污管道需穿地梁与市政管道连接的，请确认好市政接入口标高及坑坡，提前预埋。
8. 化粪池及管道连接由业主施工安装

门窗表

类型	设计编号	洞口尺寸(mm)	数量	备注
成手网门	M0821	800X2100	1	平开门
内房木门	M8521	850X2100	2	平开门
入户大门	M1021	1000X2100	1	钢木平开门
房间主窗	C1515	1500X1500	6	推拉窗
上悬窗	C1005	1000X500	1	平开窗

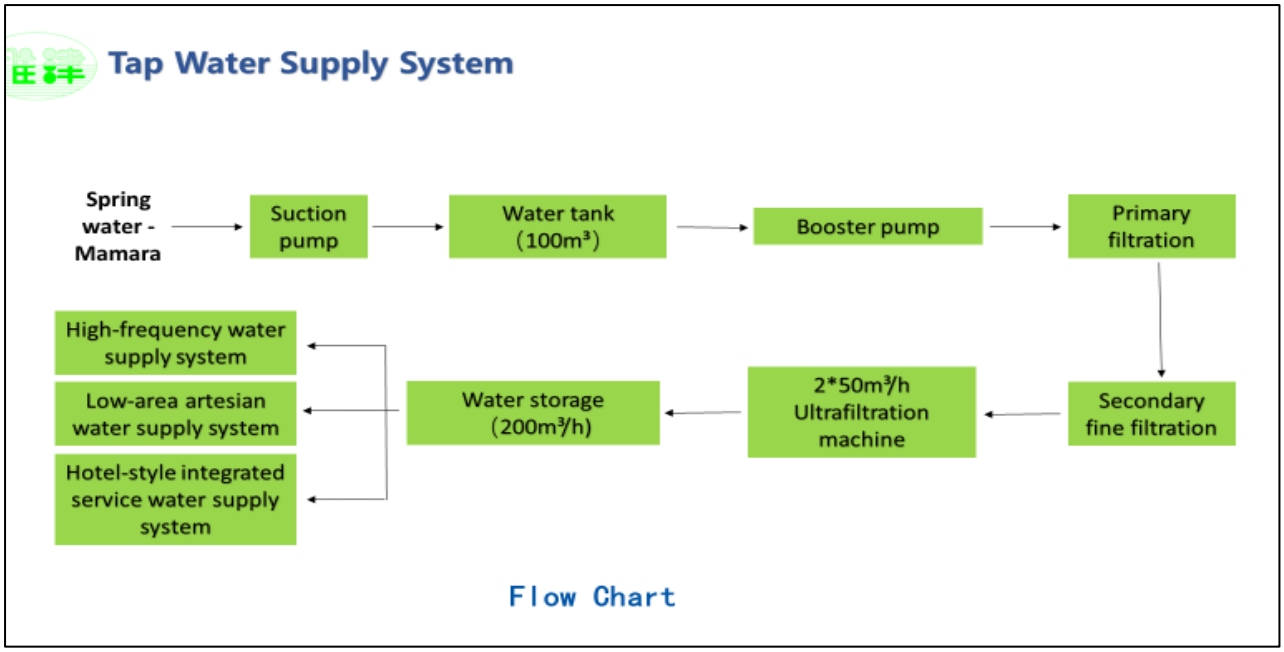


5,2 Construction of water treatment and bottling facility including a water storage tanks

Water treatment and storage - A water supply plant with a capacity of 2,400 KL of tap water will be constructed and designed to ensure the domestic water demand of urban residents, merchants, and schools in the region.

A mineral water plant – It will be built to produce high-quality and clean bottled mineral water (bottled 250ML, 500ML, 1000ML, and barrelled 5L, 10L mineral water) using the water source of Mamara Spring.

Drinking water will be sourced from the Mamara river spring source and will be processed to meet international drinking water standards. A treatment plant and storage facility will be built on site. The water treatment process will be as follows;



The same process with images with filtration equipment's;

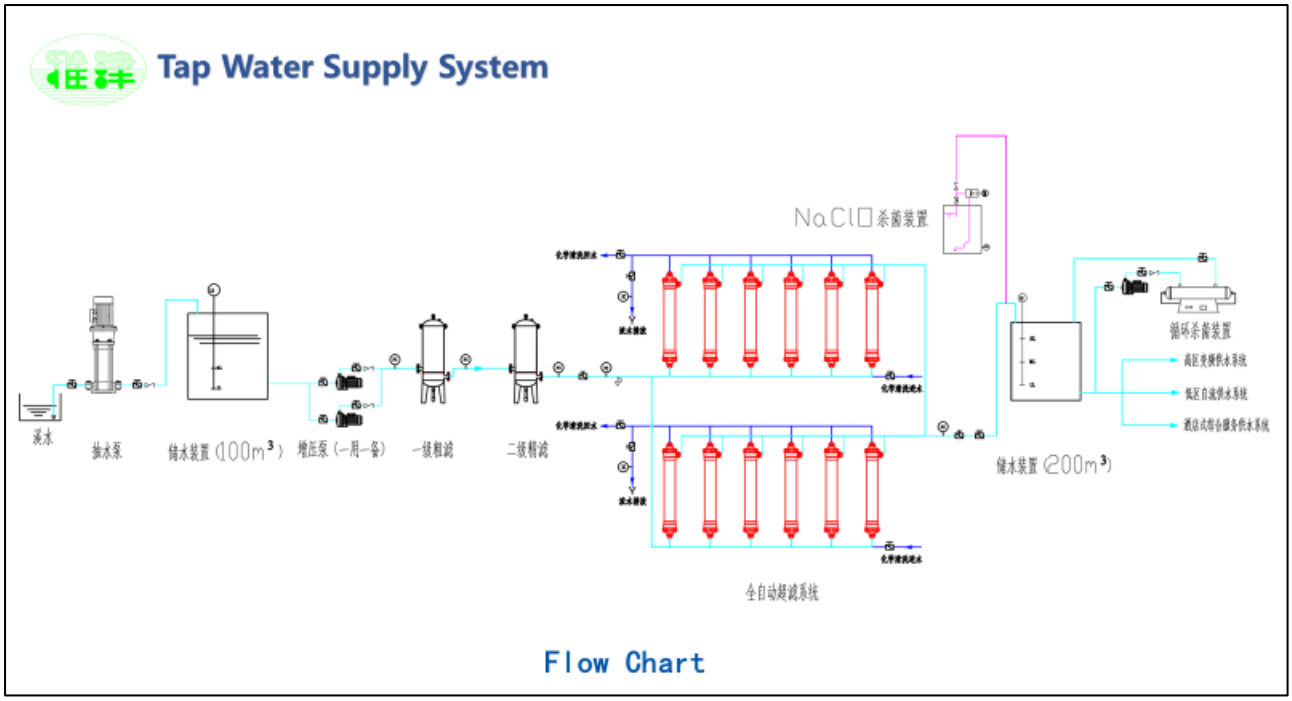


Figure 8: Tap water supply system

The first and second phase of filtration use bag filter. The bag filter is a multi-purpose filter equipment with novel structure, small size, easy and flexible operation, energy saving, high efficiency, closed work, and strong applicability. The bag filter is a pressure filter device, which mainly consists of the main components such as a filter cylinder, a filter cylinder cover, a quick-open mechanism, and a stainless-steel filter bag reinforcement net. The filter bag itself is

installed in the reinforced mesh basket. The liquid can penetrate the filter bag with the required fineness level to obtain qualified filtrate, and the foreign particles are intercepted by the filter bag. The machine is very easy to change the filter bag, and the filter has almost no material consumption.

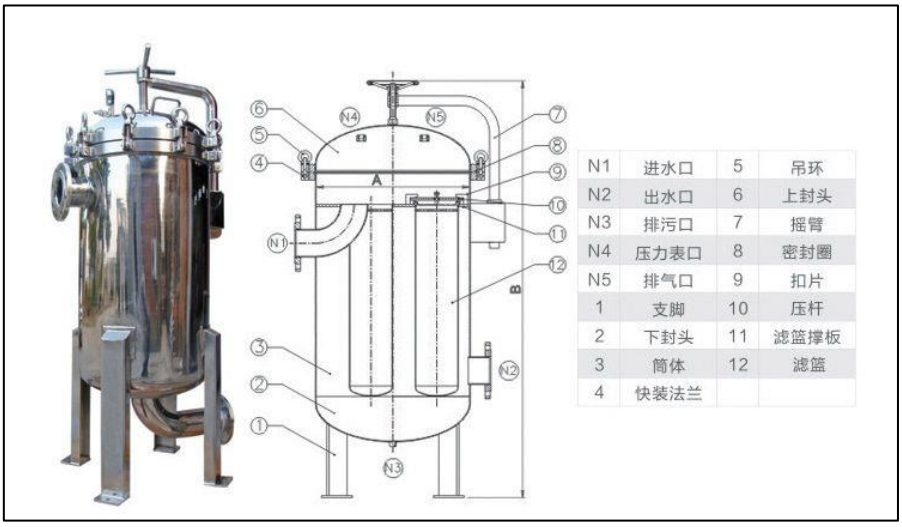


Figure 9: Filtration system

The final phase of filtration uses Ultrafiltration technology - Ultrafiltration technology is a nano-scale membrane separation technology. The hollow fibre ultrafiltration process uses hollow fibre membrane filaments as the filter medium and the pressure difference between the internal and external pressures of the membrane filaments as the driving force. The process of material separation to achieve the purpose of solution purification, separation, purification, and concentration.

Ultrafiltration can trap particles and impurities between 0.002 and 1μm. The molecular weight of the cutting used to characterize the ultrafiltration membrane is generally between 1,000 and 10,000. As a pre-treatment for reverse osmosis, the cutting molecular weight is usually selected from 5 to 10 Thousand.

Advantages of ultrafiltration technology which now widely used around world includes;

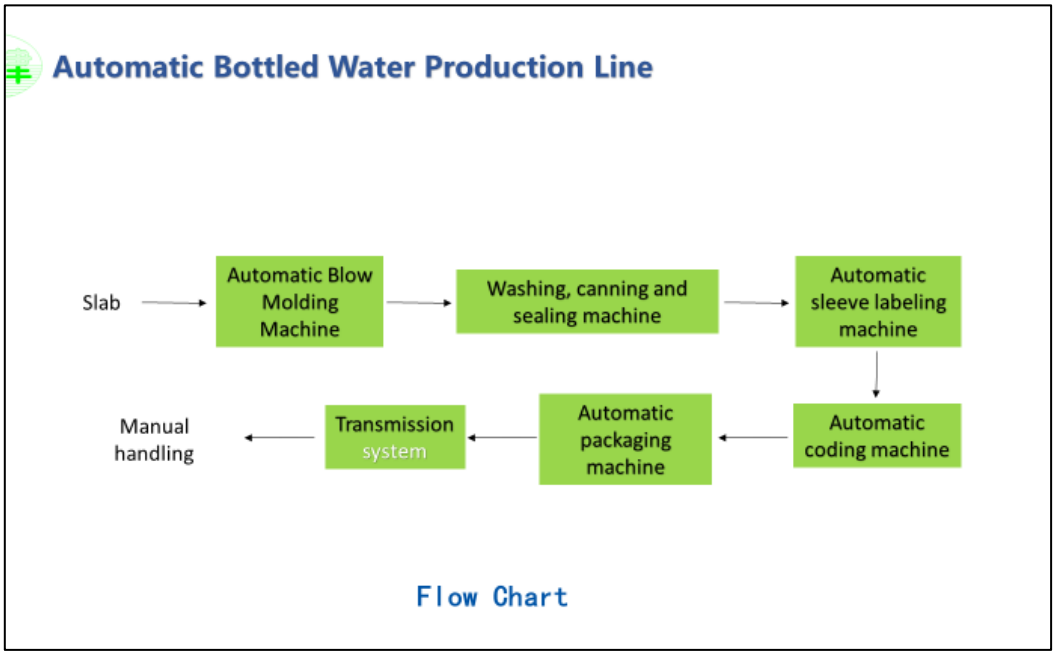
- Stable filtration effect: Ultrafiltration produced water quality is little affected by the fluctuation of raw water quality, which can ensure the stability of the produced water quality.
- Low energy consumption: normal temperature and pressure operation, low operating costs.
- High efficiency: The utilization rate of the original solution is high, and the waste is small.
- Small footprint: Ultrafiltration equipment is compact.
- No phase change: The filtration separation process is a pure physical separation at normal temperature. The material after ultrafiltration separation will not change its properties and there will be no secondary residue.

- Wide range of separations: Cross-filtration membranes can be made into products with different filtration accuracy from 2nm to 100nm for different applications.

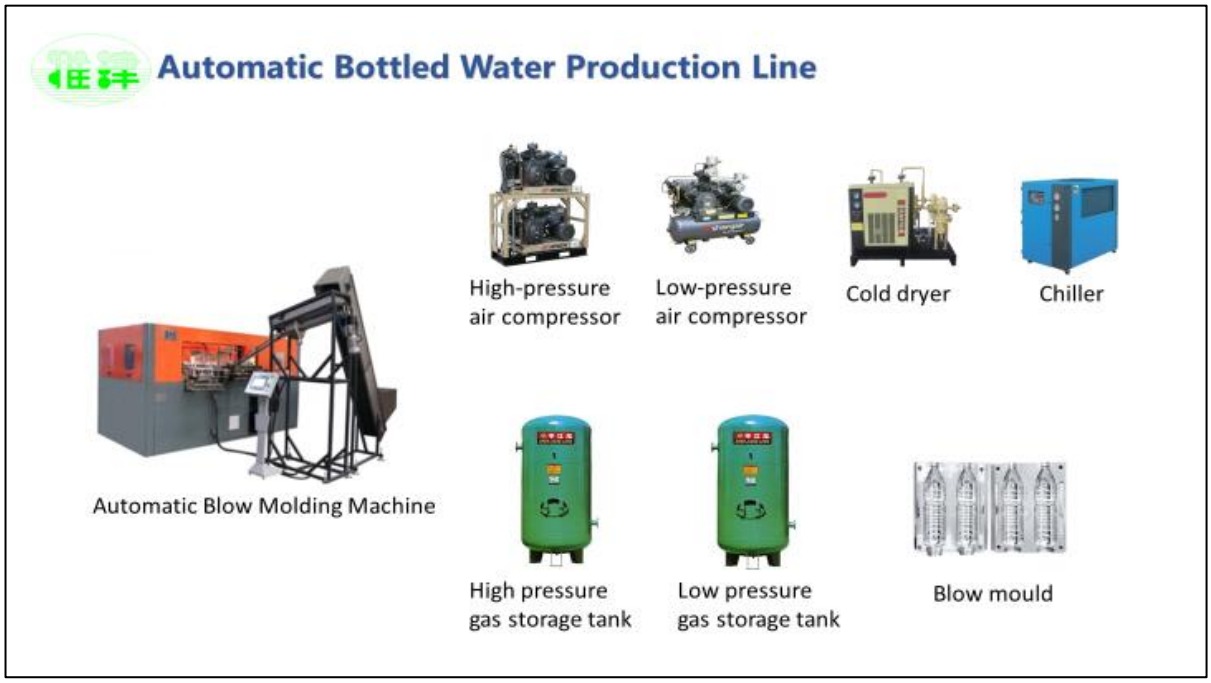
Figure 10:Here is a typical ultraviolet technology equipment;

Automatic Bottled Water Production Line – treated water will also be transferred for bottling at the bottling plant next to the water treatment plant. The following is the process for the bottling of water;

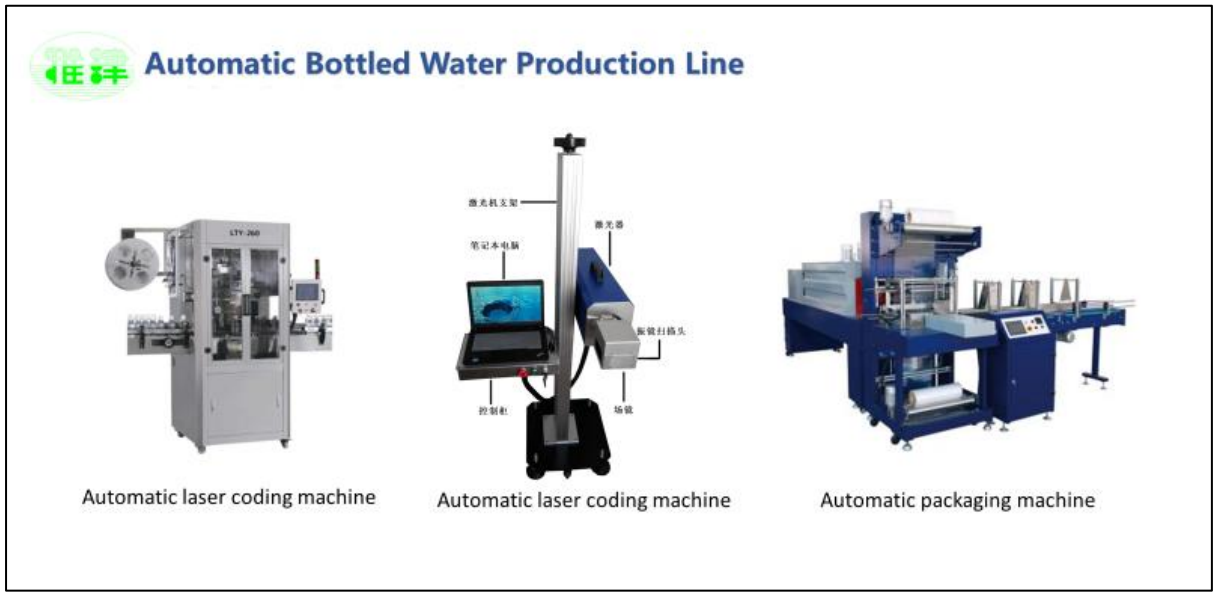
Figure 11: Automatic Bottle production line



Here is an image representation of the process;



Here is the packaging process for water bottling;



The design specifications for the actual buildings to house the water treatment and bottling plants are not available and will be provided later.

The associated storage water tanks specification is yet to be provided as well and have not been included in the EIS. However, there will be a storage tank build on the hill adjacent to

both plants. See below the location of the water treatment and bottling plants and the storage and supply tanks.

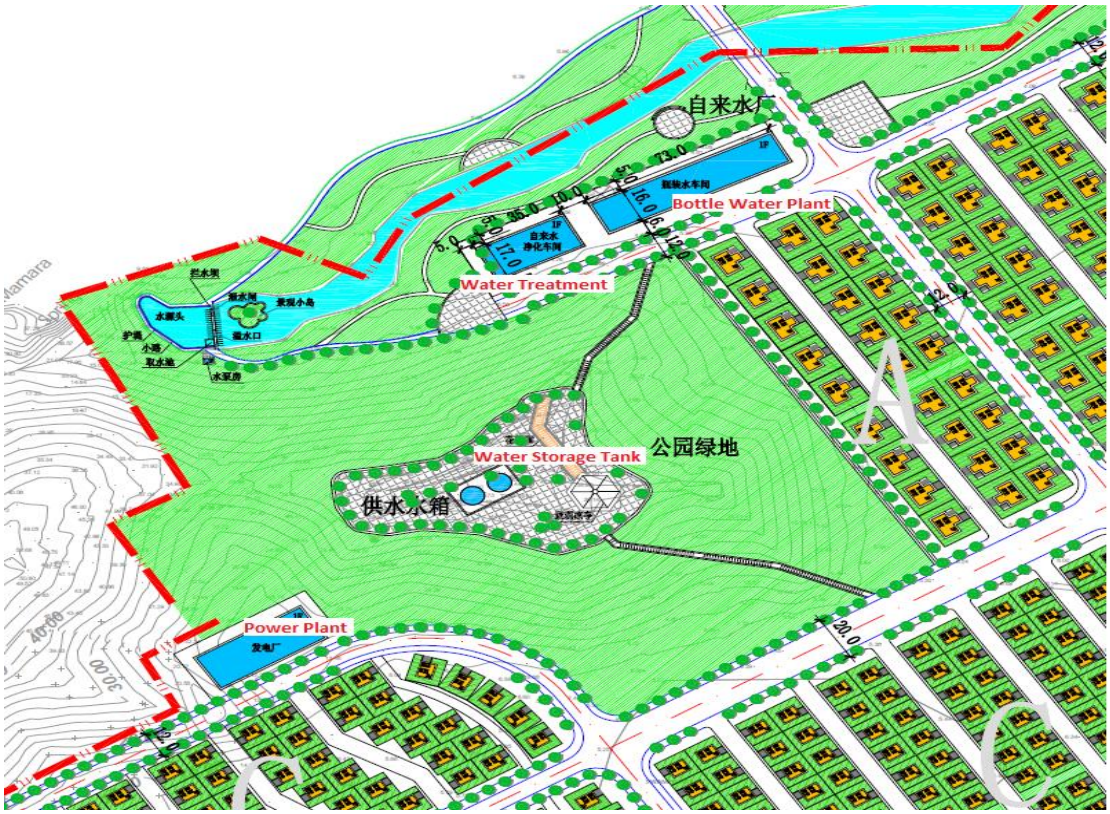


Figure 12: Location of Bottling Plant

5.3 Construction of wastewater treatment plant – Membrane Technology

The wastewater and sewage treatment plant will be built, and the domestic sewage will be collected, transferred to the sewage treatment plant through the underground pipeline, the wastewater will be filtered, treated to match the environmental standard.

The proposed development will also include the development of a sewage treatment facility that will be located close to the main road on the coastal side after the Poha bridge although this will be re-considered due to flood threats. A three-stage septic tanks will be constructed to treat wastewater and excreta. The wastewater treated by the tertiary treatment is partially used for watering the plants of the community area. The sewage and wastewater be treated a different zone before being piped to final phase at the site.

The proposed membrane technology is not a new system as it has been used all over the world to treat wastewater. Th basic equipment is shown below;

It is expected that installation of these equipment will be done underground and will be as per shown below;

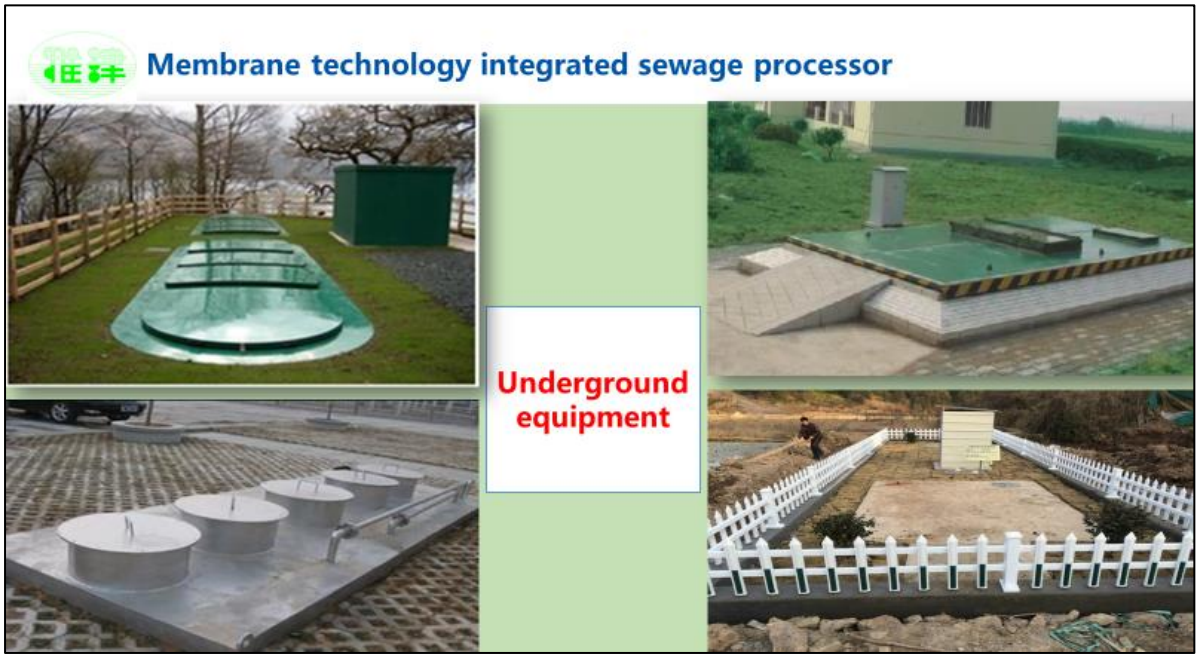
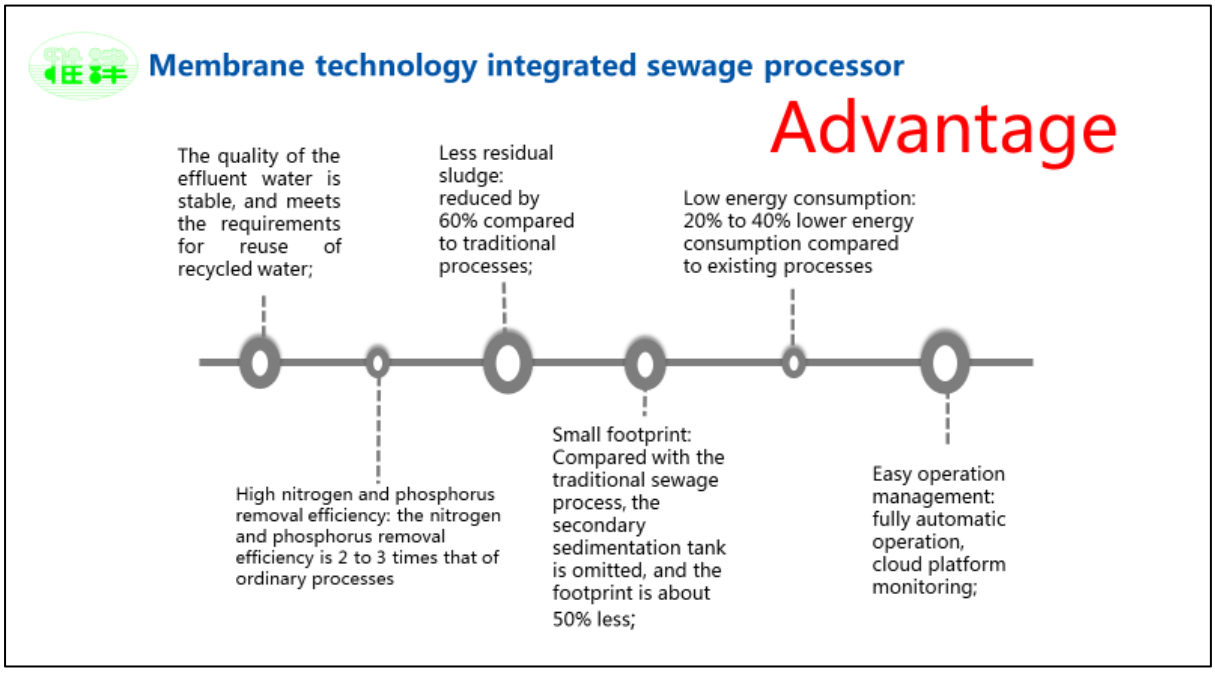
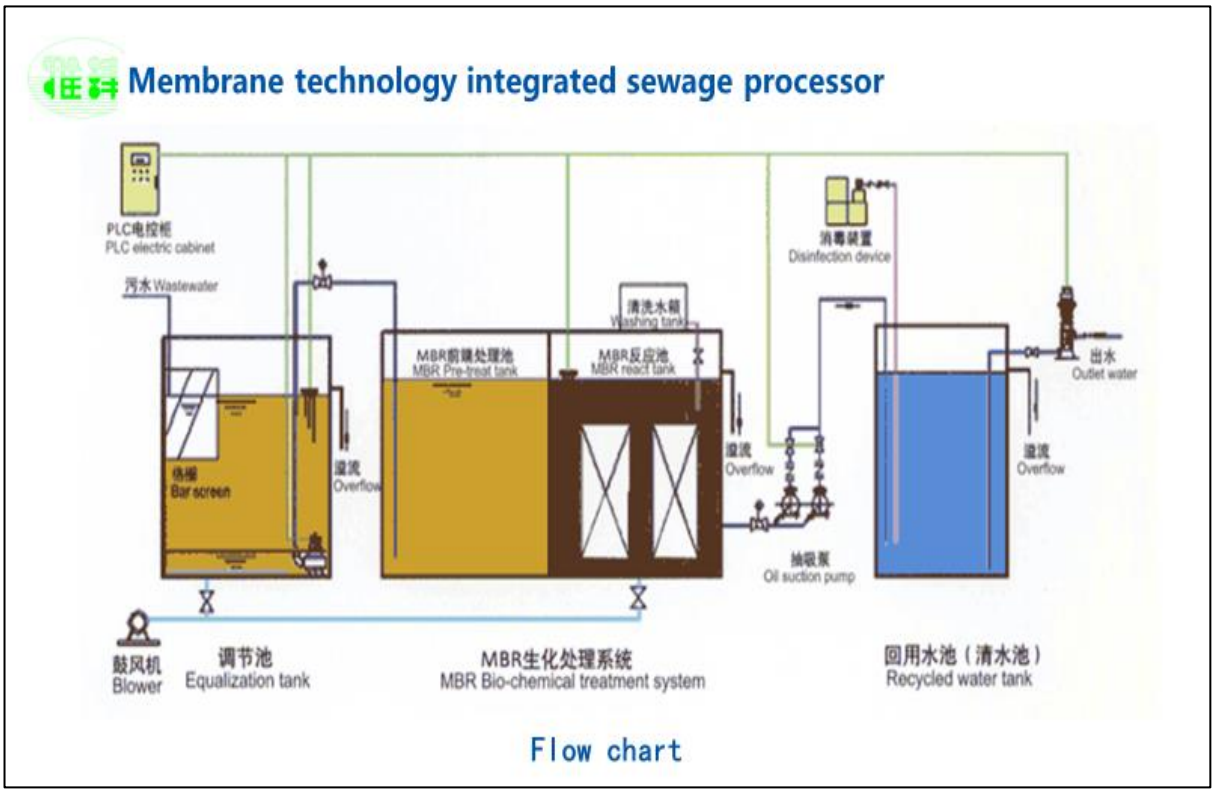


Figure 13: Sewage processor

The sewage and waste treatment using the membrane technology is undertaken as follows;



The image of the process in the tanks are as follows;



5.4 Construction of power plant to house generator and associated infrastructure

A diesel power plant with a total installed capacity of 5000 KW will be built. The diesel generator set will be installed and used in batches according to the construction progress of civil servants' residential houses. There is also new consideration for the city to connect to the Solomon Power lines and so there is ongoing discussion on this option. However, this EIS will look at having the power plants as part of the plan.

The power plant house design is not yet completed, but it will be located at the base of the hill where the storage tanks are located. Consideration will be given to issues related to noise and potential for fuel leakage on site.

Chemicals or Hazardous Materials

Investment in real estate development means that not much chemical or hazardous materials will be used for any development purposes or is expected to be an output. The technology for water and sewage treatment are mostly environment friendly. The water treatment system however will also use Sodium Chloride (NaCl) which will be used in standards safe amounts for water treatment and human consumption.

The intense use of machines will result in use of diesel fuel for machines and the power plant but those can be easily mitigated. Most of the building material will use light steels materials for the buildings.

Solid waste will be a major issue during the operations phase but that will be addressed as a major environment issues for the operational phase of the development.

Machinery, Equipment and Vehicles

Heavy machinery and equipment will be used during all the different phases. The current excavation and reclamation now have 2 unit of 20-ton Excavators, 2 units of Bull Dozers, and 3 units of 10 wheels Dump Trucks.

The next full operation will increase the numbers of machinery to 5 units Excavators, 10 units Dump Trucks, 3 units Bull Dozers, 1-unit motor grader, 1-unit road roller.

Specialised machines will be used for the different phases of road and building construction as well.

6.0 LOCATION AND BASELINE ENVIRONMENT CONDITION

6.1 Project Geography and Location

The proposed Mamara new capital city is located on Guadalcanal, Solomon Islands. Guadalcanal is part of Solomon Islands archipelago located along the equatorial belt and enjoy a warm and wet equatorial climate. Guadalcanal is the largest of six major islands of the Solomon group, with an area of 5310 km2, it extends 150 km from northwest to southeast and is 45 km at its broadest. Guadalcanal is the largest island and occupies a central position in the country at 9°25'S, 159°58'E.

The interior has sheer and ragged peaks including Mt Makarakomburu (2,447 m) and Mt Popomanaseu (2,330 m), the nation's tallest peaks. The southern coasts of Guadalcanal are some of the wettest places on earth with a mean annual rainfall of around 8000 mm and hence has acquired the name 'the weather coast' (Hackman 1979).

The indigenous people of Guadalcanal are Melanesians who speak 14 different Austronesian dialects. There are two main groups, the Guadalcanal language speaking such as Ghari, Mbirao and Tolo, and Malaita speaking language such as Marau (Are – Are speakers who migrated from Malaita) and Longu.

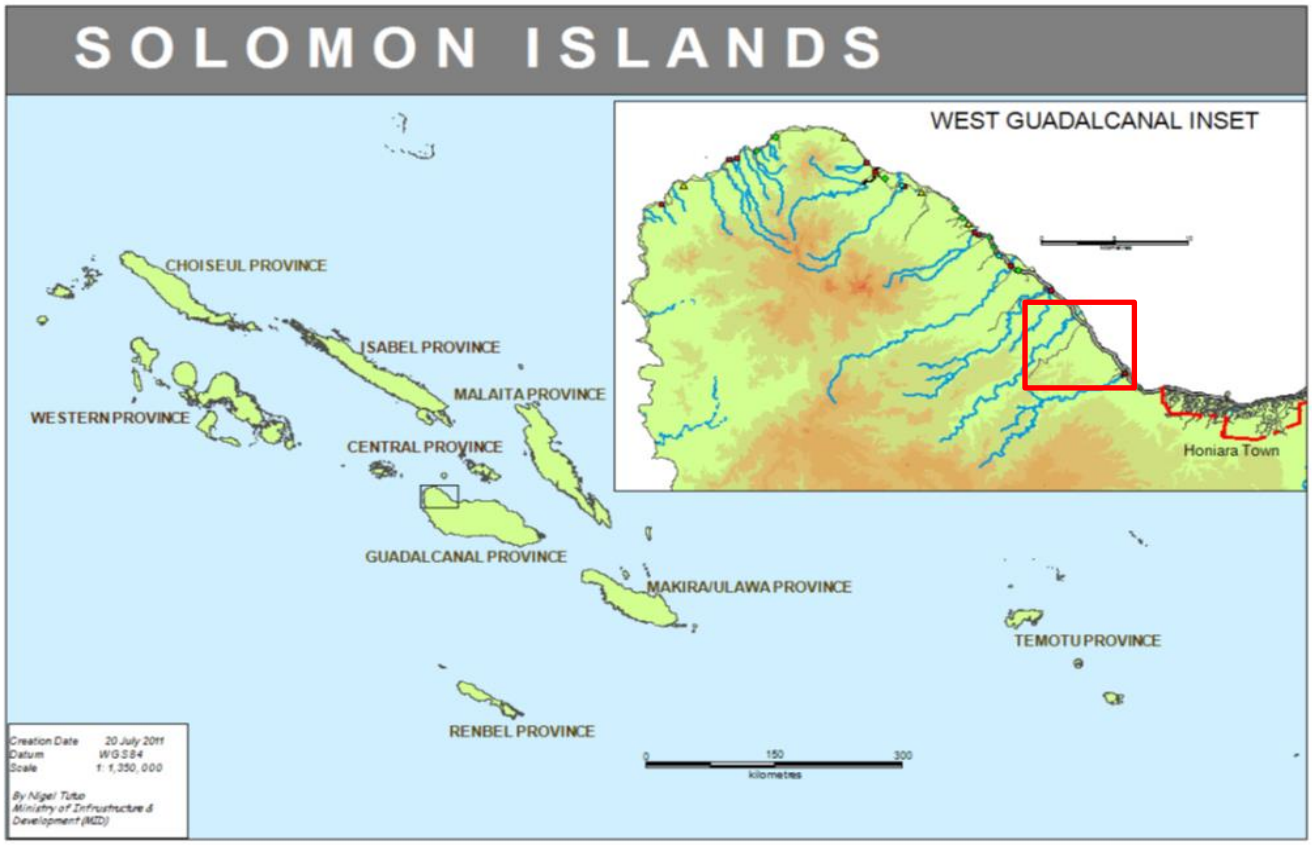


Figure 14: Mamara New Capital city Project Location shown on square box above

Figure 15: Mamara project area view from Poha Bridge –Westwards

Figure 16: Mamara project area view from Mamara River – Eastwards towards Honiara

Numerous rivers transect this zone, draining generally northwards from the mountains. Hence, there are several streams and rivers that intersect in the Mamara Tasivarongo area, between Belamatanga and Poha River and include Bonege river, in the North-western Guadalcanal. The project area is adjacent to Poha River (catchment area of 48.1 km2) and Mamara spring which has a small 1km2 catchment of mixed grassland and lowland forests. The Poha river

regularly experience flooding during the rainy season and this is expected to be exacerbated under climate change.

6.2 Climate and Rainfall

The weather and climate of the Solomon Islands is described as seasonal movement and development of the equatorial trough. From between January to March the trough usually lies close to the south of the country resulting in North Westerly monsoonal winds with heaviest rainfall in most places, having an annual average rain fall between 3000mm to 5000 mm. While the wettest period of the year is between the months of August to November with an average daily fall of 190mm to 330mm.

The climate of Guadalcanal is tropical and equatorial tempered by maritime influences. There are two seasons; a north-west monsoon from November to March and a south-east trade wind period between April and October. Temperatures do not vary much throughout the year, with daytime temperatures ranging from 26 oC to 31 oC, night-time temperatures can drop to 17 oC. While inland temperatures are higher than coastal temperatures, temperature also decreases with altitude. Relative humidity shows slight periodic discrepancy but has marked diurnal variation. Humidity is highest in the morning and frequently reaches 90%.

The proximity of Mamara to Honiara means that average rainfall result for Honiara are the closest to the development site.

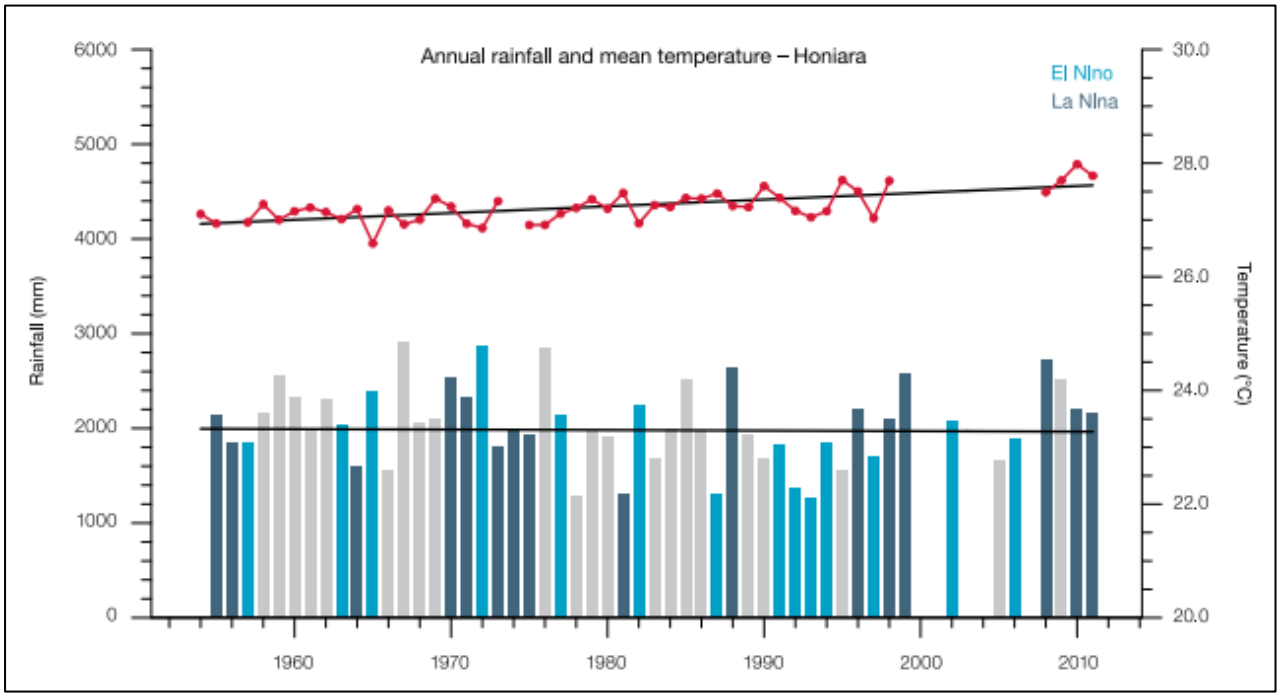


Figure 17: Annual rainfall and mean temperature for Honiara

6.3 Elevation and Slope (Contour map specific to the site)

The proposed development site has about 30 percent of the 100 hectares with gentle to sloping hills at about 30-40 meters above sea level and sloping ranging from 45-80 degrees. Most of the ranging hills are expected to be levelled during phase one of the development.

Figure 18: View of Mamara project site with elevated hills at the back

6.4 Volcanic and Tectonic Features

Solomon Islands including Guadalcanal are very prone to earthquakes, landslides and tsunamis and seismic activity. In 2007, an earthquake in the Western province triggered a tsunami and resulted in the uplifting of some land and reef areas. Likewise, in the 1970's an earthquake affected the populations of Guadalcanal in the Weather Coast area resulted in three new relocation settlements at Aruligo North West of Guadalcanal; New Duidui, New Ghorabau and Vatuloki.

The Mamara site experiences constant seismic activity, due to the location of the Solomon Islands archipelago at the junction of two tectonic plates. Both provinces are vulnerable to coastal flooding, tsunamis, earthquakes, landslides, and volcanic eruption.

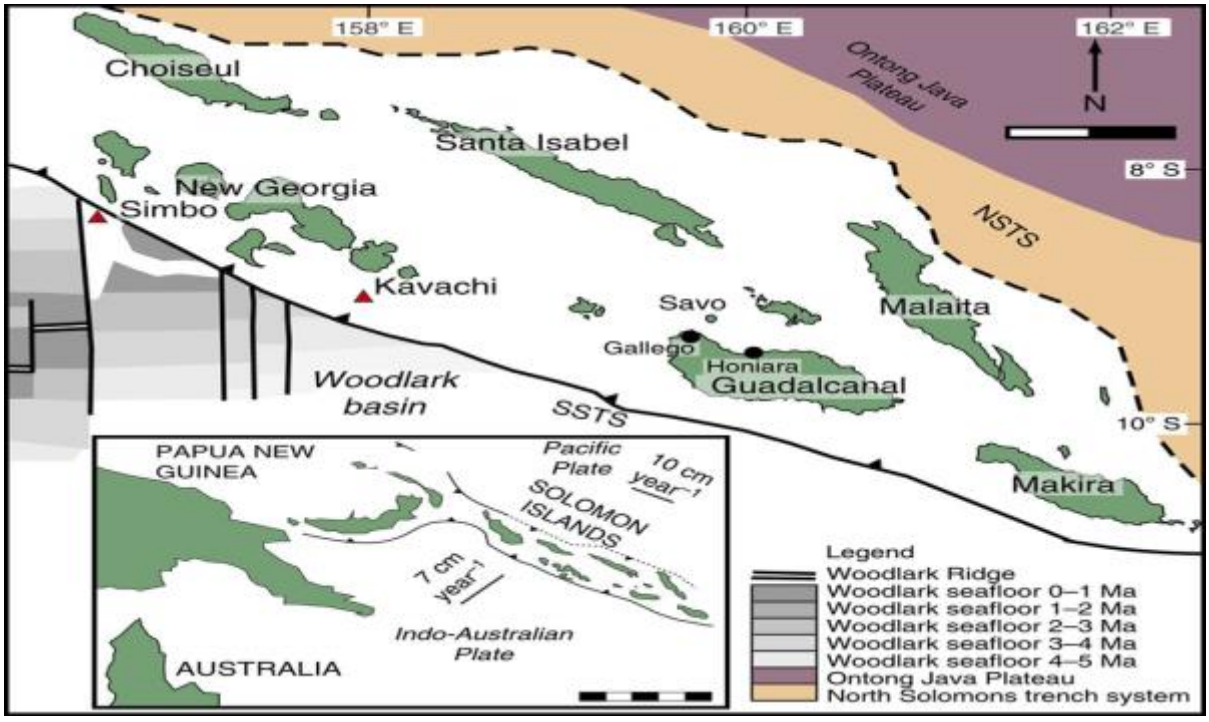


Figure 19: Map showing major tectonic plates for the Solomons and current active volcanoes close to Guadalcanal.

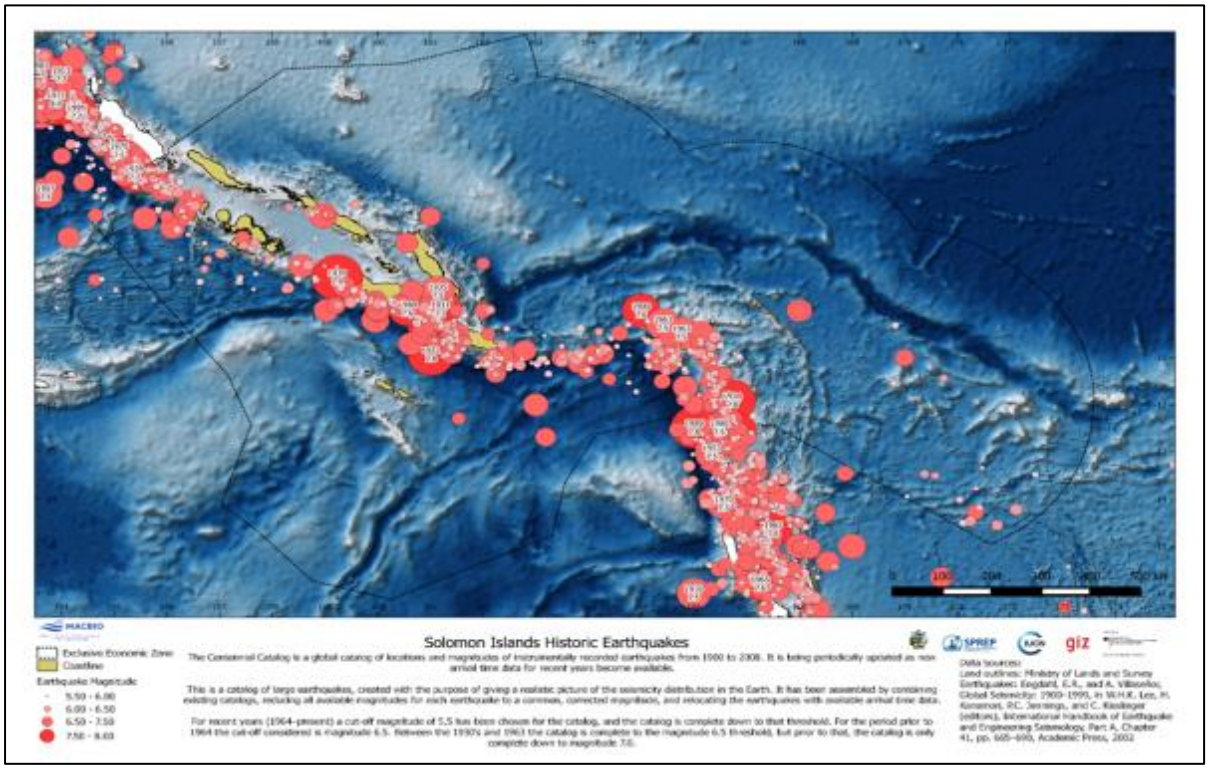


Figure 20: Solomon Islands Historic Earthquakes

6.5 Cyclones for Guadalcanal and Solomon Islands

Major cyclone for Solomon Islands in the last 50 years include; Annie (1967), Gisele (1968), Isa (1970), Ida (1972) cyclone Namu(1987) and cyclone Ita(2014) which resulted in many deaths and extensive damage to transport infrastructure.

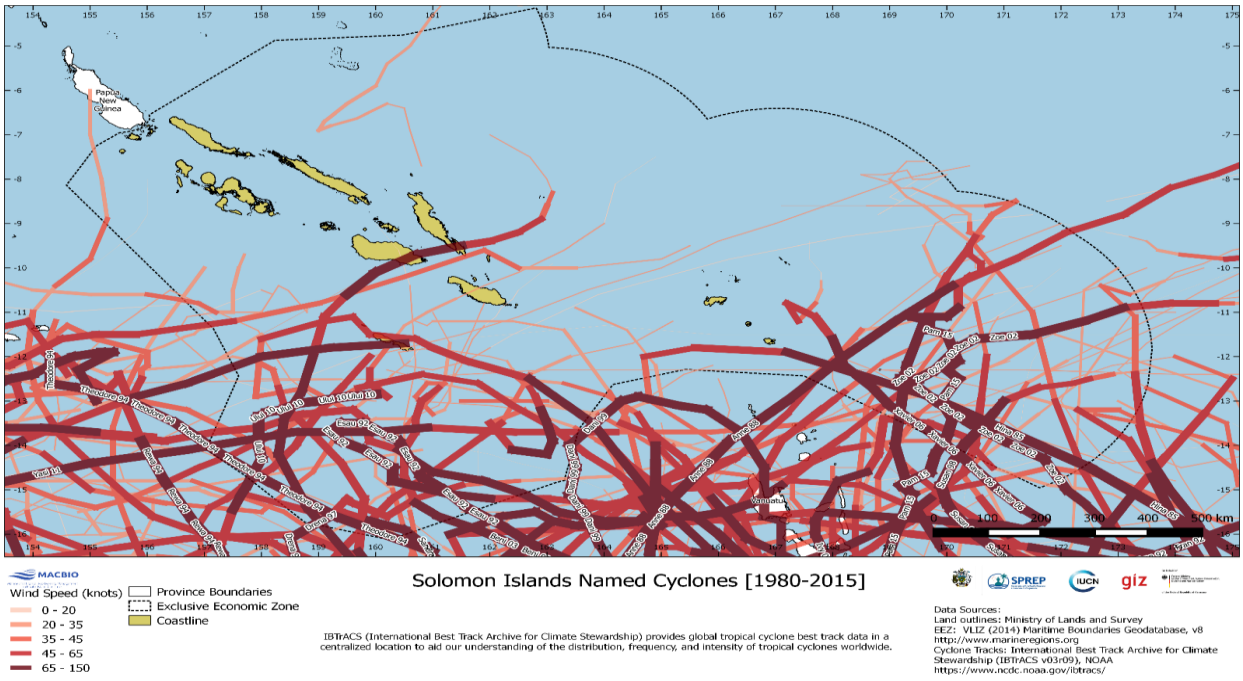


Fig 21 Solomon Island Cyclones 1980 to 2015

6.6 Watercourses and Water Bodies

The proposed development lies close the Poha river which is a major river in the area and the Marama spring. There is a possibility that the catchment inland is connected in terms of the major watersheds for both rivers.

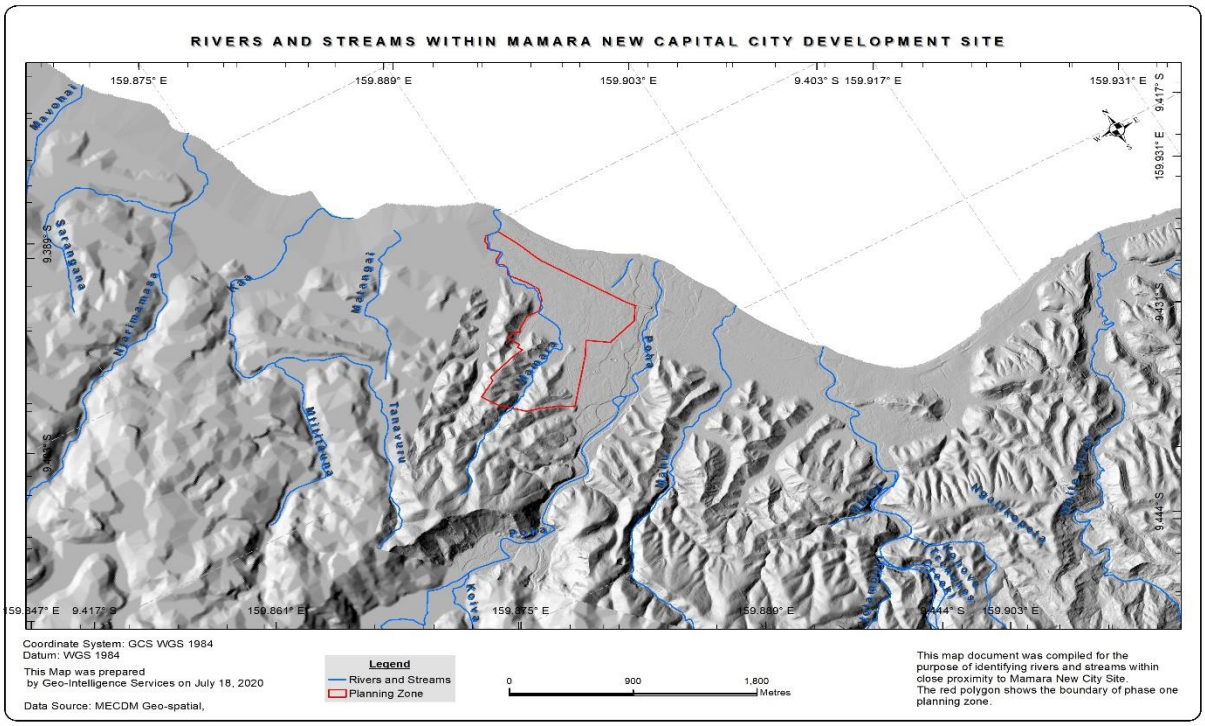
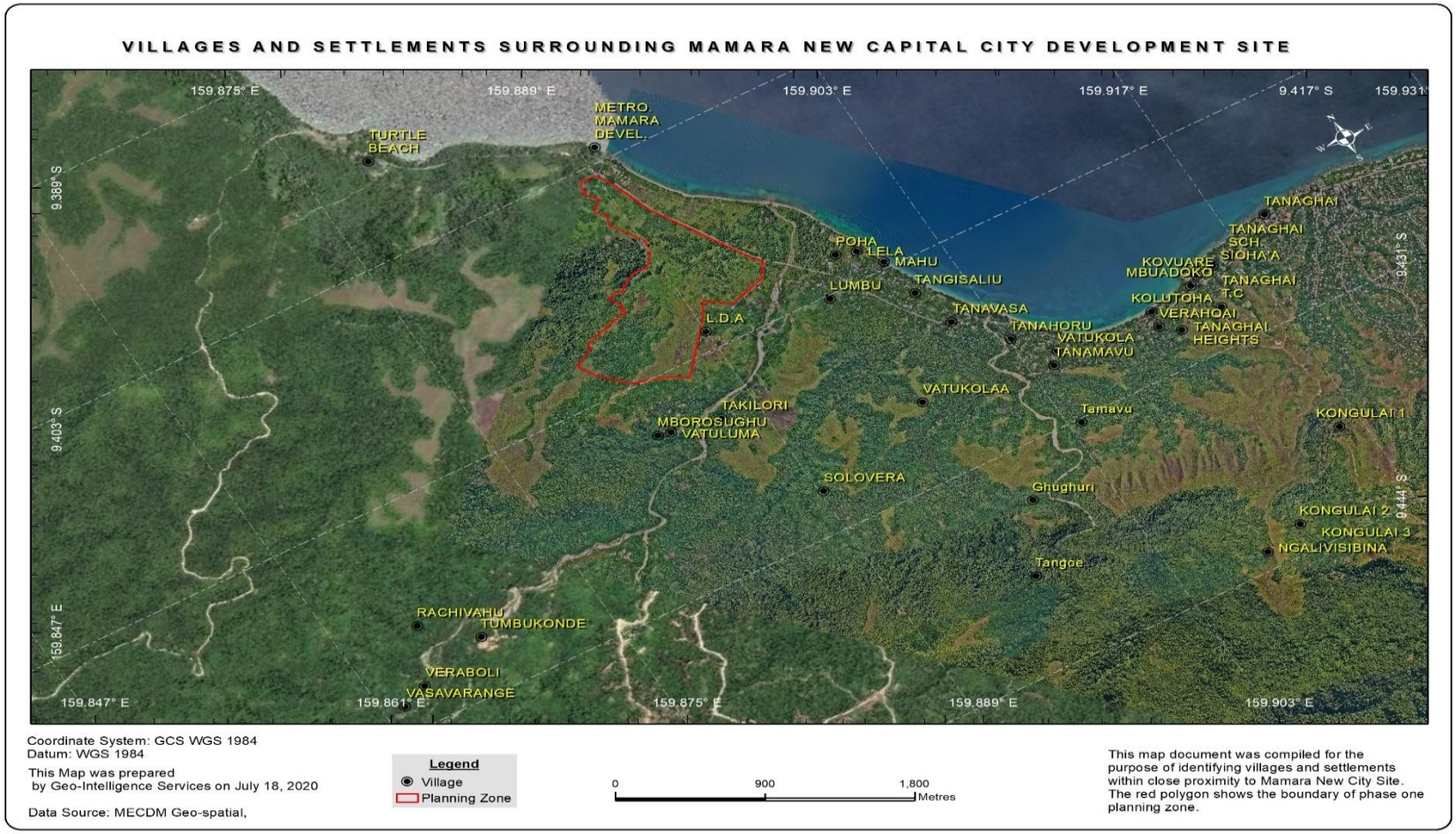


Figure 22: Major watercourses in the vicinity of the project

6.7 Community, Villages and Settlements

Fig 23: The map below shows the main settlements around the Mamara project site.



6.8 Current Land Use - including fishing and hunting areas.

The map below shows the main fishing and hunting areas used by the nearby communities and settlements. The river are major fishing and hunting areas and so is the coastline. Discussions with the community stated that the development will limit their access to these sites.

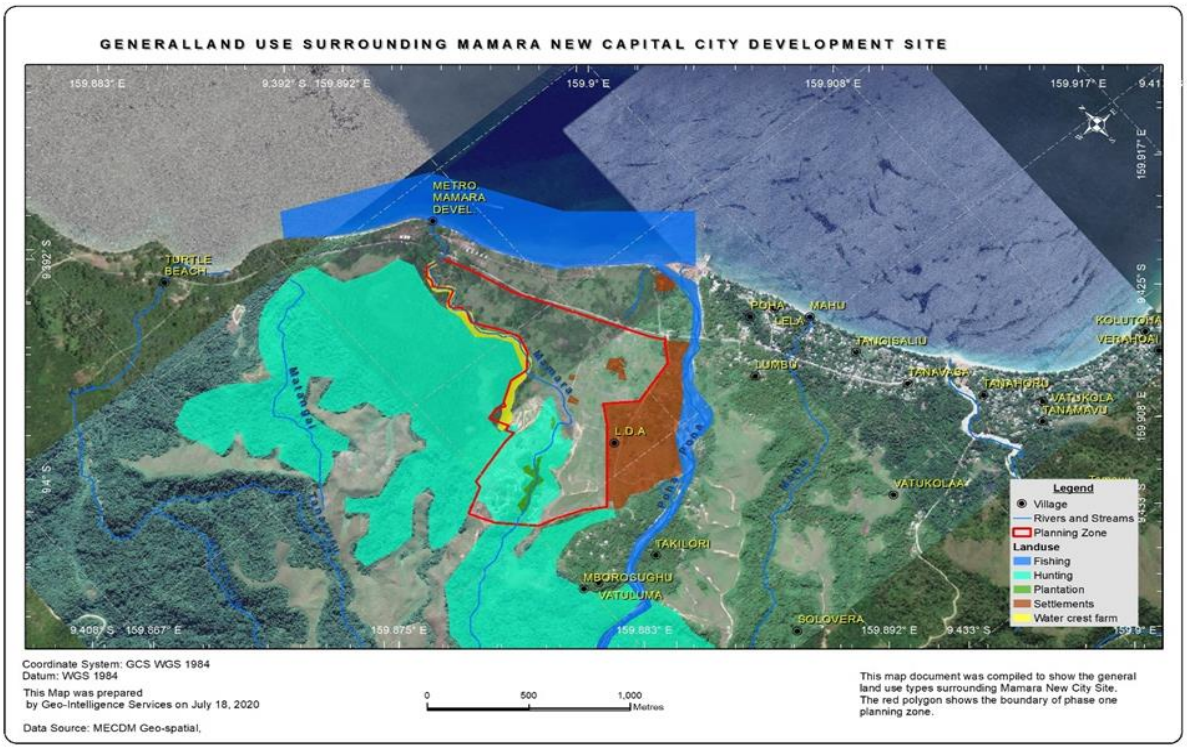


Figure 24: Current Landuse for the Project Site.

Many other associated lands use over the recent years have been carried out by illegal settlers and those from nearby communities. There is general concern at the site for land related issues and this has been raised in the social impact assessment report.

It important to stress that many of these settlers do not have historical affinity to the land are there only there to derive income due to the commercial value of the property. The site is a well-known recreation for Honiara city dwellers and thus increase of setters over the years. The proposed development broad economic opportunities will an important investment for the Solomon Island economy as it transits from dependency on logging and diversify its economic base.

6.9 National Parks, Protected Areas - Terrestrial and Marine

The proposed project site is not located in any designated protected or managed area although its close the culture site Poha cave. Most of the terrestrial and marine managed areas as shown on the map below are located far from the development site.

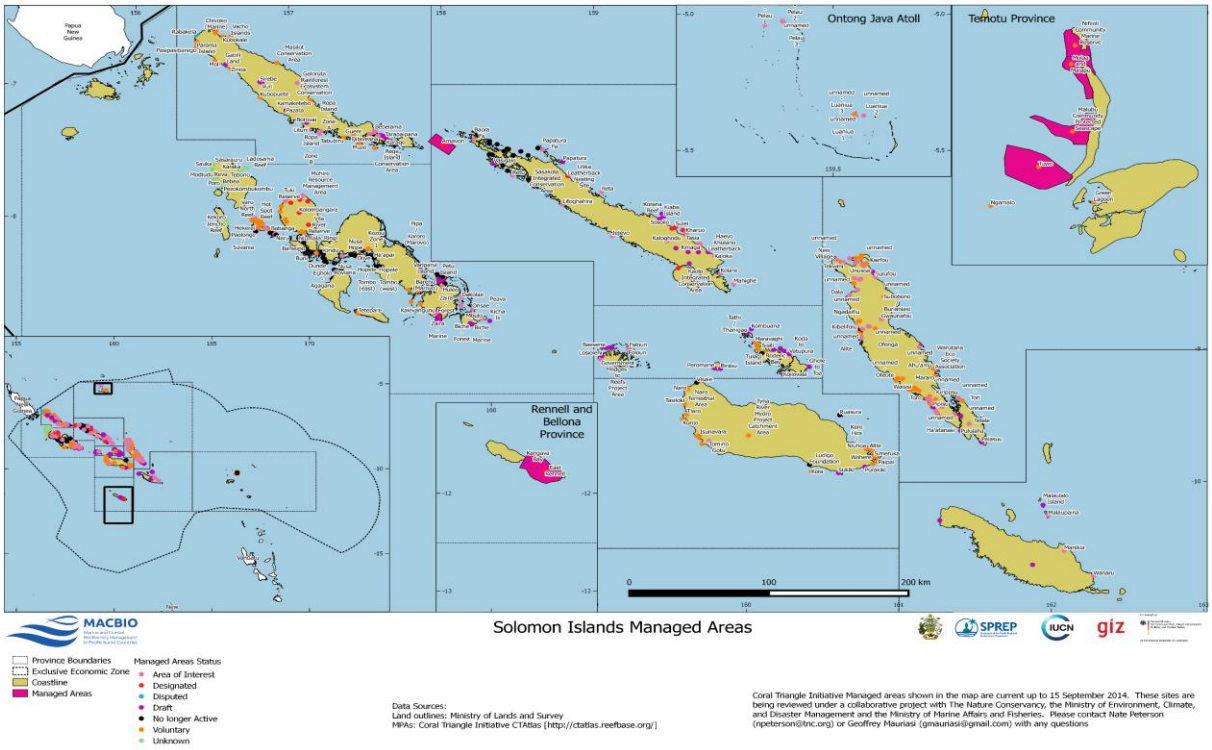


Fig 25: SI managed and protected areas

The EIS being formulated as alluded to is focused on the housing estate and associated supporting infrastructure and utilities. What this means is that other coastal developments will require separate environment studies although the baseline for the coastal or norther part of the site has been fully included in this report. The general layout of the map shown below shows the dotted redline that is covered for the EIS.

It is important to stress that the site is heavily degraded with over 100 years of development mostly for coconut plantations.

6.10 General Conceptual Design of the Location –

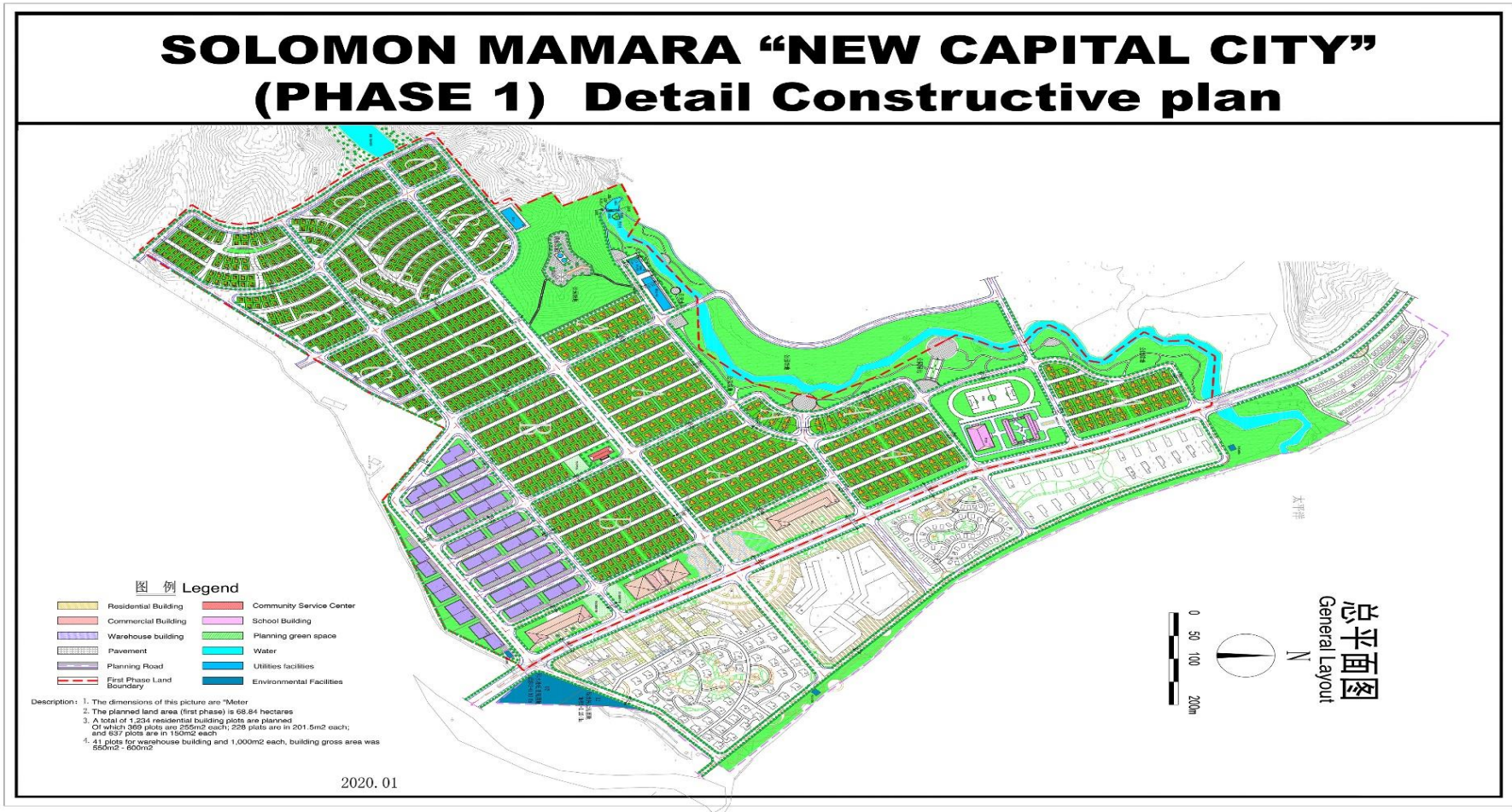


Fig 26: Mamara development plan - Note the red dotted line is the boundary for the EIS current being undertaken

References

Honiara Urban Resilience and Climate Change Adaptation Plan: a joint strategy for the Honiara City Council and Solomon Islands Government (UN-Habitat 2016a)

Cities and Climate Change Initiative, Honiara, Solomon Islands, Climate Change Vulnerability Assessment (UN-Habitat 2014)

Solomon Islands National Report: TA7394 Strengthening the Capacity of Developing Member Countries to Respond to Climate Change (ICEM 2012)

Solomon Islands National Climate Change Policy 2012–2017 (Wickham *et al.* 2012).