Community Integrated Management Plan Vaimauga West District_Upolu



Implementation Guidelines 2018

Foreword

It is with great pleasure that I present the new Community Integrated Management (CIM) Plans, formerly known as Coastal Infrastructure Management (CIM) Plans. The revised CIM Plans recognizes the change in approach since the first set of fifteen CIM Plans were developed from 2002-2003 under the World Bank funded Infrastructure Asset Management Project (IAMP), and from 2004-2007 for the remaining 26 districts, under the Samoa Infrastructure Asset Management (SIAM) Project.

With a broader geographic scope well beyond the coastal environment, the revised CIM Plans now cover all areas from the ridge-to-reef, and includes the thematic areas of not only infrastructure, but also the environment and biological resources, as well as livelihood sources and governance.

The CIM Strategy, from which the CIM Plans were derived from, was revised in August 2015 to reflect the new expanded approach and it emphasizes the whole of government approach for planning and implementation, taking into consideration an integrated ecosystem based adaptation approach and the ridge to reef concept. The timeframe for implementation and review has also expanded from five years to ten years as most of the solutions proposed in the CIM Plan may take several years to realize.

The CIM Plans is envisaged as the blueprint for climate change interventions across all development sectors – reflecting the programmatic approach to climate resilience adaptation taken by the Government of Samoa. The proposed interventions outlined in the CIM Plans are also linked to the Strategy for the Development of Samoa 2016/17 - 2019/20 and the relevant ministry sector plans.

We wish to acknowledge the significant contributions of our District and Village communities and our key government partner stakeholders and implementing agencies, in particular:

Ministry of Women Community and Social Development (MWCSD)
Ministry of Works Transportation and Infrastructure (MWTI)
Ministry of Natural Resources and Environment (MNRE)
Ministry of Agriculture and Fisheries (MAF)
Electric Power Corporation (EPC)
Land Transport Authority (LTA)
Samoa Water Authority (SWA)
Ministry of Health (MOH)
Ministry of Finance (MOF)

We acknowledge also our key international donor partners: the World Bank, the Pilot Program for Climate Resilience and Adaptation Fund, Adaptation Fund Project, through the UNDP, for the financial support that enabled the review and update of the CIM Plans.

Finally, I commend these CIM Plans to all relevant stakeholders from government ministries to districts and village communities and development partners to implement with the utmost urgency. It is assured that the implementation of the CIM Plans further enhance the resilience of Samoa to the impacts of climate change.

Thank you

Hon. Fiame Naomi Mata'afa

Minister of Natural Resources and Environment

Participants in the Plan

The CIM Plan is a Partnership between the Government of Samoa and the villages within the Plan area. The Plan area starts from the ridge extending to the reef broadly covering 4 sectors; Infrastructure; Natural Environment and Resources; Livelihood and Food security; and Village Governance. Both partners have responsibilities for issues and solutions and the Plan gives an integrated approach to the provision of services and improvement of resilience now and in the future.

This Plan incorporates the Faipule District of Vaimauga West (Mulinu'u/Sogi/Savalalo/Fugalei/Saleufi, Vaimea/Aai o Fiti, Alamagoto, Apia, Togafuafua/Matafele/Tufuiopa, Taufusi, Lalovaea/Lalovaea Sasae/Palisi, Malifa/Motootua/Leufisa, Tanugamanono, Nafanua/Setema Fou, Papaloloa/Tanumaleko, Papauta/Loimata o Apaula, Vailima, Avele/Vaoala/Tiapapata, Matautu-tai/Matautu-uta, Vaiala, Vaipuna/Levili, Faatoia/Vini/Maagao, Magiagi, Moata'a, Vaivase, Toomatagi).

The village representatives participated in the preparation of this CIM Plan in partnership with the Government of Samoa.

Date of Signing:	22 June 2018
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Representatives

Signatures

Mulinu'u/Sogi/Savalalo/Fugalei/Saleufi Villages

- Suluape Ponifasio
- Faletausaga Ioane
- Akenese Tauia
- Roseta Ioane

Vaimea/Aai o Fiti Villages

- Sula Senia Sheck
- Pupumai Nicky Nielsen
- Betty Nosese
- Seala Hili
- P Peresitene

Alle Apele Hile, Harer

AlamagotoVillage

- Lefau Soonalole
- Ava Etuale
- Toa Etuale
- Seuitusi Tala
- Maua Lui



Apia Village

- Hinemoa Matagi
- Tuiletufuga Siaosi Tuiletufuga
- Juliana Tuiletufuga
- Salauimatagi Tuiletufuga
- Saveatama Jonathan



Togafu'afu'a, Matafele, Tufuiopa Villages

- Leuluama V Faaee
- Mele Mamea
- Vavao Misi
- Fuamoli Misi
- Ulugia Tevita

ABon Sun

Taufusi Village

- Lilomaiava Schuster
- Tuifea Sapa
- Tui Schuster
- Seulu Loimata
- Aufagatene Ene

JA JA

MNRE

Lalovaea Sisifo, Lalovaea Sasa'e, Palisi Villages

- Tevaga Sasulu
- Laine Obrien
- Talaitaua Kovio
- Ausage Faaoso Misimoa
- Ausage Poua Misimoa



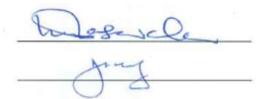
Malifa, Moto'otua, Leufisa Villages

- Lloyd Siaosi
- Kelly Faletoese
- Mosololo Fuimaono
- Moemoeolemalotumua Oilau
- Makerita Maninatu



Tanugamanono Village

- Tumau Tafuvai Atoa
- Tuuamalii Iose



Nafanua (Setema Fou) Village

- Aumua Kaisalika
- Suafoa Muliaga
- Matagi Ugafe
- Nuualuga Aumua
- Lepule Misiuepa Matagi

Some Notes

Papaloloa, Tanumaleko Village

- Papalii Tuisimona Tinai
- Vonnie Papalii Tinai
- Pati Tuamalii
- Mataui Polataivao
- Vai N Matagi

Papauta (Loimata o Apaula) Village

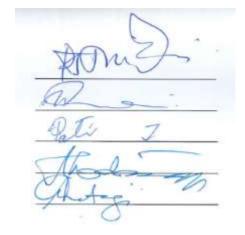
- Taliulu Lupo Fruean
- Vainalepa Peseta
- Solotama Tuia
- Tafaomauga Siaosi
- Peter Sasi

Vailima Village

- Puaaefu Jordan
- Puaasina Tamafiti
- Leniu Tomevaa
- Eseta Faleniko
- Vailima Lefale Makesi

Avele, Vaoala, Tiapapata Village

- Tavui Anne Laumea
- Sooale Koroseta
- Loli Filimana
- Samoa Iakopo
- Matau Faletolu
- Vaatilua Tufa
- Savea Petelo







(savin Am Lane Arde.

K. Soigue. Vacala.

Modela Vacala.

Macala.

Rev. Pare Malobelei

Matautu-tai/Matautu-uta Village

- Pupuaalii Senio Pupualii
- Solapo Avau
- Vaigalepa Niko
- Avamua Pio
- Kuliatu Enesi
- Taiupu Toomalatai

Vaiala Village

- Sasa Patu
- Falepauga Loau Tavita
- Puipuialii Ausage
- Terissa Asi
- Natasha Patu

Vaipuna, Levili Village

- Tuasa Ronnie
- Elenoa Salanoa
- Togisia Vena
- Serenita Papalii Afatia
- Papalii Afatia

Fa'atoia, Vini, Ma'agao Village

- Papalii Pene
- Puao Saveaalii
- Taupau Ioane
- Aeau P Leavai
- Vaimoana Jane

Andry.
Arramua Pio

Action Holofuis Derish Asi Rota.

Agrica Mangar

Rayerahi Spueshi Walsi

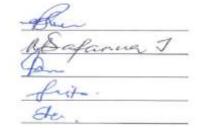
Magiagi Village

- Punoalii Fetulima Kopelani
- Fetuao Nuualesi
- Segi Melegi
- Tafilipou

Fieturo Nuvalesi Edit.

Moata'a Village

- Peresia Tamapua
- Mereane Safanua
- Fogafua Filipo
- Fenika Vaani
- Eteuati Aifili



Vaivase Village

- Faasoutele Savalio
- Savea Uili Sinclair
- Tumanuvao Sione
- Otto Lafaele
- Onopene Faoagalii



To'omatagi Village

• Lauano Perese

mann.

The Government of Samoa adopts the Community Integrated Management Plan for the Faipule District of Vaimauga Westas a Management Plan for the Implementation of the Community Integrated Management Strategy (CIMS).

The Ministry of Natural Resources and Environment, as lead organization of Government, on behalf of the participating Government Departments and Corporations, confirms the participation of the Government of Samoa in the preparation of this Community Integrated Management Plan and its adoption as a Management Plan for the implementation of the Community Integrated Management Strategy.

Ulu Bismarck Crawley

CHIEF EXECUTIVE OFFICER, MNRE

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Acronyms:

ACTOHYMS:	A constitution of the control of the
ASCH	Areas Sensitive to Coastal Hazards
BCA	Benefit Cost Analysis
CBFMP	Community Based Fisheries Management Plan
CC	Climate Change
CCA	Climate Change Adaptation
CDCRM	Community Disaster & Climate Risk Management
CEP	Community Engagement Plan
CHZ	Coastal Hazard Zone
CEHZ	Coastal Erosion Hazard Zone
CFHZ	Coastal Flooding Hazard Zone
CIM	Community Integrated Management (Plan) or (Strategy)
CLHZ	Coastal Landslip Hazard Zone
COEP	Code of Environmental Practice
CSO	Civil Society Organization
CSSP	Civil Society Support Programme
DSP	District Sub Project
EbA	Ecosystem based Adaptation
ECCCR	Enhancing Coastal Community Climate Resilience
ECR	Enhancing Climate Resilience
EMP	Environmental Management Plan
EPC	Electric Power Corporation
ERN	Emergency Radio Network
HCSI	High Coastal Sensitive Index
IAS	Invasive Alien Species
IG	Implementation Guideline
KBA	Key Biodiversity Area Key Performance Indicator
KPI	, , , , , , , , , , , , , , , , , , ,
LTA	Land Transport Authority
LTO	Long Term Output
MAF	Ministry of Agriculture and Fisheries
MET Office	Meteorological Office
МоН	Ministry of Health
MNRE	Ministry of Natural Resources and Environment
MWCSD	Ministry of Women Community and Social Development
MWTI	Ministry of Work Transport and Infrastructure
NAP	National Action Programme
NBSAP	National Biodiversity Action Plan
NDMP	National Disaster Management Plan
NESP	National Environment Sector Plan
NISP	National Infrastructure Strategic Plan
NRW	Non Revenue Water
PA - KO	Priority Area - Key Outcome
PUMA	Planning Urban Management Agency
PPCR	Pilot Programme Climate Resilience
R2R	Ridge to Reef
SIAM	Samoa Infrastructure Asset Management
SOER	State of Environment Report
SWA	Samoa Water Authority
UNDP-GEF SGP	United Nations Development Programme Global Environment Facility Small Grants
ONDI GDI GGI	Programme
WB	World Bank
WCR	West Coast Road
WMP	Watershed Management Plan
WSSP	Water Sanitation Sector Plan
44721	water Janitation Jector Fran

Glossary

Coastal Hazard Zones Defined areas landward of the coast which are or are considered likely to be

subject to the effects of hazards over a defined assessment period. In this study, reference is made to four coastal hazard zones: ASCHs (areas sensitive to coastal hazards); CEHZs (coastal erosion hazard zones); CFHZs (coastal flood hazard

zones) and CLHZs (coastal landslip hazard zones).

"Do Minimum" option A Management option that involves continuing with the present maintenance

and upgrading programme on and when required basis.

Emergency Management To provide communities with skills, facilities and materials so that they may

adapt, respond and recover more quickly in the event of emergencies.

Hazard A source of potential harm or a situation with a potential to cause loss.

Infrastructure Built structures and networks which support the national, regional or local

community.

Lifeline infrastructure
Infrastructure that contributes directly to the survival of the community and its

ability to respond and recover at the time of extreme events.

Implementation Guidelines A document to guide land use and resource practices to achieve specified goals,

objectives and policies and provide a framework for the implementation of

defenses and works.

Issue A specific concern regarding both cause and effect.

benefit (e.g. land use includes areas used for villages or crops, resource use

includes activities such as sand mining, gravel extraction or fishing).

Monitoring Process of measuring the effectiveness or impacts of projects and works against

predicted standards, levels or outcomes.

Resilience The ability to be adaptive, responsive and quick to recover.

Community Resilience The ability for the community to be adaptive, responsive and quick to recover

from the adverse effects of hazard.

Natural Resilience— The ability of natural systems to be adaptive, responsive and quick to recover

from natural processes or hazards.

Risk The chance of something happening that will have an impact on objectives. It is

measured in terms of consequence and likelihood. In the Community Integrated Management Plan context it is the likelihood that infrastructure, environment and biological resources and agricultural and marine resources (food security) will be subject to inland and coastal hazards and the potential for loss of

property, life or land due to natural processes.

Stakeholders Those people and organizations who may affect, be affected by, or perceive

themselves to be affected by, a decision or activity. The term stakeholder may

also include interested parties.

Strategy Direction or course of action to achieve a define division.

Susceptibility The degree to which infrastructure at risk is likely to be damaged by coastal

hazards and how easy/difficult, expensive/cheap it is to replace. In the context of the CIM Plan the term susceptibility is equivalent to the term vulnerability as

the Samoan phrase for both susceptibility and vulnerability is the same.

Vision A desired destiny.

Food access

Livelihood A livelihood is a means of making a living. It encompasses people's capabilities,

assets, income and activities required to secure the necessities of life Food availability: The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid).

Access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live

(including traditional rights such as access to common resources).

Utilization Utilization of food through adequate diet, clean water, sanitation and health care

to reach a state of nutritional well-being where all physiological needs are met.

This brings out the importance of non-food inputs in food security.

Stability To be food secure, a population, household or individual must have access to

adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore

refer to both the availability and access dimensions of food security.

Introduction to the CIM Plan

The Strategic Vision

The District Community Integrated Management (CIM) Plan for Vaimauga West District has been prepared as part of the Government of Samoa's Adaptation Fund - *Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project*. The CIM Plan is one of the primary means of implementing the CIM Strategy, which was formally approved by the Government of Samoa in February, 2001 and updated in 2015 as providing the Strategic direction for enhancing the resilience of community livelihoods, infrastructure, environment and natural resources using a holistic and integrated ridge-to-reef approach. The Strategy has as its central vision:

Resilience – Community Livelihoods, Infrastructure, Environment and Natural Resources to Climate Change and Natural Disasters

The CIM Plan takes this vision and provides the practical tools with which the communities and the government, in partnership, can implement the Strategy. *To be resilient is to be adaptive, responsive and quick to recover so that communities are environmentally, socially and economically sustainable (CIM Strategy, 2015).*

The Aim of the CIM Plan

The aim of the CIM Plan is to help communities and government improves resilience by identifying actions and solutions considered as best approach to issues identified. Not all the solutions may be actioned immediately but the plan will ensure that issues and options are identified for the long-term improvement in resilience of community livelihoods, infrastructure, and environment and resource systems.

The CIM Plan will:

- 1. Improve the community's awareness of all hazard risks from the ridge to the reef;
- 2. Enable the community as well as providers of services and physical, financial, and technical support in all climate prone sectors, to reduce inland and coastal hazard risks in villages;
- 3. Enable the community and government service providers of infrastructure services, livelihoods, environment and natural resources to better adapt, respond and recover from cyclones.

Structure of the Plan

The CIM Plan consists of two parts each serving a separate and distinct purpose.

- *Plan Development,* which describes the process undertaken in preparing the CIM Plan in conjunction with representatives of the Communities involved, the Government and other stakeholders with interests in the Plan area.
- *Implementation Guidelines*, which describes the Plans and Actions recommended as outcomes of the process, together with the partner responsible for implementing these outcomes. The participants of the CIM Plan preparation process are acknowledged in the Implementation Guidelines.

Implementation Guidelines

Purpose of the Implementation Guidelines

The Implementation Guidelines describe the solutions proposed that will increase the resilience of the villages in the Plan area and the ways these solutions can be implemented. The solutions are presented for various livelihoods, infrastructure, environment and natural resources items that have moderate to low resilience. Where one solution will provide benefits to other items of livelihoods, infrastructure, environment and natural resources these "Other Benefits" are also noted. Implementation is considered to be the joint responsibility of both the villages and the government in partnership. The government is responsible for the provision of national and district "Public", infrastructure and public goods and benefits derive from environmental services and natural resources , while villages are responsible for local and community infrastructure and livelihoods related actions. The responsibility for implementing the proposed actions is also defined. Solutions for both District and Village level issues related to livelihoods, infrastructure, environment and natural resources respectively, and the responsibility of both partners, should be considered together as they combine to provide for the integrated management of all community development initiatives.

The solutions for village level interventions related to livelihoods, infrastructure, environment and natural resources will usually be the responsibility of the Village Council and Families in the village to implement. Advice and resources may be available from the Government to assist the village in implementing these solutions. In most situations these solutions will also provide benefits to both village and district infrastructure and resources and environmental goods that are shared between villages. These solutions should be considered an integral part of strengthening communityresilience at both levels.

Duration of the Plan

The CIM Plan is **reviewed** every 10 years but during the Plan period, the solutions implemented will be **monitored** a five (5) yearly basis to ensure the proposed solutions are effective and are actually improving resilience. The 5 yearly monitoring of the new CIM Plan is aligned with the 5 year review of **the key national planning and programming** strategy for Samoa: the *Strategy for the Development of Samoa* (SDS). The new CIM Plan recognizes some solutions are likely to take longer than 5 years, whilst others may take up to 10 years to implement due to the complexity of planning process, funding and budgeting programming required to implement these solutions.

Detailed implementation of the solution will determine the monitoring requirements and Key Performance Indicators.

Financing of the Plan

Implementation of best solutions is the collective effort of all identified responsible agencies, civil society organizations, donor partners **and** district and village communities themselves. Funding will be sourced through several mechanisms recognizing the Government of Samoa's programmatic approach to tackling climate change impacts on its development progress. While every effort has been made to identify priority actions needed to build the resilience of Samoa and its communities, the Government also recognizes that not all actions identified can be financed at once. Implementation of best solutions will be undertaken strategically and over time in line with available funding and, **if** determined a priority CCA activity that will actually build the resilience of communities and Samoa as a whole. Criteria of determining priority CCA best solutions for financing are:

- proposed development is in general accordance with the objectives of the CIM Strategy 2015;
- development is specifically recommended in the CIM Plan
- number of people that will benefit from the development, i.e. population benefit
- development will provide *life sustaining* support for communities
- minimum or neutralenvironmental effects
- development will improve resilience
- development will achieve speedy recovery
- development will reduce risk
- also identified as a priority in other Sector Plans or National Strategies

During the development of the new CIM Plans, the World Bank funded Pilot Programme for Climate Resilience Enhancing Climate Resilience for Coastal Resources and Communities (PPCR ECR) prepared two (2) key documents:

Community Engagement Plan (CEP)-the guidelines provided in the CEP is an excellent capacity building tool that can be used by CSO's and village communities themselves to aid development of small

grant proposals to existing small grant funding mechanisms like CSSP and the UNDP-GEFSGP

➤ **District Sub Project (DSP)** – the guidelines provided in the DSP targets single districts or multi-district projects with a large number of beneficiaries.

Noting Samoa's programmatic approach to CC and CCA, these key documents are fundamental in guiding development partners, implementing agencies and other stakeholders on the most effective way of resourcing and supporting climate change adaptation projects at the village and district levels. These village and district level CCA projects actually achieve the majority of key indicators in various Sector Plans, subsequently achieving key national indicators contained in the *Strategy for the Development of Samoa* (SDS).

1. Description of Vaimauga WestDistrict

Physical and Natural Resource Setting

The Faipule District of Vaimauga West is a low lying coastal plain that covers part of the northern shoreof Upolu Island and extends inland reaching Mt Vaea and highlandsbordering the district from east to west. Apia, the largest city and home port for the pelagic fishing fleet and site for the major fish markets of the country is situated within this district.

On both the eastern¹and western²coast of Vaimauga West, mangrove areas take up much of the location. The eastern part of the district's coastline also contains reef breaks of various distances ranging from 1 m to 1 km, with the most important being the channel which provides access to the Apia Port. The port facilitates for the country's many stevedoring, chandlery and further port related businesses located within the district. A dominant sea wall erected in the early 1990s after cyclone Ofa and Val protects the harbor and runs through most of the city's shoreline. These seawalls were later upgraded to the state in which it currently is. A smaller sea wall located east of the Apia Port and approximately 1m in height extends along Palolo Deep to Vaiala.

Coastal and alluvial soils with generally high levels of fertility dominate the coastal regions of Vaimauga West. These soil types were formed by a sandy beach, silty estuaries or coastal inundations. Inland, the hilly landscape is dominated by broad sloping ridges separated by deep gorges and much of the area is subject to erosion.

Since the introduction of the sea wall which safeguards the coast of Central Apia, the creation of a manmade beach at the mouth of the Vaisigano Bridge near the Aggie Grey's Hotel, building developments of the Apia Waterfront Project and a new discharge point for the Moata'a mangroves at Taumeasina Island, there has been an alteration in sand/sediment deposit patterns around the coast as well as the unnatural flow of wave travel patterns.

Vaimauga West is anurbanized area in contrast to other districts under CIMP review. It includes the Central Business Area, most of Samoa's Government offices including the Parliament Buildings at Mulifanua and many head offices for local and international companies. The main government institutions in the district include Police, Fire and Emergency management headquarters, the central bank offices and other commercial banks, andall government ministries including the key central agency; the Ministry of Finance. Next to the Internal Affairs offices is the main Pulenu'u fale where village representatives meet. In addition to these establishments, a number of historic sites, Aggie Grey's Hotel and Bungalows, TanoaTusitala Hotel, the clock tower, flea market and churches are located along the area, particularly along the main Beach Road.

Besidesthe main river (Vaisigano River) that flows through Vaimauga West, three other rivulets Gasegase, Fuluasou and Loimata o Apaulaflow through Vaimauga West's catchment area. These rivers flood the more densely populated coastal areas of the district during heavy rain.

Vaimauga West consists of villages and village groups located along the coast, inland and in valley flats. Their descriptions are as follows.

Mulinu'u, Savalalo, Fugalei, SaleufiandSogi are coastal villages located on the western side of the Apia harbor. Fugalei is a reclaimed mangrove region and is farther away from the sea compared to the other four villages. The old Parliament building, currently under renovation is located at Mulinu'u. Mulinu'u also houses a number of tourist accommodations³ and restaurants⁴ as well as an NUS Ocean Campus and the Samoa Meteorology Office at the peninsula. In Saleufi, several drains have been built over and are blocked causing water to pond due to the inadequate drainage structures. The reclaimed area off of Savalalo and Fugalei has exacerbated the drainage of the region. A particularly flood prone zone is the drain beside the Apollo's Cinema which outlets onto the main road. The area also experiences flooding from up stream Vaimoso.

Vaimea and A'ai o Fiti are inland villages east of Vaimoso and west of Lalovaea/Palisi. The Vaimoso School and cemetery behind the school have blocked drains and are swampy. Most issues with these villages include flooding during heavy rain from upland overland flows, flooding from the blocked Vaimoso ford, or ponding and inundation from blocked drains.

¹Moata'a area

²Mulinu'u/Fugalei area

³Amanaki Hotel Restaurant and Bar; Hotel Elisa and Hotel Millenia

⁴ Sails Restaurant and Apia Yacht Club

Alamagoto is an inland village located south of A'ai o Fiti and north of Sinamoga. It experiences similar flooding issues as A'ai o Fiti and Vaimea in relation to flooding from blocked drains and flooding from the low bridge. The drains in Alamagoto stop at the northern edges of the village along the Moamoa Road. Overland flows from inland mountains are also a problem. Palisi Street has no drains hence flood water run off the mountains and collect on Palisi Street before overflowing into Alamagoto.

Apia is located in Central Apia and includes part of the coast along Beach Road and areas of land between the Vaisigano River and the Vailima Stream next to the Marist Brother's School. The village includes commercial areas along Beach Road and side roads, Government agencies such as the Police Station, and residential areas behind the commercial areas. There are drainage issues (blocked culverts or drains) near the Marist School which floods down the coast. Two springs are located within the village, one situated near the Apia Cemetery and another inland behind Lalovaea School. The spring near the cemetery acts as a supplementary water supply for a number of surrounding homes when the water supply is cut. The coast has a dominant, high, sea wall and coastal walkway. There are a number of churches located along the Beach Road and also on roads back from the coast. Sand mining is being undertaken at the mouth of the Vaisigano River. The area has a metered water supply, and stable electricity and telephone networks.

Togafu'afu'a, Matafele and Tufuiopa are located along south and west of Apia. The villages have two main waterways running along through them; the stream that discharges near Chan Mow and the spring that flows around the Marist Brother's School. The main road runs north/south. It has a number of blocked drains and stagnant water. Rubbish is an issue along the stream banks and land has been reclaimed at Chan Mow's narrowing the river channel. One spring is located in Tufui'opa. Metered water supplies are available for the villages as well as good electricity and telephone connections.

Taufusi is located at the intersection of Vaitele and Vaea Streets. The area has a large number of drains that run along the roads and east/west between houses on both sides of Vaea Street and north/south on the south side of the Vaitele Street. Two large culverts/bridges are located on Vaitele Street. The western most one is cleared by people walking through it. On the other side of Vaitele Street a commercial operator uses the drainage area to store containers. Some ponding areas have been poorly filled in, creating flood areas around dwellings. The majority of the village is flooded during heavy rains. There is a popular local market selling local produce in this village.

Lalovaea and Palisi are villages located inland south of Taufusi and Tufuiopa. Lalovaea includes a linear strip of land on the northern side of Vaitele Street extending west from Ifiifi Street, and most of the block between Ifiifi Street and Convent Street. Palisi is located east of Vaimea and west of Lalovaea. The majority of Lalovaea is located south of Vaitele Street to the east of Palisi over the mountain down into the Mulivai River valley behind the Moto'otua hospital. The river is generally Lalovaea's eastern boundary. Lalovaea is subject to flooding from the Mulivai River and runoff from Mount Vaea. The ford floods often and the river valley are eroding through landslips. There is concern over the hospital's overflow from septic tanks and Ligaliga Funeral Home dumping rubbish into the Vailima Valley.

There are two main roads which extend inland (south) from Vaitele Street. Local roads branch off from one of these roads. Although most roads have been sealed, rain and storm water runoff have damaged them. An inland spring resides within this island group. There are a number of commercial businesses operating inland in Lalovaea including the Roko bar/restaurant. Lalovaea is also home to the Government Prayer House.

Malifa, Moto'otua and Leufisa are located in three main blocks north of Maluafou and west of Tanugamanono between the Vaisigano River and the Vailima Stream. There is a large scale subdivision of land approved on the western side of the Vailima Stream extending from the Moto'otua hospital to Papauta Girl's College. The National Hospital and associated infrastructure is located in Leufisa/Moto'otua. The area has a number of schools including Apia Primary School, Maluafou School and Leififi College. The area has metered water supply, although this is not consistent, and all homes have electricity. The Vailima Stream is undermining the banks of the EFKS Leufisa Church.

Tanugamanono is located on the Cross Island Road east of Leufisa. Its eastern boundary is the Vaisigano River. Three local roads reside within the village. Some drains on the Cross Island Road are blocked and intersection with local roads often flooded. Tanugamanono has its own Primary School. An unstable power pole is located just behind the school. An underground telephone box on the corner of Leufisa Road and the main road floods and is impassable during heavy rain. The area is not metered and water pressure and quality are an issue. Electricity is supplied to all homes in this village. A diesel power station situated in Tanugamanono causes

vibrations, noise associated with its operation, and nearby villages sometimes complain of diesel smoke and smells emanating from the station.

Nafanua is located off the Cross Island Road. It has a nursery on the western side of the road and two local roads. The SROS Headquarters is located in this area. Water supply is metered but not reliable. Some properties also have water tanks. The local roads are narrow with either overgrown, blocked drains or no drains, and the Main Cross Island Road also has poor drainage.

Papaloloa and Tanumaleko are small villages located on either side of the Cross Island Road south of Nafanua and Tanugamanono. Papaloloa consists of one of the main local sealed road with poor drainage, particularly at the eastern end of the road. Tanumaleko is located south of the Nafanua nursery. Water supply to Papaloloa east of the Cross Island Road is metered, however to the west of the road water supply is not metered. Electricity lines cross properties rather than being located along the road side and telephone service is affected during storms.

Papauta is another inland village north of Leufisa. All of the village houses are located on the south-eastern side of a Vailima Stream tributary which overflows during heavy rain. Papauta has one main road, which extends behind Papauta Girl's College and south west inland. The road is not sealed, narrow and steep in parts. There is a two culvert ford on the Vailima Stream which floods during heavy rain. On one side of the main road is the tributary; along the other is an open channel. During heavy rain the Vailima tributary floods in flat low lying developed areas and storm water runs down the main road and in the open drain. Land has been cleared along Papauta Road for plantations. Village plantations are also located further inland (south west). Soil erosion from hill slopes is also an issue. Water is metered and quantity is fine. Water pressure however is an issue. There are a number of springs located inland, which are used for bathing.

Vailima is located inland on the Cross Island Road. It consists of a number of local roads with blocked drains. The village can now access clean water through the SWA water supply system and is supplied with electricity. The village has a number of areas that pond after heavy rain, particularly near the taxi stand at the back of Avele College's playing ground and inland behind Vailima Primary School. Vailima's main local road extends southeast down into the Vaisigano River valley and eventually joins Magiagi's 'Ueligitone' area. The road is steep, narrow and not sealed. Electricity and telephone lines run along the first part of this road. Halfway along the local road is an area where people have illegally dumped rubbish over the side of a steep cliff. At the bottom of the valley are EPC's water reservoirs (both old and new) and further south a power station.

Avele, Vaoala and Tiapapata are villages located on the Cross Island Road south of Vailima. These villages have a number of local roads and work roads. The local road on the east of the Cross Island Road has flood prone areas and is also the start of a tourist walkway currently being developed. The walkway will extend down the valley to a waterfall and sliding rocks. It is under construction and parts of the earth exposed to create the track have been replanted. The land slopes northwards and as such during heavy rain water flows across roads into hillside properties and homes. The local roads are narrow, and generally have either have no drains or are blocked. A reservoir that provides the National Hospital's water supply is located at the base of a Bank Street cliff. Water is metered; however the flow and pressure are limited at times.

Matautuuta and Matautu Tai are located on the eastern corner of Apia harbour. The area includes the port and the coastal village Matautu Tai (north of Matafagatele Rd) and inland Matautuuta (south of Matafagatele Rd). Matafagatele Rd is a busy main road with limited drainage system in this area. The main local road in Matautuuta is off Matafagatele Road. The road is not sealed. Electricity lines at the end of this road cross over houses. The area floods from the Vaisigano River and ponds in some areas. It was heavily flooded when the supply pipes burst open during heavy rains of the 2012 cyclone Evans. Soil erosion was quite obvious from the muddy nature of ponding areas after the flooding. Matautu Tai includes a number of commercial businesses such as restaurants, stores, the port and government offices. Heavy traffic is generated from port activities. Along the coast are Palolo Deep and a seawall, which is eroding. Runoff from Matautu Tai and Matafagatele Road often discharges into Matautu Tai and Vaipuna. Water in the area is metered, there is a stable electricity supply and telecommunications are good. Matautu Primary School is located close to the Vaisigano River. There are a number of churches in these villages including CCS and Latter Day Saints (LDS).

Vaiala is a coastal village located north of Vaipuna and between Matautu Tai and Moata'a. The coast has a sea wall, which extends to Matautu Tai. A recently constructed sea wall is in very good condition and has improved the scenery in this popular part of the Vaiala Coast. There is yet no visible change to the wetland/mangrove areas as a result of the new seawall. The village has one spring on the boundary with Vaipuna village, which floods houses in the vicinity. The road is used as an alternative connection to Matafagatele Road and sometimes

by heavy trucks, which are trying to access the port at Matautu Tai. The road is narrow in places and does not have a footpath.

Vaipuna is located between the villages of Matautu Tai and Moata'a close to the coast and is bound on its southern side by Matafagatele Road; Vaipuna straddles both sides of Vaipuna Road. Like Moata'a, Vaipuna also has a large wetland area on the eastern side of Vaipuna Road.

Levili is located immediately to the south of Vaipuna on the southern side of Matafagatele Road and Fa'ato'ia Road. Houses have built up to the edge of the wetland area, often with no septic tanks and rubbish is often dumped in the wetland. There are two drains, which cross Matafagatele Road from Levili and Apia Park. There is also a spring on the western side of Vaipuna Road, on the boundary of Vaiala village, which floods during heavy rain and high tide. Some houses in the area are at lower elevations and surface water ponds in this area.

Fa'ato'ia, Vini and Ma'agao villages are located inland south of Apia Park and Fa'ato'ia Road. The villages incorporate a network of roads running north/south and east/west. The Vaisigano River forms the western boundary of the villages. The river diverts from its path during heavy rainfalls and floods northwards through homes and roads. Some drains are blocked causing further flooding or ponding areas. A number of local roads were unsealed in 2006 but have recently been sealed (e.g Lelata Road, a road in Fa'ato'ia, Ma'agao and the north/south road). Vini is located at the western most corner of the Moata'a mangrove system. During heavy rain the mangrove floods north into Apia Park and south towards Fa'ato'ia but there was no significant effect on the mangrove per se. There is a spring located at the corner of Vini Road. Another feature of Ma'agao and Lelata village is the hydroelectric pipeline which runs along the Vaisigano River to the Power Station. Water is metered and electricity and telephone connections and supply are sufficient and stable.

Magiagi is an inland village made up of two parts; the settlement along the main road is informally known as Aukilani and the settlement along the valley is known as Ueligitone. Being located in the Vaisigano River valley makes Ueligitone (and its residents) prone to flooding.

Aukilani has metered water while the lower area, Ueligitone, sources its water from the Vaisigano River through the old/decaying German laid pipes (90-100 years old). Ueligitone experiences problems with both water supply and water quality. Most of the higher area, Aukilani, has a steady and stable electricity supply, however further inland and in the Ueligitone area the supply is limited. There is also limited access to the Ueligitone area, access either being gained from a footpath beside the LDS church or a road from Vailima to the north. A prominent feature of Ueligitone is the pipeline, which supplies the Vaisigano hydro power station. The pipe runs the length of the Vaisigano River valley and divides Ueligitone in two. The pipeline was damaged during the 2012 cyclone causing an extensive flooding in the lower area; causing significant damage to properties in Magiagi, Lelata, Fa'atoia, Levili, Vaipuna and Matautu. A vehicle maintenance track runs along the pipeline route, which is used as Ueligitone's main thoroughfare. There are no roadside drains in the lower area and limited or blocked drains in the upperAukilani area. Fallen trees caused by heavy rain and cultivation on steep lands are evident in the upland areas and is washed down through the river during extreme events, causing the river to burst its banks and overflow into villages downstream.

Moata'a village is located on the eastern corner of Vaimauga West along the coast. Matafagatele Road runs along the village before turning south to follow the coast. The main feature of the village is an extensive wetland area located behind homes on Matafagatele Road. The wetland extends west to the village of Vini. The wetland area used to cover the entire village and discharge through the reserve area near Taumeasina. Today the wetland discharges through a narrow channel near Moata'a Primary School and some of the wetland has been filled and reclaimed for buildings and other developments. A pedestrian footpath crosses the southern corner of the wetland area and acts as a barrier for out-flows to the coast even though there are culverts through this area. Water in the wetland on both sides of the footpath is generally stagnant and is not suitable for swimming. Regular flooding occurs during heavy rainfall and high tide and often floods homes located on the edges of the wetland areas. Moata'a village has one spring and two pools which are both located on the corner of the wetland. Part of the village's coast has a seawall. The northern part of Moata'a's coast has changed significantly as a result of a number of reclamations including: Taumeasina Reserve; Taumeasina island off the coast of Vaipuna and Moata'a; the reclamation of the Vaipuna coastline and the reclamation of a jetty at Taumeasina.

Vaivase is made up of two villages Vaivase Tai and Vaivase Uta. Vaivase Tai is located closer to the coast while Vaivase Uta is located inland, east of To'omatagi. The eastern side of Vaivase Tai includes a steep valley and stream. The Vaivase Stream is eroding the land that the EFKS church is situated on. Sediment laden storm water run-off from Samoa College and the Polytechnic, drain across the road into houses. Water supply is reticulated and power supply is erratic at times. The power supply often gets turned off, is of low voltage and subject to

surges. Since the main telephone box has been placed underground connections are often not clear. During heavy rain the area where the telephone control box is located gets flooded and telephones don't work. Schools in the area include Samoa College, Vaivase Primary School, Falefitu Primary School and Vaimauga College.

To'omatagi is a small village located north of the National University of Samoa, west of Vaivase Uta and east of Magiagi. The village consists of one street of residences. The street has electricity supply and telephone connections on both sides of the road. The electricity lines hang low. Water supply has recently been upgraded by SWA replacing the old unmetered dirty water supply. There is limited water pressure at the southern end of To'omatagi road. The main street is steep and sediment laden storm water channels down it and ponds at the northern most corner of the road. This is exacerbated by run off from the To'omatagi Road from the other direction too. The road is narrow, and does not have a footpath; plantations are located in the river valley which floods. Le Papaigalala (NUS Campus) is situated along the road towards To'omatagi.

In total, 25 roads are located within the Vaimauga West district (Market Rd, Palisi Rd, Atina'e Rd, Apa'ula Heights Rd, Apa'ula St, Moto'otua Rd, Fa'ato'ia Lane, Faipule Rd, Vini Rd, Fogavai Rd, Matautu St, Matautu Drive, Kolisi Rd, Taliilagi Place, Gloria Rd, Tanugamanono Rd, Skippers Lane, Tana Rd, Lamosa St, Tanu,aleko Rd, Eugene Rd, States Rd, Alaoa Rd, Vaiala/Vini Rd and LeviliUta Rd) where only 3⁵ are in very poor condition and the remaining in less but still poor states.

Majority of the issues with these roads are; pot holes, failed patching, chipped and rough edges, narrowness, poor and rough surface structure, dangerous open drainage structure, overgrown and encroaching vegetation, installation of speed limit road signs and the need of proper road markings. Six major bridge crossings in Samoa are vulnerable to climate change and the Vaisigano Bridge is one of the susceptible bridges. The Vaisigano River is one of the two major catchment areas situated in Upolu.

Invasive species common to the district include pulumamoe, which appears to take up any opening in the original vegetation whether through cultivation or by wind damage; tamaligiuliuli or silk tree (Albizziachinesis) which is widespread in the district and could become the major threat to village vegetation in the future; tamaligipaepae(Albizziafalcataria) which is present in the hills and gullies of Vaimauga West and could cause landslips if blown over by strong winds as they do not have well-formed penetrating root systems; the large leaf merremia vine (Merremiapeltata), a big concern as it tends to invade open space and smother larger trees that remain in cultivated or wind damaged forest areas; faapasi(Spathodiacampanulata) or the African Tulip; vaomigi(Hiptiscapitata) a recently introduced weed that is fast spreading in pastures and cultivated lands; vaolapiti(Solannommammosum) an introduced sub-shrub with spiny leaves and stems, usually uncommon in cultivated areas, was accidentally introduced through cattle movement; vaopinati(Sennatora) occasional as a weed; lusina(Leucaenaleucocephala) wild tamarind; vaopovi(Pennisetumpurpureum) elephant grass, a tall reedlike grass common on road sides; losa Honolulu also sometimes referred to a losafiti, is a fast growing introduced shrub with showy white flowers; vilitaliga (Clerodendrum quadriloculare) dominate areas where it grows, sprouting readily from the roots forming dense mono-specific thickets and puluvao(Funtumia elastic) or African Rubber Tree is a serious threat as it dominates secondary growth, preventing the return of native forests and species (Reti, 2016).

Social and Economic Setting

The Vaimauga West district currently has a population of 19,0296; Malifa/Moto'otua/Leufisa 798, Tanugamanono 805, Nafanua/Setema Fou 370, Papauta 383, Vailima 769, Avele/Vaoala/Tiapapata 1,256, Vaiala 972, Fa'ato'ia/Vini/Ma'agao 915, Magiagi 1999, Vaivase 1897, To'omatagi 225, Mulinu'u/Sogi/Fugalei/Savalalo/Saleufi 617, Alamagoto 904, Apia 200, Lalovaea/Lalovaea East/Palisi 1,861, Matautu tai/uta 935, Moata'a 1,595, Papaloloa/Tanumalolo 302, Taufusi 364, Togafu'afu'a/Matafele/Tufuiopa 841, Vaimea/A'ai o Fiti 599 and Vaipuna/Levili 4227.

This area is the most significant employment area in Samoa with many workers coming into the area each day from around the country to work at offices and businesses located in the CBD and Greater Apia Urban Area. The maintenance, protection and enhancement of this district is important for the national development of Samoa.

The road network is a critical element of the district's infrastructure because of its economic and social significance of Urban Apia. However, roads are often severely affected by floods resulting in disruption to traffic

⁵Apaula St, Faipule Rd and Alaoa Rd

⁶Female 9,500; Male 9,529

⁷ SBS Village Directory 2016 - Census 2016 Preliminary Count

and damage to the roads and buildings that often require ongoing maintenance. Improvements are proposed to Vaitele Street between Lepa and the Cross Island Road, which will include widening to four lanes and placing main electricity and telephone lines underground.

The main coast road (Beach Road) and Atina'e, Tufui'opa, Logan, Fa'ato'ia and Vaiala – Vini roads provide the east/west links through the district, while Cross Island Road provides the main connection south to the south coast of Upolu. Other inland roads extend development and provide access to plantations. Access to the Moto'otua National Hospital is through Ifiifi Street and a number of intersecting roads e.gMoto'otua, Sinave, Salenesa and Leufisa Streets. These main roads in the network are sealed. The main public hospital is located in an elevated location outside of coastal hazard and flooding zones.

Majority of the agricultural activities in Vaimauga West consists mainly of small garden plots adjacent to houses. These plots produce a wide variety of fruits and vegetables that are used both on a subsistence and commercial scale. Plantations are found in the upland areas away from the coast which is outside the urban parts. Selected interviews and site observations indicate livelihood and food security are linked to the small micro-agricultural household vegetable and fruit production. Several households have cattle and small livestock in areas outside the urban areas and fishing is for sustenance and profitable purposes. In the Apia Urban Area, 30% of crop activities are deemed to be minor (Dews, 2016).

The most common varieties used for household subsistence are taro 11.7%; fish 5.6%; banana 4.5%; coconuts 2.9%; giant taro 1.9%; cooked local pork 1.9%; cocoa 1.1%; breadfruit 0.7% and pumpkin at 0.7%. These values total up to 31% with the remaining 69% belonging to products not produced locally⁸.

The livelihood in the district is influenced by local employment generated from the large urban and peri-urban zones along with the associated infrastructures including government employment. Income generation is mainly reliant on local employment and households are not fully dependent on agriculture, fisheries or traditional crafts sectors as other rural communities of Samoa.

Although the household farm plots are small, the agricultural foot print in the district is accumulated and the impacts can be widespread across the coastal plateau. Impacts to the marine environment are from increased sediment loads and elevated nutrients combined with urban run-off. The marine environment is important as it supports a range of livelihood activities not just within the Vaimauga West District but adjacent areas as well.

Area proximity to the coastline creates the situation for opportunistic fishing for a large part of the population. Fishing pressure can be correlated to seasons, local weather conditions and family commitments. Families being made aware of employing traditional fishing rules may reduce the local impact of overfishing (Dews, 2016).

Primary services such as water, power and telephone generally follow all main roads and extend inland.

Climate Risk and Resilience

The use of LiDar mapping data, hydrologist and geomorphologist data and findings for this district has helped determine inland and coastal hazard zones and high risk areas for Vaimauga West. The immediate risks for some areas of Vaimauga West are from inland inundation, coastal landslip, fluvial hazards and coastal erosion

The major issue that the district experiences particularly during extreme events is inland flooding. This matter is exacerbated due to inadequate road structures and drainage systems. Storm water runoff from further upland is noticed to pond on streets and main road as culverts are either blocked or are not established within the area. Due to the variation in landscape and topography, soil types, aspect to prevailing winds and the extent of development that has altered the land formation within the district, it is difficult to predict with any precision the impacts from climate change within any given livelihood activity at the district level.

The Vaimauga West District includes the central part of Apia on the northern side of the island of Upolu. It is characterized by a narrow, low lying, coastal plain with Mount Vaea and highlands bordering the city in the south from east to west. The lowland is relatively flat and its elevation is not more than ten metres above the mean sea level. Across the whole of Apia's urban area lie the catchments of the six streams from Fagalii in the east to Fuluasou in the west. The Fagalii catchment is the smallest, occupying a narrow valley adjacent to the Vaivase catchment. It has a total area of approximately 500 ha. The two largest catchments are the Vaisigano and Fuluasou catchments, each with a total area of 3,200 ha with the Gasegase catchment the third largest at 2,500

⁸ Livelihood Specialist Village Report

ha. The Mulivai and the Vaivase catchments are each approximately 700 ha in area. The district has a total area of 5,946 hectares. The area covering Tsunami shore exclusive zone is 59 hectares, which is 0.62% of the total area of the district. The district has about 5288 buildings; about 291 buildings are located within the Tsunami shore exclusive zone (Tokalauvere, 2018).

Element at risk includes all human-made infrastructure and natural features, which consist of physical and non-physical infrastructures that face risks from natural disasters Human-made physical infrastructures include houses, road networks, utilities networks, bridges, drainage networks and railways. Humanmadenon-physical elements consist of economic, cultural and political environments. Natural features that may be affected by natural disasters include beaches, river systems, swamps, vegetation and all fauna in these environments (Tokalauvere, 2018).

Vaimauga West District Interventions

Coastal area ("Reef")

CIM Plan Solutions

In function of the	Doct Colutions	Donofito	Guideline to assist with the	Relevant Sector
Infrastructure	Best Solutions	Benefits	implementation	Plans, National
			imprementation	Strategies & Policies
Part of Main roads (junction of Beach Road and Tofilau St., junction of Matafagatele Road and Togoaasa Crescent, Matafagatele Road and Sagauga Street and Mulinu'u Road,exposure toextremely high risk9 hazard zones (IFHZ, CEHZ, CFHZ and tsunami shore exclusive zone)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems atidentified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/	Improve infrastructure resilience and rate of recovery Climate proof national road network Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016)
Parts of Levili Road, junction of Levili Uta Rd and Faatoia Rd, Faipule Road¹¹, part of Faatoia Lane Rd, part of Apia Park Loop Rd, Taumeasina Drive, Togoaasa Crescent, part of Logan Road, Togafuafua Road, part of Convent Street	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations	Improve infrastructure resilience and rate of recovery Climateproofnation al road network Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings	NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA

⁹Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

 $^{^{10}}$ Not in national road network so not included in LTA normal road maintenance programme for Upolu Zone 1

and Atinae		natural disasters	Utilize environmental and	
Road -			social safeguards including	
exposure to	Responsibility:LTA/	Maintain lifeline	EIAs in screening and	
high risk ¹¹	MWTI/\/Village	access and	designing built environment	
hazard zones	7 0 3	connectivity for	infrastructure projects for	
(IFHZ, CFHZ)		Central Business	Vaimauga West district	
(11 112) (1 112)		Area	vaimaaga veest alserret	
		Tircu	Include in budget	
		Safer villages,	programming CBA, design	
		houses and roads	and construction	
		nouses and roads	and construction	
		Minimise national	Designation of the IFHZ,	
		disaster recovery	CEHZ and CFHZ as an "at	
		expenditure on	risk" zone with appropriate	
		damaged	landuse planning controls	
		properties, public	and restrictions	
			una restrictions	
		and private assets		
Drainage	Continue to assess and	Improves climate	Use existing information for	NISP2011 KESO 5
systems to be	upgrade culverts on	resilience of	guidance but not limited to:	
improved in	main and 'access' roads	infrastructure and	"Vulnerability Assessment of	TSP2014-2019 Goal
high risk areas	in district especially at	rate of response	the Samoa Road Network	2 KO 1
(lower	junctions with access	and recovery to	(2017)";	
catchment areas,	roads sitting within	natural hazards	"Review of National Road	Vulnerability
near rivers and	combined hazard zones	and disasters.		Assessment of the
streams)	exacerbating inland		Standards in Samoa (2016)";	Samoa Road
exacerbating	flooding and storm water	Minimises national	"Samoa Code of	Network (2016)
inland flooding	surges (IFHZ, CEHZ,	disaster recovery	Environmental Practice	and Road Network
and storm water	CFHZ)- culverts in	expenditure on	(2007)"	Adaptation Strategy,
surges affecting	accordance with	damaged		LTA
infrastructure,	Vulnerability Assessment	properties, public	Use updated Hazard Maps to	
village homes	of the Samoa Road	and private assets	inform designs	
and other assets	Network			
	recommendations	Encourages	Undertake a Cost Benefit	
		coastal families to	Analysis to weigh options for	
	Implement national	relocate inland.	funding	
	standards for culverts		Incorporate environmental	
	and drains to facilitate	Maintains lifeline	and social safeguards	
	the overland flow of	access for all of	concerns in the design and	
	storm water and reduce	Savaii	undertake consultations with	
	flooding		affected communities.	
		Use as escape	affected communities.	
	Implement regular	routes when	Apply for necessary permits	
	drainage inspection and	necessary	as required by law	
	maintenance		1	
		Provides access for		
	Responsibility:LTA/	utility providers to		
	MWTI/MNRE/MWCSD	extend their		
	/Village / Families	services inland		
Control Dusiness	Dologato agesta cutaida af	Minimico	Dlanning provisions to be	CIM Ctrategy 2015
Central Business	Relocate assets outside of	Minimise	Planning provisions to be	CIM Strategy 2015
Area (CBD),	high risk hazard zones	expenditure on	guided by the Planning and	National Duil 1:
Government	when re-building	damaged	Urban Management Act 2004	National Building
buildings, tourist	Davidan landara alam	properties and	Enforcement of National	Code
facilities,	Develop landuse planning	personal assets	Enforcement of National	
Churches,	and development controls	Cofon will	Building Code 2017	
Schools and	to restrict developments	Safer villages,	F	
private	within high risk hazard	houses and roads	Encourage insurance of	
residences	zones such as CEHZ and	Ingress	significant investments and	
located in	CFHZ	Increases	assets within hazard zones	
extremely high	Conduct	awareness for	Htilian homand man J	
risk hazard	Conduct awareness raising	insurance	Utilise hazard maps and	

 $^{^{11}\}mbox{Extremely}$ high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

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zones (IFHZ,	campaign on flood		Geomorphologist Drainage	
CFHZ, CEHZ and	resilient building practices		Infrastructure Database to	
tsunami shore	and designs for at risk		determine safe areas for	
	_			
exlusive zone)	communities living in and		relocation purposes	
	near high risk hazard			
	zones		Designation of the IFHZ,	
			CEHZ and CFHZ as an "at	
	Design infrastructure to		risk" zone with appropriate	
	take into account the		landuse planning controls	
	immediate hazard zones;		and restrictions	
	for example, raise floor			
	levels of houses in flood			
	prone areas			
	_			
	Families and village to			
	limit building and			
	developing on natural			
	overland flow paths			
	exacerbating inland			
	flooding and storm water			
	surges			
	Surges			
	Responsibility:Village /			
	Families /MWTI/			
	MNRE/ MWCSD			
Flood protection	Upgrade waterways	Minimise	Conduct and utilize	NISP2011 KESO 5
measures for		expenditure on	recommendation of	
fords and bridges	Upgrade all crossings	damaged	geotechnical, catchment	TSP2014-2019 Goal
		properties &	management and drainage	2 KO 1
	Upgrade or repair	personal assets	analysis in the planning	_ 110 1
	riverine embankment	personal assets		
		34	phase	
	protection work	Mitigatepotentialda		
	upstream	mage from inland	Conduct a full catchment	
		flooding	management, drainage	
	Construct levees to		analysis and geotechnical	
	reduce flooding along	Reduce flooding of	engineering survey of	
	estuaries and coastal	_	embankment and	
		built up areas		
	streams		watercourses in district	
		Safer villages,		
	Install advisory edge	houses and roads	Utilise Hazard maps and	
	markers and depth		Geomorphologist Drainage	
	markers to warn vehicle		Infrastructure Database to	
	and pedestrians at all		identify specific location and	
	_		, i	
	crossings		condition of current drainage	
			/ infrastructure requiring	
	Government and Villages		maintenance and upgrade	
	to liaise and collaborate		works	
	on processes needed to			
	protect riverbanks from		Encourage and utilize	
	land clearing and		environmental and social	
	developments		safeguards including EIAs in	
	developments			
	D 17.171.		screening and designing	
	Responsibility: MWTI/		infrastructure facilities	
	LTA/MNRE/ District/			
	Village		Include in budget	
			programming CBA, design	
			and construction. Bridge and	
			road designs to take account	
			of forecast changes in sea	
			level rise and local flooding	
			from increased rainfall	
			intensity	
			Designation of the CEHZ and	
			CFHZ as an "at risk" zone	
L	I			I.

			with appropriate landuse	
			planning controls and restrictions	
Upgrade roads	Assess and upgrade	Improve	Utilise Hazard maps and	CIM Strategy 2015
used as escape routes	approved escape/access roads to include	infrastructure resilience and rate	Geomorphologist Drainage Infrastructure Database	NISP2011 KESO 5
	adequate sized culverts to facilitate the overland	of recovery	Include in budget	TSP2014-2019 Goal
	flow of storm water and reduce flooding onto main	Improve preparedness and	programming CBA, design and construction. Road	2 KO 1
	roads and neighbouring villages	readiness response to natural disasters	design standard to take account of forecast changes	Vulnerability Assessment of the
	Implement regular drainage inspection and	Reduce impact from coastal erosion and	in sea level rise and increased rainfall intensity	Samoa Road Network (2016) and Road Network
	maintenance	natural disasters		Adaptation Strategy, LTA
	Responsibility:LTA/ MWTI/	Safer villages, houses and roads		
		Minimise national disaster recovery		
		expenditure on damaged		
		properties and public assets		
Evacuation Shelter and a	Assess and/or select location for either an	Improve resilience of public	Enforcement of National Building Code 2017	National Disaster Management Plan
connected escape route needed for		infrastructure	Utilise hazard maps and	2017-2021
emergency preparedness	including safe access routes to the shelter	Improve preparedness	Geomorphologist findings to inform location and designs	National Building Code
and response	Conduct	and readiness response to natural		National Policy for People with
	evacuationshelterassess ment and mark on CIM	disasters		Disabilities
	Plan hazard maps			
	Develop a Village Climate Disaster Management Plan(VCDMP)			
	Conduct trainings for			
	People With Disabilities (PWDs) on emergency			
	and disaster response strategies			
	Implement CDCRMprogram			
	Install relevant signs to guide the community on			
	emergency response procedures and to			
	locations of evacuation shelters			
	Where no suitable houses exist, build emergency			
	shelter(s) outside the hazard zones			

Electricity supply	Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD Provide underground lines	Maintain electricity	Monitor distribution	EPC Strategic Plan
Electricity Supply	Install and connect power supply for inland residents Relocate overhead lines to a more resilient location when being replaced Install streetlights along the roads where needed for community safety Install and connect to solar power supply if made available Families to limit building and developments near electricity posts Responsibility:EPC/	supply at all times including natural disasters	networks to avoid overloading poles and contributing to line failures	Er C Su ategic riali
Effluent and wastewater management systems	Conduct a thorough assessment of effects of discharge from Tanugamanono Power Station Introduce ban on latrines established in and around fluvial hazard zones Extend effluent and wastewater management systems outside of the Greater Apia Urban Area Conduct campaign for public awareness of district ban and establish a "neighbourhood watch" agreement with district to monitor and manage introduced policies Government, district and villages to monitor, report and apply penalty on offenders	Increase adaptation during extreme weather events Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply	management plan for Vaimauga West district	National Waste Management Strategy National Waste Management Policy

	Responsibility: MNRE/MWCSD/ District/ Village		Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management	
Natural Resources and Environment	Best Solutions	Benefits		RelevantSector Plans, National Strategies & Policies
Fugalei, Moata'a, Vaiala, Mulinuu/Sogi Mangrove area conservation	Government to implement boundary demarcation of wetland reserves at Moata'a, Vaipuna and Fugalei with application of planning controls and appropriate management guidelines to meet the needs as both drainage system components and conservation areas District and village councils to regulate clearing of lands around wetlands and initiate replanting programmes for coastal areas Promote and support village and district tree planting on coastal areas around existing seawalls to strengthen seawalls and reduce erosion using native species such as talie, fetau, toa etc that are known to have greater resilience to natural disasters and changing climate conditions Depth and density of planting to be increased and a minimum vegetative distance of 200mm as an effective wave barrier distance Village and Government management of clearing inland catchment areas close to rivers and streams to reduce sedimentation of estuaries, wetlands and the lagoon Responsibility: MNRE /MAF/Village/Village CSSP/NGO/	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from inland flooding	MNRE DEC to provide technical assistance and backstopping in the development of a Mangrove Management Plan for Vaimauga West district Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Develop a specific Mangrove Legislation providing systematic consideration of mangroves in decisionmaking, promote the use of existing legal mechanisms to benefit mangroves, and underpin integrated management of coastal natural resources, including mangroves, at the village level	NESP 2017 - 2021 Community Engagement Plan
District Upland Forest	Continue programme by Forestry on replanting native forestry species of the upland forest	Protects and enhance local species diversity Reduced risk of	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants	Community Engagement Plan Two Million Tree Planting Strategy

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	Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Responsibility: MNRE-WRD & Forestry/	slips and erosion Reduce impact from inland flooding	Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	2015-2020 Restoration Operational Plan 2016-2020
Protection of catchment areas	Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE//SWA/District/Village/CSSP/GEF-SGP	Reduced risk of slips and erosion Improve resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas	Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020
Flood protection measures (soft solution to support flood protection measures for infrastructure)	Conduct riparian replanting along river channels and watercourses Encourage planting of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas	Mitigatepotentialda mage from inland flooding Reduce flooding of built up areas Safer villages, houses and roads	Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation	Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

Soft coastal reprotection measures ended for included and support and an almost year the recommendation of the western services and most valuerable areas of strengther existing seawall and to measures will ended for include coastal erosion and landslips, Talie, Fetau, Tou conditions To act as an effective wave harding condition of the parties, and infimum distance of 200m of vegetation is needed for superint of dentify alternative sustainable madring and mining Sand mining And the process of the season of the area of the collaborate consultation on and mining policy and regulation Willage consultation on and mining policy and regulation Willage and government to collaborate closely on designated areas for sand mining and policy and regulation Willage and government to collaborate closely on designated areas for sand for domestic use and following the coast survivors of the area of the area of the proposed and through accusts the proposed and through accusts the proposed and plants through accusts the proposed and plants through accusts the proposed and through accusts the proposed and plants and protection and reduce crop vulnerability to pests and diseases. Livelihood and Food Security Livelihood and Food Security From the amore the proposed and facilitate reproposed and plants through accusts the proposed and plants and proposed and plants and proposed and plants through accusts the proposed and plants and plant					
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	Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices		diversification to suit prolonged impacts of climate change and support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting	
	Conduct pilot site trials for climate ready plant varieties Responsibility: MAF/MNRE/village		MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice, seedlings and planting material for village/families as a trial	
	Parties vinage		Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and	
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages Obtain necessary permits required by law before developments take place Responsibility: MWCSD	all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

Inland area ("Ridge")

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National
				Strategies & Policies
Part of Main road ¹² network : exposure to Immediate Fluvial Hazard Zone (IFHZ)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/MNRE/Village	Improve infrastructure resilience and rate of recovery Climate proof national road network Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ,	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan

¹²Vailele Street, Vaivaseuta Road, Palisi Road, Saleufi Street, Atinae Road, Vaitele Street, Vaea Road, Leufisa Street, Apaula Street, Papauta Road, Cross Island Road, Avele Road, Palisi Road and Moamoa Road

	and drains to facilitate the overland flow of	damaged properties, public	Apply for pagescary permits	
	storm water and reduce flooding	and private assets	Apply for necessary permits as required by law	
	Implement regular drainage inspection and maintenance		Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	
	Responsibility:LTA/ MWTI/MNRE/MWCSD /Village/ Families		Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District	
			Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	
Village infrastructure located in high	Relocate assets outside of high risk hazard zones when re-building	Minimise expenditure on damaged	Planning provisions to be guided by the Planning and Urban Management Act 2004	CIM Strategy 2015 National Building
risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc	Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ	properties and personal assets Safer villages, houses and roads Increases	Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones	Code
	Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility:Village / Families /MWTI/MNRE/MWCSD	awareness for insurance	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Flood protection measures for fords and bridges	Upgrade waterways Upgrade all crossings Upgrade or repair	Minimise expenditure on damaged properties & personal assets	Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1
	riverine embankment protection work	Mitigate potential	inform location and designs	Vulnerability Assessment of the

Vaivaseuta, Magiagi and and Flood Management Plan in and Roa	Road k (2016) d Network ion Strategy,
Vaivaseuta, Magiagi and Palisi Reduce flooding of built up areas Construct levees to reduce flooding along estuaries and coastal streams Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments Reduce flooding of built up areas Maintains lifeline access for all of Upolu Utilise environmental and social safeguards including ElAs in screening and designing infrastructure facilities Develop an integrated land management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database findings ElAs in screening and designing infrastructure facilities Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Include in budget	d Network
Palisi Construct levees to reduce flooding along estuaries and coastal streams Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments Reduce flooding of built up areas Radiuce flooding of built up areas Maintains lifeline access for all of Upolu Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Include in budget	
Construct levees to reduce flooding along estuaries and coastal streams Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments built up areas Maintains lifeline access for all of Upolu Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Include in budget	ion Strategy,
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Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments Safer villages, houses and roads Safer villages, houses and roads Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Include in budget	
Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments Safer villages, houses and roads Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Include in budget	
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management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and land clearing and developments management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Include in budget	
Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Include in budget	
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on processes needed to protect riverbanks from land clearing and developments may adversely affect the natural habitats and ecosystems of the area Include in budget	
protect riverbanks from land clearing and developments natural habitats and ecosystems of the area	
land clearing and developments Include in budget	
developments Include in budget	
Include in budget	
Responsibility: MWTI/ nrogramming CBA, design	
nesponsibility, PIV II/	
LTA/MNRE and construction.	
Designation of the IFHZ as an	
"at risk" zone with	
appropriate landuse planning	
controls and restrictions	
Upgrade roads Assess and upgrade Improve Utilise hazard maps and National	1
	Manageme
	2017-2021
of recovery inform location and designs	
	ategy 2015
drainage ditches where Improve Develop an integrated land	
	4-2019 Goal
readiness response aim of reducing any 2 KO 1	1 2017 dour
Implement routine to natural disasters unnecessary actions that	
maintenance of the roads may adversely affect the	
and clear any debris Safer villages, natural habitats and	
obstructing the free flow houses and roads ecosystems of the area	
of surface water runoff	
Minimise national Designation of the IFHZ,	
developments near and expenditure on risk" zone with appropriate	
around road shoulders of damaged landuse planning controls	
all access roads properties and and restrictions	
public assets	
Enforce environmental Utilise environmental and	
safeguards where social safeguards including	
reclamations are proposed. EIAs in screening and	
Government and district to designing built environment	
manage processes by infrastructure projects for	
requiring villagers to get Vaimauga West district	
the appropriate permits	
and consent	
Responsibility:LTA/	
MWTI/ MNRE/	
Villages/Families	

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Evacuation	Assess and/or select	Improve resilience	Enforcement of National	National
Shelter and a	location for either an	of public infrastructure	Building Code 2017	DisasterManageme nt Plan2017-2021
connected escape route needed for	existing or new evacuation shelter,	mmastructure	Utilise hazard maps and	nt rianzu1/-2021
emergency	including safe access	Improve	Geomorphologist findings to	NationalBuildingCo
preparedness	routes to the shelter	preparedness	inform location and designs	de
and response	routes to the sheller	and readiness	inform focation and designs	N .: ID I: C
and response	Conduct evacuation	response to natural		National Policy for
	shelter assessment and	disasters		People with Disabilities
	mark on CIM Plan hazard			Disabilities
	maps			NISP2011 KESO 5
				11101 2011 11200 0
	Develop			
	aVillageClimateDisasterM			
	anagementPlan(VCDMP)			
	Conduct trainings for			
	People With Disabilities (PWDs) on emergency			
	and disaster response			
	strategies			
	Strategies			
	Implement			
	CDCRMprogram			
	Install relevant signs to			
	guide the community on			
	emergency response			
	procedures and to			
	locations of evacuation shelters			
	Sileiters			
	Where no suitable houses			
	exist, build emergency			
	shelter(s) outside the			
	hazard zones			
	Retrofit identified and			
	approved schools or			
	churches outside hazard			
	zones and designate as			
	evacuation shelter			
	Responsibility: MNRE			
	/DMO/ MWTI/Village			
	/CSSP/Council of Churches/MWCSD			
Electricity	Install streetlights	Maintain	Monitor distribution	EPC Strategic Plan
supply	along the roads where	electricity supply	networks to avoid	Li o bu ategie i iaii
	needed for community	at all times	overloading poles and	
	safety	including natural	contributing to line failures	
		disasters		
	Relocate overhead lines	A 11 11 1		
	to a more resilient	Avoid accidents		
	location when being	from fallen		
	replaced	electricity posts		
	Provide underground			
	lines in the long term			
	_			
	Install and connect to			
	solar power supply if			
	made available			

	Responsibility: EPC /MWTI/ Villages			
Effluent and wastewater management systems	Introduce ban on latrines established in and around fluvial hazard zones	Increase adaptation during extreme weather events	Review waste water strategy/ legislation to include role of Village/District bylaws	National Waste Management Strategy
Systems	Families in fluvial hazard zones to install proper septic waste disposal systems Implement district/	Improve infrastructure resilience and rate of recovery Improve health	Develop/Update and register District/Village bylaws to include regulating developments and latrines in IFHZ and areas susceptible to flooding	
	village drainage cleanup and awareness programme Produce posters and village signs for public awareness Responsibility: MNRE/MWCSD/ District/Village	and sanitation Reduce contamination of water supply	Utilise Hazard maps and Geomorphologist findings to inform location Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management	
Solid waste management and collection	Conduct campaign for public awareness of district ban on rubbish dumping and establish a "neighbourhood watch" agreement with district to monitor and manage introduced policies Government, district and villages to monitor, report and apply penalty on offenders Government to monitor waste collection contractors and apply penalties according to relevant legislation Responsibility:MNRE/District/Village	Increase adaptation during extreme weather events Improveinfrastruct ureresilience and rate of recovery Improve health and sanitation Reduce contamination of water supply	Develop an integrated land management plan for Vaimauga West District Utilise Waste Management Act/Legislation to guide process of effecting the 'polluter pays' principle Review Waste Management strategy/ legislation to include role of Village/District bylaws Develop/Update and register District/Village bylaws to include regulating illegal rubbish dumping especially around catchment areas and areas susceptible to flooding Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management	
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting systems for vulnerable families as a short term solution District to support SWA efforts at exploratory boreholes in district	Increase adaptation during drought periods Improveinfrastruc tureresilience and rate of recovery Improve health and sanitation Reduce		CIM Strategy 2015 WaterandSanitatio nSectorPlan SWA 10 Year Investment Plan(2016) Community Engagement Plan

Natural Resources and Environment District Upland Forest	District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas *Responsibility:SWA/MWCSD/MNRE/District/Village/CSSP* Best Solutions Continue programme by Forestry on replanting native forestry species of the upland forest Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases	contamination of water supply Reduce impact from inland flooding Benefits Protects and enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on	RelevantSector Plans, National Strategies & Policies Community Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
	Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Responsibility: MNRE- WRD & Forestry/		appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	
Protection of catchment areas	Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as	Reduced risk of slips and erosion Improve resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas	Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020

	tava, and poumuli			
	Responsibility: MNRE/ /SWA/District/Village/ CSSP/GEF-SGP			
Sand/rock mining (commercial) and sand/rock extraction (domestic): rivers and riverbanks	Identify alternative sustainable sources of	Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads Reduce impact from coastal erosion Economic benefit for villagefrom sustainable sandminingactiviti es	MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks Undertake assessments of identified sites Undertake consultation with villages affected by proposed sand/rock mining Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers Utilise Sui o Nu'u monthly meetings to monitor progress	Draft Soil Resource Management Bill
	Village/Families Conduct riparian replanting along river channels and watercourses Encourage planting of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas Responsibility: MNRE/Villages	Mitigate potential damage from inland flooding Reduce flooding of built up areas Safer villages, houses and roads	of CIM Plan activities Implement Vaimauga West	Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Plans, National Strategies & Policies
Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting	Promote and facilitate planting of root crops(i.eyams, sweet potato) which are more resilient tocyclones, drought sand floods Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop	Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters	Utilise Hazard Maps and Geomorphologist findings to inform location and design Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum MNRE Forestry, DEC and	AgricultureSectorPla n2016-2021 Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

	vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Conduct pilot site trials for climate ready plant varieties Responsibility: MAF/MNRE/village		MAF to collaborate on supply of climate resilient crops and plants MAF to provide trainings, awareness raising on crop diversification to suit prolonged impacts of climate change and support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice, seedlings and planting material for village/families as a trial Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth	
		D. C.	and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural	all national sector plans	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021
	resources	the long term		

Facilitate continuous awareness raising programs with the villages	· ·	
Responsibility: MWCSD /Village	environment of communities	

Vaimauga WestDistrict Map



VAIMAUGA WEST DISTRICT





Coordinate System: GCS WGS 1984

Datum: WGS 1984 Units: Degree Data Source: Ministry of Natural Resource and Environment, Samoa

Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

3. Mulinu'u, Sogi, Savalalo, Fugalei, SaleufiVillage Interventions

CIM Plan Solutions

CIM Plan Solut				
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure toextremely high risk13 hazard zones (IFHZ, CEHZ, CFHZ and tsunami shore exclusive zone)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems atidentified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/MNRE/Community	Improve infrastructure resilience and rate of recovery Climate proof national road network Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, community homes and other assets	Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ) – culverts in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Implement national standards for culverts	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan

 $^{^{13}}$ Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

	and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance Responsibility:LTA/	damaged properties, public and private assets	affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment	
	MWTI/MNRE/ MWCSD/Communities / Families		Strategy and Flood Management Plan for Vaimauga West District	
Government buildings, tourist facilities, Churches, Schools and private residences located in extremely high risk hazard zones (IFHZ, CFHZ, CEHZ and tsunami shore exlusive zone)	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility:Community/Families/MWTI/		Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Flood protection measures for fords and bridges	Upgrade waterways Upgrade all crossings Upgrade or repair riverine embankment	Minimise expenditure on damaged properties & personal assets	Conduct and utilize recommendation of geotechnical, catchment management and drainage analysis in the planning phase	NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Vulnerability
	protection work upstream of Vaimoso, Alamagoto and Palisi based on recommendations of geotechnical, catchment management and	Mitigate potential damage from inland flooding Reduce flooding of built up areas	Conduct a full catchment management, drainage analysis and geotechnical engineering survey of embankment and watercourses in district	Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA

	drainage analysis	Safer villages,		
	_	houses and roads	Utilise Hazard maps and	
	Construct levees to		Geomorphologist Drainage	
	reduce flooding along		Infrastructure Database to	
	estuaries and coastal		identify specific location and	
	streams		condition of current drainage	
			/ infrastructure requiring	
	Install advisory edge		maintenance and upgrade	
	markers and depth		works	
	markers to warn vehicle			
	and pedestrians at all		Encourage and utilize	
	crossings		environmental and social	
			safeguards including EIAs in	
	Government and Villages		screening and designing	
	to liaise and collaborate		infrastructure facilities	
	on processes needed to			
	protect riverbanks from		Include in budget	
	land clearing and		programming CBA, design	
	developments		and construction. Bridge and	
	•		road designs to take account	
	Responsibility: MWTI/		of forecast changes in sea	
	LTA/MNRE/ District/		level rise and local flooding	
	Community		from increased rainfall	
	, and the second		intensity	
			Designation of the CEHZ and	
			CFHZ as an "at risk" zone	
			with appropriate landuse	
			planning controls and	
**	, , ,	•	restrictions	mana a di a di a di a
Upgrade roads	Assess and upgrade	Improve	Utilise Hazard maps and	TSP2014-2019 Goal
used as escape	approved escape/access	infrastructure	Geomorphologist Drainage	2 KO 1
routes	roads to include	resilience and rate	Infrastructure Database	
	adequate sized culverts	of recovery		Vulnerability
	to facilitate the overland	T	Include in budget	Assessment of the
	flow of storm water and	Improve	programming CBA, design	Samoa Road
	reduce flooding onto main	preparedness and	and construction. Road	Network (2016) and
	roads and neighbouring	readiness response	design standard to take	Road Network
	villages	to natural disasters	account of forecast changes	Adaptation Strategy,
		D 1	in sea level rise and increased	LTA
	Implement regular	Reduce impact from	rainfall intensity	
	drainage inspection and	coastal erosion and	Designation of the IFHZ,	
	maintenance	natural disasters	CEHZ and CFHZ as an "at	
		Safer villages,	risk" zone with appropriate	
	Responsibility:LTA/MW	houses and roads	landuse planning controls	
	TI/Communities		and restrictions	
		Minimise national		
		disaster recovery	Develop/Update and	
		expenditure on	register District/Village	
		damaged	bylaws to include	
		properties and	maintenance of drainages	
		public assets	and illegal rubbish dumping	
			into waterways	
			Utilise Sui o Nu'u monthly	
			meetings to monitor	
			progress of village cleanup	
			and awareness programmes	

Parts of Main	Continue to upgrade,	Improve	Develop a climate resilient	NISP2011 KESO 5
roads: exposure	widen roads, upsize ocean outfalls and	infrastructure resilience and rate	Drainage Master Plan for	TCD2014 2010 Coal
to extremely high risk ¹⁴	improve drainage	of recovery	Vaimauga West utilising Hazard maps and	TSP2014-2019 Goal 2 KO 1
hazard zones	systems atidentified	orrecovery	Geomorphologist Drainage	2 KU 1
(IFHZ, CEHZ,	areas to increase	Climate proof	Infrastructure Database	Vulnerability
CFHZ and	regulation of water flow	national road	imastructure Database	Assessment of the
tsunami shore	and reduce flooding onto	network	Implement Vaimauga West	Samoa Road
exclusive	roads in extremely high	neework	Integrated Catchment Strategy	
zone)	risk hazard zones in	т	and Flood Management Plan in	
	accordance with	Improve preparedness and	conjunction with	Adaptation Strategy,
	Vulnerability Assessment	readiness response	Geomorphologist Drainage	LTA
	of the Samoa Road	to natural disasters	Infrastructure Database	
	Network	to natural disasters	findings	
	recommendations	Reduce impact from	Utilize environmental and	
	Decreased bility LTA	coastal erosion and	social safeguards including	
	Responsibility:LTA/ MWTI	natural disasters	EIAs in screening and	
	IVI VV II		designing built environment	
		Maintain lifeline	infrastructure projects for	
		access and	Vaimauga West district	
		connectivity for	_	
		Central Business Area		
		AI Ca	Include in budget	
		Safer villages,	programming CBA, design	
		houses and roads	and construction	
			Designation of the IFHZ,	
		Minimise national	CEHZ and CFHZ as an "at	
		disaster recovery	risk" zone with appropriate	
		expenditure on	landuse planning controls	
i			ianduse pianning conditions	
		damaged	and restrictions	
		damaged properties, public		
Natural	Rost Solutions	damaged properties, public and private assets	and restrictions	RolovantSoctor
Natural Resources and	Best Solutions	damaged properties, public	and restrictions Guideline to assist with the	
Natural Resources and Environment	Best Solutions	damaged properties, public and private assets	and restrictions Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Resources and	Best Solutions Government to implement	damaged properties, public and private assets Benefits	and restrictions Guideline to assist with the implementation	Plans, National
Resources and Environment	Government to implement boundary demarcation of	damaged properties, public and private assets Benefits Protects and enhance local	and restrictions Guideline to assist with the implementation MNRE DEC to provide technical assistance and back	Plans, National Strategies & Policies
Resources and Environment Fugalei, Mulinuu/Sogi Mangrove area	Government to implement boundary demarcation of wetland reserves at	damaged properties, public and private assets Benefits Protects and	and restrictions Guideline to assist with the implementation MNRE DEC to provide technical assistance and back stopping in the development	Plans, National Strategies & Policies
Resources and Environment Fugalei, Mulinuu/Sogi	Government to implement boundary demarcation of wetland reserves at Fugalei, Mulinuu/Sogi	damaged properties, public and private assets Benefits Protects and enhance local	and restrictions Guideline to assist with the implementation MNRE DEC to provide technical assistance and back stopping in the development of a Mangrove Management	Plans, National Strategies & Policies
Resources and Environment Fugalei, Mulinuu/Sogi Mangrove area	Government to implement boundary demarcation of wetland reserves at Fugalei, Mulinuu/Sogi with application of	damaged properties, public and private assets Benefits Protects and enhance local species diversity	and restrictions Guideline to assist with the implementation MNRE DEC to provide technical assistance and back stopping in the development of a Mangrove Management Plan for Vaimauga West	Plans, National Strategies & Policies NESP 2017 - 2021
Resources and Environment Fugalei, Mulinuu/Sogi Mangrove area	Government to implement boundary demarcation of wetland reserves at Fugalei, Mulinuu/Sogi with application of planning controls and	damaged properties, public and private assets Benefits Protects and enhance local species diversity Sustains ecosystem	and restrictions Guideline to assist with the implementation MNRE DEC to provide technical assistance and back stopping in the development of a Mangrove Management	Plans, National Strategies & Policies NESP 2017 - 2021 Community
Resources and Environment Fugalei, Mulinuu/Sogi Mangrove area	Government to implement boundary demarcation of wetland reserves at Fugalei, Mulinuu/Sogi with application of planning controls and appropriate management	damaged properties, public and private assets Benefits Protects and enhance local species diversity Sustains ecosystem services and	and restrictions Guideline to assist with the implementation MNRE DEC to provide technical assistance and back stopping in the development of a Mangrove Management Plan for Vaimauga West district	Plans, National Strategies & Policies NESP 2017 - 2021 Community
Resources and Environment Fugalei, Mulinuu/Sogi Mangrove area	Government to implement boundary demarcation of wetland reserves at Fugalei, Mulinuu/Sogi with application of planning controls and appropriate management guidelines to meet the	damaged properties, public and private assets Benefits Protects and enhance local species diversity Sustains ecosystem	and restrictions Guideline to assist with the implementation MNRE DEC to provide technical assistance and back stopping in the development of a Mangrove Management Plan for Vaimauga West district Develop an integrated land	Plans, National Strategies & Policies NESP 2017 - 2021 Community
Resources and Environment Fugalei, Mulinuu/Sogi Mangrove area	Government to implement boundary demarcation of wetland reserves at Fugalei, Mulinuu/Sogi with application of planning controls and appropriate management	damaged properties, public and private assets Benefits Protects and enhance local species diversity Sustains ecosystem services and functions Reduce	and restrictions Guideline to assist with the implementation MNRE DEC to provide technical assistance and back stopping in the development of a Mangrove Management Plan for Vaimauga West district	Plans, National Strategies & Policies NESP 2017 - 2021 Community
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Resources and Environment Fugalei, Mulinuu/Sogi Mangrove area	Government to implement boundary demarcation of wetland reserves at Fugalei, Mulinuu/Sogi with application of planning controls and appropriate management guidelines to meet the needs as both drainage system components and	damaged properties, public and private assets Benefits Protects and enhance local species diversity Sustains ecosystem services and functions Reduce	Guideline to assist with the implementation MNRE DEC to provide technical assistance and back stopping in the development of a Mangrove Management Plan for Vaimauga West district Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the	Plans, National Strategies & Policies NESP 2017 - 2021 Community
Resources and Environment Fugalei, Mulinuu/Sogi Mangrove area	Government to implement boundary demarcation of wetland reserves at Fugalei, Mulinuu/Sogi with application of planning controls and appropriate management guidelines to meet the needs as both drainage system components and conservation areas	damaged properties, public and private assets Benefits Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply	Guideline to assist with the implementation MNRE DEC to provide technical assistance and back stopping in the development of a Mangrove Management Plan for Vaimauga West district Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and	Plans, National Strategies & Policies NESP 2017 - 2021 Community
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Resources and Environment Fugalei, Mulinuu/Sogi Mangrove area	Government to implement boundary demarcation of wetland reserves at Fugalei, Mulinuu/Sogi with application of planning controls and appropriate management guidelines to meet the needs as both drainage system components and conservation areas **Responsibility: MNRE/MAF/Communities/**	damaged properties, public and private assets Benefits Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from	Guideline to assist with the implementation MNRE DEC to provide technical assistance and back stopping in the development of a Mangrove Management Plan for Vaimauga West district Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Develop a specific Mangrove	Plans, National Strategies & Policies NESP 2017 - 2021 Community
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Resources and Environment Fugalei, Mulinuu/Sogi Mangrove area	Government to implement boundary demarcation of wetland reserves at Fugalei, Mulinuu/Sogi with application of planning controls and appropriate management guidelines to meet the needs as both drainage system components and conservation areas **Responsibility: MNRE/MAF/Communities/**	damaged properties, public and private assets Benefits Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from	Guideline to assist with the implementation MNRE DEC to provide technical assistance and back stopping in the development of a Mangrove Management Plan for Vaimauga West district Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Develop a specific Mangrove Legislation providing systematic consideration of mangroves in decisionmaking, promote the use of existing legal mechanisms to benefit mangroves, and	Plans, National Strategies & Policies NESP 2017 - 2021 Community
Resources and Environment Fugalei, Mulinuu/Sogi Mangrove area	Government to implement boundary demarcation of wetland reserves at Fugalei, Mulinuu/Sogi with application of planning controls and appropriate management guidelines to meet the needs as both drainage system components and conservation areas **Responsibility: MNRE/MAF/Communities/**	damaged properties, public and private assets Benefits Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from	Guideline to assist with the implementation MNRE DEC to provide technical assistance and back stopping in the development of a Mangrove Management Plan for Vaimauga West district Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Develop a specific Mangrove Legislation providing systematic consideration of mangroves in decisionmaking, promote the use of existing legal mechanisms to	Plans, National Strategies & Policies NESP 2017 - 2021 Community

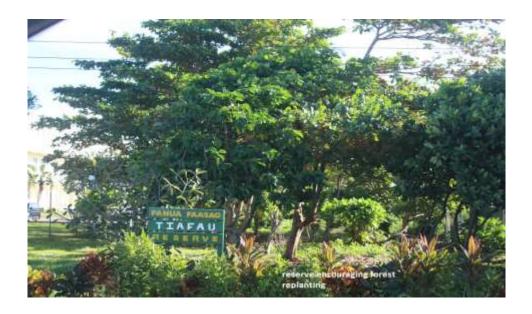
 $^{^{14}\}rm{Extremely}$ high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

			natural resources, including	
Flood protection measures (soft solution to support flood protection measures for infrastructure)	Conduct riparian replanting along river channels and watercourses Encourage planting of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas	Mitigate potential damage from inland flooding Reduce flooding of built up areas Safer villages, houses and roads	Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation	Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020
	Responsibility: MNRE/			
Soft coastal protection	Communities Plant native species along coastal areas to strengthen	Soft coastal protection	Develop an integrated land management plan for	NESP 2017-2021
measures needed for most vulnerable areas	existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and	measures will support and strengthen existing and new infrastructure along the coast	Vaimauga West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area	Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan
	changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed	Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based	MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and	2016-2020
	Responsibility: MNRE/ MAF/Communities	Approach	MAF to collaborate on supply of climate resilient crops	
Sand mining (commercial) and sand extraction (domestic)	Identify alternative sustainable sources of sand for domestic use Research the impacts of sand mining	Mitigate potential damage from coastal erosion and flooding accommodating the hazard	MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks	Draft Soil Resource Management Bill
	Community consultation on sand mining policy and regulation	Safer villages, houses and roads	Undertake assessments of identified sites	
	Village and government to collaborate closely on designated areas for sand/rock mining Raise awareness and	Reduce impact from coastal erosion Economic benefit for villagefrom sustainable sandmining	Undertake consultation with villages affected by proposed sand/rock mining Develop and register District bylaws to include managing and monitoring domestic	
	support of sustainable land use practices Responsibility: MNRE/ Conmmunity/Families	activities	sand/rock mining of rivers Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities	

Livelihood and	Best Solutions	Benefits	Guideline to assist with the	
roou security			Implementation	•
Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting	Promote and facilitate planting of root crops(i.eyams,sweet potato)which are more resilient to cyclones, droughts and floods Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Conduct pilot site trials for climate ready plant varieties Responsibility: MAF/MNRE/Community	Improve health through access to clean water and waste management Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters	Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants MAF to provide trainings, awareness raising on crop diversification to suit prolonged impacts of climate change and support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice, seedlings and planting material for village/families as a trial Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and	Plans, National Strategies & Policies AgricultureSectorPla n2016-2021 Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020
Governance	Best Solutions	Benefits	MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village Guideline to assist with the implementation	Relevant Sector Plans, National
Strongth on the	Undate and for develor	Strongthon		Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated	all national sector plans	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan
	developments in water catchment areas and near	Strategies, Plans	Utilise Sui o Nu'u monthly	2016-2021

boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources	Improve ability of communities to adapt, respond and recover quickly in the long term	meetings to monitor progress of district/village bylaws	
Facilitate continuous awareness raising programs with the villages Obtain necessary permits required by law before developments take place	Improve accountability and enabling environment of communities		
Responsibility: MWCSD /MNRE /Community			

Non-CR issues raised during consultations	Proposed Solution	Comments
Lands	Villagers requested land from	Related to CR as relocation is one of the recommended
Responsibility: Community/	government for relocation	solutions to impacts of climate change included in the
Government	purposes	Vaimauga West CIM Plan

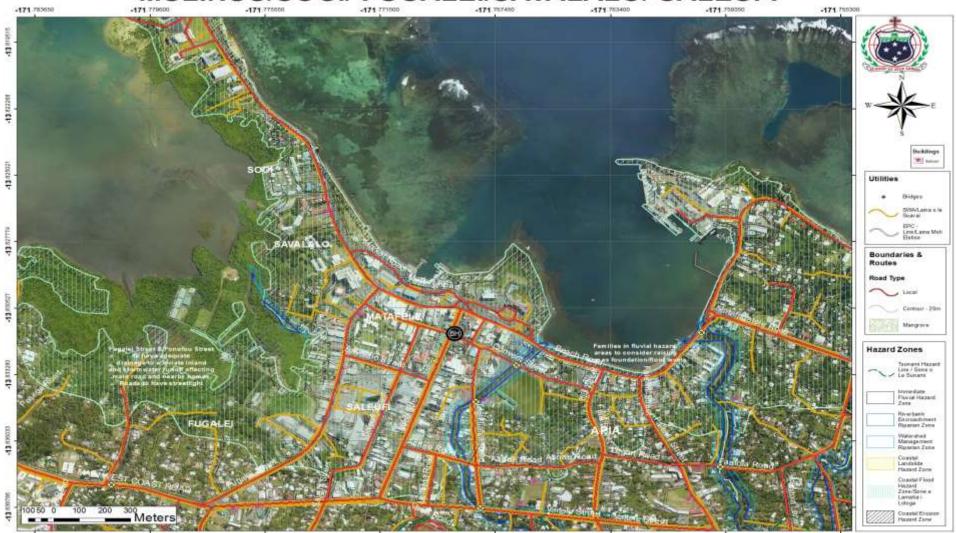






Mulinu'u, Sogi, Savalalo, Fugalei and Saleufi Village Map

MULINUU/SOGI/ FUGALEI/SAVALALO/ SALEUFI



Coordinate System: GCS WGS 1984

Datum: WGS 1984 Units: Degree Data Source: Ministry of Natural Resource and Environment, Samoa

Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

4. Vaimea, Aai o FitiVillage Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with	Relevant Sector
	_ 500 0013410110		the implementation	Plans, National
				Strategies & Policies
Parts of Main	Continue to upgrade,	Improve	Develop a climate resilient	NISP2011 KESO 5
roads: exposure to high risk ¹⁵	widen roads, upsize ocean outfalls and	infrastructure resilience and rate	Drainage Master Plan for Vaimauga West utilising	TSP2014-2019 Goal
hazard zones	improve drainage	of recovery	Hazard maps and	2 KO 1
(IFHZ, CEHZ,	systems at identified	011000,019	Geomorphologist Drainage	2.1.0 1
CFHZ)	areas to increase	Climate proof	Infrastructure Database	Vulnerability
	regulation of water flow	national road	T 1	Assessment of the
	and reduce flooding onto roads in extremely high	network	Implement Vaimauga West Integrated Catchment	Samoa Road Network (2016)
	risk hazard zones in		Strategy and Flood	and Road Network
	accordance with	Improve	Management Plan in	Adaptation
	Vulnerability Assessment	preparedness and readiness response	conjunction with	Strategy, LTA
	of the Samoa Road	to natural disasters	Geomorphologist Drainage	
	<i>Network</i> recommendations	_	Infrastructure Database findings	
	recommendations	Reduce impact from coastal	iniuliigo	
	Responsibility:LTA/	erosion and natural	Utilize environmental and	
	MWTI/ MNRE	disasters	social safeguards including	
	/Community		EIAs in screening and designing built environment	
		Maintain lifeline	infrastructure projects for	
		access and connectivity for	Vaimauga West district	
		Central Business		
		Area	Include in budget	
			programming CBA, design	
		Safer villages, houses and roads	and construction	
		nouses and roads	Designation of the IFHZ,	
		Minimise national	CEHZ and CFHZ as an "at	
		disaster recovery	risk" zone with appropriate	
		expenditure on	landuse planning controls	
		damaged properties, public	and restrictions	
		and private assets		
Drainage	Continue to assess and	Improves	Use existing information for	CIM Strategy 2015
systems to be	upgrade culverts on	infrastructure	guidance but not limited to:	NICDOO11 VECO E
improved in high risk areas	main and 'access' roads in district especially at	resilience and rate of response and	"Vulnerability Assessment of the Samoa Road Network	NISP2011 KESO 5
(lower	junctions with local	recovery to	(2017)"; "Review of National	TSP2014-2019 Goal
catchment	roads sitting within	natural hazards	Road Standards in Samoa	2 KO 1
areas, near	combined hazard zones	and disasters	(2016)"; "Samoa Code of	
rivers and streams)	exacerbating inland flooding and storm	Encourages coastal	Environmental Practice	Community Sector Plan
exacerbating	water surges (IFHZ,	families to relocate	(2007)"	1 1411
inland flooding	CEHZ, CFHZ) – culverts in	inland	Un dontalto a Cost Donastit	
and storm water			Undertake a Cost Benefit Analysis to weigh options for	
surges affecting	Vulnerability Assessment	Maintains lifeline	funding	
infrastructure, village homes	of the Samoa Road Network	access for all of Upolu	_	
and other assets	recommendations	- opoiu	Incorporate environmental and social safeguards	
		Minimises national	anu sociai saieguaius	

 $^{^{15}}$ Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance Responsibility:I.TA/MWIT/MNEE/MWCSD/Community/Families Responsibility:I.TA/MWIT/MNEE/MWCSD/Community/Families Relocate assets outside of high risk hazard zones obcated in high risk hazard zones such as houses, schools, Churches, Businesses, Committee houses etc Relocate assets outside of right risk hazard zones of a trisk communities living in and near high risk hazard zones for example, raise floor levels of houses in flood prone areas Religion and maintenance of drainages and illegal rubbish dumping into waterways Planning provisions to be guided by the Planning and Urban Management Act to restrict developments to restrict developments to restrict developments of a waveness for at risk communities living in and near high risk hazard zones of a trisk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerchaints ginland Responsibility:I.TA/MWIT/MNEE/MWCSD/Community/Families Develop Interacted consultations with files and censority and files properties and censority and files properties and community and U					
risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths Develop landuse planning properties and personal assets Safer villages, houses and roads Safer villages, houses and roads Increases awareness for insurance Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	infrastructure	standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance Responsibility:LTA/ MWTI/MNRE/MWCSD /Community / Families Relocate assets outside of high risk hazard zones	expenditure on damaged properties, public and private assets Minimise expenditure on	undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways Planning provisions to be guided by the Planning and	CIM Strategy 2015
flooding and storm water surges Responsibility:Commun ity / Families /MWTI/ MNRE/ MWCSD	infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility:Community / Families / MWTI/	expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for	Management Plan for Vaimauga West District Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls	National Building

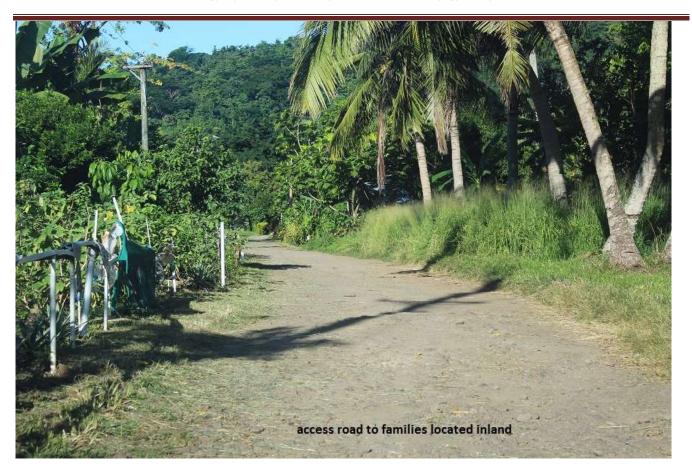
	_			
Electricity supply	Provide underground lines in the long term Install and connect power supply for inland residents Relocate overhead lines to a more resilient location when being replaced Install streetlights along the roads where needed for community safety Install and connect to solar power supply if made available Families to limit building and developments near electricity posts Responsibility:EPC/MWTI/Community/Families	Maintain electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan
Effluent and wastewater management systems	Introduce ban on latrines established in and around fluvial hazard zones Conduct campaign for public awareness of village ban and establish a "neighbourhood watch" agreement with village councils to monitor and manage introduced policies Government, district and villages to monitor, report and apply penalty on offenders Responsibility: MNRE/MWCSD/District/Community	Increase adaptation during extreme weather events Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply	management plan for Vaimauga West district Utilise Waste Management Act/Legislation to guide process of effecting the 'polluter pays' principle Review wastewater strategy/ legislation to include role of Village/District bylaws Develop/Update and	
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Plans, National Strategies & Policies
District Upland Forest	Continue programme by Forestry on replanting native forestry species of the upland forest Promote agroforestry and mixed planting including	Protects and enhance local species diversity Reduced risk of slips and erosion	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants Develop an integrated land management plan with the	Community Engagement Plan Two Million Tree Planting Strategy 2015-2020

	fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management	Reduce impact from inland flooding	aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and	Restoration Operational Plan 2016-2020
	Programme Implement Sustainable Land Management (SLM) practices Responsibility: MNRE-		provide seedlings for different vegetation types suitable to the habitats and planting materials for village	
	WRD & Forestry/ District /Community /CSSP			
Protection of catchment areas	Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli **Responsibility: MNRE/**	Reduced risk of slips and erosion Improve resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas	Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020
Sand/rock	/SWA/District/Commu nity /CSSP/GEF-SGP Identify alternative	Mitigate potential	MNRE to continue to identify	Draft Soil Resource
mining (commercial) and sand/rock extraction	sustainable sources of sand for domestic use Research the impacts of	damage from coastal erosion and flooding accommodating the	specific sites for inshore/ inland sustainable sand/rock mining to meet demand without compromising	Management Bill
(domestic): rivers and	sand mining	hazard	riverbanks	
riverbanks	Community consultation on sand mining policy and regulation	Safer villages, houses and roads	identified sites	
	Community and government to	Reduce impact from coastal erosion	Undertake consultation with villages affected by proposed sand/rock mining	
	collaborate closely on designated areas for sand/rock mining	Economic benefit for villagefrom sustainable	Develop and register District bylaws to include managing	

		sandmining	and monitoring domestic	
	Raise awareness and	activities	sand/rock mining of rivers	
	support of sustainable			
	land use practices		Utilise Sui o Nu'u monthly	
	D		meetings to monitor progress	
	Responsibility: MNRE/ Community/Families		of CIM Plan activities	
Livelihood and		Benefits	Guideline to assist with the	RelevantSector
Food Security	Best solutions	Benefits	implementation	Plans, National
1000000001109			p	Strategies & Policies
Plantations,	Promote and facilitate	Improve recovery	Utilise Hazard Maps and	AgricultureSectorPla
crops and plants	planting of root crops(to create more	Geomorphologist findings to	n2016-2021
threatened by	i.eyams,sweet	resilient villages	inform location and design	
changes in	potato) which are more		S	Two Million Tree
climate, inland	resilient to cyclones,	Improve	Agriculture sector to provide	Strategy 2015-2020
flooding and	droughts and floods	preparedness and	best practice management	
inadequate soil		readiness response	guidelines for the	Restoration
for planting	Promote agroforestry and	to natural disasters	management of water that	Operational Plan
	mixed planting including		allows for levels of	2016-2020
	fruit trees species to		contamination to be kept to	
	promote ecological		minimum	
	stability, soil protection		MNDE E : DEC 1	
	and reduce crop		MNRE Forestry, DEC and	
	vulnerability to pests and		MAF to collaborate on	
	diseases		supply of climate resilient	
	T 1 (1) T (1)		crops and plants	
	Implement the Integrated		MAF to provide trainings,	
	Pest Management Programme		awareness raising on crop	
	Frogramme		diversification to suit	
	Implement Sustainable		prolonged impacts of	
	Land Management (SLM)		climate change and support	
	practices		in supply of nursery trees,	
	praesions		technology and	
	Conduct pilot site trials		infrastructure to have a	
	for climate ready plant		sustainable mechanism for	
	varieties		replanting	
			MAF to assist in	
	Responsibility: MAF/		establishment of pilot sites	
	MNRE/Community		to trial climate ready plant	
	,		varieties and provide advice,	
			seedlings and planting	
			material for village/families as a trial	
			as a ti iai	
			Develop an integrated land	
			management plan with the	
			aim of reducing any	
			unnecessary actions that	
			may adversely affect the	
			natural habitats and	
			ecosystems of the area	
			MNRE Forestry to advice on	
			appropriate species, depth	
			and density of planting and	
			provide seedlings for	
			different vegetation types suitable to the habitats and	
			planting materials for village	
			planting materials for village	

Governance	Best Solutions	Benefits	Guideline to assist with	RelevantSector
			the implementation	Plans, National
				Strategies & Policies
Strengthen the	Update and/or develop	Strengthen	Develop and register	Village Fono Act
governance of	bylaws to manage the	implementation of	district/village bylaw to	(Amendment Bill
natural	use of natural resources,	all national sector	protect all district/ village	2016)
resources and	and to control land use	plans	and government assets,	
land use	impacts; such as		environment, livelihood and	Community
through Bylaws	drainage maintenance,	Strengthen	food security especially	Sector Plan
	rubbish dumping, sand	monitoring of all	activities affecting water	
	mining, stray animals	National Acts,	catchment areas and	Community
	and unregulated	Regulation,	coastline	Development Plan
	developments in water	Strategies, Plans		2016-2021
	catchment areas and	and Policies	Utilise Sui o Nu'u monthly	
	near boreholes.		meetings to monitor progress	
		Improve ability of	of district/village bylaws	
	Collaborate with Sui o	communities to		
	Nuu to monitor the use	adapt, respond and		
	of and impact on natural	recover quickly in		
	resources	the long term		
	Facilitate continuous	Improve		
	awareness raising	accountability and		
	programs with the	enabling		
	community	environment of		
		communities		
	Responsibility:MWCSD			
	/Community			

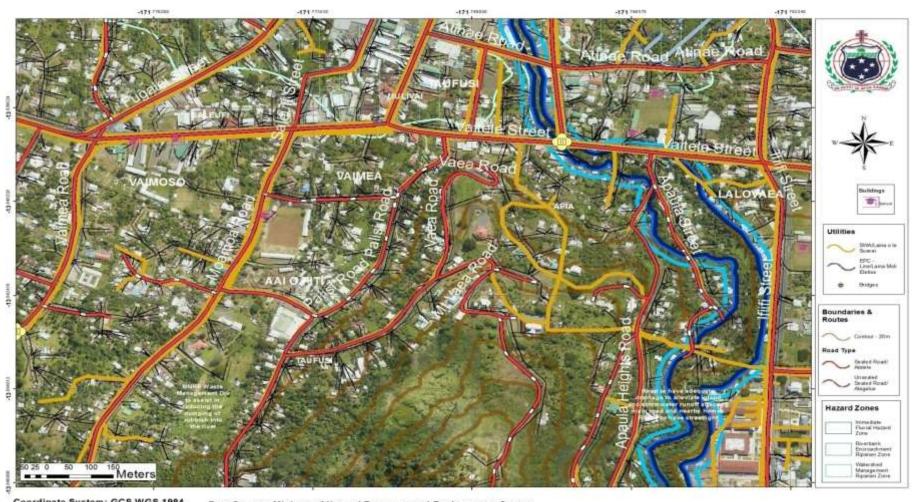
Non-CR issues raised during consultations	Proposed Solution	Comments
Foraging pigs from neighbouring villages damaging lands and assets Responsibility: Village/Government	Aai of Fiti and neighbouring villages to develop village bylaws governing fencing of domestic	Not a CR issue but indirectly related to water supply contamination and health issues especially during and after extreme events
	animals	





Vaimea, Aai o Fiti Village Map

VAIMEA, AAI O FITI VILLAGES



Coordinate System: GCS WGS 1984 Datum: WGS 1984 Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

5. AlamagotoVillage Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National
			implementation	Strategies & Policies
Parts of Main	Continue to upgrade,	Improve	Develop a climate resilient	NISP2011 KESO 5
roads: exposure	widen roads, upsize	infrastructure	Drainage Master Plan for	
to high risk ¹⁶	ocean outfalls and	resilience and rate	Vaimauga West utilising	TSP2014-2019 Goal
hazard zones	improve drainage	of recovery	Hazard maps and	2 KO 1
(IFHZ, CEHZ,	systems at identified		Geomorphologist Drainage	
CFHZ)	areas to increase	Climate proof	Infrastructure Database	Vulnerability
	regulation of water flow	national road	T 1 . TY . TAY .	Assessment of the
	and reduce flooding onto	network	Implement Vaimauga West Integrated Catchment Strategy	Samoa Road
	roads in extremely high risk hazard zones in	Improvo	and Flood Management Plan in	Network (2016) and Road Network
	accordance with	Improve preparedness and	conjunction with	Adaptation Strategy,
	Vulnerability Assessment	readiness response	Geomorphologist Drainage	LTA
	of the Samoa Road	to natural disasters	Infrastructure Database	
	Network	to natural albasters	findings	
	recommendations	Reduce impact from	3	
		coastal erosion and	Utilize environmental and	
	Responsibility:LTA/	natural disasters	social safeguards including	
	MWTI/		EIAs in screening and	
		Maintain lifeline	designing built environment	
		access and	infrastructure projects for	
		connectivity for	Vaimauga West district	
		Central Business Area	Include in budget	
		Alea	programming CBA, design	
		Safer villages,	and construction	
		houses and roads		
			Designation of the IFHZ,	
		Minimise national	CEHZ and CFHZ as an "at	
		disaster recovery	risk" zone with appropriate	
		expenditure on	landuse planning controls	
		damaged	and restrictions	
		properties, public		
		and private assets	***	0114 G:
Drainage	Continue to assess and	Improves	Use existing information for	CIM Strategy 2015
systems to be improved	upgrade culverts on main and 'access' roads	infrastructure resilience and rate	guidance but not limited to: "Vulnerability Assessment of	NISP2011 KESO 5
Drainage	in district especially at	of response and	the Samoa Road Network	NISPZUII KESU S
systems to be	junctions with local	recovery to natural		TSP2014-2019 Goal
improved in	roads sitting within	hazards and	(2017)"; "Review of National Road Standards in Samoa	2 KO 1
high risk areas	combined hazard zones	disasters		-
(lower	exacerbating inland		(2016)"; "Samoa Code of	Community Sector
catchment areas,	S	Encourages coastal	Environmental Practice	Plan
near rivers and	surges (IFHZ, CEHZ,	families to relocate	(2007)"	
streams)	CFHZ)- culverts in	inland	Undertake a Cost Benefit	
exacerbating	accordance with		Analysis to weigh options for	
inland flooding	Vulnerability Assessment	Maintains lifeline	funding	
and storm water	of the Samoa Road	access for all of		
surges affecting	Network	Upolu	Incorporate environmental	
infrastructure,	recommendations		_	

 $^{^{16}}$ Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

village homes		Minimises national	and social safeguards	
and other assets	Implement national	disaster recovery	concerns in the design and undertake consultations with	
	Implement national standards for culverts	expenditure on damaged	affected communities	
	and drains to facilitate	properties, public	anected communities	
	the overland flow of	and private assets	Apply for necessary permits	
	storm water and reduce	•	as required by law	
	flooding		***************************************	
	T 1 . 1		Utilise hazard maps and	
	Implement regular		Geomorphologist Infrastructure Drainage	
	drainage inspection and maintenance		Database to inform designs	
	manifemance		J	
			Develop Integrated Catchment	
	Responsibility:LTA/		Strategy and Flood	
	MWTI/MNRE/MWCSD		Management Plan for	
	/Village / Families		Vaimauga West District	
			Develop and register	
			District/Village bylaws to	
			include maintenance of	
			drainages and illegal rubbish	
x 7:11	D. 1	16:	dumping into waterways	ODA O
Village infrastructure	Relocate assets outside of	Minimise	Planning provisions to be	CIM Strategy 2015
located in high	high risk hazard zones when re-building	expenditure on damaged	guided by the Planning and Urban Management Act 2004	National Building
risk hazard	when re-bunding	properties and	Orban Management Act 2004	Code
zones; such as	Develop landuse planning	personal assets	Enforcement of National	5545
houses, schools,	and development controls		Building Code 2017	
Churches,	to restrict developments	Safer villages,	_	
Businesses,	within high risk hazard	houses and roads	Encourage insurance of	
Committee houses etc	zones such as CEHZ and CFHZ	Increases	significant investments and assets within hazard zones	
nouses etc	CFIIZ	awareness for	assets within hazard zones	
	Conduct awareness raising		Utilise hazard maps and	
	campaign on flood		Geomorphologist Drainage	
	resilient building practices		Infrastructure Database to	
	and designs for at risk		determine safe areas for	
	communities living in and		relocation purposes	
	near high risk hazard zones		Designation of the IFHZ,	
	201103		CEHZ and CFHZ as an "at	
	Design infrastructure to		risk" zone with appropriate	
	take into account the		landuse planning controls	
	immediate hazard zones;		and restrictions	
	for example, raise floor levels of houses in flood			
	prone areas			
	profic areas			
	Familias and village to			
	Families and village to limit building and			
	developing on natural			
	overland flow paths			
	exacerbating inland			
	flooding and storm water			
	surges			
	Responsibility:Village /			
	Families /MWTI/			
	MNRE/ MWCSD			

Landslips	Implement slope	Improve	Utilise hazard maps and	CIM Strategy 2015
Î	stabilization or 'forced	infrastructure	Geomorphologist Drainage	
	collapse' under	resilience and rate	Infrastructure Database to	Transport
	controlled conditions at	of recovery	inform location and designs	SectorPlan2014-
	most vulnerable			2019 Goal 2
	landslide areas of	Climate proof	Implement Vaimauga West	
	Vaimauga West as	national road	District Integrated Catchment	NISP2011 (KESO 5
	identified in the	network	Strategy and Flood	D&E)
	Vulnerability Assessment	·	Management Plan in	
	of the Samoa Road	Improve	conjunction with	
	Network report	preparedness	Geomorphologist Drainage	
	D 1 1 (1 1	and readiness	Infrastructure Database	
	Reduce sediment loads	response to natural	findings	
	and loss of top soil by	disasters	Deceler or interneted land	
	discouraging farming on	Daduga impagt from	Develop an integrated land	
	steep slopes and keeping livestock in areas away	Reduce impact from coastal erosion and	management plan with the aim of reducing any	
	from wetlands and	landslides	unnecessary actions that	
	watershed sites	ianusnues	may adversely affect the	
	water sired sites	Maintain lifeline	natural habitats and	
	Government, Village and	access for all of	ecosystems of the area	
	landowners to liaise and	Upolu	ccosystems of the area	
	collaborate on processes	Opolu	Utilise environmental and	
	needed to protect upland	Safer villages,	social safeguards including	
	catchment area,	houses and roads	EIAs in screening and	
	riverbanks from land		designing built environment	
	clearing and	Minimise national	infrastructure projects for	
	developments	disaster recovery	Vaimauga West district	
	P	expenditure on		
		damaged	Include in budget	
	Responsibility:LTA/M	properties, public	programming CBA, design	
	WTI/ MNRE/ Villages	and private assets	and construction	
			Designation of the IFHZ,	
			CEHZ and CFHZ as an "at	
			risk" zone with appropriate	
			landuse planning controls	
			and restrictions	
Electricity supply	Provide underground lines	Maintain electricity	Monitor distribution	EPC Strategic Plan
J 11 J	in the long term	supply at all times	networks to avoid	
		including natural	overloading poles and	
	Install and connect power	disasters	contributing to line failures	
	supply for inland residents		-	
		Avoid accidents		
	Relocate overhead lines to	from fallen		
	a more resilient location	electricity posts		
	when being replaced			
	T . 11			
	Install streetlights along			
	the roads where needed			
	for community safety			
	Install and connect to			
	solar power supply if			
	made available			
	maue available			
	Families to limit building			
	and developments near			
	electricity posts			

	Responsibility:EPC/ MWTI/ Village/Families			
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting systems for vulnerable families as a short term solution District to support SWA efforts at exploratory boreholes in district District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas Responsibility:SWA/MWCSD/MNRE/District/Village/CSSP	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA(2016)10 year investment plan to improve water supply network to support all inland families without access todrinkingwater Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform location and designs	CIM Strategy 2015 WaterandSanitatio nSectorPlan SWA 10 Year Investment Plan(2016) Community Engagement Plan
Effluent and wastewater management systems	Introduce ban on latrines established in and around fluvial hazard zones Families in fluvial hazard zones to install proper septic waste disposal systems Implement district/village drainage cleanup and awareness programme Produce posters and village signs for public awareness Responsibility: MNRE/MWCSD/ District/Village	Increase adaptation during extreme weather events Improveinfrastruct ureresilience and rate of recovery Improve health and sanitation Reduce contamination of water supply	037	
Natural Resources and	Best Solutions	Benefits	-	Plans, National
Environment District Upland Forest	Continue programme by Forestry on replanting native forestry species of the upland forest Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection	Protects and enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the	Community Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

	and reduce crop		natural habitats and	
	vulnerability to pests and		ecosystems of the area	
	diseases			
			MNRE Forestry to advice on	
	Implement the Integrated		appropriate species, depth	
	Pest Management		and density of planting and	
	Programme		provide seedlings for	
	-8 -		different vegetation types	
	Implement Sustainable		suitable to the habitats and	
	Land Management (SLM)		planting materials for village	
	practices		planting materials for vinage	
	praetices			
	Responsibility: MNRE-			
	WRD & Forestry/			
	District /Village/CSSP			
Protection of	Promote and support	Reduced risk of	Develop Integrated	Water Sector Plan
catchment areas	agroforestry and other	slips and erosion	Watershed/Catchment	water sector rian
cateminent areas	cropping systems that	ships and crosion	Strategy and Flood	Community
	combine trees and crops,	Improve resilience	Management Plan for	Engagement Plan
	especially in catchments,	of catchments	Vaimauga West District	00
	and erosion-prone and	or cateminents	vannauga west bistrict	Restoration
	sensitive areas	Improve	Develop and register	Operational Plan
	sensitive areas	preparedness and	District/Village bylaws to	2016-2020
	Limit land clearance and	readiness response	include penalizing illegal	2010 2020
	agricultural development	to natural disasters	deforestation and	
	around catchment areas,	to flatural disasters	developments in upper	
	SWA intake and	Reduce	catchment areas	
	boreholes in district	contamination of	Catcillient areas	
	borenoies in district			
	Enforce Watershed	water supply		
	Management Riparian			
	Zone and Riverbank			
	Encroachment Control			
	and regulate			
	developments around the			
	upland area			
	Donlant actahment areas			
	Replant catchment areas			
	with local species such as			
	tava, and poumuli			
	Degrangibility, MNDE/			
	Responsibility: MNRE/ /SWA/District/Village/			
	CSSP/GEF-SGP			
Sand/rock	Identify alternative	Mitigate potential	MNRE to continue to identify	Draft Soil Resource
mining	sustainable sources of	damage from	specific sites for inshore/	Management Bill
(commercial) and		coastal erosion and	inland sustainable sand/rock	
sand/rock	sand for domestic use	flooding	mining to meet demand	
extraction	Research the impacts of	accommodating the	without compromising	
(domestic):	sand mining	hazard	riverbanks	
rivers and	Sana mining	mazar u	Try Ci Danks	
riverbanks	Village consultation on	Safer villages, houses	Undertake assessments of	
11VELDAIIKS	sand mining policy and	and roads	identified sites	
	regulation	ana roads	raciidiica sites	
	108010011	Reduce impact from	Undertake consultation with	
	Village and government	coastal erosion	villages affected by proposed	
	to collaborate closely on	coastai Ei USIUII	sand/rock mining	
	designated areas for	Economic benefit	Sanu/ I OCK IIIIIIIIg	
	sand/rock mining	for villagefrom	Develop and register District	
	sanu/ i ock illillillg	sustainable	bylaws to include managing	
	Raise awareness and		and monitoring domestic	
	raise awai elless allu	sandmining	and monitoring domestic	

	support of sustainable land use practices	activities	sand/rock mining of rivers	
	Responsibility: MNRE/ Village/Families		Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities	
Flood protection measures (soft solution to support flood protection measures for infrastructure)	Conduct riparian replanting along river channels and watercourses Encourage planting of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas Responsibility: MNRE/Villages	Mitigatepotentialda mage from inland flooding Reduce flooding of built up areas Safer villages, houses and roads	Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation	Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting	Promote and facilitate planting of root crops(i.eyams,sweet potato) which are more resilient to cyclones, droughts and floods Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Conduct pilot site trials for climate ready plant varieties Responsibility: MAF/MNRE/village	Improve health through access to clean water and waste management Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters	Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants MAF to provide trainings, awareness raising on crop diversification to suit prolonged impacts of climate change and support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice, seedlings and planting material for village/families as a trial Develop an integrated land	AgricultureSectorPla n2016-2021 Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

			management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National
			-	Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages Responsibility: MWCSD /Village	all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

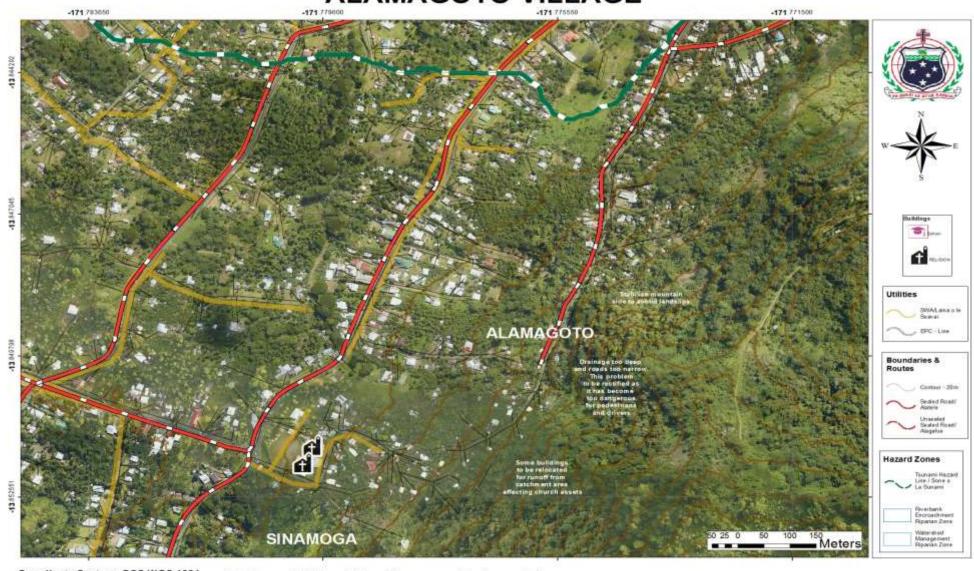
Non-CR issues raised during consultations	Proposed Solution	Comments
Exposed drainage on national road network	LTA to provide footpath over open drains for safety of travelling public	
Responsibility: Village/ Government	and village community	recovery teams during and after extreme events





Alamagoto Tai Village Map

ALAMAGOTO VILLAGE



Coordinate System: GCS WGS 1984 Datum: WGS 1984

Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

6. ApiaVillage Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the	Relevant Sector
			implementation	Plans, National
D	0 11 1	τ	D 1 1:	Strategies & Policies
Parts of Main roads: exposure	Continue to upgrade, widen roads, upsize	Improve infrastructureresili	Develop a climate resilient Drainage Master Plan for	NISP2011 KESO 5
to high risk ¹⁷	ocean outfalls and	ence and rate of	Vaimauga West utilising	TSP2014-2019 Goal
hazard zones	improve drainage	recovery	Hazard maps and	2 KO 1
(IFHZ, CEHZ,	systems at identified	a	Geomorphologist Drainage	77.1
CFHZ)	areas to increase regulation of water flow	Climateproofnation al road network	Infrastructure Database	Vulnerability Assessment of the
	and reduce flooding onto	ai i oau lietwoi k	Implement Vaimauga West	Samoa Road
	roads in extremely high	Improve	Integrated Catchment Strategy	Network (2016)
	risk hazard zones in	preparedness and	and Flood Management Plan in	and Road Network
	accordance with	readiness response	conjunction with	Adaptation Strategy,
	Vulnerability Assessment of the Samoa Road	to natural disasters	Geomorphologist Drainage Infrastructure Database	LTA
	Network	Reduce impact from	findings	
	recommendations	coastal erosion and	5	
		natural disasters	Utilize environmental and	
	Responsibility:LTA/ MWTI	Maintain lifeline	social safeguards including EIAs in screening and	
	MIVVII	access and	designing built environment	
		connectivity for	infrastructure projects for	
		Central Business	Vaimauga West district	
		Area	In also de toe hand onto	
		Safer villages,	Include in budget programming CBA, design	
		houses and roads	and construction	
		Minimise national	Designation of the IFHZ, CEHZ and CFHZ as an "at	
		disaster recovery expenditure on	risk" zone with appropriate	
		damaged	landuse planning controls	
		properties, public	and restrictions	
		and private assets		
Drainage systems to be	Continue to assess and	Improves infrastructure	Use existing information for	CIM Strategy 2015
improved in	upgrade culverts on main and 'access' roads	resilience and rate	guidance but not limited to: "Vulnerability Assessment of	NISP2011 KESO 5
high risk areas	in district especially at	of response and	the Samoa Road Network	1.101 2011 11200 0
(lower	junctions with local	recovery to natural	(2017)"; "Review of National	TSP2014-2019 Goal
catchment areas,	roads sitting within	hazards and	Road Standards in Samoa	2 KO 1
near rivers and streams)	combined hazard zones exacerbating inland	disasters	(2016)"; "Samoa Code of	Community Sector
exacerbating	flooding and storm water	Encourages coastal	Environmental Practice	Plan
inland flooding	surges (IFHZ, CEHZ,	families to relocate	(2007)"	
and storm water	CFHZ) - culverts in	inland	Undertake a Cost Benefit	
surges affecting	accordance with	Maintains lifeline	Analysis to weigh options for	
infrastructure, village homes	Vulnerability Assessment of the Samoa Road	access for all of	funding	
and other assets	Network	Upolu	Incorporate environmental	
	recommendations		Incorporate environmental and social safeguards	
		Minimises national	concerns in the design and	
	Implement national standards for culverts	disaster recovery	undertake consultations with	
	standards for culverts	expenditure on		

 $^{^{17}}$ Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

Village infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc	and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance Responsibility:LTA/MWTI/MNRE/MWCSD/Village / Families Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility:Village / Families (MMTI)	damaged properties, public and private assets Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
	Families /MWTI/ MNRE/ MWCSD			
Electricity supply		Maintain electricity supply at all times including natural disasters	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan

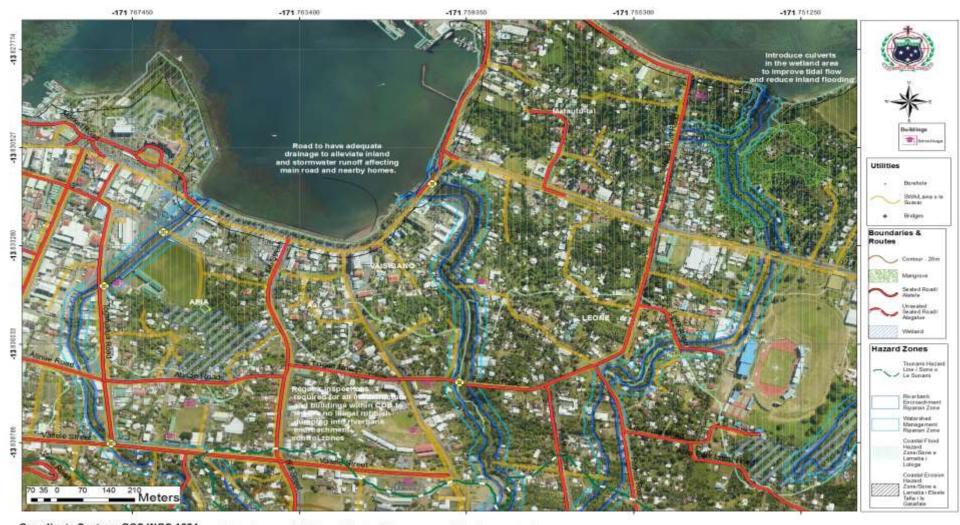
	Relocate overhead lines to a more resilient location when being replaced	Avoid accidents from fallen electricity posts		
	Install streetlights along the roads where needed for community safety			
	Install and connect to solar power supply if made available			
	Families to limit building and developments near electricity posts			
	Responsibility:EPC/ MWTI/ Village/Families			
Effluent and wastewater management systems	Introduce ban on latrines established in and around fluvial hazard zones Conduct campaign for public awareness of	Increase adaptation during extreme weather events Improveinfrastruct ureresilience and	Develop an integrated land management plan for Vaimauga West district Utilise Waste Management Act/Legislation to guide	National Waste Management Strategy National Waste Management Policy
	village ban and establish a "neighbourhood watch" agreement with village councils to monitor and manage introduced policies	Improve health and sanitation Reduce contamination of	process of effecting the 'polluter pays' principle Review wastewater strategy/legislation to include role of Village/District bylaws	Integrated Apia Master Plan for Water Supply, Sanitation and Drainage
	Government, district and villages to monitor, report and apply penalty on offenders *Responsibility:*	water supply	Develop/Update and register District/Village bylaws to include regulating developments and latrines around catchment areas and areas susceptible to flooding	
	MNRE/MWCSD/ District/ Village		Include in budget programming design, and installment of sewage and treatment systems	
			Utilise Hazard maps and Geomorphologist findings for planning purposes	
Village pool (near Apia Cemetery) located in high	Upgrade pool fence Test the quality of the water source before any	Increase adaptation during drought periods	Utilise Hazard Maps and Geomorphologist findings to inform location and design	CIM Strategy 2015 Water and Sanitation Sector Plan
risk hazard zones	investment on the pool is undertaken (eg: fence/repair works)	Improve health and sanitation Reduce	MNRE Water & Sanitation to conduct water testing and analysis of village pool prior to any intervention	Community Engagement Plan
	Responsibility: CSSP/ NGOs/ MNRE/Village	contamination of water supply		
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Plantations, crops and plants threatened by	Promote and facilitate planting of root crops(i.eyams,sweet	Improve recovery to create more resilient villages	Utilise Hazard Maps and Geomorphologist findings to inform location and design	AgricultureSectorPla n2016-2021
changes in climate, inland	potato) which are more resilient to cyclones,	Improve	Agriculture sector to provide	Two Million Tree Strategy 2015-2020

flooding and	droughts and floods	preparedness and	best practice management	
inadequate soil		readiness response	guidelines for the	Restoration
for planting	Promote agroforestry and	to natural disasters	management of water that	Operational Plan
	mixed planting including		allows for levels of	2016-2020
	fruit trees species to		contamination to be kept to	
	promote ecological		minimum	
	stability, soil protection		MNRE Forestry, DEC and	
	and reduce crop vulnerability to pests and		MAF to collaborate on	
	diseases		supply of climate resilient	
	uiseases		crops and plants	
	Implement the Integrated		er ops una plants	
	Pest Management		MAFtoprovidetrainings,	
	Programme		awareness raising on crop	
	1 rogramme		diversification to suit	
	Implement Sustainable		prolonged impacts of	
	Land Management (SLM)		climate change and support	
	practices		in supply of nursery trees,	
	•		technology and	
	Conduct pilot site trials		infrastructure to have a	
	for climate ready plant		sustainable mechanism for	
	varieties		replanting	
			MAF to assist in	
			establishment of pilot sites	
	Responsibility: MAF/		to trial climate ready plant	
	MNRE/village		varieties and provide advice,	
			seedlings and planting	
			material for village/families	
			as a trial	
			Develop an integrated land	
			management plan with the	
			aim of reducing any	
			unnecessary actions that	
			may adversely affect the	
			natural habitats and	
			ecosystems of the area	
			MNRE Forestry to advice on	
			appropriate species, depth	
			and density of planting and	
			provide seedlings for	
			different vegetation types	
			suitable to the habitats and	
			planting materials for village	
Governance	Best Solutions	Benefits	Guideline to assist with	RelevantSector
			the implementation	Plans, National Strategies & Policies
Strengthen the	Update and/or develop	Strengthen	Develop and register	Village Fono Act
governance of	bylaws to manage the use		district/village bylaw to	(Amendment Bill
natural	of natural resources, and	all national sector	protect all district/ village	2016)
resources and	to control land use	plans	and government assets,	
land use	impacts; such as drainage	-	environment, livelihood and	Community
through Bylaws	maintenance, rubbish	Strengthen	food security especially	Sector Plan
	dumping, sand mining,	monitoring of all	activities affecting water	
	stray animals and	National Acts,	catchment areas and	Community
	unregulated	Regulation,	coastline	Development Plan
	developments in water	Strategies, Plans		2016-2021
	catchment areas and	and Policies	Utilise Sui o Nu'u monthly	
	near boreholes.		meetings to monitor progress	
		Improve ability of	of district/village bylaws	
	Collaborate with Sui o	communities to		
	Nuu to monitor the use of	adapt, respond and		l l

	recover quickly in the long term	
awareness raising programs with the villages	Improve accountability and enabling environment of	
Responsibility: MWCSD /Village	communities	

Apia Village Map

APIA



Coordinate System: GCS WGS 1984 Datum: WGS 1984

Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

7. Togafu'afu'a, Matafele, TufuiopaVillage Interventions

CIM Plan Solutions

CIM Plan Solut				
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure to high risk ¹⁸ hazard zones (IFHZ, CEHZ, CFHZ)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations	Improveinfrastruct ureresilience and rate of recovery Climateproofnation al road network Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and	NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
	Responsibility:LTA/ MWTI/	Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Drainage systems to be improved Drainage systems to be improved in	Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within	Improves infrastructure resilience and rate of response and recovery to natural hazards and	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1
high risk areas (lower catchment areas, near rivers and streams) exacerbating	surges (IFHZ, CEHZ, CFHZ)- culverts in accordance with	Encourages coastal families to relocate inland	(2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for	Community Sector Plan
inland flooding and storm water surges affecting infrastructure, village homes and other assets	Vulnerability Assessment of the Samoa Road Network recommendations Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce	Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on damaged properties, public and private assets	funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law	

 $^{^{18}}$ Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

	flooding			
Community infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc	Implement regular drainage inspection and maintenance Responsibility:LTA/MWTI/MNRE /MWCSD/Community/Families Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and community to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility:Community / Families / MWTI/	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Flactricity cupely	MNRE/ MWCSD	Maintain alastrisite	Monitor distribution	EDC Stratogic Dlan
Electricity supply	in the long term Install and connect power supply for inland residents Relocate overhead lines to a more resilient location when being replaced	Maintain electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts	networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan
	Install streetlights along			

	the roads where needed for community safety			
	Install and connect to solar power supply if			
	made available Families to limit building and developments near			
	electricity posts			
	Responsibility:EPC/ MWTI/ Community /Families			
Effluent and wastewater	Introduce ban on latrines established in and around	Increase adaptation during extreme	Develop an integrated land management plan for	National Waste Management Strategy
management systems	fluvial hazard zones Conduct campaign for	weather events Improve		National Waste Management Policy
	public awareness of village ban and establish a "neighbourhood watch"	infrastructure resilience and rate of recovery	Act/Legislation to guide process of effecting the 'polluter pays' principle	Integrated Apia Master Plan for Water Supply,
	agreement with village councils to monitor and	Improve health		Sanitation and Drainage
	manage introduced policies	and sanitation Reduce	legislation to include role of Village/District bylaws	
	Government, district and community to monitor,	contamination of water supply	Develop/Update and register District/Village	
	report and apply penalty on offenders		bylaws to include regulating developments and latrines around catchment areas and	
	Responsibility: MNRE/MWCSD/		areas susceptible to flooding	
	District/ Community		Include in budget programming design, and installment of sewage and	
			treatment systems Utilise Hazard maps and	
			Geomorphologist findings for planning purposes	
Natural	Best Solutions	Benefits	Guideline to assist with the	
Resources and Environment			•	Plans, National Strategies & Policies
Village pool located in high risk hazard zones (coastal erosion	Village pool is currently in a poor state with an assessment needed for options to either	Increase adaptation during drought periods	Utilise Hazard Maps and Geomorphologist findings to inform location and design	CIM Strategy 2015 Community Engagement Plan
fluvial	rejuvenate or find a new site depending on the location of springs	Improve health and sanitation	MNRE Water & Sanitation to conduct water testing and analysis of village pool	
impacts and storm surges)	Test the quality of the	Reduce contamination of	prior to any intervention	
	water source before any further investment on the pool is undertaken (eg: fence/repair works)	water supply	UpdateVillage bylaws to include managing and maintaining village natural resources	
	Responsibility: MoF-CSSP/ MNRE/Communities		Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	

Governance	Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages Responsibility: MWCSD /Community	all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

Non-CR issues raised during consultations	Proposed Solution	Comments
Street lights for areas near Mulivai bridge and Marist Boys school	Community and familiesto liaise with EPC directly	Not a CR issue but contributes to safety of travelling public
Responsibility: Families/		
Government		

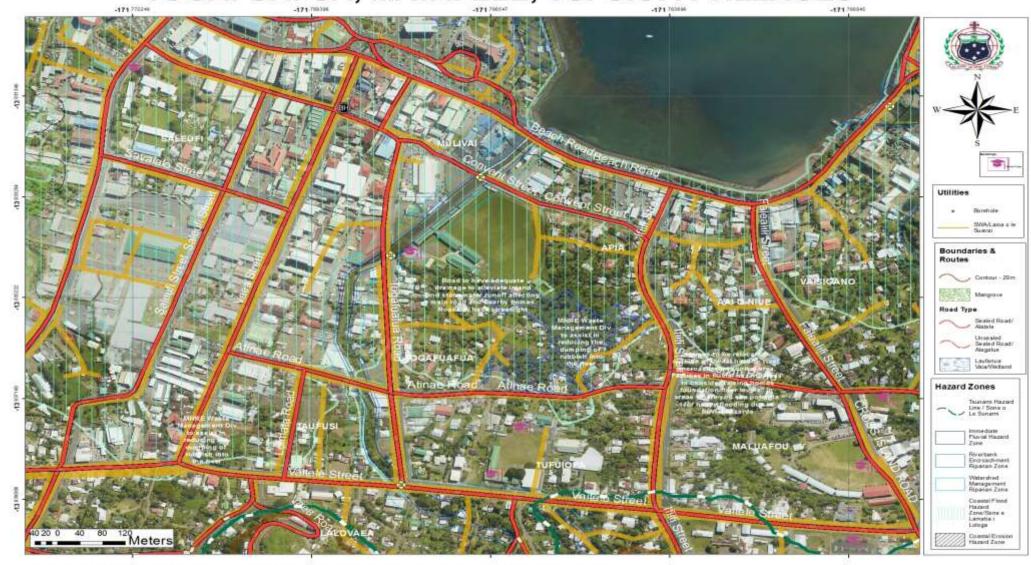






Togafu'afu'a, Matafele, Tufuiopa Village Map

TOGAFUAFUA, MATAFELE, TUFUIOPA VILLAGES



Coordinate System: GCS WGS 1984 Datum: WGS 1984 Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

8. Taufusi Village Interventions

CIM Plan Solutions

CIM Plan Solut				
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure to high risk¹9 hazard zones (IFHZ, CEHZ, CFHZ)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/	Improve infrastructure resilience and rate of recovery Climate proof national road network Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, community homes and other assets	Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ) – culverts in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Implement national standards for culverts	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan

¹⁹Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

		, .	00 1	
	and drains to facilitate the overland flow of storm water and reduce	damaged properties, public and private assets	affected communities Apply for necessary permits	
	flooding	and private assets	as required by law	
	Implement regular drainage inspection and maintenance		Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	
	Responsibility:LTA/ MWTI/MNRE/MWCSD /Community / Families		Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District	
			Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	
Community infrastructure located in high risk hazard	Relocate assets outside of high risk hazard zones when re-building	Minimise expenditure on damaged properties and	Planning provisions to be guided by the Planning and Urban Management Act 2004	CIM Strategy 2015 National Building Code
zones; such as houses, schools, Churches, Businesses, Committee houses etc	Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ	personal assets Safer villages, houses and roads Increases	Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones	
	Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility:Community / Families / MWTI / MNRE / MWCSD	awareness for insurance	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Electricity supply	Install streetlights along the roads where needed for community safety Relocate overhead lines to a more resilient	Maintain electricity supply at all times including natural disasters Avoid accidents	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Corporate Plan

	location when being replaced	from fallen electricity posts		
	Provide underground lines in the long term			
	Install and connect to solar power supply if			
	made available			
	Responsibility: EPC /MWTI/ Communities			
Effluent and wastewater management systems	Introduce ban on latrines established in and around fluvial hazard zones	Increase adaptation during extreme weather events	management plan for Vaimauga West district	National Waste Management Strategy National Waste
	Conduct campaign for public awareness of village ban and establish a	Improve infrastructure resilience and rate	Act/Legislation to guide process of effecting the	Management Policy Integrated Apia Master
	"neighbourhood watch" agreement with village councils to monitor and	of recovery Improve health	'polluter pays' principle Review waste water strategy/	Plan for Water Supply, Sanitation and Drainage
	manage introduced policies	and sanitation Reduce	legislation to include role of Village/District bylaws	S
	Government, district and villages to monitor, report and apply penalty on offenders	contamination of water supply	Develop/Update and register District/Village bylaws to include regulating developments and latrines	
	Responsibility: MNRE/MWCSD/		around catchment areas and areas susceptible to flooding	
	District/ Community		Include in budget programming design, andinstallment of sewage and treatment systems	
			Utilise Hazard maps and Geomorphologist findings for planning purposes	
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Strengthen the governance of natural	Update and/or develop by laws to manage the use of natural resources,	Strengthen implementation of all national sector	Develop and register district/village bylaw to protect all district/ village	Village Fono Act (Amendment Bill 2016)
resources and land use through Bylaws	and to control land use impacts; such as drainage maintenance, rubbish	plans	and government assets, environment, livelihood and food security especially	Community Sector Plan
	dumping, sand mining, stray animals and unregulated	Strengthen monitoring of all National Acts,	activities affecting water catchment areas and coastline	Community Development Plan
	developments in water catchment areas and near boreholes.	Regulation, Strategies, Plans and Policies	Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	2016-2021
	Collaborate with Sui o Nuu to monitor the use of and impact on natural resources	Improve ability of communities to adapt, respond and recover quickly in the long term		
	Facilitate continuous awareness raising			

programs with the villages	Improve	
	accountability and	
Responsibility: MWCSD	enabling	
/Community	environment of	
	communities	



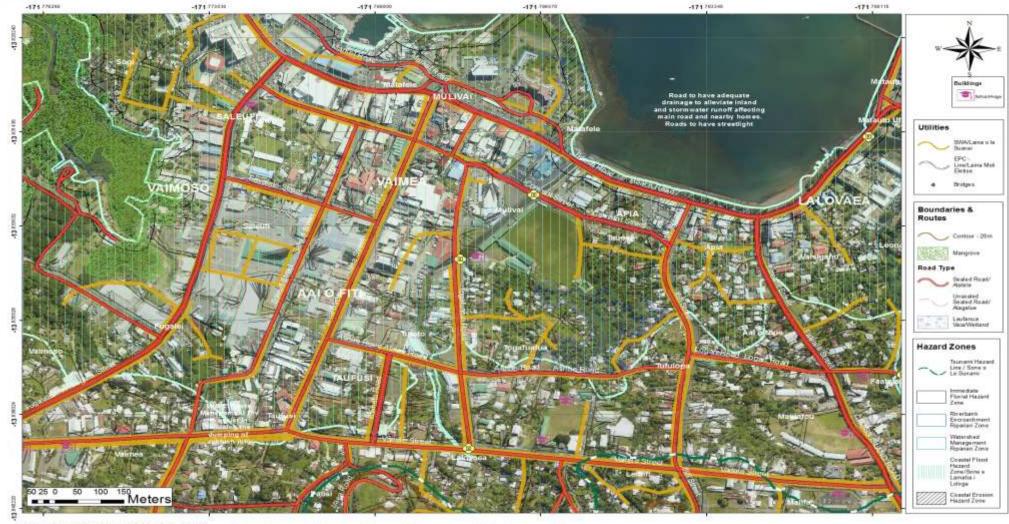


Taufusi Village Map



TAUFUSI





Coordinate System: GCS WGS 1984

Datum: WGS 1984 Units: Degree Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

9. Lalovaea, Lalovaea Sasa'e, Palisi Village Interventions

CIM Plan Solutions

CIM Plan Solut		D (1		n 1
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies &Policies
Parts of Main roads: exposure to high risk ²⁰ hazard zones (IFHZ, CEHZ, CFHZ)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/MNRE/Village	Improve infrastructure resilience and rate of recovery Climate proof national road network Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ) – culverts in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Implement national standards for culverts	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan

 $^{^{20}}$ Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

	and drains to facilitate	damagad	affacted communities	
	and drains to facilitate the overland flow of	damaged properties, public	affected communities	
	storm water and reduce flooding	and private assets	Apply for necessary permits as required by law	
	Implement regular drainage inspection and maintenance		Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	
	Responsibility:LTA/ MWTI/MNRE/MWCSD /Village / Families		Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District	
			Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	
Flood protection	Upgrade waterways	Minimise	Conduct and utilize	NISP2011 KESO 5
measures for fords and bridges	Upgrade all crossings	expenditure on damaged	recommendation of geotechnical, catchment	TSP2014-2019 Goal
5		properties &	management and drainage	2 KO 1
	Upgrade or repair riverine embankment	personal assets	analysis in the planning phase	Vulnerability
	protection work	Mitigatepotentialda	•	Assessment of the
	upstream of Lalovaea (Loimata o Apaula area)	mage from inland flooding	Conduct a full catchment management, drainage	Samoa Road Network (2016)
	and Palisi)	_	analysis and geotechnical	and Road Network
	Construct levees to	Reduce flooding of built up areas	engineering survey of embankment and	Adaptation Strategy, LTA
	reduce flooding along	-	watercourses in district	
	estuaries and coastal streams	Safer villages, houses and roads	Utilise Hazard maps and	
		nouses and roads	Geomorphologist Drainage	
	Install advisory edge markers and depth		Infrastructure Database to identify specific location and	
	markers to warn vehicle		condition of current drainage	
	and pedestrians at all crossings		/ infrastructure requiring maintenance and upgrade works	
	Government and Villages			
	to liaise and collaborate on processes needed to		Encourage and utilize environmental and social	
	protect riverbanks from		safeguards including EIAs in	
	land clearing and developments		screening and designing infrastructure facilities	
	Responsibility: MWTI/ LTA/MNRE/ District/ Village		Include in budget programming CBA, design and construction. Bridge and	
	Ü		road designs to take account of forecast changes in sea level rise and local flooding from increased rainfall intensity	
			Designation of the CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	

Upgrade access/	Construct roadside	Improve	Utilise hazard maps and	National Disaster
local roads ²¹ to	drainage ditches where	infrastructure	Geomorphologist Drainage	Management
national	needed	resilience and rate	Infrastructure Database to	Plan2017-2021
standards to		of recovery	inform location and designs	
alleviate inland	Implement routine			CIM Strategy 2015
flooding affecting	maintenance of the roads	Improve	Develop an integrated land	
Lalovaea, Palisi	and clear any debris	preparedness and	management plan with the	TSP2014-2019 Goal
and lower Apia	obstructing the free flow	readiness response	aim of reducing any	2 KO 1
CBD area	of surface water runoff	to natural disasters	unnecessary actions that	
			may adversely affect the	
	Village to regulate	Safer villages,	natural habitats and	
	developments near and	houses and roads	ecosystems of the area	
	around road shoulders of	30.1.1	D : (: (:) IEIIZ	
	all access roads	Minimise national	Designation of the IFHZ,	
	F-6	disaster recovery	CEHZ and CFHZ as an "at	
	Enforce environmental	expenditure on	risk" zone with appropriate	
	safeguards where reclamations are proposed.	damaged	landuse planning controls and restrictions	
	Government and district to	properties and public assets	and restrictions	
	manage processes by	public assets	Utilise environmental and	
	requiring villagers to get		social safeguards including	
	the appropriate permits		EIAs in screening and	
	and consent		designing built environment	
	and consent		infrastructure projects for	
	Responsibility:LTA/		Vaimauga West district	
	MWTI/ MNRE/		vaimaaga veest alserret	
	Villages/Families			
Village	Relocate assets outside of	Minimise	Planning provisions to be	CIM Strategy 2015
infrastructure	high risk hazard zones	expenditure on	guided by the Planning and	
located in high	when re-building	damaged	Urban Management Act 2004	National Building
risk hazard		properties and		Code
zones; such as	Develop landuse planning	personal assets	Enforcement of National	
houses, schools,	and development controls		Building Code 2017	
Churches,	to restrict developments	Safer villages,		
Businesses,	within high risk hazard	houses and roads	Encourage insurance of	
Committee	zones such as CEHZ and	_	significant investments and	
houses etc	CFHZ	Increases	assets within hazard zones	
		awareness for	7711· 1	
	Conduct awareness raising	insurance	Utilise hazard maps and	
	campaign on flood		Geomorphologist Drainage	
	resilient building practices		Infrastructure Database to determine safe areas for	
	and designs for at risk communities living in and			
	near high risk hazard		relocation purposes	
	zones		Designation of the IFHZ,	
	201103		CEHZ and CFHZ as an "at	
	Design infrastructure to		risk" zone with appropriate	
	take into account the		landuse planning controls	
	immediate hazard zones;		and restrictions	
	for example, raise floor			
	levels of houses in flood			
	prone areas			
	Families and village to			
	limit building and			
	developing on natural			
	overland flow paths			
	exacerbating inland			
	flooding and storm water			
	surges			
	J			

 $^{^{21}}$ Vaea Road, Apaula Street, Apaula Heights Road, Palisi Road and Ieriko Road. Mt Vaea Rd not in national network so not covered under LTA normal road maintenance programme

	Responsibility:Village / Families /MWTI/ MNRE/ MWCSD			
Landslips	Implement slope stabilization at most vulnerable landslide areas of Vaimauga West as identified in the Vulnerability Assessment of the Samoa Road Network report Reduce sediment loads and loss of top soil by discouraging farming on steep slopes and keeping livestock in areas away from wetlands and watershed sites Government, Village and landowners to liaise and collaborate on processes needed to protect upland catchment area, riverbanks from land clearing and developments Responsibility:LTA/MW TI/ MNRE/ Villages	Improve infrastructure resilience and rate of recovery Climateproofnation al road network Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and landslides Maintain lifeline access for all of Upolu Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs Implement Vaimauga West District Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls	CIM Strategy 2015 Transport SectorPlan2014- 2019 Goal 2 NISP2011 (KESO 5 D&E)
Effluent and wastewater management systems	Introduce ban on latrines established in and around fluvial hazard zones Families in fluvial hazard zones to install proper septic waste disposal systems Implement district/ village drainage cleanup and awareness programme Produce posters and village signs for public awareness Responsibility: MNRE/ MWCSD/ District/ Village	Increase adaptation during extreme weather events Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply	857	

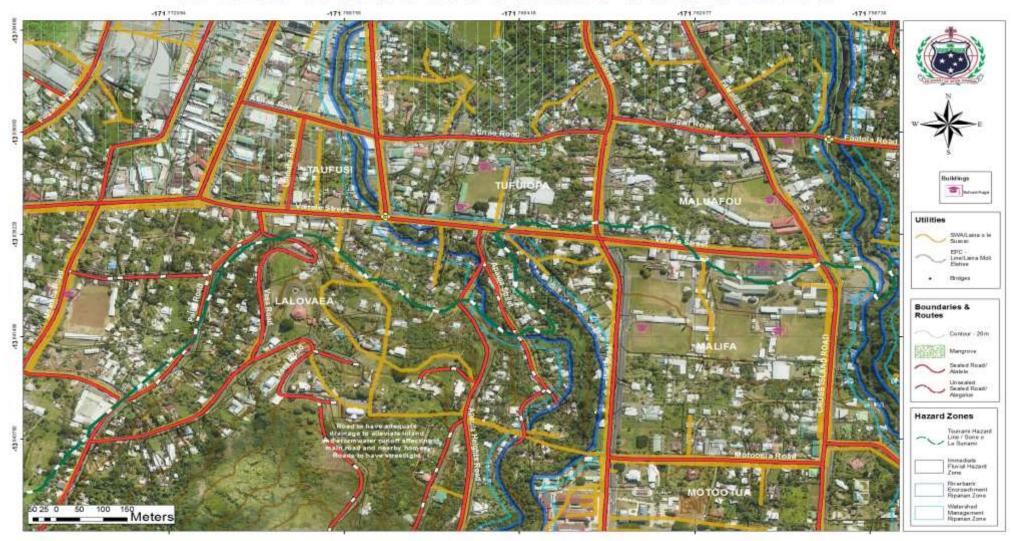
Doot Colotions	Dana Cita		DalamantCastan
Best Solutions	Benefits	Guideline to assist with the implementation	Plans, National
		-	Strategies & Policies
Continue programme by Forestry on replanting native forestry species of the upland forest Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices	Protects and enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	Community Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Responsibility: MNRE- WRD & Forestry/ District /Village/CSSP			
Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE//SWA/District/Village/CSSP/GEF-SGP	Reduced risk of slips and erosion Improve resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas	Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020
Conduct riparian replanting along river channels and watercourses Encourage planting of	Mitigate potential damage from inland flooding Reduce flooding of built up areas	Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure	Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020
Condu replai chann water	uct riparian nting along river nels and courses	nct riparian Inting along river Itels and Itel	Integration of Mitigate potential damage from inland flooding and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure

	conjunction with	Safer villages,	and designs	
	engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas Responsibility: MNRE/	houses and roads	MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation	
	Villages			
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021
	Facilitate continuous awareness raising programs with the villages Responsibility: MWCSD /Village	Improve accountability and enabling environment of communities		





LALOVAEA & PALISI VILLAGES



Coordinate System: GCS WGS 1984 Datum: WGS 1984

Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

10. Malifa, Moto'otua, Leufisa Village Interventions

CIM Plan Solutions

CIM Plan Solut				
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure to high risk ²² hazard zones (IFHZ, CEHZ, CFHZ)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/	Improveinfrastruct ureresilience and rate of recovery Climateproofnation al road network Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction	NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
		disaster recovery expenditure on damaged properties, public and private assets	Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Drainage	Continue to assess and	Improves	Use existing information for	CIM Strategy 2015
systems to be	upgrade culverts on main	infrastructure	guidance but not limited to:	NICDOM11 VECO E
improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding	and 'access' roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ) – culverts in	resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate	"Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)"	NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan
and storm water surges affecting infrastructure, village homes and other assets	accordance with Vulnerability Assessment of the Samoa Road Network recommendations Implement national standards for culverts and drains to facilitate the overland flow of	inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on	Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with	
	storm water and reduce flooding	damaged properties, public	affected communities Apply for necessary permits	

 $^{^{22}}$ Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

		1	. 11 1	
		and private assets	as required by law	
	Implement regular drainage inspection and maintenance		Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	
	Responsibility:LTA/ MWTI/MNRE/MWCSD /Community / Families		Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District	
			Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	
Community infrastructure located in high	Relocate assets outside of high risk hazard zones when re-building	Minimise expenditure on damaged	Planning provisions to be guided by the Planning and Urban Management Act 2004	CIM Strategy 2015 National Building
risk hazard	when re-banding	properties and	orban Management Net 2004	Code
zones; such as houses, schools, Churches,	Develop landuse planning and development controls to restrict developments	personal assets Safer villages,	Enforcement of National Building Code 2017	
Businesses, Committee houses etc	within high risk hazard zones such as CEHZ and CFHZ	houses and roads Increases awareness for	Encourage insurance of significant investments and assets within hazard zones	
	Conduct awareness raising campaign on flood resilient building	insurance	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to	
	practices and designs for at risk communities living in and near high risk		determine safe areas for relocation purposes	
	hazard zones Design infrastructure to		Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate	
	take into account the immediate hazard zones;		landuse planning controls and restrictions	
	for example, raise floor levels of houses in flood prone areas			
	Families and village to limit building and developing on natural overland flow paths			
	exacerbating inland flooding and storm water surges			
	Responsibility:Communi ty / Families /MWTI/ MNRE/ MWCSD			
Effluent and wastewater management systems	Introduce ban on latrines established in and around fluvial hazard zones	Increase adaptation during extreme weather events		National Waste Management Strategy
	Families in fluvial hazard zones to install proper septic waste disposal systems	Improve infrastructure resilience and rate of recovery	Develop/Update and register District/Village bylaws to include regulating developments and latrines in	
	Implement district/	Improve health	IFHZ and areas susceptible to flooding	

Natural Resources and Environment District Upland Forest	village drainage cleanup and awareness programme Produce posters and village signs for public awareness Responsibility: MNRE/MWCSD/ District/Community Best Solutions Continue programme by Forestry on replanting native forestry species of the upland forest	and sanitation Reduce contamination of water supply Benefits Protects and enhance local species diversity Reduced risk of	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants	RelevantSector Plans, National Strategies & Policies Community Engagement Plan Two Million Tree Planting Strategy
	Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Responsibility: MNRE-WRD & Forestry/District /Community /CSSP	slips and erosion Reduce impact from inland flooding	Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	2015-2020 Restoration Operational Plan 2016-2020
Protection of catchment areas	Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli	Reduced risk of slips and erosion Improve resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas	Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020

	Responsibility: MNRE/ /SWA/District/Commun ity/CSSP/JEF-SGP	D. C.		
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages Responsibility: MWCSD /Community	all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021





Malifa, Moto'otua, Leufisa Village Map

MALIFA, MOTOOTUA, LEUFISA VILLAGES



Coordinate System: GCS WGS 1984 Datum: WGS 1984 Units: Degree Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

11. Tanugamanono Village Interventions

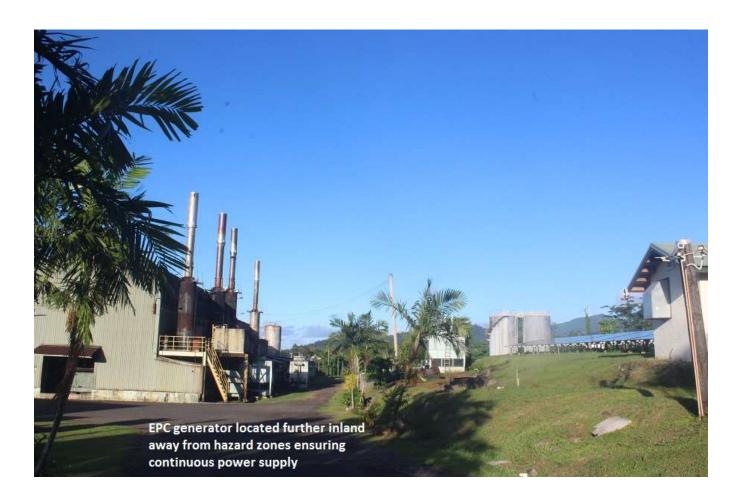
CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the	Relevant Sector
Infrastructure	Dest solutions	belients	implementation	Plans, National Strategies & Policies
Drainage	Continue to assess and	Improves	Use existing information for	CIM Strategy 2015
systems to be	upgrade culverts on main	infrastructure	guidance but not limited to:	
improved in	and 'access' roads in	resilience and rate	"Vulnerability Assessment of	NISP2011 KESO 5
high risk areas	district especially at junctions with local roads	of response and recovery to natural	the Samoa Road Network	TSP2014-2019 Goal
(lower catchment areas,	•	hazards and	(2017)"; "Review of National	2 KO 1
near rivers and	hazard zones exacerbating	disasters	Road Standards in Samoa	2 10 1
streams)	inland flooding and storm		(2016)"; "Samoa Code of Environmental Practice	Community Sector
exacerbating	water surges (IFHZ, CEHZ,	Encourages coastal	(2007)"	Plan
inland flooding	CFHZ)- in accordance with		(2007)	
and storm water	Vulnerability Assessment of	inland	Undertake a Cost Benefit	
surges affecting infrastructure,	the Samoa Road Network recommendations	Maintains lifeline	Analysis to weigh options for	
village homes	recommendations	access for all of	funding	
and other assets	Implement national	Upolu		
	standards for culverts	- P	Incorporate environmental	
	and drains to facilitate	Minimises national	and social safeguards concerns in the design and	
	the overland flow of	disaster recovery	undertake consultations with	
	storm water and reduce	expenditure on	affected communities	
	flooding	damaged		
	Implement regular	properties, public and private assets	Apply for necessary permits	
	drainage inspection and	and private assets	as required by law	
	maintenance		Utilise hazard maps and	
			Geomorphologist	
	Responsibility:LTA/		Infrastructure Drainage	
	MWTI/MNRE/MWCSD		Database to inform designs	
	/Village / Families			
			Develop Integrated Catchment	
			Strategy and Flood	
			Management Plan for	
Access/work	Assess and upgrade	Improve	Vaimauga West District Utilise hazard maps and	National
roads require	access/work roads as	infrastructure	Geomorphologist Drainage	DisasterManageme
maintenance and		resilience and rate	Infrastructure Database to	nt Plan2017-2021
upgrade as it		of recovery	inform location and designs	
exacerbates	Construct roadside			CIM Strategy 2015
flooding onto	drainage ditches where	Improve	Develop an integrated land	manaaaaaa .
main Cross Island Road and	needed	preparedness and	management plan with the aim of reducing any	TSP2014-2019 Goal 2 KO 1
exacerbate river	Implement routine	readiness response to natural disasters	unnecessary actions that	2 KU 1
/ford overruns	maintenance of the roads	to natural disasters	may adversely affect the	Community Sector
,	and clear any debris	Safer villages,	natural habitats and	Plan
	obstructing the free flow	houses and roads	ecosystems of the area	
	of surface water runoff			
	Tell . 1 .	Minimise national	Designation of the IFHZ,	
	Village to regulate	disaster recovery	CEHZ and CFHZ as an "at	
	developments near and around road shoulders of	expenditure on damaged	risk" zone with appropriate landuse planning controls	
	all access roads	properties and	and restrictions	
		public assets		
	Enforce environmental		Utilise environmental and	
	safeguards where		social safeguards including	
	reclamations are proposed.		EIAs in screening and	
	Government and district to		designing built environment	
	manage processes by		infrastructure projects for	

	requiring villagers to get the appropriate permits		Vaimauga West district	
	and consent			
	and consent			
	Responsibility:LTA/			
	MWTI/ MNRE/			
17:11	Villages/Families	N	DI 1	CIM Ct. 1 2015
Village infrastructure	Relocate assets outside of high risk hazard zones	Minimise expenditure on	Planning provisions to be guided by the Planning and	CIM Strategy 2015
located in high	when re-building	damaged	Urban Management Act 2004	National Building
risk hazard		properties and	0.000	Code
zones; such as	Develop landuse planning	personal assets	Enforcement of National	
houses, schools,	and development controls	0.0 111	Building Code 2017	
Churches, Businesses,	to restrict developments within high risk hazard	Safer villages, houses and roads	Encourage insurance of	
Committee	zones such as CEHZ and	nouses and roads	significant investments and	
houses etc	CFHZ	Increases	assets within hazard zones	
		awareness for		
	Conduct awareness	insurance	Utilise hazard maps and	
	raising campaign on flood resilient building		Geomorphologist Drainage Infrastructure Database to	
	practices and designs for		determine safe areas for	
	at risk communities living		relocation purposes	
	in and near high risk			
	hazard zones		Designation of the IFHZ, CEHZ and CFHZ as an "at	
	Design infrastructure to		risk" zone with appropriate	
	take into account the		landuse planning controls	
	immediate hazard zones;		and restrictions	
	for example, raise floor			
	levels of houses in flood prone areas			
	profic areas			
	Families and village to			
	limit building and			
	developing on natural			
	overland flow paths			
	exacerbating inland			
	flooding and storm water surges			
	burges			
	Responsibility:Village /			
	Families /MWTI/ MNRE/ MWCSD			
Effluent and	Introduce ban on latrines	Increase adaptation	Develop an integrated land	National Waste
wastewater	established in and around	during extreme	management plan for	Management Strategy
management	fluvial hazard zones	weather events	Vaimauga West district	AT IVAY
systems	Conduct campaign for	Improveinfrastruct	Utilise Waste Management	National Waste Management Policy
	public awareness of	ureresilience and	Act/Legislation to guide	management runcy
	village ban and establish a	rate of recovery	process of effecting the	Integrated Apia Master
	"neighbourhood watch"	•	'polluter pays' principle	Plan for Water Supply,
	agreement with village	Improve health	Davissaria	Sanitation and
	councils to monitor and manage introduced	and sanitation	Review wastewater strategy/ legislation to include role of	Drainage
	policies	Reduce	Village/District bylaws	
	_	contamination of	0,, -	
	Government, district and	water supply	Develop/Update and	
	villages to monitor, report		register District/Village	
	and apply penalty on offenders		bylaws to include regulating developments and latrines	
	Officiacis		around catchment areas and	
			areas susceptible to flooding	

	Responsibility:MNRE/ MWCSD/ District/ Village		Include in budget programming design, andinstallment of sewage and treatment systems Utilise Hazard maps and Geomorphologist findings for planning purposes	
Natural Resources and Environment	Best Solutions	Benefits	_	Plans, National Strategies & Policies
Protection of catchment areas	Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE//SWA/District/Village/	Reduced risk of slips and erosion Improve resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas	Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020
Governance	CSSP/GEF-SGP Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources	all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021
	Facilitate continuous awareness raising	Improve accountability and		

programs with the villages	enabling	
	environment of	
Responsibility: MWCSD	communities	
/Village		



Tanugamanono Village Map

TANUGAMANONO



Coordinate System: GCS WGS 1984

Datum: WGS 1984 Units: Degree Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

12. Nafanua (Setema Fou) Village Interventions

CIM Plan Solutions

CIM Plan Solut				
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure to high risk ²³ hazard zones (IFHZ, CEHZ, CFHZ)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/	Improve infrastructure resilience and rate of recovery Climate proof national road network Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy,
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding	Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within combined	Improves infrastructure resilience and rate of response and recovery to natural hazards and	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1
	hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ)- culverts in	disasters Encourages coastal families to relocate	Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)"	Community Sector Plan
and storm water surges affecting infrastructure, village homes and other assets	accordance with Vulnerability Assessment of the Samoa Road Network recommendations	inland Maintains lifeline access for all of Upolu	Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental	
	Implement national standards for culverts and drains to facilitate the overland flow of	Minimises national disaster recovery expenditure on	and social safeguards concerns in the design and undertake consultations with	

 $^{^{23}}$ Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

	storm water and reduce flooding Implement regular drainage inspection and maintenance Responsibility:LTA/ MWTI/MNRE/MWCSD/Community / Families	damaged properties, public and private assets	affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register	
Community	Relocate assets outside of	Minimise	District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	
Community infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility:Community / Families / MWTI / MNRE / MWCSD		Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Effluent and wastewater management systems	Introduce ban on latrines established in and around fluvial hazard zones	Increase adaptation during extreme weather events	management plan for Vaimauga West district	National Waste Management Strategy National Waste
3,3601113	Conduct campaign for public awareness of	Improveinfrastruct ureresilience and		Management Policy

	village ban and establish a	rate of recovery	process of effecting the	Integrated Apia Master
	"neighbourhood watch"		'polluter pays' principle	Plan for Water Supply,
	agreement with village	Improve health		Sanitation and
	councils to monitor and	and sanitation	Review waste water strategy/	Drainage
	manage introduced		legislation to include role of	
	policies	Reduce	Village/District bylaws	
		contamination of		
	Government, district and	water supply	Develop/Update and	
	villages to monitor, report		register District/Village	
	and apply penalty on		bylaws to include regulating	
	offenders		developments and latrines	
			around catchment areas and	
	Responsibility:		areas susceptible to flooding	
	MNRE/MWCSD/			
	District/ Community		Include in budget	
			programming design,	
			andinstallment of sewage	
			and treatment systems	
			II4:1: II	
			Utilise Hazard maps and	
			Geomorphologist findings for	
Natural	Best Solutions	Benefits	planning purposes Guideline to assist with the	DolovantCoston
Resources and	Dest solutions	Delients	implementation	Plans, National
Environment			implementation	Strategies & Policies
Protection of	Promote and support	Reduced risk of	Develop Integrated	Water Sector Plan
catchment areas	agroforestry and other	slips and erosion	Watershed/Catchment	water sector rian
cateminent areas	cropping systems that	ships and crosion	Strategy and Flood	Community
	combine trees and crops,	Improve resilience	Management Plan for	Engagement Plan
	especially in catchments,	of catchments	Vaimauga West District	
	and erosion-prone and		, amadaga 11 eeu 2 ieu 1eu	Restoration
	sensitive areas	Improve	Develop and register	Operational Plan
		preparedness and	District/Village bylaws to	2016-2020
	Limit land clearance and	readiness response	include penalizing illegal	
	agricultural development	to natural disasters	deforestation and	
	around catchment areas,		developments in upper	
	SWA intake and	Reduce	catchment areas	
	boreholes in district	contamination of		
		water supply		
	Enforce Watershed			
	Management Riparian			
	Zone and Riverbank			
	Encroachment Control			
	and regulate			
	developments around the			
	upland area			
	Replant catchment areas			
	with local species such as			
	tava, and poumuli			
	Decree 2 22 September 2			
	Responsibility: MNRE/			
	/SWA/District/			
	Community/CSSP/GEF- SGP			
Governance	Best Solutions	Benefits	Guideline to assist with	RelevantSector
dovernance	Dest solutions	Delients	the implementation	Plans, National
			ine implementation	Strategies & Policies
Strengthen the	Update and/or develop	Strengthen	Develop and register	Village Fono Act
governance of	bylaws to manage the use	implementation of	district/village bylaw to	(Amendment Bill
natural	of natural resources, and	all national sector	protect all district/ village	2016)
resources and	to control land use	plans	and government assets,	2010)
land use	impacts; such as drainage	Piulis	environment, livelihood and	Community
	maintenance, rubbish	Strengthen	food security especially	Sector Plan
through Bylaws	maintenance, runnish	Suchenen	I TOOK SECULIEV ESDECIALLY	SECTOL LIGHT

dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural	recover quickly in	activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Community Development Plan 2016-2021
Facilitate continuous awareness raising programs with the villages Responsibility: MWCSD /Community	Improve accountability and enabling environment of communities		

Nafanua (Setema Fou) Village Map

NAFANUA



Coordinate System: GCS WGS 1984 Datum: WGS 1984

Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

13. Papaloloa, Tanumaleko Village Interventions

CIM Plan Solutions

CIM Plan Solut Infrastructure	Best Solutions	Benefits	Guideline to assist with the	Relevant Sector
mii astructure	Dest solutions	Delients	implementation	Plans, National
Parts of Main road and access roads ²⁴ : exposure to high risk ²⁵ hazard zones (IFHZ, CEHZ, CFHZ)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	TSP2014-2019 Goal 2 KO 1 Community Sector Plan Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within IFHZ–culverts in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on damaged properties, public and private assets	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan

²⁴Hinoma Street and Dora Street

 $^{^{25}}$ Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

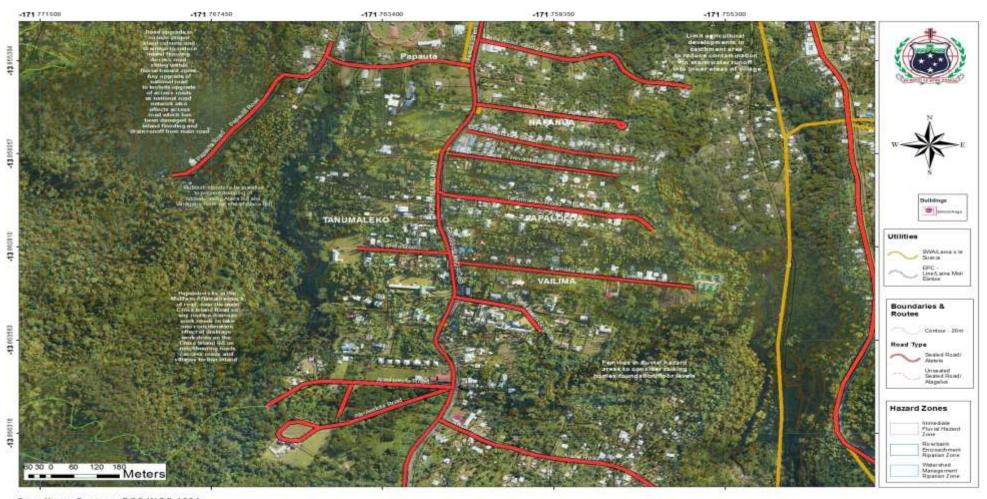
Community infrastructure located in high risk hazard zones; such as houses, schools,	Responsibility:LTA/ MWTI/MNRE/MWCSD /Community / Families Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls	Minimise expenditure on damaged properties and personal assets	Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017	CIM Strategy 2015 National Building Code
Churches, Businesses, Committee houses etc	to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility: Community / Families	Safer villages, houses and roads Increases awareness for insurance	Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Natural	/MWTI/ MNRE/ MWCSD Best Solutions	Benefits	Guideline to assist with the	
Resources and Environment			implementation	Plans, National Strategies & Policies
District Upland	Continue programme by	Protects and	MNRE Forestry, DEC and	Community
Forest	Forestry on replanting native forestry species of the upland forest Promote agroforestry and mixed planting including fruit trees species to promote ecological	enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	MAF to collaborate on supply of climate resilient crops and plants Develop an integrated land management plan with the aim of reducing any unnecessary actions that	Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
	stability, soil protection and reduce crop vulnerability to pests and diseases		may adversely affect the natural habitats and ecosystems of the area	2010-2020

Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Responsibility: MNRE-WRD & Forestry/District /Community/CSSP Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area	Reduced risk of slips and erosion Improve resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas	Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020
with local species such as tava, and poumuli Responsibility: MNRE/ /SWA/District/Commun			
Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National
of natural resources, and to control land use	all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Strategies & Policies Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021
	Pest Management Programme Implement Sustainable Land Management (SLM) practices Responsibility: MNRE-WRD & Forestry/ District /Community /CSSP Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE/ /SWA/District/Commun ity/CSSP/GEF-SGP Best Solutions Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural	Pest Management Programme Implement Sustainable Land Management (SLM) practices Responsibility: MNRE-WRD & Forestry/District /Community/CSSP Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE//SWA/District/Community/CSSP/GEF-SGP Best Solutions Benefits Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve preparedness and readiness response to natural disasters Reduce contamination of water supply Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve preparedness and readiness response to natural disasters Reduce contamination of water supply Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve preparedness and readiness response to natural disasters Reduce contamination of water supply Strengthen implementation of all national sector plans Improve preparedness and readiness response to natural disasters Reduce contamination of water supply Strengthen implementation of all national Acts, Regulation, Strategies, Plans and Policies Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	Implement the Integrated Pest Management Programme Programme

Facilitate continuous awareness raising	Improve accountability and	
programs with the villages	enabling environment of	
Responsibility: MWCSD /Community	communities	

Papaloloa, Tanumaleko Village Map

PAPALOLOA, TANUMALEKO



Coordinate System: GCS WGS 1984 Datum: WGS 1984

Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

14. Papauta (Loimata o Apaula) Village Interventions

CIM Plan Solutions

CIM Plan Solut Infrastructure	Best Solutions	Benefits	Guideline to assist with the	Relevant Sector
iiii asti uctui e	Dest Solutions	Delicitis	implementation	Plans, National
			p.occ.o	Strategies & Policies
Parts of Main	Continue to upgrade,	Improve	Develop a climate resilient	TSP2014-2019 Goal
road and access	widen roads, upsize	infrastructure	Drainage Master Plan for	2 KO 1
roads ²⁶ :	ocean outfalls and	resilience and rate	Vaimauga West utilising	
exposure to	improve drainage	of recovery	Hazard maps and	Vulnerability
high risk ²⁷	systems at identified	,	Geomorphologist Drainage	Assessment of the
hazard zones	areas to increase	Improve	Infrastructure Database	Samoa Road
(IFHZ, CEHZ,	regulation of water flow	preparedness and		Network (2016)
CFHZ)	and reduce flooding onto	readiness response	Implement Vaimauga West	and Road Network
	roads in extremely high	to natural disasters	Integrated Catchment Strategy	Adaptation Strategy,
	risk hazard zones in		and Flood Management Plan in	LTA
	accordance with	Reduce impact from	conjunction with	
	Vulnerability Assessment	coastal erosion and	Geomorphologist Drainage	
	of the Samoa Road	natural disasters	Infrastructure Database	
	Network	36 1.6 1.	findings	
	recommendations	Maintain lifeline	Hailing anning and and	
	Deep engibility LTA/	access and	Utilize environmental and	
	Responsibility:LTA/ MWTI/	connectivity for Central Business	social safeguards including EIAs in screening and	
		Area	designing built environment	
		Alea	infrastructure projects for	
		Safer villages,	Vaimauga West district	
		houses and roads	vaimaaga west aistrice	
		nouses and roads	Include in budget	
		Minimise national	programming CBA, design	
		disaster recovery	and construction	
		expenditure on		
		damaged	Designation of the IFHZ,	
		properties, public	CEHZ and CFHZ as an "at	
		and private assets	risk" zone with appropriate	
			landuse planning controls and restrictions	
Drainage	Continue to assess and	Improves	Use existing information for	CIM Strategy 2015
systems to be	upgrade culverts on main	infrastructure	guidance but not limited to:	Cilvi Strategy 2015
improved in	and 'access' roads in	resilience and rate	"Vulnerability Assessment of	NISP2011 KESO 5
high risk areas	district especially at	of response and	the Samoa Road Network	
(lower	junctions with local roads	recovery to natural	(2017)"; "Review of National	TSP2014-2019 Goal
catchment areas,	sitting within IFHZ –	hazards and	Road Standards in Samoa	2 KO 1
near rivers and	culverts in accordance	disasters	(2016)"; "Samoa Code of	
streams)	with <i>Vulnerability</i>		Environmental Practice	Community Sector
exacerbating	Assessment of the Samoa	Encourages coastal	(2007)"	Plan
inland flooding	Road Network	families to relocate	(2007)	
and storm water	recommendations	inland	Undertake a Cost Benefit	
surges affecting		36.1.1.1.10.2.	Analysis to weigh options for	
infrastructure,	Implement national	Maintains lifeline	funding	
village homes	standards for culverts	access for all of	0	
and other assets	and drains to facilitate	Upolu	Incorporate environmental	
	the overland flow of	Minimigas national	and social safeguards	
	storm water and reduce flooding	Minimises national disaster recovery	concerns in the design and	
	nooung	expenditure on	undertake consultations with	
		damaged	affected communities	
		properties, public	Apply for pagagagy page:ta	
		and private assets	Apply for necessary permits as required by law	
		F-1. att dobets	as required by law	

²⁶Papauta Road

²⁷Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

	- ""			
	Responsibility:LTA/			
	MWTI/MNRE/MWCSD		Utilise hazard maps and	
	/Village / Families		Geomorphologist	
			Infrastructure Drainage	
			Database to inform designs	
			G	
			Develop Integrated Catchment	
			Strategy and Flood	
			Management Plan for	
			Vaimauga West District	
			vaimauga West District	
			Dll	
			Develop and register	
			District/Village bylaws to	
			include maintenance of	
			drainages and illegal rubbish	
			dumping into waterways	
Village	Relocate assets outside of	Minimise	Planning provisions to be	CIM Strategy 2015
infrastructure	high risk hazard zones	expenditure on	guided by the Planning and	
located in high	when re-building	damaged	Urban Management Act 2004	National Building
risk hazard		properties and	G	Code
zones; such as	Develop landuse planning	personal assets	Enforcement of National	
houses, schools,	and development controls	r	Building Code 2017	
Churches,	to restrict developments	Safer villages,	2 41141119 0040 2017	
Businesses,	within high risk hazard	houses and roads	Encourage insurance of	
Committee	zones such as CEHZ and	nouses and iddus	significant investments and	
		Ingrana	_	
houses etc	CFHZ	Increases	assets within hazard zones	
		awareness for		
	Conduct awareness raising	insurance	Utilise hazard maps and	
	campaign on flood		Geomorphologist Drainage	
	resilient building practices		Infrastructure Database to	
	and designs for at risk		determine safe areas for	
	communities living in and		relocation purposes	
	near high risk hazard			
	zones		Designation of the IFHZ,	
			CEHZ and CFHZ as an "at	
	Design infrastructure to		risk" zone with appropriate	
	take into account the		landuse planning controls	
	immediate hazard zones;		and restrictions	
	for example, raise floor		and restrictions	
	levels of houses in flood			
	prone areas			
	Families and village to			
	limit building and			
	developing on natural			
	overland flow paths			
	exacerbating inland			
	flooding and storm water			
	-			
	surges			
	Responsibility:Village /			
	Families /MWTI/			
	MNRE/ MWCSD			
Reticulated	,	Increase adaptation	Davidon and register	CIM Stratogy 2015
	Extend the water supply to	Increase adaptation	Develop and register	CIM Strategy 2015
water supply,	families inland with no	during drought	District/Village bylaws to	1A7-6 1
quality and	access to water	periods	include regulating	Water and
network to be		Ţ.	developments around	Sanitation Sector
improved	Procure rainwater	Improve	catchment areas and	Plan
	harvesting systems for	infrastructure	boreholes	CY474 4 6 77
	vulnerable families as a	resilience and rate		SWA 10 Year
	short term solution	of recovery	Implement SWA(2016)10	Investment
			year investment plan to	Plan(2016)
	District to support SWA	Improve health	improve water supply	
•		-	- ***	

Natural Resources and Environment	efforts at exploratory boreholes in district District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas Responsibility:SWA/ MWCSD/ MNRE / District/ Village/ CSSP Best Solutions	and sanitation Reduce contamination of water supply Reduce impact from inland flooding Benefits	network to support all inland families without access todrinking water Include in budget programming design, andextension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform location and designs Guideline to assist with the implementation	Community Engagement Plan RelevantSector Plans, National Strategies & Policies
District Upland Forest	Continue programme by Forestry on replanting native forestry species of the upland forest Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Responsibility: MNRE- WRD & Forestry/	Protects and enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	Community Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Protection of catchment areas	Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area	Reduced risk of slips and erosion Improve resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas	Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020

Governance	Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE/ /SWA/District/Village/ CSSP/GEF-SGP Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages Responsibility: MWCSD/Village	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

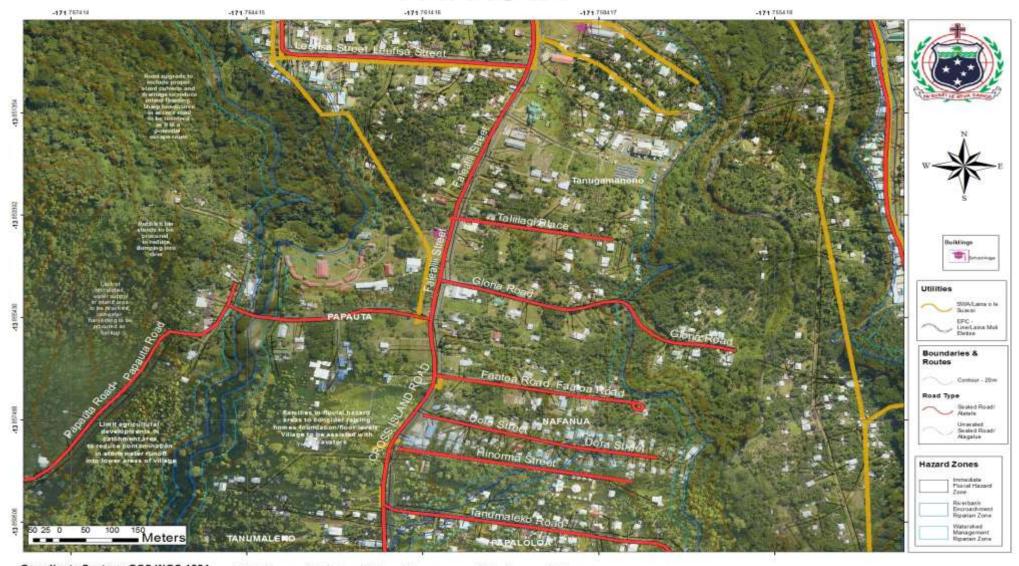
Non-CR issues raised during consultations	Proposed Solution	Comments
Sharp road curve/bend in Papauta	Village and private landowners to	Not a CR issue
Road (inland section)	resolve land issues	
Responsibility: Village/ EPC		





Papauta (Loimata o Apaula) Village Map

PAPAUTA



Coordinate System: GCS WGS 1984 Datum: WGS 1984

Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

15. Vailima Village Interventions

CIM Plan Solutions

Infrastructura		Danofita	Cuidalina ta assist suitle the	Dolovort Costan
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National
				Strategies & Policies
Parts of Main road and access roads ²⁸ : exposure to high risk ²⁹ hazard zones (IFHZ)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including	Strategies & Policies TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
	MWTI/	Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Drainage systems to be improved Drainage systems to be improved in high risk areas	Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1
(lower catchment areas, near rivers and streams) exacerbating inland flooding	with <i>Vulnerability</i>	Encourages coastal families to relocate inland Maintains lifeline	(2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for	Community Sector Plan
and storm water surges affecting infrastructure, village homes and other assets	standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance	access for all of Upolu Minimises national disaster recovery expenditure on damaged properties, public and private assets	funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law	

²⁸Vaiala Beach School Road and Lamosa Street

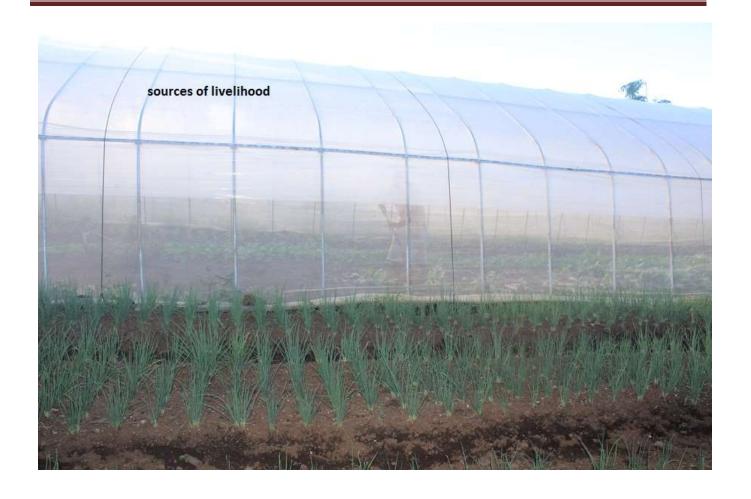
 $^{^{29}}$ Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

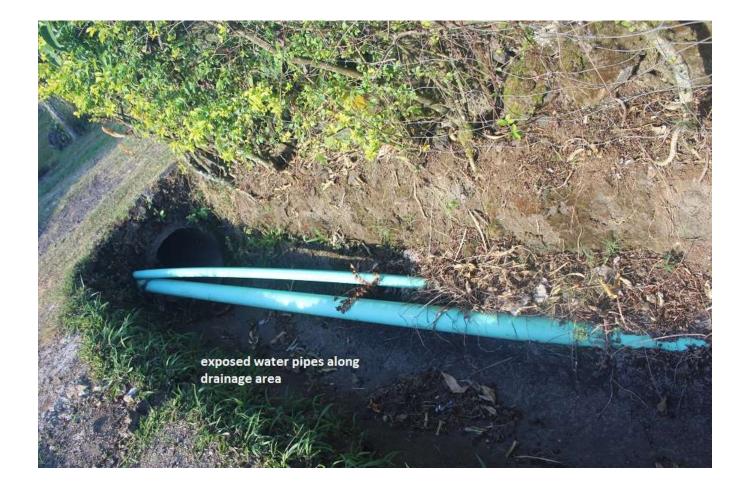
Reticulated water supply, quality and network to be improved	Responsibility:LTA/MWTI/MNRE/MWCSD/Village / Families Extend the water supply to families inland with no access to water Procure rainwater harvesting systems for vulnerable families as a short term solution District and village to support SWA water rationing programmes during times of drought District to support SWA efforts at exploratory boreholes in district District and villages to support SWA efforts at exploratory boreholes, intakes and catchment areas Responsibility:SWA/	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA(2016)10 year investment plan to improve water supply network to support all inland families without access todrinkingwater Include in budget programming design, andextension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform location and designs Utilise Sui o Nu'u monthly	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan(2016) Community Engagement Plan
	Responsibility:SWA/ MWCSD/MNRE/		meetings to monitor	
	District/Village/CSSP		progress of village programmes and responsibilities	
Natural	Best Solutions	Benefits	Guideline to assist with the	RelevantSector
Resources and Environment			_	Plans, National Strategies & Policies
District Upland Forest	Continue programme by Forestry on replanting native forestry species of the upland forest Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices	Protects and enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	Community Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

	Responsibility: MNRE- WRD & Forestry/ District /Village/CSSP			
Protection of catchment areas	Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE//SWA/District/Village/CSSP/GEF-SGP	Reduced risk of slips and erosion Improve resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas	Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020
Livelihood and Food Security		Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Pest management; invasive plants and animals	Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Vaimauga West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)

Governance	farmers to manage stray animals (pigs, cattle) that are contaminating water sources Responsibility: Villages /District/ MNRE/MAF/ SROS Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National
Strongthon the	Undate and for dayslan	Strongthon	Davidon and register	Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages	all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021
	Responsibility: MWCSD /Village	communities		

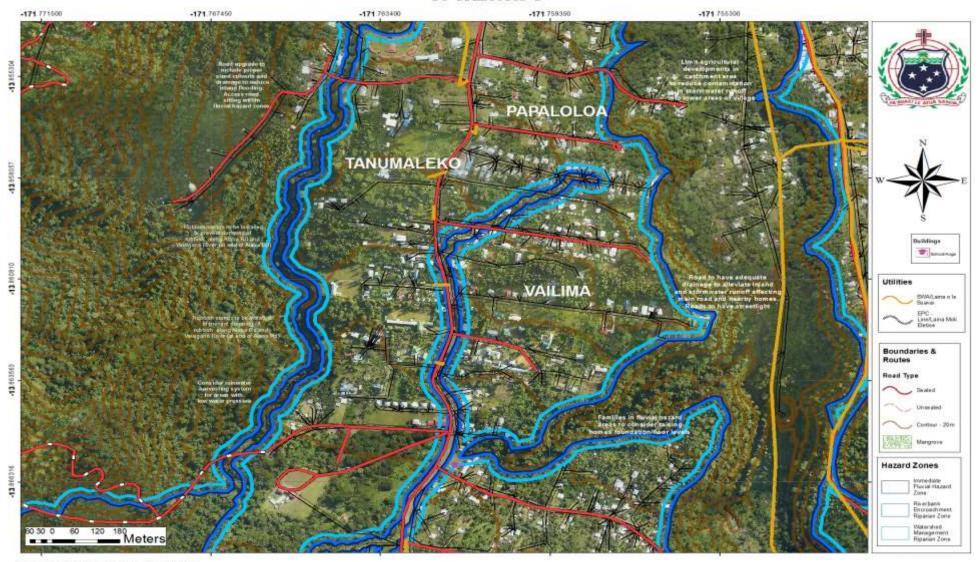
Non-CR issues raised during consultations	Proposed Solution	Comments
consultations		
Signs (school crossing) in front of	School/MESC to request	Not a CR issue
school	LTA/MWTI assistance directly	
Responsibility: School / LTA/ MESC		
Land for agricultural developments	Families/village to liaise with	Not a CR issue
Responsibility: Families / Member	Member of Parliament	
of Parliament		





Vailima Village Map

VAILIMA



Coordinate System: GCS WGS 1984 Datum: WGS 1984 Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

16. Avele, Vaoala, Tiapapata Village Interventions

CIM Plan Solutions

CIM Plan Solution				
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main Cross Island road and access roads ³⁰ : exposure to high risk ³¹ hazard zones (IFHZ)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy,
Drainage systems to be improved in high risk areas	Continue to assess and upgrade culverts on main and 'access' roads in	Improves infrastructure resilience and rate	Use existing information for guidance but not limited to: "Vulnerability Assessment of	CIM Strategy 2015 NISP2011 KESO 5
(lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting	Assessment of the Samoa Road Network	of response and recovery to natural hazards and disasters Encourages coastal families to relocate	the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)"	TSP2014-2019 Goal 2 KO 1 Community Sector Plan
infrastructure, village homes and other assets	Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular	inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on damaged properties, public	Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities	

 $^{^{30}}$ Avele Road, Collins Street, Letava Street, Skippers Lane, Vaoala Heights Road, Island Style Road

³¹Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

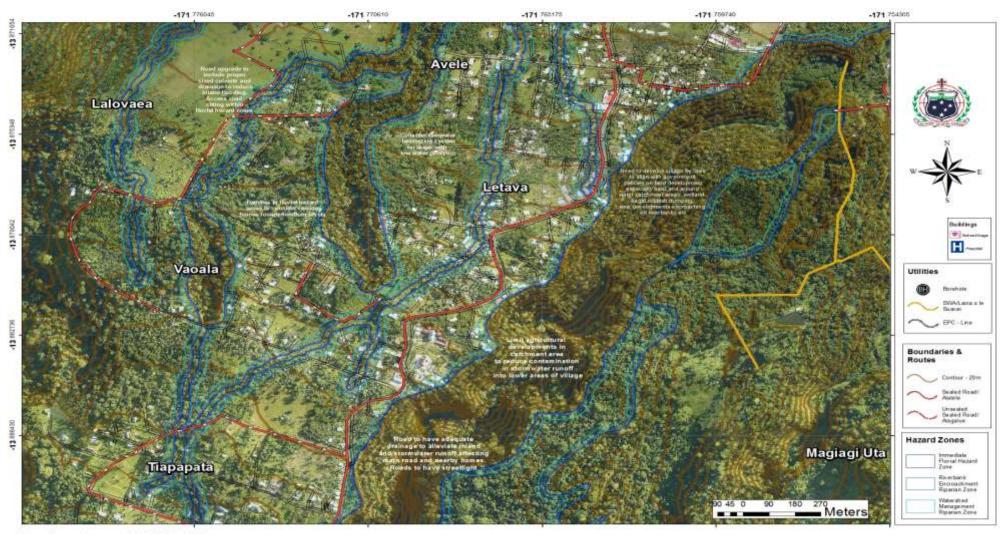
	drainage inspection and maintenance	and private assets	Apply for necessary permits as required by law	
	Responsibility:LTA/ MWTI/MNRE/MWCSD /Village / Families		Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	
			Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District	
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water	Increase adaptation during drought periods	Develop and register District/Village bylaws to include regulating developments around	CIM Strategy 2015 Water and Sanitation Sector
	Procure rainwater harvesting systems for vulnerable families as a short term solution	Improve infrastructure resilience and rate of recovery	catchment areas and boreholes Implement SWA(2016)10 year investment plan to	Plan SWA 10 Year Investment Plan(2016)
	District to support SWA efforts at exploratory boreholes in district	Improve health and sanitation	improve water supply network to support all inland families without access todrinkingwater	Community Engagement Plan
	District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas	contamination of water supply Reduce impact from inland flooding	Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems	
	Responsibility:SWA/ MWCSD/ MNRE / District/ Village/ CSSP	nooung	Utilise hazard maps and Geomorphologist findings to inform location and designs	
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
District Upland Forest	Continue programme by Forestry on replanting native forestry species of the upland forest Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Responsibility: MNRE- WRD & Forestry	Protects and enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	Community Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
	WRD & Forestry/ District /Village/CSSP			

	1		_	
Protection of	Promote and support	Reduced risk of	Develop Integrated	Water Sector Plan
catchment areas	agroforestry and other cropping systems that	slips and erosion	Watershed/Catchment Strategy and Flood	Community
	combine trees and crops,	Improve resilience	Management Plan for	Engagement Plan
	especially in catchments,	of catchments	Vaimauga West District	88
	and erosion-prone and			Restoration
	sensitive areas	Improve	Develop and register	Operational Plan
		preparedness and	District/Village bylaws to	2016-2020
	Limit land clearance and	readiness response	include penalizing illegal	
	agricultural development	to natural disasters	deforestation and	
	around catchment areas, SWA intake and	Reduce	developments in upper catchment areas	
	boreholes in district	contamination of water supply	catchine it areas	
	Enforce Watershed	11 5		
	Management Riparian			
	Zone and Riverbank			
	Encroachment Control and regulate			
	developments around the			
	upland area			
	Replant catchment areas			
	with local species such as			
	tava, and poumuli			
	Responsibility: MNRE/ /SWA/District/Village/			
	CSSP/GEF-SGP			_
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Strengthen the	Update and/or develop	Strengthen	Develop and register	Village Fono Act
governance of	bylaws to manage the use	implementation of	district/village bylaw to	(Amendment Bill
natural resources	of natural resources, and	all national sector	protect all district/ village	2016)
and land use	to control land use	plans	and government assets,	
through Bylaws	impacts; such as drainage		environment, livelihood and	Community
	maintenance, rubbish dumping, sand mining,	Strengthen monitoring of all	food security especially activities affecting water	Sector Plan
	stray animals and	National Acts,	catchment areas and	Community
	unregulated	Regulation,	coastline	Development Plan
	developments in water	Strategies, Plans		2016-2021
	catchment areas and	and Policies	Utilise Sui o Nu'u monthly	
	near boreholes.		meetings to monitor progress	
	Collaborate with Cui c	Improve ability of	of district/village bylaws	
	Collaborate with Sui o Nuu to monitor the use of	communities to adapt, respond and		
	and impact on natural	recover quickly in		
	resources	the long term		
	Facilitate continuous	Improve		
	awareness raising	accountability and		
	programs with the villages	enabling		
		environment of		
	Responsibility: MWCSD /Village	communities		

Non-CR issues raised during consultations	Proposed Solution	Comments
Upgrade road to Animal Protection Society Responsibility: APS / LTA/ MNRE	APS to request LTA directly	Not a CR issue as there is not enough population in this area to justify investment. Focus should be on upgrading drainage on Avele Road to alleviate inland flooding and storm water surges onto properties in this village as well as villages further downstream
Nurseries Responsibility: Families / MAF	Individuals to seek funding assistance from other sources	Related to livelihood section of CR but only a few individuals involved
Sewing machines for commercial purposes Responsibility: Families/ SBEC	Individuals to seek funding assistance from other sources	Related to livelihood section of CR but only a few individuals involved

Avele, Vaoala, Tiapapata Village Map

AVELE, VAOALA, TIAPAPATA VILLAGES



Coordinate System: GCS WGS 1984

Datum: WGS 1984 Units: Degree Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

17. Matautu-Tai, Matautu-Uta Village Interventions

CIM Plan Solutions

CIM Plan So				
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main road and access roads ³² : exposure to extremelyhigh risk ³³ hazard zones (IFHZ, CFHZ, CEHZ and tsunami shore exclusive zone)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water	Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with Vulnerability Assessment of the Samoa Road Network recommendations	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)"	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan
surges affecting infrastructure, village homes and other assets	Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance	Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on damaged properties, public and private assets	Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and	

³²Sagauga Road, Matautu Drive sitting in CEHZ and CFHZ only

³³Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

			undertake consultations with	
			affected communities	
			Apply for necessary permits	
	Responsibility:LTA/		as required by law	
	MWTI/MNRE/MWCSD		77.01	
	/Village / Families		Utilise hazard maps and	
			Geomorphologist	
			Infrastructure Drainage	
			Database to inform designs	
			Develop Integrated Catchment	
			Strategy and Flood	
			Management Plan for	
			Vaimauga West District	
Electricity supply	Provide underground lines	Maintain electricity	Monitor distribution	EPC Strategic Plan
	in the long term	supply at all times	networks to avoid	
	S	including natural	overloading poles and	
	Install and connect power	disasters	contributing to line failures	
	supply for inland residents		_	
		Avoid accidents		
	Relocate overhead lines to	from fallen		
	a more resilient location	electricity posts		
	when being replaced			
	Install streetlights along			
	the roads where needed			
	for community safety			
	Install and connect to			
	solar power supply if			
	made available			
	made available			
	Families to limit building			
	and developments near			
	electricity posts			
	Responsibility:EPC/			
_	MWTI/ Village/Families			
Governance	Best Solutions	Benefits	Guideline to assist with	RelevantSector
			the implementation	Plans, National
Strengthen the	Update and/or develop	Strengthen	Develop and register	Strategies & Policies Village Fono Act
governance of	bylaws to manage the use		district/village bylaw to	(Amendment Bill
natural	of natural resources, and	all national sector	protect all district/ village	2016)
resources and	to control land use	plans	and government assets,	_010,
land use	impacts; such as drainage		environment, livelihood and	Community
through Bylaws	maintenance, rubbish	Strengthen	food security especially	Sector Plan
	dumping, sand mining,	monitoring of all	activities affecting water	
	stray animals and	National Acts,	catchment areas and	Community
	unregulated	Regulation,	coastline	Development Plan
	developments in water	Strategies, Plans		2016-2021
	catchment areas and	and Policies	Utilise Sui o Nu'u monthly	
	near boreholes.	I	meetings to monitor progress	
l		improve ability of	of district/village bylaws	
	Collaborate with Coi -	Improve ability of		
	Collaborate with Sui o	communities to		
	Nuu to monitor the use of	communities to adapt, respond and		
	Nuu to monitor the use of and impact on natural	communities to adapt, respond and recover quickly in		
	Nuu to monitor the use of	communities to adapt, respond and		
	Nuu to monitor the use of and impact on natural resources	communities to adapt, respond and recover quickly in the long term		
	Nuu to monitor the use of and impact on natural	communities to adapt, respond and recover quickly in		
	Nuu to monitor the use of and impact on natural resources Facilitate continuous	communities to adapt, respond and recover quickly in the long term Improve		

Responsibility: MWCSD	communities	
/Village		

Matautu Tai/Uta Village Map

MATAUTU-TAI, MATAUTU-UTA VILLAGES



Coordinate System: GCS WGS 1984 Datum: WGS 1984

Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

18. Vaiala Village Interventions

CIM Plan Solutions

CIM Plan Solut				
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main road and access roads ³⁴ : exposure to high risk ³⁵ hazard zones (IFHZ, CFHZ and CEHZ)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Maintain seawall that was upgraded in 2015 Responsibility:LTA/MWTI/	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on damaged properties, public	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan

³⁴Matautu Street near Vaiala seawall and Vaiala-Vini Road

³⁵Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

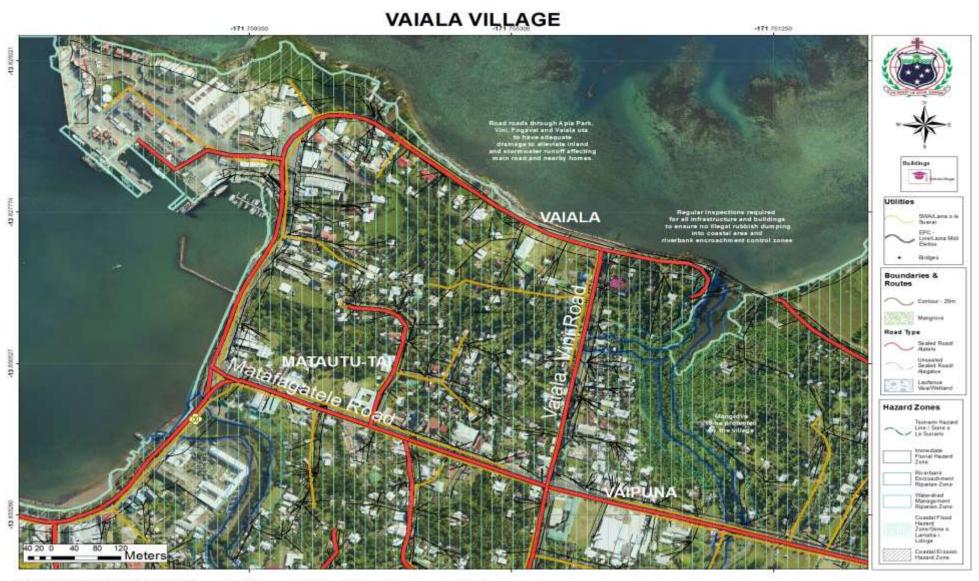
	maintenance	and private assets	Apply for necessary permits	
			as required by law	
	Responsibility:LTA/			
	MWTI/		Utilise hazard maps and	
			Geomorphologist	
			Infrastructure Drainage	
			Database to inform designs	
			Develop Integrated Catchment	
			Strategy and Flood	
			Management Plan for	
			Vaimauga West District	
Natural	Best Solutions	Benefits	Guideline to assist with the	RelevantSector
Resources and			_	Plans, National
Environment				Strategies & Policies
Vaiala/	Government to implement	Protects and	MNRE DEC to provide	NESP 2017 - 2021
Vaipuna	boundary demarcation of	enhance local	technical assistance and	
Mangrove area	wetland reserves at	species diversity	backstopping in the	Community
conservation	Vaiala/ Vaipuna with		development of a Mangrove	Engagement Plan
	application of planning	Sustains ecosystem	Management Plan for	
	controls and appropriate	services and	Vaimauga West district	Agriculture Sector
	management guidelines to	functions	.	Plan 2016-2021
	meet the needs as both		Develop an integrated land	
	drainage system	Reduce	management plan with the	PUMA Act
	components and	contamination of	aim of reducing any	1 OMITTICE
	conservation areas	water supply	unnecessary actions that	PUMA Regulation
			may adversely affect the	
	Introduce culverts in	Reduce impact from	natural habitats and	Village Fono
	wetland areas to	inland flooding		Act(Amendment Bill
	improve tidal flow and			2016)
	fishpassageinthewetland		Develop a specific Mangrove	,
	area		Legislation providing	
	D: (: (] 20		systematic consideration of	
	District and village		mangroves in decision-	
	councils to regulate		making, promote the use of	
	clearing of lands around		existing legal mechanisms to	
	wetlands and initiate		benefit mangroves, and	
	replanting programmes		underpin integrated	
	for coastal areas		management of coastal	
	Dromoto and support		natural resources, including	
	Promote and support		mangroves, at the village level	
	village and district tree planting on coastal areas		MNDE Egreetwy to advise an	
	•		MNRE Forestry to advice on	
	around existing seawalls to strengthen seawalls and		appropriate species, depth and density of planting and	
	reduce erosion using		provide seedlings for	
	native species such as		different vegetation types	
	talie, fetau, toa etc that are		suitable to the habitats and	
	known to have greater		planting materials for	
	resilience to natural		district/Village	
	disasters and changing		aistricty village	
	climate conditions		Identify funding /budget	
	ominate containions		requirements and	
	Depth and density of		implementation	
	planting to be increased		programme for	
	and a minimum vegetative		establishment of protected	
	distance of 200mm as an		areas in district	
	effective wave barrier			
	distance			
	Village and Government			
	management of clearing			
	inland catchment areas			

	close to rivers and streams to reduce sedimentation of estuaries, wetlands and the lagoon			
	Responsibility: MNRE /MAF/Village/Village CSSP/NGO/			
Village pool (Vaiala uta- near Levili) located in high risk hazard zones (coastal erosion and flooding from	Village pool is currently in a poor state with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs	Increase adaptation during drought periods Improve health and sanitation	Geomorphologist findings to inform location and design	CIM Strategy 2015 Community Engagement Plan
fluvial inundation, wave	Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works)	Reduce contamination of water supply	prior to any intervention UpdateVillage bylaws to include managing and maintaining village natural resources	
	Responsibility: MoF-CSSP/ MNRE/Villages		Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources	all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021
	Facilitate continuous awareness raising programs with the villages	Improve accountability and enabling		





Vaiala Village Map



Coordinate System: GCS WGS 1984 Datum: WGS 1984

Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

19. Vaipuna, Levili Village Interventions

CIM Plan Solutions

CIM Plan Solutions					
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies	
Parts of Main road and access roads ³⁶ : exposure tohazard zones (IFHZ)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy,	
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on damaged properties, public and private assets	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan	

³⁶Apia Park Loop Road, Levili-uta Road

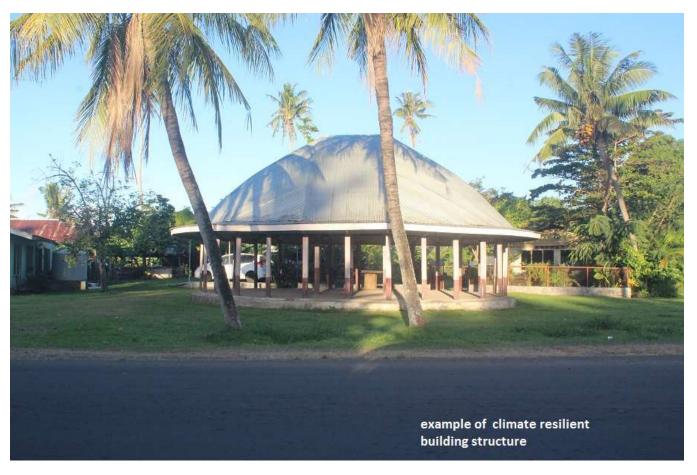
	Responsibility:LTA/		77.31	
	MWTI/		Utilise hazard maps and	
			Geomorphologist	
			Infrastructure Drainage	
			Database to inform designs	
			December 1 Catalana and	
			Develop Integrated Catchment	
			Strategy and Flood	
			Management Plan for	
77:11	Dala anti- anni da a 6	Minimi	Vaimauga West District	CIM Charles 2015
Village infrastructure	Relocate assets outside of high risk hazard zones	Minimise expenditure on	Planning provisions to be guided by the Planning and	CIM Strategy 2015
located in high	when re-building	damaged	Urban Management Act 2004	National Building
risk hazard	when re-building	properties and	orban Management Act 2004	Code
zones; such as	Develop landuse planning	personal assets	Enforcement of National	Coue
houses, schools,	and development controls	personal assets	Building Code 2017	
Churches,	to restrict developments	Safer villages,	Dullullig Code 2017	
Businesses,	within high risk hazard	houses and roads	Encourage insurance of	
Committee	zones such as CEHZ and	nouses and roads	significant investments and	
	CFHZ	Increases	assets within hazard zones	
houses etc	Griiz	awareness for	assets within hazard zones	
	Conduct awareness	insurance	Utilise hazard maps and	
	raising campaign on flood	msurance	Geomorphologist Drainage	
	resilient building		Infrastructure Database to	
	practices and designs for		determine safe areas for	
	at risk communities living		relocation purposes	
	in and near high risk		relocation purposes	
	hazard zones		Designation of the IFHZ,	
	nazara zones		CEHZ and CFHZ as an "at	
	Design infrastructure to		risk" zone with appropriate	
	take into account the		landuse planning controls	
	immediate hazard zones;		and restrictions	
	for example, raise floor			
	levels of houses in flood			
	prone areas			
	Eamilies and village to			
	Families and village to			
	limit building and developing on natural			
	overland flow paths			
	exacerbating inland			
	flooding and storm water			
	surges			
	341 gc3			
	Responsibility:Village /			
	Families /MWTI/			
	MNRE/ MWCSD			
Natural	Best Solutions	Benefits	Guideline to assist with the	
Resources and			-	Plans, National
Environment		D 4 4 3		Strategies & Policies
Vaiala/	Government to implement	Protects and	MNRE DEC to provide	NESP 2017 - 2021
Vaipuna	boundary demarcation of	enhance local	technical assistance and	C
Mangrove area	wetland reserves at	species diversity	backstopping in the	Community
conservation	Vaiala/ Vaipuna with	C	development of a Mangrove	Engagement Plan
	application of planning	Sustains ecosystem	Management Plan for	
	controls and appropriate	services and	Vaimauga West district	
	management guidelines to	functions	Develop an integrated land	
	meet the needs as both	Daduas	management plan with the	
	drainage system	Reduce	aim of reducing any	
	components and	contamination of	unnecessary actions that	
	conservation areas	water supply	may adversely affect the	
	Introduceculverts in	Reduce impact from	natural habitats and	
	mu oducecuivei ts III	Reduce IIIIpact II offi	naturar nabitats alla	

	wetland areas to	inland flooding	ecosystems of the area	
	improve tidal flow and			
	fish passage in the		Develop a specific Mangrove	
	wetland area		Legislation providing	
			systematic consideration of	
	District and village		mangroves in decision-	
	councils to regulate		making, promote the use of	
	clearing of lands around		existing legal mechanisms to	
	wetlands and initiate		benefit mangroves, and	
	replanting programmes		underpin integrated	
	for coastal areas		management of coastal	
	D ()		natural resources, including	
	Promote and support		mangroves, at the village level	
	village and district tree		71 C . 1	
	planting on coastal areas around existing seawalls		Identify funding /budget	
	to strengthen seawalls and		requirements and	
	reduce erosion using		implementation	
	native species such as		programme for	
	talie, fetau, toa etc that are		establishment of protected	
	known to have greater		areas in district	
	resilience to natural		Utilise Sui o Nu'u monthly	
	disasters and changing		meetings to monitor progress	
	climate conditions		of village programmes on	
			waste management	
	Depth and density of		waste management	
	planting to be increased			
	and a minimum vegetative			
	distance of 200mm as an			
	effective wave barrier			
	distance			
	Village and Government			
	management of clearing			
	inland catchment areas			
	close to rivers and			
	streams to reduce			
	sedimentation of			
	estuaries, wetlands and			
	the lagoon			
	XA711 +:			
	Where reclamations are			
	proposed, Government			
	and district to manage processes by requiring			
	villagers to get the			
	appropriate permits and			
	consent			
	Consont			
	Responsibility: MNRE			
	/MAF/Village/Village			
	CSSP/NGO/			
Governance	Best Solutions	Benefits	Guideline to assist with	RelevantSector
			the implementation	Plans, National
				Strategies & Policies
Strengthen the	Update and/or develop	Strengthen	Develop and register	Village Fono Act
governance of	bylaws to manage the use	-	district/village bylaw to	(Amendment Bill
natural	of natural resources, and	all national sector	protect all district/ village	2016)
resources and	to control land use	plans	and government assets,	
land use	impacts; such as drainage		environment, livelihood and	Community
through Bylaws	maintenance, rubbish	Strengthen	food security especially	Sector Plan
	dumping, sand mining,	monitoring of all	activities affecting water	C ''
	stray animals and	National Acts,	catchment areas and	Community
	unregulated	Regulation,	coastline	Development Plan

developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of	Strategies, Plans and Policies Improve ability of communities to adapt, respond and	Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	2016-2021
and impact on natural resources	recover quickly in the long term		
Facilitate continuous awareness raising programs with the villages	Improve accountability and enabling environment of		
Responsibility: MWCSD /Village	communities		

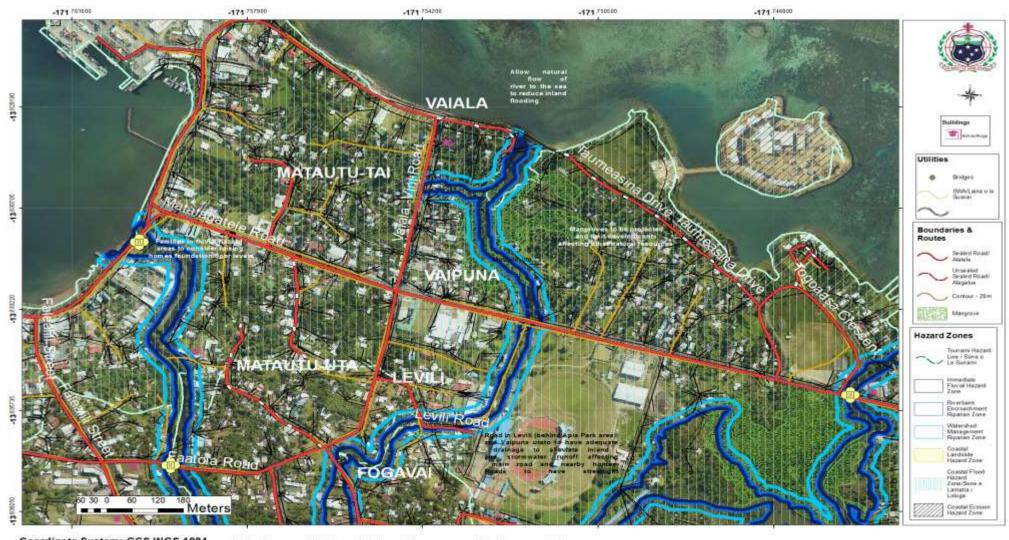
Non-CR issues raised during consultations	Proposed Solution	Comments
Traffic: install humps at	Village to request LTA directly	Not a CR issue
Vaipuna/Levili roads		
Responsibility: LTA/ Village		





Vaipuna, Levili Village Map

VAIPUNA, LEVILI VILLAGES



Coordinate System: GCS WGS 1984 Datum: WGS 1984

Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

20. Fa'atoia, Vini, Ma'agao Village Interventions

CIM Plan Solutions

	CIM Plan Solutions					
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies		
Parts of Main road and access roads ³⁷ : exposure to hazard zones (IFHZ)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA		
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on damaged properties, public and private assets	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan		

³⁷Faipule Road not in LTA normal road maintenance programme

Flood protection measures for fords and bridges Upgrade all crossings	Goal ne ork
Flood protection measures for fords and bridges Upgrade or repair riverine embankment protection work upstream of Magiagi Ensure river channel upstream is cleared and maintained regularly Construct levees to reduce flooding along estuaries and coastal streams Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs Mitigatepotentialda mage from inland flooding Ensure river channel upstream is cleared and maintained regularly Construct levees to reduce flooding along estuaries and coastal streams Install advisory edge markers and depth markers to warn vehicle Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs Mitigatepotentialda mage from inland flooding Ensure river channel upstream is cleared and maintained regularly Construct levees to reduce flooding along estuaries and coastal streams Safer villages, houses and roads Install advisory edge markers and depth markers to warn vehicle	Goal ne ork
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Flood protection measures for fords and bridges Upgrade all crossings Upgrade or repair riverine embankment protection work upstream of Magiagi Ensure river channel upstream is cleared and maintained regularly Construct levees to reduce flooding along estuaries and coastal streams Install advisory edge markers and depth markers to warn vehicle Flood protection wan Anagement Plan for Vaimauga West District Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs Mitigatepotentialda manage from inland flooding Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database findings Safer villages, houses and roads Strategy and Flood Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs Mitigatepotentialda Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database findings Safer villages, houses and roads Safer villages, houses and roads Strategy and Flood Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database findings Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities	Goal ne ork
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Flood protection measures for fords and bridges Upgrade all crossings Upgrade or repair riverine embankment protection work upstream of Magiagi Ensure river channel upstream is cleared and maintained regularly Construct levees to reduce flooding along estuaries and coastal streams Upgrade waterways Minimise expenditure on damaged properties & personal assets Mitigatepotentialda mage from inland flooding Ensure river channel upstream is cleared and maintained regularly Construct levees to reduce flooding along estuaries and coastal streams Naminauga West District Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs Mitigatepotentialda mage from inland flooding Reduce flooding of built up areas Maintains lifeline access for all of Upolu Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities Safer villages, houses and roads Network (2016) and Road Network adaptation Strateg Database findings Utilise environmental and designing infrastructure facilities	Goal ne ork
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crossings management plan with the	
aim of reducing any	
Government and Villages unnecessary actions that	
to liaise and collaborate may adversely affect the	
on processes needed to natural habitats and	
protect riverbanks from ecosystems of the area	
land clearing and	
developments Include in budget programming CBA, design	
nesponsibility: Proving	
LTA/MNRE/ District/ Village Designation of the IFHZ as an	
Village Designation of the IFHZ as an "at risk" zone with	
appropriate landuse planning	
controls and restrictions	
Village Relocate assets outside of Minimise Planning provisions to be CIM Strategy 2015	15
infrastructure high risk hazard zones expenditure on guided by the Planning and	
located in high when re-building damaged Urban Management Act 2004 National Building	5
risk hazard properties and Code	
zones; such as Develop landuse planning personal assets Enforcement of National	
houses, schools, and development controls Building Code 2017	
Churches, to restrict developments Safer villages, Businesses, within high risk hazard houses and roads Encourage insurance of	
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awareness for	
Conduct awareness insurance Utilise hazard maps and	
raising campaign on flood Geomorphologist Drainage	
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practices and designs for determine safe areas for	
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hazard zones Designation of the IFHZ,	

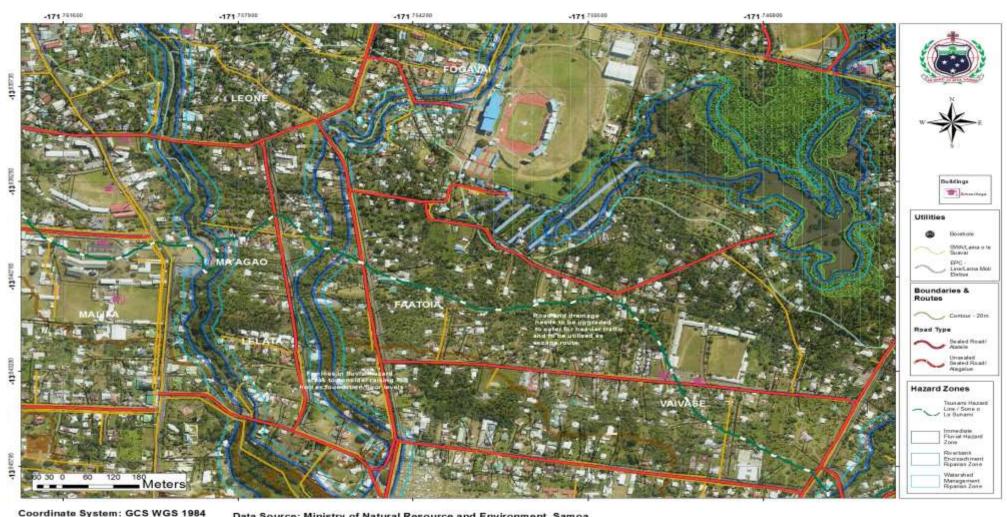
Design infrastructure to take into account the		CEHZ and CFHZ as an "at risk" zone with appropriate	
immediate hazard zones; for example, raise floor levels of houses in flood prone areas		landuse planning controls and restrictions	
Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges			
Responsibility:Village / Families /MWTI/ MNRE/ MWCSD			
Best Solutions	Benefits		
		_	Plans, National Strategies & Policies
Village pool is currently in	Increase adaptation		CIM Strategy 2015
a poor state with an assessment needed for options to either	during drought periods	Geomorphologist findings to inform location and design	Community Engagement Plan
	_		
	Samtation		
	Reduce	prior to any intervention	
		UndateVillage hylaws to	
further investment on the	water suppry		
pool is undertaken (eg:		maintaining village natural	
fence/repair works)		resources	
Responsibility: MoF-CSSP/ MNRE/NGOs/ Villages		Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	
Conduct riparian replanting along river channels and	Mitigatepotentialda mage from inland flooding	Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in	Two Million Tree Strategy 2015-2020
watercourses Encourage planting of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas Responsibility: MNRE/Villages	Reduce flooding of built up areas Safer villages, houses and roads	conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation	Restoration Operational Plan 2016-2020
	Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges **Responsibility:Village/Families/MWTI/MNRE/MWCSD** Best Solutions Village pool is currently in a poor state with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works) **Responsibility: MoF-CSSP/MNRE/NGOs/Villages** Conduct riparian replanting along river channels and watercourses Encourage planting of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas **Responsibility: MNRE/**	Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility: Village / Families /MWTI/ MNRE/ MWCSD Best Solutions Village pool is currently in a poor state with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works) Responsibility: MoF-CSSP/ MNRE/NGOs/ Villages Conduct riparian replanting along river channels and watercourses Encourage planting of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas Responsibility: MNRE/	Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges **Responsibility:Village / Families / MWTI/MNRE/ MWCSD** **Best Solutions** Benefits** Guideline to assist with the implementation* Utiliage pool is currently in a poor state with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works)* Responsibility: MoF-CSSP/MNRE/NGOs/ Villages* Conduct riparian replanting along river channels and watercourses Encourage planting of indigenous species in conjunction with material drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas Responsibility: MNRE/

Governance	Dogt Colutions	Benefits	Guideline to assist with	RelevantSector
Governance	Best Solutions	вененся	the implementation	Plans, National
			••	Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages	all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021
	Responsibility: MWCSD /Village	communities		



Faatoia Maagao Village Map

FAATOIA, VINI, MA'AGAO VILLAGES



Datum: WGS 1984

Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

21. Magiagi Village Interventions

CIM Plan Solutions

CIM Plan Solut				
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main road	Continue to upgrade,	Improve	Develop a climate resilient	NESP 2017 - 2021
and access roads ³⁸ : exposure to hazard zones	widen roads, upsize ocean outfalls and improve drainage	infrastructure resilience and rate of recovery	Drainage Master Plan for Vaimauga West utilising Hazard maps and	CIM Strategy 2015
(IFHZ)	systems at identified areas to increase	Improve	Geomorphologist Drainage Infrastructure Database	NISP2011 KESO 5
	regulation of water flow and reduce flooding onto	preparedness and readiness response	Implement Vaimauga West	TSP2014-2019 Goal 2 KO 1
	roads in extremely high risk hazard zones in	to natural disasters	Integrated Catchment Strategy and Flood Management Plan in	Community Sector
	accordance with Vulnerability Assessment of the Samoa Road	Reduce impact from coastal erosion and natural disasters	conjunction with Geomorphologist Drainage Infrastructure Database	Plan PUMA Act
	<i>Network</i> recommendations	Maintain lifeline	findings	ReviewofNational
	Responsibility:LTA/ MWTI/	access and connectivity for Central Business	Utilizeenvironmental and social safeguards including EIAs in screening and	RoadStandardsinSa moa(2016)MWTI
		Area	designing built environment infrastructure projects for	Vulnerability Assessment of the
		Safer villages, houses and roads	Vaimauga West district Include in budget	Samoa Road Network (2016) and Road Network
		Minimise national disaster recovery	programming CBA, design and construction	Adaptation Strategy, LTA
		expenditure on damaged properties, public and private assets	Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate	
		and private assets	landuse planning controls and restrictions	
Drainage systems to be improved in	Continue to assess and upgrade culverts on main	Improves infrastructure	Use existing information for guidance but not limited to:	CIM Strategy 2015
high risk areas (lower catchment areas, near rivers	and 'access' roads in district especially at junctions with local roads	resilience and rate of response and recovery to natural	"Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National	NISP2011 KESO 5 TSP2014-2019 Goal
and streams) exacerbating	sitting within IFHZ – culverts in accordance	hazards and disasters	Road Standards in Samoa (2016)"; "Samoa Code of	2 KO 1
inland flooding and storm water surges		Encourages coastal families to relocate	Environmental Practice (2007)"	Community Sector Plan
affecting infrastructure, village homes and	recommendations	inland	Undertake a Cost Benefit	
other assets	Implement national standards for culverts	Maintains lifeline access for all of	Analysis to weigh options for funding	
	and drains to facilitate the overland flow of storm water and reduce	Upolu Minimises national	Incorporate environmental and social safeguards	
	flooding	disaster recovery expenditure on	concerns in the design and undertake consultations with affected communities	
	Implement regular drainage inspection and	damaged properties, public	Apply for necessary permits	

³⁸Alaoa Road and several unnamed tracks

			11 1	
	maintenance	and private assets	as required by law	
	Responsibility:LTA/ MWTI/MNRE/MWCSD /Village / Families		Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	
Village infrastructure located in high risk hazard zones; such as houses, schools, Churches,	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls	Minimise expenditure on damaged properties and personal assets	Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017	
Businesses, Committee houses etc	to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural	Safer villages, houses and roads Increases awareness for insurance	Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
	overland flow paths exacerbating inland flooding and storm water surges Responsibility:Village / Families /MWTI/ MNRE/ MWCSD			
Upgrade roads ³⁹ used as escape routes	Assess and upgrade access/work roads as potential escape routes Construct roadside	Improve infrastructure resilience and rate of recovery	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs	National Disaster Management Plan2017-2021
	drainage ditches where needed	Improve preparedness and	Develop an integrated land management plan with the	CIM Strategy 2015 NISP2011 KESO 5

³⁹Ueligitone and Aukilani Roads, Alaoa Road (to Vailima/Vaoala)

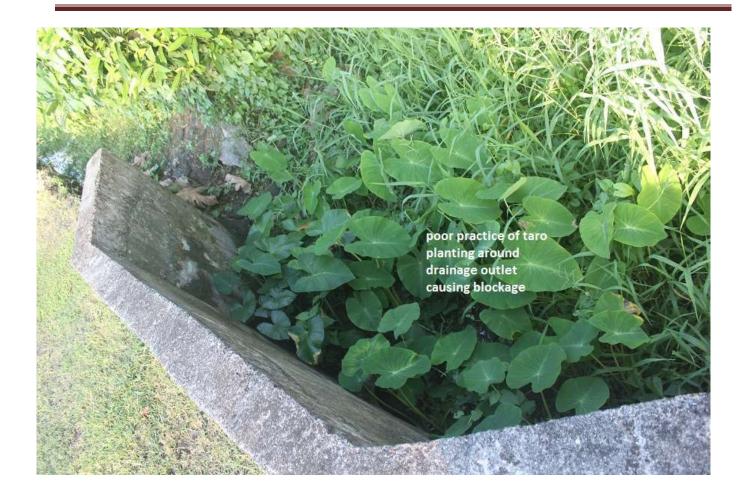
	Implement routine maintenance of the roads and clear any debris obstructing the free flow of surface water runoff Village to regulate developments near and around road shoulders of all access roads Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent Responsibility:LTA/	readiness response to natural disasters Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and public assets	aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district	TSP2014-2019 Goal 2 KO 1 Community Sector Plan
	MWTI/ MNRE/ Villages			
Reticulated water supply, quality and network to be improved	/Families Extend the water supply to families inland with no access to water Procure rainwater harvesting systems for vulnerable families as a short term solution District to support SWA efforts at exploratory boreholes in district District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas Responsibility:SWA/MWCSD/MNRE/District/Village/CSSP	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA(2016)10 year investment plan to improve water supply network to support all inland families without access todrinkingwater Include in budget programming design, andextension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform location and designs	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan(2016) Community Engagement Plan
Flood protection measures for fords and bridges	Upgrade waterways Upgrade all crossings Upgrade or repair riverine embankment protection work upstream of Lelata, Maagao, Vaisigano Construct levees to reduce flooding along estuaries and coastal streams Install advisory edge	Minimise expenditure on damaged properties & personal assets Mitigatepotentialda mage from inland flooding Reduce flooding of built up areas Maintains lifeline access for all of Upolu	Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database findings Utilise environmental and	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA

Landslips	markers and depth markers to warn vehicle and pedestrians at all crossings Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments Responsibility: MWTI/LTA/MNRE/District/Village Implement slope stabilization at most vulnerable landslide area del identified in study and Vaimauga West Integrated Catchment Strategy and Flood Management Plan Reduce sediment loads and loss of top soil by discouraging buildings and farming on steep slopes and keeping livestock in areas away from wetlands and watershed sites Government, Village and landowners to liaise and collaborate on processes needed to protect upland catchment area, riverbanks from land clearing and developments Responsibility:LTA/M WTI/MNRE/Village	Safer villages, houses and roads Improveinfrastruct ureresilience and rate of recovery Climateproofnation al road network Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and landslides Maintain lifeline access for all of Upolu Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	social safeguards including EIAs in screening and designing infrastructure facilities Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Include in budget programming CBA, design and construction. Designation of the IFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs Implement Vaimauga West District Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate	CIM Strategy 2015 Transport SectorPlan2014- 2019 Goal 2 NISP2011 (KESO 5 D&E)
			CEHZ and CFHZ as an "at	

 $^{^{40}\}mbox{Upper Magiagi region}$ overlooking Ueligitone section

Notural Decourage	Doct Colutions	Benefits	Guideline to assist with the	DolovoutCostou
Natural Resources and Environment	Best Solutions	вепентѕ		Plans, National
			-	Strategies & Policies
District Upland Forest	Continue programme by Forestry on replanting native forestry species of the upland forest Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices	Protects and enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	Community Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
	Responsibility: MNRE- WRD & Forestry/ District /Village/CSSP			
Protection of catchment areas	Promote and support agroforestry and other	Reduced risk of slips and erosion	Develop Integrated Watershed/Catchment	Water Sector Plan
	cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE//SWA/District/Village/CSSP/GEF-SGP	Improve resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas	Community Engagement Plan Restoration Operational Plan 2016-2020
Flood protection	Conduct riparian	Mitigate potential	Implement Integrated	Two Million Tree
measures (soft solution to support	replanting along river channels and	damage from inland flooding	Strategy and Flood	Strategy 2015-2020
flood protection measures for infrastructure)	watercourses Encourage planting of	Reduce flooding of built up areas	Management Plan in conjunction with hazard Maps and Geomorphologist	Restoration Operational Plan 2016-2020

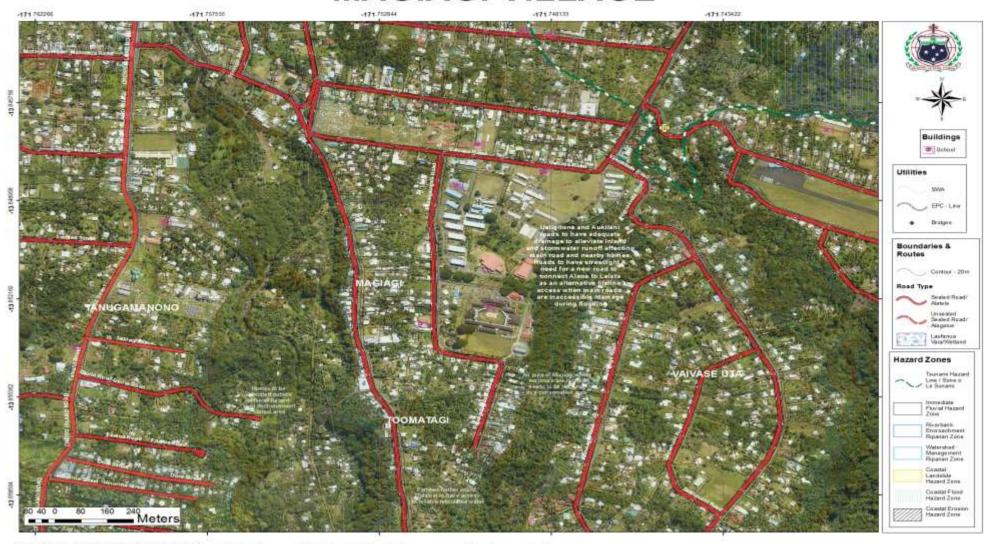
	indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas Responsibility: MNRE/Villages	Safer villages, houses and roads	Drainage Infrastructure Database to inform location and designs MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation	
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	RelevantSector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages Responsibility: MWCSD /Village	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021





Magiagi Village Map

MAGIAGI VILLAGE



Coordinate System: GCS WGS 1984 Datum: WGS 1984 Units: Degree Data Source: Ministry of Natural Resource and Environment, Samoa Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

22. Moata'a Village Interventions

CIM Plan Solutions

	CIM Plan Solutions						
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies			
Parts of Main road and access roads ⁴¹ : exposure to extremely high risk hazard zones (IFHZ, CEHZ, CFHZ and tsunami shore exclusive zone)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/MNRE/Village	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public and private assets	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilizeenvironmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA			
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on damaged properties, public and private assets	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan			

 $^{^{\}rm 41}{\rm Apia}$ Park Loop Road, Togoaasa Crescent, Taumeasina Drive

	Responsibility:LTA/ MWTI/MNRE/MWCSD /Village / Families		Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	
			Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District	
			Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	
Village houses, churches, shops, Moataa Primary School, Taumeasina Resort and other government assets located in high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Upgrade roads	Responsibility:Village / Families /MWTI/ MNRE/ MWCSD Assess and upgrade	Improveinfrastruct	Utilise hazard maps and	National
used as escape routes	access/work roads as potential escape routes	ureresilience and rate of recovery	Geomorphologist Drainage Infrastructure Database to inform location and designs	DisasterManageme nt Plan2017-2021
	Construct roadside drainage ditches where needed	Improve preparedness and readiness response to natural disasters	Develop an integrated land management plan with the aim of reducing any	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1
	Implement routine maintenance of the roads and clear any debris	Safer villages, houses and roads	unnecessary actions that may adversely affect the natural habitats and	Community Sector Plan

	obstructing the free flow		ecosystems of the area	
	of surface water runoff	Minimise national		
		disaster recovery	Designation of the IFHZ,	
	Village to regulate	expenditure on	CEHZ and CFHZ as an "at	
	developments near and	damaged	risk" zone with appropriate	
	around road shoulders of	properties and	landuse planning controls	
	all access roads	public assets	and restrictions	
	Enforce environmental		Heilian auriumum autal au d	
	safeguards where		Utilise environmental and social safeguards including	
	reclamations are proposed.		EIAs in screening and	
	Government and district to		designing built environment	
	manage processes by		infrastructure projects for	
	requiring villagers to get		Vaimauga West district	
	the appropriate permits		S	
	and consent			
	Responsibility:LTA/			
	MWTI/ MNRE/			
Flood protection	Villages/Families Upgrade waterways	Minimise	Conduct a full catchment	CIM Strategy 2015
measures for	opgrade waterways	expenditure on	management, drainage	CIM Strategy 2015
fords and bridges	Upgrade all crossings	damaged	analysis and geotechnical	TSP2014-2019 Goal
101 ab ana bi iuges	abbrage an erossings	properties &	engineering survey and use	2 KO 1
	Upgrade or repair	personal assets	its recommendations to	-
	riverine embankment	P	inform location and designs	Vulnerability
	protection work	Mitigate potential	O	Assessment of the
	upstream of Moata'a,	damage from inland	Implement Vaimauga West	Samoa Road
	Vini, Vaiala, Faatoia and	flooding	Integrated Catchment Strategy	Network (2016)
	Vaivase-uta		and Flood Management Plan in	
		Reduce flooding of	conjunction with hazard Maps	Adaptation Strategy,
	Ensure river channel	built up areas	and Geomorphologist	LTA
	upstream is cleared and	Maintain a lifalin a	Drainage Infrastructure	
	maintained regularly	Maintains lifeline access for all of	Database findings	
	Construct levees to	Upolu	Utilise environmental and	
	reduce flooding along	Ороги	social safeguards including	
	estuaries and coastal	Safer villages,	EIAs in screening and	
	streams	houses and roads	designing infrastructure	
			facilities	
	Install advisory edge			
	markers and depth		Develop an integrated land	
	markers to warn vehicle		management plan with the	
	and pedestrians at all		aim of reducing any	
	crossings		unnecessary actions that may adversely affect the	
	Government and Villages		natural habitats and	
	to liaise and collaborate		ecosystems of the area	
	on processes needed to		-	
	protect riverbanks from		Include in budget	
	land clearing and		programming CBA, design	
	developments		and construction.	
	Responsibility: MWTI/		Designation of the IFHZ as an	
	LTA/MNRE/ District/		"at risk" zone with	
	Village		appropriate landuse planning controls and restrictions	
Natural	Best Solutions	Benefits	Guideline to assist with the	RelevantSector
Resources and	_ 550 5514010115	_01101110		Plans, National
Environment			•	Strategies & Policies
Coastal	Encourage relocation of	Reduce impact from	MNRE Forestry to continue to	NESP 2017 - 2021
protection	families/houses in badly	inland flooding on	provide technical assistance	
	eroded coastal areas	coastal areas	to guide village planting	Community
			programmes in coastal areas	Engagement Plan

	Conduct feasibility study of proposed seawall in	Mitigate potential damage from	MNRE Forestry to provide	
	most vulnerable eroded	coastal erosion and	suitable climate ready trees	
	areas	flooding	suitable for coastal	
	ur cuo	accommodating the	conditions	
	Responsibility: MNRE	hazard		
	/Village/ CSSP/NGO/	3		
		Safer villages, houses		
		and roads		
Moata'a	Government to implement	Protects and	MNRE DEC to provide	NESP 2017 - 202
Mangrove area	boundary demarcation of	enhance local	technical assistance and	C
conservation	wetland reserves at	species diversity	backstopping in the	Community
	Moata'a with application of planning controls and	Sustains ecosystem	development of a Mangrove Management Plan for	Engagement Plan
	appropriate management	services and	Vaimauga West district	
	guidelines to meet the	functions	vaimauga west district	
	needs as both drainage	Tunctions	Develop an integrated land	
	system components and	Reduce	management plan with the	
	conservation areas	contamination of	aim of reducing any	
		water supply	unnecessary actions that	
	Introduce culverts in	Supply	may adversely affect the	
	wetland areas to	Reduce impact from	natural habitats and	
	improve tidal flow and	inland flooding	ecosystems of the area	
	fish passage in the		-	
	wetland area		Develop a specific Mangrove	
			Legislation providing	
	District and village		systematic consideration of	
	councils to regulate		mangroves in decision-	
	clearing of lands around		making, promote the use of	
	wetlands and initiate		existing legal mechanisms to	
	replanting programmes		benefit mangroves, and	
	for coastal areas		underpin integrated	
	D		management of coastal	
	Promote and support		natural resources, including	
	village and district tree		mangroves, at the village level	
	planting on coastal areas		MNDE Four-tracks	
	around existing seawalls		MNRE Forestry to advice on	
	to strengthen seawalls and reduce erosion using		appropriate species, depth and density of planting and	
	native species such as		provide seedlings for	
	talie, fetau, toa etc that are		different vegetation types	
	known to have greater		suitable to the habitats and	
	resilience to natural		planting materials for	
	disasters and changing		district/Village	
	climate conditions		alouto, thage	
			Identifyfunding	
	Depth and density of		/budgetrequirements	
	planting to be increased		andimplementationprogra	
	and a minimum vegetative		mmeforestablishment of	
	distance of 200mm as an		protected areas in district	
	effective wave barrier			
	distance		Hazard map	
	Trill 1.0		H. D. G. W. L. W	
	Village and Government		Utilise Sui o Nu'u monthly	
	management of clearing		meetings to monitor progress	
	inland catchment areas		of village programmes on	
	close to rivers and		waste management	
	streams to reduce			
	sedimentation of			
	estuaries, wetlands and the lagoon			
	uie iagooii			
	Where reclamations are			
	proposed, Government	İ		

	and district to manage			
	processes by requiring			
	villagers to get the			
	appropriate permits and			
	consent			
	Responsibility: MNRE			
	/MAF/Village/CSSP/			
	NGO			
District Upland	Continue programme by	Protects and	MNRE Forestry, DEC and	Community
Forest	Forestry on replanting	enhance local	MAF to collaborate on	Engagement Plan
	native forestry species of	species diversity	supply of climate resilient	0.0.
	the upland forest	op 20200 and 22200	crops and plants	Two Million Tree
		Reduced risk of	The second secon	Planting Strategy
	Promote agroforestry and	slips and erosion	Develop an integrated land	2015-2020
	mixed planting including	sups and crosion	management plan with the	2010 2020
	fruit trees species to	Reduce impact from	aim of reducing any	Restoration
	promote ecological	inland flooding	unnecessary actions that	Operational Plan
	stability, soil protection	illiana nooding	may adversely affect the	2016-2020
	and reduce crop		natural habitats and	2010-2020
	vulnerability to pests and		ecosystems of the area	
	diseases		ccosystems of the area	
	uiseases		MNRE Forestry to advice on	
	Implement the Integrated		appropriate species, depth	
	Pest Management		and density of planting and	
	Programme		provide seedlings for different vegetation types	
	Implement Custoinable		suitable to the habitats and	
	Implement Sustainable Land Management (SLM)			
			planting materials for village	
	practices			
	Responsibility: MNRE-			
	WRD & Forestry/			
	District /Village/CSSP			
Protection of	Promote and support	Reduced risk of	Develop Integrated	Water Sector Plan
catchment areas	agroforestry and other		Watershed/Catchment	water sector Plan
catcillient areas	cropping systems that	slips and erosion	Strategy and Flood	Community
		Improve regiliones		Engagement Plan
	combine trees and crops,		Management Plan for	
	•	Improve resilience		Eligagement Flan
	especially in catchments,	of catchments	Vaimauga West District	
	especially in catchments, and erosion-prone and	of catchments	Vaimauga West District	Restoration
	especially in catchments,	of catchments Improve	Vaimauga West District Develop and register	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas	of catchments Improve preparedness and	Vaimauga West District Develop and register District/Village bylaws to	Restoration
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and	of catchments Improve preparedness and readiness response	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development	of catchments Improve preparedness and	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas,	of catchments Improve preparedness and readiness response to natural disasters	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and	of catchments Improve preparedness and readiness response to natural disasters Reduce	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas,	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district	of catchments Improve preparedness and readiness response to natural disasters Reduce	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE/	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan
	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli	of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper	Restoration Operational Plan

Flood protection	Conduct riparian	Mitigatepotentialda		Two Million Tree
measures (soft	replanting along river	mage from inland	Integrated Catchment Strategy	Strategy 2015-2020
solution to	channels and	flooding	and Flood Management Plan in	
support flood	watercourses		conjunction with hazard Maps	Restoration
protection		Reduce flooding of	and Geomorphologist	Operational Plan
measures for	Encourage planting of	built up areas	Drainage Infrastructure	2016-2020
infrastructure)	indigenous species in		Database to inform location	
	conjunction with	Safer villages,	and designs	
	engineered water land	houses and roads		
	drainage action plans		MNRE to zone hazard areas	
			along major watercourses	
	Promote and support		based on flood risk to provide	
	village and district		suitable areas for riparian	
	afforestation in the upper		revegetation	
	and mid-catchment areas			
	to reduce riverbank			
	failures especially in flood			
	prone areas			
	Responsibility: MNRE/			
	Villages			
Soft coastal	Plant native species along	Soft coastal	Develop an integrated land	NESP 2017-2021
protection	coastal areas to strengthen	-	management plan for	
measures	existing seawall and to	measures will	Vaimauga West district with	Two Million Tree
needed for	reduce coastal erosion and	1 1	the aim of reducing any	Planting Strategy
most	landslips; Talie, Fetau, Toa,		unnecessary actions that	2015-2020
vulnerable	Togatogo are known to	and new	may adversely affect the	
areas	have greater resilience to	infrastructure	natural habitats and	Restoration
	natural disasters and	along the coast	ecosystems of the area	Operational Plan
	changing climate	D 1	MARI	2016-2020
	conditions	Reduce impact from	MAF to assist in	
	To act as an effective wave	coastal erosion and	establishment of pilot sites to	
	barrier, a minimum	natural disasters	trial climate ready plant	
	distance of 200m of	I	varieties	
	vegetation is needed	Implements an Ecosystem Based	MNDE Forestry, DEC and	
	vegetation is needed	-	MNRE Forestry, DEC and MAF to collaborate on	
	Responsibility: MNRE/	Approach	supply of climate resilient	
	MAF/Villages		crops	
Village pool in	Village pool is currently in	Increase adaptation	Utilise Hazard Maps and	CIM Strategy 2015
mangrove area	a poor location with an	during drought	Geomorphologist findings to	Civi Strategy 2015
mangrove area	assessment needed for	periods	inform location and design	Community
	options to either	perious	iniorni locacion and design	Engagement Plan
	rejuvenate or find a new	Improve health and	MNRE Water & Sanitation	Engagement i ian
	site depending on the	sanitation	to conduct water testing	
	location of springs		and analysis of village pool	
		Reduce	prior to any intervention	
	Test the quality of the	contamination of	F 122 22 223y moor vondon	
	water source before any	water supply	UpdateVillage bylaws to	
	further investment on the	11 3	include managing and	
	pool is undertaken (eg:		maintaining village natural	
	fence/repair works)		resources	
			Utilise Sui o Nu'u monthly	
	Responsibility: MoF-CSSP/		meetings to monitor progress	
	MNRE/Villages/ NGOs		of village programmes and	
			responsibilities	
Governance	Best Solutions	Benefits	Guideline to assist with	RelevantSector
			the implementation	Plans, National
				Strategies & Policies
Strengthen the	Update and/or develop	Strengthen	Develop and register	Village Fono Act
governance of	bylaws to manage the use		district/village bylaw to	(Amendment Bill
natural	of natural resources, and	all national sector	protect all district/ village	2016)
resources and	to control land use	plans	and government assets,	

Ī	land use	impacts; such as drainage		environment, livelihood and	Community
	through Bylaws	maintenance, rubbish	Strengthen	food security especially	Sector Plan
		dumping, sand mining,	monitoring of all	activities affecting water	
		stray animals and	National Acts,	catchment areas and	Community
		unregulated	Regulation,	coastline	Development Plan
		developments in water	Strategies, Plans		2016-2021
		catchment areas and	and Policies	Utilise Sui o Nu'u monthly	
		near boreholes.		meetings to monitor progress	
			Improve ability of	of district/village bylaws	
		Collaborate with Sui o	communities to		
		Nuu to monitor the use of	I		
		and impact on natural	recover quickly in		
		resources	the long term		
		B 11:	Ŧ		
		Facilitate continuous	Improve		
		awareness raising	accountability and		
		programs with the villages	O .		
		Despensibility MWCCD	environment of		
		Responsibility: MWCSD	communities		

Responsibility: MWCSD /Village





Moataa Village Map

MOATA'A VILLAGE



Coordinate System: GCS WGS 1984 Datum: WGS 1984

Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

23. Vaivase Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the	Relevant Sector
imi asti ucture	Dest solutions	Delicitis	implementation	Plans, National Strategies & Policies
Parts of Main road: exposure to hazard zone (IFHZ)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Responsibility:LTA/MWTI/	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintain lifeline access and connectivity for Central Business Area Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties, public	Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga West district Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at	TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
		and private assets	risk" zone with appropriate landuse planning controls and restrictions	
Drainage systems to be	Continue to assess and upgrade culverts on main	Improves infrastructure	Use existing information for guidance but not limited to:	CIM Strategy 2015
improved in high risk areas	and 'access' roads in district especially at	resilience and rate of response and	"Vulnerability Assessment of the Samoa Road Network	NISP2011 KESO 5
(lower catchment areas,	junctions with local roads sitting within IFHZ –	recovery to natural hazards and	(2017)"; "Review of National Road Standards in Samoa	TSP2014-2019 Goal 2 KO 1
near rivers and streams) exacerbating inland flooding	culverts in accordance with Vulnerability Assessment of the Samoa Road Network	disasters Encourages coastal families to relocate	(2016)"; "Samoa Code of Environmental Practice (2007)"	Community Sector Plan
and storm water surges affecting infrastructure, village homes	Implement national standards for culverts	inland Maintains lifeline access for all of	Undertake a Cost Benefit Analysis to weigh options for funding	
and other assets	and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance	Minimises national disaster recovery expenditure on damaged properties, public and private assets	Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law	
			Utilise hazard maps and	

	Responsibility:LTA/		Geomorphologist	
	MWTI/MNRE/MWCSD		Infrastructure Drainage	
	/Community / Families		Database to inform designs	
			Deceler Internet d Catalana	
			Develop Integrated Catchment	
			Strategy and Flood Management Plan for	
			_	
			Vaimauga West District	
			Develop and register	
			District/Village bylaws to	
			include maintenance of	
			drainages and illegal rubbish	
			dumping into waterways	
Community	Relocate assets outside of	Minimise	Planning provisions to be	CIM Strategy 2015
infrastructure	high risk hazard zones	expenditure on	guided by the Planning and	divistrategy 2015
located in high	when re-building	damaged	Urban Management Act 2004	National Building
risk hazard	when ie banamg	properties and	orban Franagement net 200 i	Code
zones; such as	Develop landuse planning	personal assets	Enforcement of National	3040
houses, schools,	and development controls	P	Building Code 2017	
Churches,	to restrict developments	Safer villages,	. 0	
Businesses,	within high risk hazard	houses and roads	Encourage insurance of	
Committee	zones such as CEHZ and		significant investments and	
houses etc	CFHZ	Increases	assets within hazard zones	
		awareness for		
	Conduct awareness raising	insurance	Utilise hazard maps and	
	campaign on flood		Geomorphologist Drainage	
	resilient building practices		Infrastructure Database to	
	and designs for at risk		determine safe areas for	
	communities living in and		relocation purposes	
	near high risk hazard			
	zones		Designation of the IFHZ,	
			CEHZ and CFHZ as an "at	
	Design infrastructure to		risk" zone with appropriate	
	take into account the		landuse planning controls	
	immediate hazard zones;		and restrictions	
	for example, raise floor			
	levels of houses in flood			
	prone areas			
	Families and village to			
	limit building and			
	developing on natural			
	overland flow paths			
	exacerbating inland			
	flooding and storm water			
	surges			
	D			
	Responsibility:Communi			
	ty / Families /MWTI/ MNRE/ MWCSD			
Flood protection	Upgrade waterways	Minimise	Conduct a full catchment	CIM Strategy 2015
measures for	opgrade water ways	expenditure on	management, drainage	ond suategy 2013
fords and bridges	Upgrade all crossings	damaged	analysis and geotechnical	TSP2014-2019 Goal
ioras ana briages	oppiaac an crossings	properties &	engineering survey and use	2 KO 1
	Upgrade or repair	personal assets	its recommendations to	
	riverine embankment	r ====================================	inform location and designs	Vulnerability
	protection work	Mitigatepotentialda	resultion und designs	Assessment of the
	upstream	mage from inland	Implement Vaimauga West	Samoa Road
	^	flooding	Integrated Catchment Strategy	Network (2016)
	Ensure river channel	G	and Flood Management Plan in	and Road Network
	upstream is cleared and	Reduce flooding of	conjunction with hazard Maps	Adaptation Strategy,
	maintained regularly	built up areas	and Geomorphologist	LTA
	ر - ن		, U	

	Construct levees to reduce flooding along estuaries and coastal streams Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings Government and community to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments Responsibility: MWTI/LTA/MNRE/District/	Maintains lifeline access for all of Upolu Safer villages, houses and roads	Drainage Infrastructure Database findings Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Include in budget programming CBA, design and construction. Designation of the IFHZ as an	
	Community		"at risk" zone with appropriate landuse planning controls and restrictions	
Natural	Best Solutions	Benefits	Guideline to assist with the	RelevantSector
Resources and	Dest solutions	bellents	implementation	Plans, National
Environment				Strategies & Policies
District Upland Forest	Continue programme by Forestry on replanting native forestry species of the upland forest Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Responsibility: MNRE- WRD & Forestry/ District / Community/CSSP	Protects and enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	Community Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Protection of catchment areas	Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development	Reduced risk of slips and erosion Improve resilience of catchments Improve preparedness and readiness response to natural disasters	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and	Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020

measures (soft solution to support flood protection measures for infrastructure) Encourage planting of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas Responsibility: MNRE/Communities Governance of natural resources and land use through Bylaws Through Bylaws Teplanting along river channels and watercourses channels and watercourses channels and watercourses channels and watercourses of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas Responsibility: MNRE/Communities Benefits Benefits Guideline to assist with the implementation of all national sector plans Strengthen the governance of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and To miland flooding and Flood Management Plan in conjunction with hazard Maps and Flood Management Plan in conjunction with hazard Maps and Flood Management Plan in conjunction with hazard Maps and Flood Management Plan in conjunction with hazard Maps and Flood Management Plan in conjunction with hazard Maps and Flooding of built up areas Reduce flooding of built up areas Safer villages, houses and roads MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation Powerland Flood Management Plan in conjunction with hazard Maps and Flooding and Flood Management Plan in conjunction with hazard Maps and Flooding and Flood Management Plan in conjunction with hazard Maps and Flooding and Flood Management Plan in conjunction with hazard Maps and Flooding and Flood Management Plan in conjunction with hazard Maps and Flooding and Flood Management Plan in conjunction w					
support flood protection measures for infrastructure) Encourage planting of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mild-catchment areas to reduce riverbank failures especially in flood prone areas Responsibility: MNRE/Communities Governance Strengthen the governance of natural resources and land use through Bylaws Estrengthen the diand use through Bylaws Strengthen the governance of natural resources and land use through Bylaws Estrengthen the divelopments in water catchment areas and near boreholes. Find the diangle planting of indigenous species in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs Safer villages, houses and roads MRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation Envelopments to some the to assist with the implementation of all national sector plans Strengthen the implementation of all national sector plans Strengthen the implementation of all national sector plans Strengthen monitoring of all national Acts, Regulation, Strategies, Plans and Policies Strengthen the implementation Strengthen the implementation of all national sector plans Strengthen the implementation of all national sector pl	West Two Million Tree Strategy 2015-2020	Implement Vaimauga West Integrated Catchment Strategy	contamination of water supply Mitigate potentialdamage	SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE//SWA/District/ Community/CSSP/GEF-SGP Conduct riparian replanting along river	measures (soft
Strengthen the governance of natural resources, and land use through Bylaws Trough Bylaws Trou	nt Plan in rd Maps Operational Plan Operational Plan 2016-2020 areas rses provide rian	and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation	from inland flooding Reduce flooding of built up areas Safer villages, houses and roads	channels and watercourses Encourage planting of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas Responsibility: MNRE/Communities	solution to support flood protection measures for infrastructure)
Strengthen the governance of natural resources, and resources and land use through Bylaws maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Strengthen bylaws to manage the use of natural resources, and to control land use impacts; such as drainage through Bylaws Strengthen implementation of all national sector plans Implementation of all national sector protect all district/village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Strategies, Plans and Policies Improve ability of of district/village bylaws	Plans, National		Benefits	Best Solutions	Governance
governance of natural resources, and resources and land use impacts; such as drainage through Bylaws maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Gamendmer (alistrict/village bylaw to protect all district/village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and unregulated developments in water catchment areas and near boreholes. Gamendmer (alistrict/village bylaw to protect all district/village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Community (Community Sector Plan activities affecting water catchment areas and coastline)	Strategies & Policies Willage Fone Act	Davidon and register	Strongthon	Undate and for dayalar	Strongth on the
Nuu to monitor the use of adapt, respond and recover quickly in the long term Facilitate continuous awareness raising adapt, respond and recover quickly in the long term	to (Amendment Bill 2016) tts, ood and lly Sector Plan Community Sector Plan Community Development Plan 2016-2021 thly orogress	district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress	implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve	bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous	governance of natural resources and land use

programs with the villages	enabling	
	environment of	
Responsibility: MWCSD	communities	
/Community		





Vaivase Village Map

VAIVASE VILLAGE



Coordinate System: GCS WGS 1984

Datum: WGS 1984 Units: Degree Data Source: Ministry of Natural Resource and Environment, Samoa Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

24. To'omatagi Village Interventions

CIM Plan Solutions

	CIM Plan Solutions				
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies	
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance Responsibility:LTA/MWTI/MNRE/MWCSD/Community / Families	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on damaged properties, public and private assets	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan	
Community infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes	CIM Strategy 2015 National Building Code	

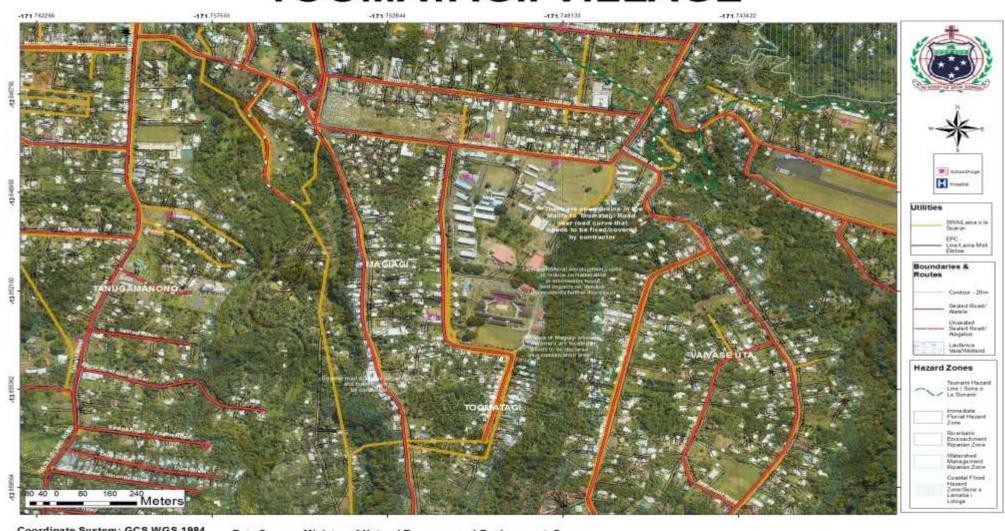
	near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas		Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
	Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges			
	Responsibility:Communi ty / Families /MWTI/ MNRE/ MWCSD			
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Plans, National Strategies & Policies
District Upland Forest	Continue programme by Forestry on replanting native forestry species of the upland forest Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Responsibility: MNRE- WRD & Forestry/ District /Community /CSSP	Protects and enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	Community Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Protection of catchment areas	Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district	Reduced risk of slips and erosion Improve resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Vaimauga West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas	Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020

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	Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE/ /SWA/District/ Community/CSSP/GEF- SGP	water supply		
Governance	Best Solutions	Benefits	Guideline to assist with	RelevantSector
dovernance	Dest solutions	Deficites	the implementation	Plans, National
			the imprementation	Strategies & Policies
Strengthen the	Update and/or develop	Strengthen	Develop and register	Village Fono Act
governance of	bylaws to manage the use		district/village bylaw to	(Amendment Bill
natural	of natural resources, and	all national sector	protect all district/ village	2016)
resources and	to control land use	plans	and government assets,	,
land use	impacts; such as drainage	•	environment, livelihood and	Community
through Bylaws	maintenance, rubbish	Strengthen	food security especially	Sector Plan
	dumping, sand mining,	monitoring of all	activities affecting water	
	stray animals and	National Acts,	catchment areas and	Community
	unregulated	Regulation,	coastline	Development Plan
	developments in water	Strategies, Plans		2016-2021
	catchment areas and	and Policies	Utilise Sui o Nu'u monthly	
	near boreholes.		meetings to monitor progress	
		Improve ability of	of district/village bylaws	
	Collaborate with Sui o	communities to		
	Nuu to monitor the use of	1 ' 1		
	and impact on natural	recover quickly in		
	resources	the long term		
	Facilitate continuous	Improve		
	awareness raising	accountability and		
	programs with the villages	enabling		
	F - G , mages	environment of		
	Responsibility: MWCSD	communities		
	/Community			

Non-CR issues raised during consultations	Proposed Solution	Comments
Land in Toomatagi valley	Village requested use of land in	Not a CR issue and should not be encouraged as agricultural
Responsibility: Village	valley for agricultural develop	developments upriver will impact Vaivase uta residents further downriver

Toomatagi Village Map

TOOMATAGII VILLAGE



Coordinate System: GCS WGS 1984 Datum: WGS 1984 Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

Upolu AF Districts Overview Map of Coastal Inundation Zones

