# **Community Integrated Management Plan**

# Anoama'a East 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 Anoama'a East (Falefa, Falevao, Lalomauga, Lufilufi and Manunu/Sauniatu/Solaua villages).

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

#### Date of Signing: <u>22 June 2018</u>

**Representatives:** 

#### Falefa Village

- Fanualelei Purcell
- Fuaoletavai Maeu
- Faitamatau Eli
- Kasiano Alualu
- Peleti Salanoa

#### **Falevao Village**

- Malaga Palale
- Tafililupetiamalie Tui
- Faasalafa Tafili Tui

#### Lalomauga Village

- Malofaiolefaiva Lama
- Naomi Fuimaono
- Seugaalii Puaiai Gagaeolo
- Fetalai Gagaeolo

Signature:

Tree 12

Coutali Partoto

Faguero

#### Lufilufi Village

- Mata'afa Peni
- Moemalo Fonoti
- Manuō Failautusi
- Tusa Finau
- Fa'amatuainu Letutusa

Trixac Le bortisa

#### Manunu/Sauniatu/Solaua Village

- Leifi Esekia •
- Lumanai Moemoe
- Moegalupe Pea'e •
- Ulisese Atualevao
- Tiaseu Toafa

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The Government of Samoa adopts the Community Integrated Management Plan for the Faipule District of Anoama'a East as 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

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 Ingagement Plan           CHZ         Coastal Froion Hazard Zone           CEHZ         Coastal Froion Hazard Zone           CHR         Community Integrated Management (Plan) or (Strategy)           CLHZ         Coastal Landslip Hazard Zone           COPP         Code of Environmental Practice           CSO         Civil Society Organization           CSSP         Civil Society Upport Programme           DSP         District Sub Project           EA         Ecosystem based Adaptation           ECCCR         Enhancing Coastal Community Climate Resilience           EKR         Environmental Maagement Plan           EPC         Electric Power Corporation           ERN         Emergency Radio Network           HGSI         Invasive Alien Species           IG         Invasive Alien Species           IG         Invasive Alien Species           IG         Inplementation Guideline           KBA         Key Performance	ASCH	Areas Consitive to Constal Haranda
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DIMA Dianning Urban Management Agency		
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	UNDP-GEF SGP	
Programme	14/D	
WB World Bank		
WCR West Coast Road		
WMP Watershed Management Plan		
WSSP Water Sanitation Sector Plan	WSSP	Water Sanitation Sector Plan

### Glossary

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.	
Secondary infrastructure	Infrastructure that contributes to the every-day development of the community.	
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.	
Land and Resource Use	The use of land and resources by the community for social, economic or other 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.	
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).		
Food access	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 Anoama'a East 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 improve 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 community resilience 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* on 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 natural environmental 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 Anoama'a East District

### **Physical and Natural Resource Setting**

The Faipule District of Anoama'a East is located at the north-eastern end of the island of Upolu. The average annual rainfall varies with Anoama'a East receiving above the national average for rainfall in this area (Dews, 2017). The district is characterized by a small headland on the coast which rises inland from the main road towards steep mountain peaks. It has some low lying areas with several slow moving streams forming numerous inland wetland areas. A number of small pockets of mangrove areas are scattered throughout the district, some are heavily degraded as a result of road construction, family gardens and being used as dumping grounds of household wastes. The coastal areas have extensive coral reefs, mangroves and wetlands. The Anoama'a east and west districts are characterised by a series of steep headlands with bays in between. The bays vary in length with the larger bays providing the setting for the villages of the Districts. The hilly and steep nature of the topography provides some protection for the natural vegetation although this also makes the villages highly vulnerable to flooding from upland rivers and streams. Short, fast flowing rivers and streams flow through most of the villages draining the steep catchments behind. The reef systems are mostly broken opposite the rivers and streams and from past volcanic activity that have left rocky outcrops offshore. Where there is a coral reef it is generally less than 500m offshore (Reti, 2017).

The five main villages of Anoama'a East are located both on the coast and inland. The villages of Lufilufi and Falefa are located by the coast, on both sides of the main East Coast Road. Manunu/Sauniatu/Solaua, Lalomauga and Falevao are located inland, away from the coast and main road. Manunu/Sauniatu/Solaua are mainly accessible through the Manunu Road via Saoluafata village in Anoamaa West district whilst Lalomauga and Falevao each have their own access roads<sup>1</sup>. The narrow flat coastal plateau has small areas of houses positioned close to the coastal main road but set back from the coastline. Inland from the coast the landscape is described as dominated by broad sloping ridges separated by deep gorges and wet climate. This landscape supports mixed farming and plantations. The soil type on the coastal plateau is at risk of salt intrusion from storm surges (Dews, 2017).

The coastline is mainly comprised of rocky shores with narrow strips of fine coral sand with several fresh water springs scattered along the coast. A large wetland area is also located in Lufilufi, which is important for the biodiversity of the area. This wetland increases the degree of flooding that impact on Lufilufi due to overflows from the wetland trying to find its way into the sea. The upland area of the district suffers from agricultural development and is facing new challenges resulting from the fast spreading merremia vine (Reti, 2017). There is a minor reef break in front of Lufilufi and the reef ends at the Falefa River mouth. These breaks influence tidal flows and sediment transport along the coast.

Two coastal revetment wall that extend approximately 1km along the coast in front of Lufilufi and approximately 500 metres in front of Falefa. These revetments provide protection to a number of village houses, churches, village pools and the culturally significant area of land on the coastal strip of Lufilufi. Erosion is evident behind the rocks, reducing the stability of the revetment. Away from the coast, the area is dominated by inland settlements, plantations and cattle farms. There has been some erosion along the river banks affecting land stability. Land-use practices such as deforestation, cattle farming and agriculture are increasing both the rate of erosion and the supply of sediment to the coast. These practices affect coastal processes including the incidence and degree of inland flooding in coastal areas, the rates of sediment accretion along the coast (occurring at Falefa) and the impact on the health of the lagoon and reef systems as fine sediments suffocate coral. They have a direct impact on the reef as the first line of defence from cyclone hazards and increase the susceptibility of coastal infrastructure to damage.

There are two main rivers in the district supplying reservoirs at Lalomauga and Sauniatu. These rivers begin in the mountains and carve a path through steep valleys meandering and levelling out as they reach the sea at Saoluafata and Falefa. The largest river, Falefa River passes through, or adjacent to, Falevao, Lalomauga and Manunu. This river flows all year round and during the rainy season causes severe flooding in the three villages. Lalomauga and Falevao have built a number of buildings, including school buildings close to its banks.

The coastal villages are also affected by the same river, but of most concern is the stormwater runoff due to lack of drainage directing overflow towards the sea. To prevent pollution of the village pool from flooding, the residents of Lufilufi have diverted stormwater runoff by installing a drainage channel alongside the pool. Wind damage by cyclones Ofa and Val in 1990 and 1991 respectively are still evident in high areas of Anoama'a East and the merremia vine has taken over most of the open areas (Reti, 2017).

#### **Social and Economic Setting**

The Anoama'a East District currently has a population of 3,785. Total male 2,011, female 1,774. These figures exclude Saletele and Sauano<sup>2</sup> who are part of Anoama'a East if the electoral jurisdictions are used to calculate populations of this district.

The main East Coast Road and Le Mafa Pass are considered an important part of the district's infrastructure and is in good condition. The main road extends inland in a southerly direction at Falefa where it crosses Le Mafa Pass. The main road provides lifeline access to the District Hospital at Lufilufi as well as access to other neighbouring districts, villages, schools, churches, and shops. The main road through Lufilufi and Falefa is generally located outside the coastal hazard zones or at the inland edge of the coastal flood hazard zone. The falls at Falefa provide a scenic tourist attraction within the district.

Primary services such as power and telephone generally follow the main road. In some locations, particularly Falefa, the telephone poles are located in the drainage channel along the main road. In Lufilufi, telephone lines are extremely low (less than 2m). Power and telephone lines along the main road are outside the hazard zones. Consistent water supply is a concern for a number of villages especially communities that live away from existing pipelines. The District hospital for instance was recently forced to close due to inadequate water provision. Of the five villages, only Lufilufi has access to Samoa Water Authority reticulated water supply. The remaining four are serviced by the Independent Water Scheme with reservoirs located at Lalomauga and Manunu.

The district of Anoama'a East supports a large hydro electric scheme at Lalomauga that is supplied by a reservoir at Sauniatu. The river at Lalomauga is a major economic asset to the local community as a source of freshwater prawns, eels and fish. These are harvested for food and prawns are sold to hotels in Apia for income. The river is also a main source of hazard from inland flooding and erosion especially during cyclone season and periods of prolonged heavy rain (Reti, 2017).

Each village has an access or work road which provides access to primary schools, plantations as well as the district hospital. These access roads generally all connect to the main East Coast Road which runs through all the way to Apia. The access road to the hospital is narrow and in poor condition. Access roads to primary schools in both Lufilufi (seal extends 300m) and Falefa (seal extends 200m) have power and are sealed as far as the school. All other access roads within the district are unsealed and vary in condition. The access roads to the villages of Lalomauga, Manunu and Falevao are particularly poor and in need of improvement. The causeways and fords are impassable during heavy rain.

The cash economy of the District is a mixture of traditional work including fishing, plantations, cattle, piggery and poultry farming. In addition a large number of local residents are employed within Apia. Anoama'a East is recorded in the Community Disaster & Climate Risk Management survey as the second highest district<sup>3</sup> with its income source from salaries. The District supports a number of primary schools<sup>4</sup>, churches<sup>5</sup>, small shops and a District hospital.

### **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 Anoama'a East.

Land-use practices, such as deforestation, cattle farming and agriculture development are increasing both the rate of erosion and the supply of sedimentation to the coast (Reti, 2017). The lowland and upland forest areas of Anoama'a East and Anoama'a West are comprised mainly of disturbed secondary forests and the existence of inland settlements with their own agricultural development needs exacerbate the land clearing problem.

<sup>&</sup>lt;sup>2</sup> Total female for Sauano and Saletele = 192; total male = 207

<sup>&</sup>lt;sup>3</sup> Out of 25 districts surveyed from both Upolu and Savaii

<sup>&</sup>lt;sup>4</sup> Falevao Primary School; Falevao, St Peters Pre-School (Catholic Mission), St Peters Primary School(Catholic Mission), Falefa Primary School; Falefa, Lalomauga Primary School; Lalomauga, Piula Theological Pre-School (Mehodist Mission), Loimata Pre-school (Methodist Mission), Lufilufi Primary School; Lufilufi, Manunu Primary School; Manunu/Sauniatu/Solaua

<sup>&</sup>lt;sup>5</sup> Falevao: CCCS, Falefa: CCCS, Catholic, AOG, LDS, Lalomauga: CCCS, Lufilufi: CCCS, Catholic, Methodist, LDS, Manunu/Sauniatu/Solaua: CCCS, LDS

Element at risk includes all human-made infrastructure and natural features, which consist of physical and nonphysical infrastructures that face risks from natural disasters. Human-made physical infrastructures include houses, road networks, utilities networks, bridges, drainage networks and railways. Human-made non-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. Anoama'a East District has a total area of 4, 208 hectares. The watershed management riparian buffer covers 454 hectares, and there are 139 buildings in the district that are located in this fluvial zone. 54 buildings in the district are located both in the Coastal Flood Hazard Zone and Coastal Erosion Hazard Zone. 9 buildings sitting in the tsunami shore exclusive zone should consider relocation.

This district is prone to landslips exacerbated by inland flooding and storm water runoff. Some parts of the main East Coast Road lie extremely high hazard zones where there is a combination of the tsunami shore exclusive zone, CEHZ, CLHZ and IFHZ. Indiscriminate felling of the forest and trees further inland is exacerbating river overflows adding to flooding at lower areas of the district.

## 2. Anoama'a East District Interventions

#### **CIM Plan Solutions**

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Slope stabilization and road armouring to avoid landslips and erosions in most high risk hazard zones	Implement slope stabilization or 'forced collapse' under controlled conditions at most vulnerable landslide areas of Anoama'a East 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/MWTI/MNRE/ Villages	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 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 Anoama'a East 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 Anoama'a East 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	CIM Strategy 2015 Transport Sector Plan 2014-2019 Goal 2 NISP 2011 (KESO 5 D&E)
Flood protection measures for fords and bridges	Upgrade waterways Upgrade all crossings Upgrade or repair riverine embankment	Minimise expenditure on damaged properties & personal assets Mitigate potential damage from inland	Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs	CIM Strategy 2015 TSP 2014-2019 Goal 2 KO 1
	protection work upstream of Lalomauga, Falefa and Manunu Ensure river channel upstream is cleared and maintained regularly	flooding Reduce flooding of built up areas Safer villages, houses and roads	Implement Anoama'a East Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database findings Utilise environmental and	Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
	Construct levees to reduce flooding along	Maintain lifeline access for all of Upolu	social safeguards including EIAs in screening and	

	estuaries and coastal		designing infrastructure	
	streams		facilities	
	Install advisory edge		Include in budget programming	
	markers and depth		CBA, design and construction.	
	markers to warn		Bridge and road designs to take	
	vehicle and pedestrians		account of forecast changes in	
	at all crossings		sea level rise and local flooding	
	C		from increased rainfall intensity	
	Government and			
	Villages to liaise and		Designation of the CEHZ and	
	collaborate on processes		CFHZ as an "at risk" zone with	
	needed to protect		appropriate landuse planning	
	riverbanks from land		controls and restrictions	
	clearing and			
	developments			
	1			
	Responsibility: MWTI/			
	LTA/MNRE/ District/			
	Village			
Drainage	Assess and upgrade	Improves climate	Use existing information for	CIM Strategy
systems require	culverts and cross	resilience of	guidance but not limited to:	2015
maintenance	drainage on main East	infrastructure resilience	"Vulnerability Assessment of the	
and upgrade in	Coast Road especially at	and rate of response	Samoa Road Network (2017)";	TSP2014-2019
high risk areas	junctions of	and recovery to natural	"Review of National Road	Goal 2 KO 1
of main East	access/work roads	hazards and disasters	Standards in Samoa (2016)";	
Coast Road	within the district– in		, , , , , , , , , , , , , , , , , , ,	
	accordance with	Encourages coastal	"Samoa Code of Environmental	
	Vulnerability Assessment	families to relocate	Practice (2007)"	
	of the Samoa Road	inland	Undertake a Cost Benefit	
	Network			
	recommendations	Maintains lifeline access	Analysis to weigh options for	
		for all of Upolu	funding	
	Implement national	-	Incorporate environmental and	
	standards for culverts	Minimises national	social safeguards concerns in	
	and drains to facilitate	disaster recovery	the design and undertake	
	the overland flow of	expenditure on damaged	consultations with affected	
	storm water and reduce	properties, public and	communities	
	flooding	private assets	communities	
	_	-	Apply for necessary permits as	
	Implement regular		required by law	
	drainage inspection and		1 5	
	maintenance		Utilise hazard maps and	
			Geomorphologist Infrastructure	
	Responsibility: LTA		Drainage Database to inform	
	/MWTI/MWCSD		designs	
	/Village/ Families			
			Develop Integrated Catchment	
			Strategy and Flood Management	
			Plan for Anoama'a East District	
			Develop and register	
			District/Village bylaws to	
			include maintenance of	
			drainages and illegal rubbish	
			dumping into waterways	
Reticulated	Extend the water	Increase adaptation	Develop and register	CIM Strategy
water supply,	supply to families	during drought periods	District/Village bylaws to	2015
quality and	inland with no access		include regulating	
			1 1 . 1	Mana and J
network to be improved	to water	Improve infrastructure resilience and rate of	developments around catchment areas and boreholes	Water and Sanitation

	Procure rainwater	recovery		Sector Plan
	harvesting systems for	Improvo boolth	Implement SWA (2016)10	SWA 10 Year
	vulnerable families and	Improve health and	year investment plan to	Investment
	for identified evacuation shelters as a	sanitation	improve water supply network to support all inland families	Plan (2016)
	short term solution	Reduce contamination	without access to drinking	1 1011 (2010)
	short term solution	of water supply	water	Community
	Responsibility: SWA/	of water supply	water	Engagement
	MWCSD/MNRE/	Reduce impact from	Include in budget programming	Plan
	District/Village/	inland flooding	design, and extension costs of	
	CSSP	8	water supply and procurement	Health Sector
			of rainwater harvesting systems	Plan
			Utilise hazard maps and	Community
			Geomorphologist findings to	Sector Plan
			inform designs	
			Utiliza Cari a Nazio an anticha	
			Utilise Sui o Nu'u monthly	
			meetings to monitor progress of village programmes and	
			responsibilities	
Coastline	Assess and strengthen	Improve infrastructure	<b>^</b>	CIM Strategy
protection:	part of seawalls in <b>most</b>	resilience and rate of	Undertake a Cost Benefit	2015
Lufilufi and	high risk areas to	recovery	Analysis to weigh options for	
Falefa seawalls	reduce vulnerability of	5	funding	TSP2014-2019
	road and other critical	Reduce impact from	Incorporate environmental and	Goal 2 KO 1
	village assets in	coastal erosion	social safeguards concerns in	
	accordance with		the design and undertake	Draft Soil
	Vulnerability Assessment	Safer villages, houses and	consultations with affected	Resource
	of the Samoa Road	roads	communities	Management
	Network	Minimise expenditure on		Bill
	recommendations	damaged properties &	Apply for necessary permits as	
	Clear debris from	personal assets	required by law	
	existing culverts near	<b>r</b>	Itiliaa hazard mana and	
	seawalls to enable free		Utilise hazard maps and Geomorphologist Infrastructure	
	outflow of storm water		Drainage Database to inform	
	and streams		designs	
			0	
	Research the impacts of		Develop and register	
	sand mining		District/Village bylaws to	
	<b>T711</b> 1		include maintenance of	
	Village consultation on		drainages and illegal rubbish	
	sand mining policy and regulation		dumping into waterways	
	regulation			
	Enforce environmental			
	social safeguards where			
	reclamations, sand			
	mining, extraction or			
	other major coastal			
	works are proposed.			
	Government and village			
	to manage processes by			
	requiring villagers to get			
	the appropriate permits			
	and consent			
	Responsibility: LTA/			
	Village /MNRE/MWTI			
	maye / mane/ mw 11	1		

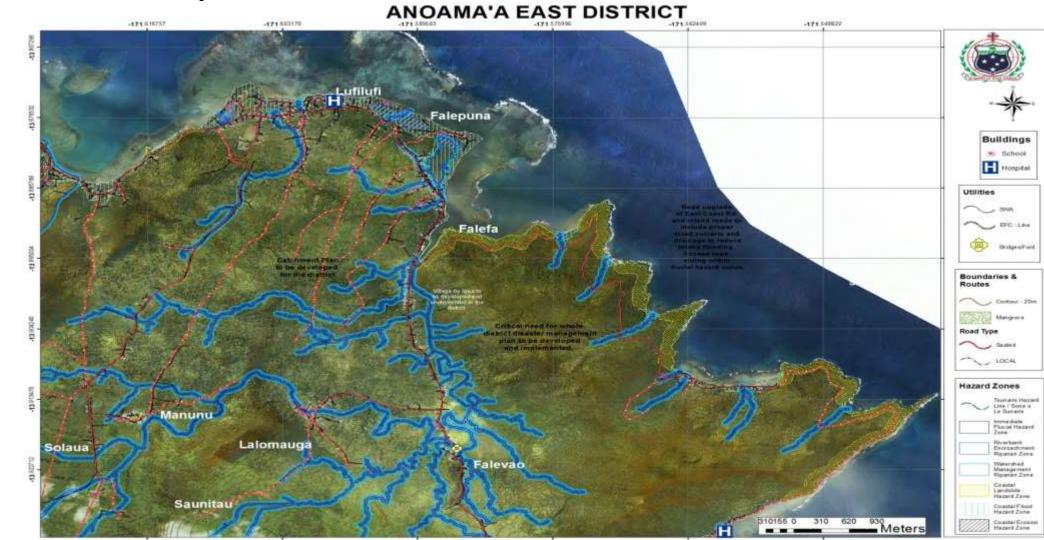
Evacuation	Assess and/or select		Enforcement of National	National
Shelter and a	location for either an	Improve resilience of public infrastructure	Building Code 2017	Disaster
connected	existing or new	public millastructure	TT: 1 1 1	Management
escape route needed for	evacuation shelter, including safe access	Improve preparedness	Utilise hazard maps and Geomorphologist findings to	Plan 2017- 2021
emergency	routes to the shelter	and readiness response to	inform location and designs	
preparedness and response	Toutes to the shelter	natural disasters	inform focation and designs	National Building Code
and response	Develop a Village			National Dalia
	Climate Disaster Management Plan (VCDMP)			National Policy for People with Disabilities
	Conduct trainings for			NISP 2011 KESO 5
	People With Disabilities (PWDs) on emergency and disaster response strategies			KESU S
	Implement CDCRM program			
	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			
	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			
Village houses, church and government assets in	Relocate assets outside of high risk hazard zones when re-building	Minimise expenditure on damaged properties and personal assets	Planning provisions to be guided by the Planning and Urban Management Act 2004	CIM Strategy 2015 National
extremely high risk hazard zones	Develop landuse planning and development controls to	Safer villages, houses and roads	Enforcement of National Building Code 2017	Building Code
	restrict developments within high risk hazard zones such as CEHZ and CFHZ	Increases awareness for insurance	Encourage insurance of significant investments and assets within hazard zones	
	CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for		Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes	

	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 <b>Responsibility: Village</b> / Families /MWTI/ MNRE/ MWCSD		Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policios
Restoration and conservation of upland forest	Re-stock existing nursery with appropriate trees Protect ridge-top habitats and forests from indiscriminate cultivate and other developments Replant native forestry species of the upland forests to restore resilience and ecological function Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area District/village to help promote the development of the agroforestry sector by encouraging relevant land use practice and where possible resolve any associated land disputes	Protects and enhance local species diversity Sustains ecosystem services and functions Reduced risk of slips and erosion Reduce contamination of water supply Reduce impact from inland flooding Improve preparedness and readiness response to natural disasters Safer villages, houses and roads	<ul> <li>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</li> <li>Develop and register District/Village bylaws to include penalizing illegal deforestation in district lands</li> <li>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village forestry programmes</li> <li>Utilise PD3 to inform location for planting/ re-planting</li> </ul>	Policies Community Engagement Plan Two Million Tree Planting Strategy 2015- 2020 Restoration Operational Plan 2016- 2020

	Responsibility: MNRE/ /MWCSD/ District			
	/Village/CSSP			
Protection of	Promote and support	Reduced risk of slips and	Develop Integrated	Water Sector
catchment areas	agroforestry and other	erosion	Watershed/Catchment Strategy	Plan
	cropping systems that	1	and Flood Management Plan for	Community
	combine trees and crops, especially in catchments,	Improve resilience of catchments	Anoama'a East District	Engagement
	and erosion-prone and	catelinents	Develop and register	Plan
	sensitive areas	Improve preparedness	District/Village bylaws to	
		and readiness response	include penalizing illegal	Restoration
	Limit land clearance and	to natural disasters	deforestation and	Operational Plan 2016-
	agricultural development around	Reduce contamination of	developments in upper catchment areas	2020
	catchment areas, SWA	water supply	catchinent areas	
	intake and boreholes in		Utilise PD3 to inform location for	
	district		planting/ re-planting	
	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/			
Flood protection	CSSP/GEF-SGP Conduct riparian	Mitigate potential	Implement Anoama'a East	Two Million
measures (soft	replanting along river	damage from inland	Integrated Catchment Strategy	Tree Strategy
solution to	channels and	flooding	and Flood Management Plan in	2015-2020
support flood	watercourses		conjunction with hazard Maps	
protection	En course a planting of	Reduce flooding of built	and Geomorphologist Drainage	Restoration
measures for infrastructure)	Encourage planting of indigenous species in	up areas	Infrastructure Database to inform location and designs	Operational Plan 2016-
init astracture)	conjunction with	Safer villages, houses and	inform location and designs	2020
	engineered water land	roads	MNRE to zone hazard areas	
	drainage action plans		along major watercourses based	
	Promote and support		on flood risk to provide suitable areas for riparian revegetation	
	village and district			
	afforestation in the upper			
	and mid-catchment areas			
	to reduce riverbank			
	failures especially in flood prone areas			
	Responsibility: MNRE/			
6. G	Villages	0.0		
Soft coastal protection	Plant native species along coastal areas to	Soft coastal protection measures will support	Develop an integrated land management plan for	Two Million Tree Planting
measures	strengthen existing	and strengthen existing	Anoama'a East district with the	Strategy 2015-
needed for most	seawall and to reduce	and new infrastructure	aim of reducing any	2020
vulnerable areas		along the coast	unnecessary actions that may	
	landslips; Talie, Fetau,		adversely affect the natural	Restoration
	Toa, Togatogo are known	Reduce impact from	habitats and ecosystems of the	Operational

	to have greater resilience	coastal erosion and	area	Plan 2016-
	to natural disasters and	natural disasters		2020
	changing climate		MAF to assist in establishment	
	conditions	Implements an Ecosystem	of pilot sites to trial climate	Forestry
		Based Approach	ready plant varieties	Management
	To act as an effective			Act 2011
	wave barrier, a minimum		MNRE Forestry, DEC and MAF	
	distance of 200m of		to collaborate on supply of	
	vegetation is needed		climate resilient crops	
	-		r i i i i i i i i i i i i i i i i i i i	
	Responsibility: MNRE/			
	MAF/Villages			
Governance	Best Solutions	Benefits	Guideline to assist with the	<b>Relevant Sector</b>
			Implementation	Plans, National
				Strategies &
				Policies
Strengthen the	Update and/or develop	Strengthen	Develop and register	Village Fono
governance of	bylaws to manage the	implementation of all	district/village bylaw to	Act
natural	use of natural resources,	national sector plans	protect all district/ village and	(Amendment
resources and	and to control land use		government assets,	Bill 2016)
land use	impacts; such as	Strengthen monitoring of	environment, livelihood and	-
through Bylaws	drainage maintenance,	all National Acts,	food security especially	Community
	rubbish dumping, sand	Regulation, Strategies,	activities affecting water	Sector Plan
	mining, stray animals	Plans and Policies	catchment areas and coastline	
	and unregulated			Community
	developments in water	Improve ability of	Utilise Sui o Nu'u monthly	Development
	catchment areas and	communities to adapt,	meetings to monitor progress of	Plan 2016-
	near boreholes.	respond and recover	district/village bylaws	2021
		quickly in the long term	, , ,	
	Collaborate with Sui o			
	Nuu to monitor the use	Improve accountability		
	of and impact on natural			
	resources	environment of		
		communities		
	Facilitate continuous			
	awareness raising			
	programs with the			
	villages			
	Obtain necessary permits			
	required by law before			
	developments take place			
	propriorito tante prace			
	Responsibility: MWCSD			
	/MNRE /Village			
	/ muye			

Non-CR issues raised during consultations	Proposed Solution	Comments
need doctor to visit more than	MOH to assess and review based on national needs and priorities in Health Sector Plan	Not a CR issue however can be a CR issue if hospital is identified as a evacuation shelter and/or a first response emergency facility during extreme weather events
power station/house at	District and Village mayor to collaborate with appropriate authorities to upgrade access road	Not a CR issue but upgrading of access road to the EPC power station will ensure a reliable and secure power system



Anoama'a East District Map

Coordinate System: GCS WGS 1984 Data Sou Datum: WGS 1984 Map Proc 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. Falefa Village Interventions

### **CIM Plan Solutions**

Infrastructure	Best Solutions	Benefits	Guideline to assist with the	Relevant Sector
				Plans, National
				Strategies & Policies
Flood	Upgrade waterways	Minimise	Conduct a full catchment	CIM Strategy 2015
protection measures for	Upgrade all crossings	expenditure on damaged	management, drainage analysis and geotechnical engineering	TSP 2014-2019 Goal
riverbanks,	opgrade all crossings	properties and	survey and use its	2 KO 1
bridges and	Upgrade or repair	personal assets	recommendations during the	2 10 1
fords	riverine embankment	percentar access	planning phase	Vulnerability
	protection work	Mitigate		Assessment of the
	upstream of Falefa	potential	Implement Anoama'a East Integrated	Samoa Road
		damage from	Catchment Strategy and Flood	Network (2016)
	Ensure river channel	inland flooding	Management Plan in conjunction with	and Road Network
	upstream is cleared and	Dodugo	hazard Maps and Geomorphologist	Adaptation
	maintained regularly	Reduce flooding of built	Drainage Infrastructure Database to identify specific location and	Strategy, LTA
	Construct levees to	up areas	condition of current drainage /	
	reduce flooding along	up ur cub	infrastructure requiring maintenance	
	estuaries and coastal	Safer villages,	and upgrade works	
	streams	houses and		
		roads	Utilise environmental and social	
	Government and Villages		safeguards including EIAs in	
	to liaise and collaborate		screening and designing	
	on processes needed to protect riverbanks from		infrastructure facilities	
	land clearing and		Include in budget programming CBA,	
	developments		design and construction. Bridge and	
			road designs to take account of	
	Responsibility: MWTI/		forecast changes in sea level rise and	
	LTA/MNRE/ District/		local flooding from increased rainfall	
	Village		intensity	
			Designation of the CEHZ and CFHZ as	
			an "at risk" zone with appropriate	
			landuse planning controls and	
			restrictions	
Village houses,		Minimise	Planning provisions to be guided by	CIM Strategy 2015
schools,	high risk hazard zones	expenditure on	the Planning and Urban	National Daildina
churches and government	when re-building	damaged properties and	Management Act 2004	National Building Code
assets in	Develop landuse planning	personal assets	Enforcement of National Building	Coue
extremely	and development controls	personal assets	Code 2017	
high risk	to restrict developments	Safer villages,		
hazard zones	within high risk hazard	houses and	Encourage insurance of significant	
	zones such as CEHZ and	roads	investments and assets within	
	CFHZ	Ţ	hazard zones	
	Conduct autoronosa mising	Increases	Itilise bazard mans and	
	Conduct awareness raising campaign on flood resilient	awareness for insurance	Utilise hazard maps and Geomorphologist Drainage	
	building practices and	mourance	Infrastructure Database to determine	
	designs for at risk		safe areas for relocation purposes	
	communities living in and			
	near high risk hazard		Designation of the IFHZ, CEHZ and	
	zones		CFHZ as an "at risk" zone with	
			appropriate landuse planning	

	Design infrastructure to take into account the		controls and restrictions	
	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 <i>Responsibility: Village /</i> <i>Families /MWTI/ MNRE/</i> <i>MWCSD</i>			
Access/work roads require maintenance and upgrade as it exacerbates flooding onto main East Coast Road	Assess and upgrade access/work roads as potential escape routes Construct roadside drainage ditches where needed 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	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and public assets	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs 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 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 Anoama'a East district	National Disaster Management Plan 2017-2021 CIM Strategy 2015 TSP 2014-2019 Goal 2 KO 1 Community Sector Plan
	Responsibility: LTA/ MWTI/ MNRE/ Villages/Families			
Evacuation Shelter and a connected	Assess and/or select location for either an existing or new	Improve resilience of public	Enforcement of National Building Code 2017	National Disaster Management Plan 2017-2021
escape route needed for emergency	evacuation shelter, including safe access routes to the shelter	infrastructure Improve	Utilise hazard maps and Geomorphologist findings to inform location and designs	National Building Code
preparedness and response	Develop a Village Climate Disaster Management Plan (VCDMP)	preparedness and readiness response to natural disasters		National Policy for People with Disabilities

	Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies			
	Implement CDCRM program			
	Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters			
	Where no suitable building 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			
Drainage	Continue to assess and	Improves	Utilise hazard maps and	CIM Strategy 2015
systems to be	upgrade culverts on	climate	Geomorphologist Drainage	
improved in high risk areas	main and access roads in district to facilitate the	resilience of infrastructure	Infrastructure Database to inform design	TSP 2014-2019 Goal 2 KO 1
mgn risk areas	overland flow of storm	resilience and		2 NU 1
	water and reduce	rate of	Use existing information for	Community Sector
	flooding - in accordance	response and	guidance but not limited to:	Plan
	with Vulnerability Assessment of the Samoa	recovery to natural	"Vulnerability Assessment of the	
	Road Network	hazards and	Samoa Road Network (2017)"; "Review of National Road Standards	
	recommendations	disasters	in Samoa (2016)"; "Samoa Code of	
	Introduce culverts in	Encourages	Environmental Practice (2007)"	
	wetland areas to	coastal families	Develop Integrated Catchment	
	improve tidal flow and fish passage in the wetland area	to relocate inland	Strategy and Flood Management Plan for Anoama'a East District	
	Implement regular drainage inspection and maintenance	Maintains lifeline access for all of Upolu	Undertake a Cost Benefit Analysis to weigh options for funding	
	maniconanico	Minimises	Utilise environmental and social safeguards including EIAs in	
	Village to conduct regular	national	screening and designing built	
	drainage and waterway clearance behind homes	disaster recovery expenditure on	environment infrastructure projects for Anoama'a East district	
	Government to regulate	damaged	Develop and register	
	developments and illegal rubbish dumping near	properties, public and	District/Village bylaws to include	
	i ubbish uuniping lical	public and		I

protection and conservation o boreholes in diResponsibility MNRE / Distri- Village/ CSSPElectricity supplyProvide underg lines in the long Install and com supply for inlam residentsRelocate overhe a more resilient when being rep Install streetlig the roads wher for community Install and com	and around waterways and drainage connecting to East Coast RoadResponsibility: LTA/ MWTI/MNRE/MWCSD /Village/ Familiesculated er supply, lity and work to be rovedExtend the water supply to families inland with no access to waterProcure rainwater harvesting systems for vulnerable families as a short term solutionVillage of Faleapuna and Falefa to support SWA water rationing programmes during times of droughtVillagers of Faleapuna and Falefa to support SWA water rationing programmes during times of drought	private assetsprivate assetsIncreaseadaptationduring droughtperiodsImproveinfrastructureresilience andrate ofrecoveryImprovehealth andsanitationReducecontamination	maintenance of drainages and illegal rubbish dumping into waterways 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 to drinking water Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan (2016) Community Engagement Plan Health Sector Plan Health Sector Plan
ElectricityProvide undergsupplylines in the longInstall and conrsupply for inlandresidentsRelocate overheda more resilientwhen being repInstall streetligthe roads wherfor communityInstall and conr	SWA efforts at protection and conservation of boreholes in district <b>Responsibility: SWA/</b> <b>MNRE / District/</b>	contamination of water supply Reduce impact from inland flooding	Geomorphologist findings for planning purposes Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	Bill 2016)
made available	tricity Provide underground ply lines in the long term Install and connect power supply for inland	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 NISP

Coastline	Assess and strengthen	Improve	Undertake a Cost Benefit Analysis to	CIM Strategy 2015
protection:	part of seawall in relevant	infrastructure	weigh options for funding	
seawall	area <b>only</b> to reduce	resilience and	Ittilian any incompany and an aight	TSP 2014-2019 Goal
upgrade and	vulnerability of road and	rate of recovery	Utilise environmental and social safeguards including EIAs in	2 KO 1
maintenance	other critical assets in	D - d :	screening and designing built	Community Contour
	accordance with	Reduce impact from coastal	environment infrastructure projects	Community Sector Plan
	Vulnerability Assessment of the Samoa Road	erosion	for Anoama'a East district	Plall
	Network	erosion	for mound a hast district	
	recommendations	Safer villages,	Develop and register Village bylaws	
	recommendations	houses and	to include banning of sand mining	
	Clear debris from existing	roads	and illegal rubbish dumping in	
	culverts near seawalls and		waterways and drains	
	waterways to enable free	Minimise		
	outflow of storm water	expenditure on	Utilise Sui o Nu'u monthly meetings	
	and streams into sea	damaged	to monitor progress of village	
		properties &	replanting and clean up	
	Where reclamations, sand	personal assets	programmes	
	mining, extraction or other			
	major coastal works are			
	proposed, Government			
	and village to manage			
	processes by requiring			
	villagers to get the			
	appropriate permits and			
	consent			
	Responsibility: MNRE/			
	Village /Families/ CSSP/			
	MWTI/LTA			
Natural	Best Solutions	Benefits	Guideline to assist with the	<b>Relevant Sector Plans</b>
Natural Resources and		Benefits	Guideline to assist with the Implementation	National Strategies &
Resources and Environment			Implementation	National Strategies & Policies
<b>Resources and</b> Environment Wetland area	Research new species	Protects and	Implementation MNRE DEC to provide technical	National Strategies & Policies Draft NESP 2017-
Resources and Environment		Protects and enhance local	Implementation MNRE DEC to provide technical assistance and backstopping in the	National Strategies & Policies
<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area	Protects and enhance local species	Implementation MNRE DEC to provide technical assistance and backstopping in the development of a Wetland	National Strategies & Policies Draft NESP 2017- 2021
<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area Undertake an assessment	Protects and enhance local	Implementation MNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a East	National Strategies & Policies Draft NESP 2017- 2021 Community
<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to	Protects and enhance local species diversity	Implementation MNRE DEC to provide technical assistance and backstopping in the development of a Wetland	National Strategies & Policies Draft NESP 2017- 2021
<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to maintain a healthy natural	Protects and enhance local species diversity Sustains	Implementation MNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a East District	National Strategies & Policies Draft NESP 2017- 2021 Community
<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to	Protects and enhance local species diversity Sustains ecosystem	Implementation MNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a East District Identify funding /budget	National Strategies & Policies Draft NESP 2017- 2021 Community
<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to maintain a healthy natural environment	Protects and enhance local species diversity Sustains ecosystem services and	ImplementationMNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a East DistrictIdentify funding /budget requirements and implementation	National Strategies & Policies Draft NESP 2017- 2021 Community
<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and	Protects and enhance local species diversity Sustains ecosystem	ImplementationMNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a East DistrictIdentify funding /budget requirements and implementation programme to continue protection	National Strategies & Policies Draft NESP 2017- 2021 Community
<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and developments adjacent to	Protects and enhance local species diversity Sustains ecosystem services and functions	Implementation MNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a East District Identify funding /budget requirements and implementation programme to continue protection of mangrove/wetland areas in	National Strategies & Policies Draft NESP 2017- 2021 Community
<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce	ImplementationMNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a East DistrictIdentify funding /budget requirements and implementation programme to continue protection	National Strategies & Policies Draft NESP 2017- 2021 Community
<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and developments adjacent to wetland areas	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination	Implementation MNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a East District Identify funding /budget requirements and implementation programme to continue protection of mangrove/wetland areas in district	National Strategies & Policies Draft NESP 2017- 2021 Community
<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and developments adjacent to	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce	Implementation MNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a East District Identify funding /budget requirements and implementation programme to continue protection of mangrove/wetland areas in district	National Strategies & Policies Draft NESP 2017- 2021 Community
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<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and developments adjacent to wetland areas Continue to plant native species along coastal areas to reduce erosion and landslips. To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Village to fence off domestic animals	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from inland	Implementation MNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a East District Identify funding /budget requirements and implementation programme to continue protection of mangrove/wetland areas in district	National Strategies & Policies Draft NESP 2017- 2021 Community
<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and developments adjacent to wetland areas Continue to plant native species along coastal areas to reduce erosion and landslips. To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Village to fence off	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from inland	Implementation MNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a East District Identify funding /budget requirements and implementation programme to continue protection of mangrove/wetland areas in district	National Strategies & Policies Draft NESP 2017- 2021 Community
<b>Resources and</b> Environment Wetland area	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and developments adjacent to wetland areas Continue to plant native species along coastal areas to reduce erosion and landslips. To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Village to fence off domestic animals	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from inland	Implementation MNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a East District Identify funding /budget requirements and implementation programme to continue protection of mangrove/wetland areas in district	National Strategies & Policies Draft NESP 2017- 2021 Community
Resources and Environment Wetland area	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and developments adjacent to wetland areas Continue to plant native species along coastal areas to reduce erosion and landslips. To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Village to fence off domestic animals	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from inland	Implementation MNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a East District Identify funding /budget requirements and implementation programme to continue protection of mangrove/wetland areas in district	National Strategies & Policies Draft NESP 2017- 2021 Community

Responsibility: MNRE / Village /CSSP/ UNDP-GEF SGP/ MWTI			
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 <b>Responsibility: MNRE/</b>	Mitigate potential damage from inland flooding Reduce flooding of built up areas Safer villages, houses and roads	Implement Anoama'a East 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
Best Solutions	Benefits	Implementation	Relevant Sector Plans, National Strategies & Policies
Implement an eradication programme to eradicate, contain or exclude invasive species Replant with climate resilient native 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 farmers to manage stray	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Anoama'a East 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 MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops 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 Village to manage pig/cattle population (compounds, in particular around water supplies)	Agriculture Sector Plan 2016-2021 Draft NESP 2017- 2021 Samoa's National Invasive Species Action Plan (NISAP)
	Village /CSSP/ UNDP-GEF SGP/ MWT1 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 <b>Responsibility: MNRE/</b> Villages Best Solutions Implement an eradication programme to eradicate, contain or exclude invasive species Replant with climate resilient native 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	Village /CSSP/ UNDP-GEF SGP/ MWT1Mitigate potential damage from inland floodingConduct riparian replanting along river channels and watercoursesMitigate potential damage from inland floodingEncourage planting of indigenous species in conjunction with engineered water land drainage action plansReduce flooding of built up areasPromote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areasBenefitsResponsibility: MNRE/ VillagesBenefitsBest SolutionsBailtains natural ecosystemImplement an eradicate, contain or exclude invasive speciesBuilds resilience of community livelihood and food securityImplement 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 takenConduct education and awareness programmes on the impacts of invasive speciesImplement the Integrated Pest Management ProgrammeImplement Sustainable Land Management (SLM) practicesBuild the capacity of farmers to manage stray	Village /CSSP / UNDP-GEF SGP/MWTIMitigate potential damage from inland flooding magement Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designsEncourage planting of indigenous species in conjunction with engineered water land drainage and instrict afforestation in the upper and mid-catchment areas to reduce riverbank failure sepcially in flood prone areasReduce flooding of built up areas safer villages, houses and riparian revegetationPromote and support village afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areasSafer villages, nouses and riparian revegetationImplement an eracication programme to a cradicatic, contain or exclude invasive speciesMaintains natural ecosystemCuideline to assist with the ImplementationImplement an erast, contain or exclude invasive speciesMaintains natural ecosystemDevelop an integrated land maagement plan for Anoama'a East district with the aim of reducing any unnecessary actions that may adversely affect the areasImplement an include information on their past, present and potential future distribution, as well as impacts of invasive speciesMar to assist netablishment of pilot sites to trial climate ready plant varietiesConduct education and awareness programmes on the impacts of invasive speciesNRRE MAF and SROS to implement aggressive, nationwide invasive species and conduct campaign on public awareness accordinglyImplement the Integrated Land Management (SLM) practicesNRE NAF and SROS

	are contaminating water sources Conduct pilot site trials for climate ready plant varieties District to fence domestic animals <b>Responsibility:</b> Villages/District/ MNRE/MAF/ SROS		fruit trees and crops	
Governance	Best Solutions	Benefits	Implementation	Relevant Sector 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 <i>Responsibility: MWCSD</i> /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





### Falefa Village Map

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### FALEFA 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

# 4. Falevao Village Interventions

### **CIM Plan Solutions**

Infrastructure	Best Solutions	Benefits	with the	Relevant National, Sector Plans and Strategies
Village houses, schools, churches and government assets in extremely 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 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 <b>Responsibility: Village / Families /MWTI/ MNRE/ MWCSD</b>	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
Drainage systems to be improved in high risk areas	Assess and upgrade culverts on most vulnerable parts of the local road especially at junctions with main East Coast Road (Falevao Uta Road and Falevao Road) – 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 <b>Responsibility: LTA/ MWTI/MWCSD</b> /Village / Families	Improves climate resilience of 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 Minimise 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	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan

			_ , , , ·	
			and undertake	
			consultations with	
			affected communities	
			Apply for necessary	
			permits as required	
			by law	
			Dy law	
			Utilise hazard maps	
			and Geomorphologist	
			Infrastructure Drainage	
			Database to inform	
			designs	
			Develop Integrated	
			Catchment Strategy and	
			Flood Management	
			Plan for Anoama'a East	
			District	
			Develop and register	
			District/Village	
			bylaws to include	
			maintenance of	
			drainages and illegal	
			rubbish dumping into	
	1		waterways	011 ( Q)
-	lope stabilization at most	Minimise	Conduct a full	CIM Strategy
8	andslide area <b>identified in</b>	expenditure on	catchment	2015
	noama'a East Integrated	damaged	management, drainago analysis	
landslips and Catchment Sterosions behind Management	trategy and Flood t Plan	properties &	drainage analysis	NISP 2011 KESO 5
school	L I IAII	personal assets	and geotechnical engineering survey	TSP 2014-2019
Upgrade wat	erways	Mitigate potential	and use its	Goal 2 KO 1
opgrade wat	,ci ways	damage from	recommendations	
Upgrade all o	crossings	inland flooding	during the planning	Draft NESP 2017-
	,		phase	2021
Upgrade or r	epair riverine	Reduce flooding of	* · · · ·	
	t protection work	built up areas	Implement Anoama'a	Two Million Tree
	Primary School		East Integrated	Strategy 2015-
	-	Safer villages,	Catchment Strategy and	2020
Construct lev	vees to reduce flooding	houses and roads	Flood Management	
along estuar	ies		Plan in conjunction	Restoration
			with hazard Maps and	Operational Plan
	channel upstream is		Geomorphologist	2016-2020
cleared and r	maintained regularly		Drainage Infrastructure	
			Database to inform	Forestry
	and Villages to liaise and		location and designs	Management Act
	on processes needed to			2011
	banks from land clearing		Utilise environmental	
and develop	ments		and social safeguards	
	ANTATTI / I TTA /BANTET /		including EIAs in	
	ity: MWTI/ LTA/MNRE/		screening and	
District/ Vill	luye		designing infrastructure	
			facilities	
			iduitues	
			Include in budget	
			Include in budget programming CBA,	

Upgrade work road to reservoir	Village to upgrade and maintain road to ensure improved accessto reservoir Construct roadside drainage ditches where needed <i>Responsibility: Village/ CSSP/MWTI/MNRE</i>	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and public assets	construction MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation Designation of the CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions Village to seek financial assistance Village to seek engineering /technical advice prior to any road upgrade Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Anoama'a East District Include in budget programming CBA, design and construction. Road design standard to take account of forecast changes in increased rainfall intensity Designation of the CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 NISP 2011 KESO 5 TSP 2014-2019 Goal 2 KO 1 Community Engagement Plan
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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 <b>Responsibility: EPC/ MWTI/</b> Village/Families	Maintain electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts.	drainages and illegal rubbish dumping into waterways Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan NISP
Natural Resources and Environment	Best Solutions	Benefits	with the Implementation	Relevant Sector Plans, National Strategies & Policies
Illegal rubbish dumping at old quarry	cleanup and awareness programme Produce posters and village signs for public awareness	Improve health and sanitation Reduce leachate into environment and water supply Reduce contaminant from overland flooding entering sea	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 Waste Management Act/Legislation to guide process of effecting the 'polluter pays' principle Develop and register District/Village bylaws to include penalizing illegal rubbish dumping in district lands Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management	National Waste Management Strategy National Waste Management Policy

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 <b>Responsibility: MNRE/ Villages</b>	Mitigate potential damage from inland flooding Reduce flooding of built up areas Safer villages, houses and roads	Implement Anoama'a East 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	Two Million Tree Strategy 2015- 2020 Restoration Operational Plan 2016-2020
Water supply from Independent Water Scheme (IWS)/ village reservoir dirty: affected by flooding and unsustainable land practices	<ul> <li>Village and relevant authorities to conduct water quality tests on a regular basis</li> <li>Introduce ban on illegal rubbish dumping in district especially around fluvial hazard zones</li> <li>Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate agricultural developments around the upland forest area</li> <li>Limit land clearance and agricultural development around intake and boreholes</li> <li><i>Responsibility: IWS/ MNRE/SWA/MWCSD/ District/ Village</i></li> </ul>	Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding Improve preparedness and readiness response to natural disasters Safer villages, houses and roads	riparian revegetation Develop and register District/Village bylaws to include regulating developments around rivers, streams and water catchment Develop Integrated Catchment Strategy and Flood Management Plan for Anoama'a East 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 Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes	CIM Strategy 2015 Water and Sanitation Sector Plan Community Engagement Plan Community Sector Plan
Livelihood and Food Security	Best Solutions	Benefits	with the Implementation	Relevant Sector Plans, National Strategies & Policies
Pest management; invasive plants and animals affecting taro plantations, vegetable gardens and other crops	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	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Anoama'a East district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)

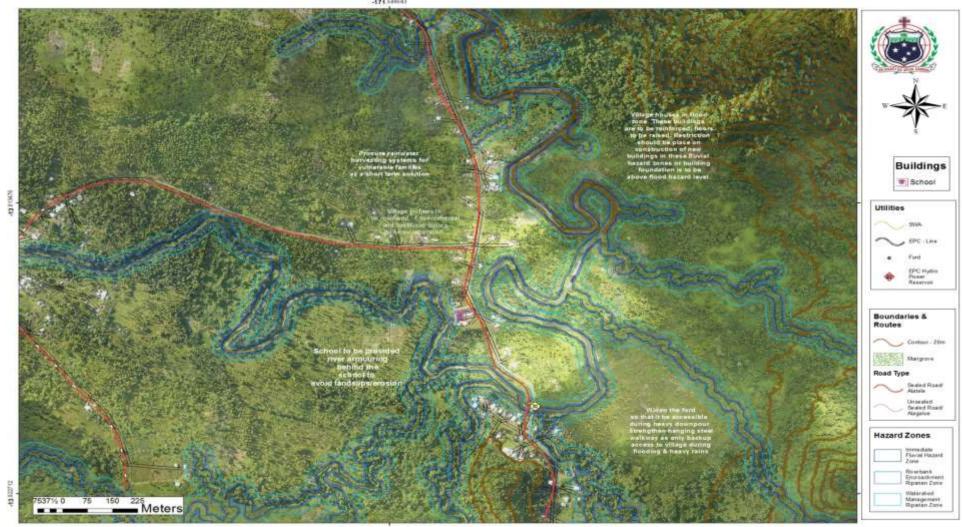
	Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources <b>Responsibility: Villages/District/</b> MNRE/MAF/ SROS		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	
Governance	Best Solutions	Benefits	accordingly Training for farmers on pests management particularly affecting fruit trees and crops Guideline to assist with the	Relevant Sector Plans, National
			Implementation	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 <i>Responsibility: MWCSD /Village</i>	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
		Improve accountability and enabling environment of communities		





### Falevao Village Map

#### FALEVAO VILLAGE 474 53555



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

# 5. Lalomauga Village Interventions

#### **CIM Plan Solutions**

Infrastructure	Best Solutions	Benefits	Guideline to assist with	Relevant
			the Implementation	National, Sector Plans and Strategies
Village houses, schools, churches and government assets in extremely 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 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 <b>Responsibility: Village /</b> Families /MWTI/ MNRE/ MWCSD	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
River armouring to avoid landslips and erosions behind school	Implement slope stabilization at most vulnerable landslide area <b>identified in study</b> and Anoama'a East Integrated Catchment Strategy and Flood Management Plan Upgrade waterways Upgrade or repair riverine embankment protection work upstream Relocate outside of high risk hazard zones when building/infrastructure requires replacement Investments within the hazard zones to adopt	Improve infrastructure resilience and rate of recovery Maintains natural ecosystem connectivity Reduce impact from coastal erosion Safer villages, houses and roads Minimise expenditure on damaged properties &	Conduct a full catchment management, drainage analysis and geotechnical engineering survey of embankment and watercourse at Anoama'a East Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs Develop Integrated Catchment Strategy and Flood Management Plan for Anoama'a East District. MNRE to develop zonation strategy for safe areas	CIM Strategy 2015 Draft NESP 2017- 2021

	appropriate mitigation	personal assets	Include in budget	
	measures	personal assess	programming design,	
	measures		construction costs	
	Construct levees to reduce		construction costs	
	flooding along estuaries and		Develop and register	
	coastal streams		District/Village bylaws to	
	coastal streams		include banning of sand	
	Engung river shannel		mining and illegal rubbish	
	Ensure river channel		dumping in waterways and	
	upstream is cleared and		drains	
	maintained regularly		uranis	
	Covernment and Villages to			
	Government and Villages to liaise and collaborate on			
	processes needed to protect			
	riverbanks from land clearing			
	and developments			
	Deenensibility, MINTL			
	Responsibility: MWTI/			
	LTA/MNRE/ District/ Village	T		CIM Churcher and
Upgrade access/	Assess and upgrade	Improve	Undertake a Cost Benefit	CIM Strategy
work road to	access/work roads and	infrastructure	Analysis to weigh options	2015
reservoir	implement where relevant	resilience and	for funding	
	Un que des te in alu de e de que te	rate of recovery	5	Community Sector
	Upgrades to include adequate		Incorporate environmental	Plan
	sized culverts to facilitate the	Improve	and social safeguards	
	overland flow of storm water	preparedness and	concerns in the design and	
	exacerbating river overruns,	readiness	undertake consultations	
	and to reduce flooding onto	response to	with affected communities	
	main roads and village lands	natural disasters		
			Apply for necessary	
	Village to restrict rubbish	Reduce impact	permits as required by law	
	dumping into waterways and	from coastal		
	conduct regular clearance of	erosion and	Utilise hazard maps and	
	rubbish behind homes	natural disasters	Geomorphologist	
	Enforce environmental		Infrastructure Drainage	
	Enforce environmental	Safer villages,	Database to inform designs	
	safeguards where	houses and roads		
	reclamations are proposed. Government and district to	Minimi e esti e e el	Develop Integrated	
		Minimise national	Catchment Strategy and	
	manage processes by requiring	5	Flood Management Plan for	
	villagers to get the appropriate		Anoama'a East District	
	permits and consent	damaged		
	Desponsibility, ITA / MIA/TI	properties and		
	Responsibility: LTA/ MWTI/ MNRE/ Villages/Families	public assets		
Evacuation Shelter	Assess and/or select location	Improve resilience	Enforcement of National	National Disaster
and a connected	for either an existing or new	of public	Building Code 2017	
escape route	evacuation shelter, including	infrastructure	Dunuing Coue 2017	Management Plan 2017-2021
needed for	safe access routes to the	minastiuttule	Utilise hazard maps and	201/-2021
	shelter	Improvo	Geomorphologist findings to	National Building
emergency preparedness and	Shellel	Improve preparedness	inform location and designs	Code
response	Conduct evacuation shelter	and readiness	intor in location and designs	
response	assessment and mark on CIM	response to		National Policy for
	Plan hazard maps	natural disasters		People with
	i iun nazaru maps			Disabilities
	Develop a Village Climate			
	Disaster Management Plan			NISP 2011 KESO 5
	(VCDMP)			
	(, , , , , , , , , , , , , , , , , , ,			
	Conduct trainings for People			
	With Disabilities (PWDs) on			

Replace ford with proper bridge and maintain hanging bridge	<ul> <li>emergency and disaster response strategies</li> <li>Implement CDCRM program</li> <li>Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters</li> <li>Where no suitable houses exist, build emergency shelter(s) outside the hazard zones</li> <li>Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter</li> <li><b>Responsibility:</b> MNRE /DMO / MWTI / Village /CSSP / Council of Churches/MWCSD</li> <li>Upgrade ford to a proper bridge</li> <li>Upgrade or repair riverine embankment protection work upstream</li> <li>Construct levees to reduce flooding along estuaries and coastal streams</li> <li>Install advisory edge markers and depth markers to warn vehicle and pedestrians at main ford in village</li> <li>Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments</li> <li><b>Responsibility:</b> MWTI / LTA/MNRE / District / Village</li> </ul>	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and public assets	Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations during the planning phase Implement Anoama'a East Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities Include in budget programming CBA, design and construction. Bridge and road designs to take account of local flooding from increased rainfall intensity Designation of the CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 TSP 2014-2019 Goal 2 K0 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
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Steel walkway:	Strengthen and upgrade steel	Safer villages,	Utilise hazard maps and	CIM Strategy
upgrade needed	walkway(hanging bridge) as alternative lifeline access	houses and roads	Geomorphologist Drainage Infrastructure Database to	2015
	during flooding, heavy rain	Improve	inform location and designs	Community Sector
	and extreme events	preparedness	inform location and designs	Plan
	und extreme events	and readiness		1 Iuli
	Responsibility: Village	response to	Utilise environmental and	National Disaster
	/DMO/ Families	natural disasters	social safeguards including	Management Plan
			EIAs in screening and	2017-2021
			designing infrastructure facilities	
			lacinties	
			Design and construction to	
			take account of forecast	
			changes in local flooding	
			from increased rainfall	
Improve water	Village to seek funding and	Increase	intensity Develop and register	CIM Strategy 2015
supply: construct	technical assistance to guide	adaptation during	District/Village bylaws to	Sin Strategy 2013
new reservoir	design	drought periods	include regulating	Water and
away from hazard			developments around	Sanitation Sector
zones	Procure rainwater harvesting systems for	Improve	catchment areas and	Plan
	vulnerable families as a short	infrastructure resilience and	boreholes	Community
	term solution	rate of recovery	Implement SWA (2016)10	Engagement
			year investment plan to	Plan
	Regulate developments	Improve health	improve water supply	
	around catchment area and boreholes in district	and sanitation	network to support all	
	borenoies in district	Deduce	inland families without	
	District to support SWA	Reduce contamination of	access to drinking water	
	efforts at exploratory	water supply	Include in budget	
	boreholes in district	water suppry	programming design, and	
	Responsibility: SWA/	Reduce impact	extension costs of water	
	MWCSP/ MNRE / District/	from inland	supply and procurement of	
	Village / CSSP	flooding	rainwater harvesting	
			systems	
			Utilise hazard maps and	
			Geomorphologist findings to	
			inform location and design	
Natural Resources	Best Solutions	Benefits		Relevant Sector
and Environment			-	Plans, National Strategies & Policies
Flood protection	Conduct riparian replanting	Mitigate potential	Implement Integrated	Two Million Tree
measures (soft	along river channels and	damage from	Watershed/Catchment	Strategy 2015-
solution to support	watercourses	inland flooding	Strategy and Flood	2020
flood protection			Management Plan in	
measures for	Encourage planting of	Reduce flooding of		Restoration
infrastructure)	indigenous species in conjunction with engineered	built up areas	Maps and Geomorphologist Drainage Infrastructure	Operational Plan 2016-2020
	water land drainage action	Safer villages,	Database to inform location	2010 2020
	plans	houses and roads	and designs	
			-	
	Promote and support village		MNRE to zone hazard areas	
	and district afforestation in		along major watercourses	
	the upper and mid-catchment areas to reduce riverbank		based on flood risk to provide suitable areas for	
	failures especially in flood		riparian revegetation	
	prone areas			

				1
	Vinages			
Restoration and conservation of upland forest	Responsibility: MNRE/ VillagesProtect ridge-top habitats and forests from indiscriminate cultivate and other developmentsReplant native forestry species of the upland forests to restore resilience and 	Protects and enhance local species diversity Sustains ecosystem services and functions Reduced risk of slips and erosion Reduce impact from inland flooding Improve preparedness and readiness response to natural disasters Safer villages, houses and roads Safer villages, houses and roads 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 Anoama'a East District 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 and register District/Village bylaws to include penalizing illegal deforestation in district lands Utilise Sui o Nu'u monthly meetings to monitor progress of district/village forestry programmes Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Anoama'a East District	Community Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020 Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020
	district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area	Reduce contamination of water supply		
	Replant catchment areas with local species such as tava, and poumuli			
	Responsibility: MNRE/ /SWA/District/Village/ CSSP/			

Governance	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector 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 <b>Responsibility: MWCSD</b> /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	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
Cut down trees close to power lines Responsibility: EPC/ Village	EPC and village to liaise directly on best solution	Not a CR issue but indirectly related to infrastructure concerns on resilience of communities during extreme events

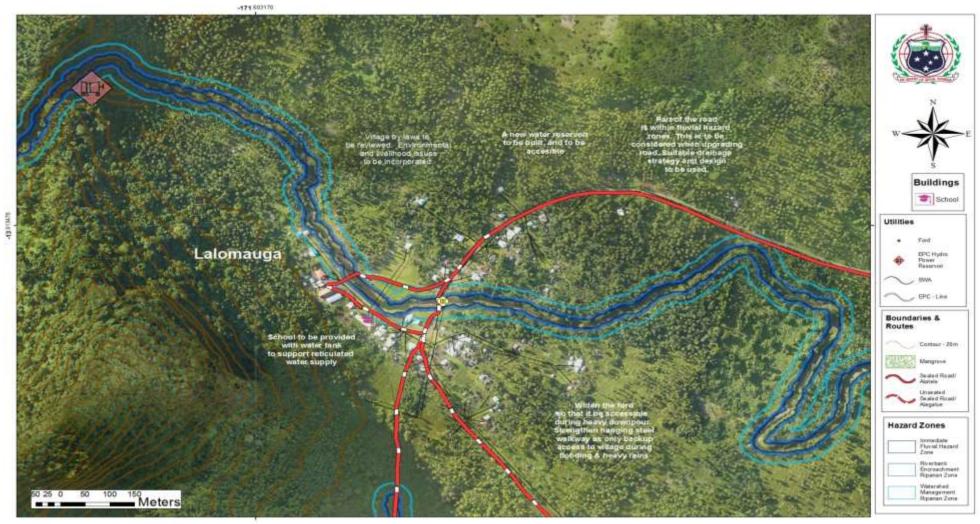






Lalomauga Village Map

LALOMAUGA VILLAGE



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

# 6. Lufilufi Village Interventions

#### **CIM Plan Solutions**

Infrastructure	Best Solutions	Benefits	Guideline to assist	<b>Relevant National, Sector</b>
	Dest solutions	Benefits	with the Implementation	Plans and Strategies
Village houses, church and government assets in extremely 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	Minimise expenditure on damaged properties and personal assets Safer villages, houses and	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building	CIM Strategy 2015 National Building Code
	CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones	roads Increases awareness for insurance	Code 2017 Encourage insurance of significant investments and assets within hazard zones	
	Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas		Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas	
	Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding		for relocation purposes Designation of the	
	and storm water surges Responsibility: Village / Families /MWTI/ MNRE/		IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and	
	MWCSD		restrictions	
Lufilufi Access road requires maintenance and upgrade as	Assess and upgrade access roads to village primary school and plantations and provide with adequate sized culverts	Improve infrastructure resilience and rate of recovery	Utilise hazard maps and Geomorphologist Drainage Infrastructure	National Disaster Management Plan 2017- 2021
it exacerbates flooding onto main East	to facilitate the overland flow of storm water and reduce flooding onto main roads and	Improve preparedness	Database to inform location and designs	CIM Strategy 2015 NISP 2011 KESO 5
Coast Road	neighboring villages Construct roadside drainage ditches where needed	and readiness response to natural disasters	Develop an integrated land management plan with the aim of reducing any	TSP 2014-2019 Goal 2 KO 1 Community Sector Plan
	Implement routine	Safer villages,	unnecessary actions that may adversely	Community Sector Fidir
	maintenance of the roads and clear any debris obstructing the free flow of surface water	houses and roads	affect the natural habitats and ecosystems of the	
	runoff	Minimise national	area	
	Village to regulate developments near and around road shoulders of all access	disaster recovery expenditure on	Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone	

	roads Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent <b>Responsibility: LTA/ MWTI/</b> MNRE/ Villages/Families	damaged properties and public assets	with appropriate landuse planning controls and restrictions Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a East district	
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program 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 Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter <b>Responsibility: MNRE /DMO/</b> <i>MWTI/Village /CSSP/Council</i>	Improve resilience of public infrastructure Improve preparedness and readiness response to natural disasters	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017- 2021 National Building Code National Policy for People with Disabilities NISP 2011 KESO 5
Water supply, quality and network to be improved	of Churches/MWCSD Village to upgrade and maintain reservoir to cater for additional families who have moved further inland	Increase adaptation during drought periods	Develop and register District/Village bylaws to include regulating developments around	CIM Strategy 2015 Water and Sanitation Sector Plan
	Procure rainwater harvesting systems for vulnerable families as a short term	Improve infrastructure resilience and	catchment areas and boreholes Implement SWA	SWA 10 Year Investment Plan (2016) Community Engagement

	-			
	solution	rate of	(2016) 10year	Plan
		recovery	investment plant to	
	Village to support SWA		improve water supply	
	water rationing programmes	Improve health	network to support all	
	during times of drought	and sanitation	inland families	
	V to support SWA efforts at		without access to	
	exploratory boreholes in	Reduce	drinking water	
	district	contamination		
	uisti ict	of water	Include in budget	
	District and village to fence	supply	programming design,	
	reservoir to protect from	<b>.</b>	and extension costs of	
	contamination	Reduce impact	water supply and	
		from inland	procurement of	
	Responsibility:	flooding	rainwater harvesting	
	MWCSD/SWA/ MNRE /		systems	
	District/Village/CSSP		Utilise hazard maps	
			and Geomorphologist	
			findings to inform	
			design	
Electricity	Install streetlights along the	Maintain	Monitor	EPC Strategic Plan
supply	roads where needed for	electricity	distribution	
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	community safety	supply at all	networks to avoid	
		times including	overloading poles	
	Relocate overhead lines to a	natural	and contributing to	
	more resilient location when	disasters	line failures	
	being replaced			
		Avoid accidents		
	Provide underground lines in	from fallen		
	the long term	electricity posts		
	-			
	Install and connect to solar			
	power supply if made			
	available			
	Responsibility: EPC /MWTI/			
Natural	Villages Best Solutions	Benefits	Guideline to assist	Relevant Sector Plans,
resources and	Dest solutions	Denents		National Strategies and
Environment				Policies
Sand/rock	Identify alternative sustainable	Mitigate	MNRE to continue to	Draft Soil Resource
extraction	sources of sand for domestic	potential	identify specific sites	Management Bill
(domestic):	use	damage from	for inshore/ inland	
coastline, rivers		coastal erosion	sustainable sand/rock	
and riverbanks	Research the impacts of sand	and flooding	mining to meet	
	mining	accommodating	demand without	
	_	the hazard	compromising	
	Village consultation on sand		riverbanks	
	mining policy and regulation	Safer villages,		
		houses and roads	Undertake	
	Village and government to		assessments of	
	collaborate closely on	Reduce impact	identified sites	
	designated areas for sand/rock	from coastal		
	mining	erosion	Undertake	
			consultation with	
	Raise awareness and support of		villages affected by	
	sustainable land use practices	benefit for	proposed sand/rock	
		village from	mining	
	Responsibility: MNRE/	sustainable	Develop and register	
1	Village/Families	sand mining	District bylaws to	
	0,	activities	include managing and	

			monitoring domestic sand/rock mining of rivers	
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist	Relevant Sector Plans, National Strategies & Policie
Livelihood and Food Security Pest management; invasive species (african snails and worms affecting vegetable gardens)	Best SolutionsImplement an eradication programme to eradicate, contain or exclude invasive speciesReplant with climate resilient native species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be takenConduct education and awareness programmes on the impacts of invasive speciesImplement the Integrated Pest Management (SLM) practicesBuild the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sourcesConduct pilot site trials for climate ready plant varietiesDistrict to fence domestic animalsDistrict MNRE/MAF/SROS<	Benefits Maintains natural ecosystem Builds resilience of community livelihood and food security	with the	
			Village to manage pig/cattle population (compounds, in particular around water supplies)	
			Training for farmers on pests management particularly affecting fruit trees and crops	

Food security	Promote and facilitate	Improve health	Agriculture sector to	Agriculture Sector Plan
	planting of rootcrops ( i.e	through access	provide best practice	2016-2021
	yams, sweet potato) which	to clean water	management	
	are more resilient to cyclones,	and waste	guidelines for the	Two Million Tree Strategy
	droughts and floods	management	management of water	2015-2020
	Dromoto agree forestry and	Improve	that allows for levels of contamination to be	Restantian Operational
	Promote agro- forestry and mixed planting including fruit	recovery to	kept to minimum	Restoration Operational Plan 2016-2020
	trees species to reduce crop	create more	kept to minimum	Flaii 2010-2020
	vulnerability to pests and	resilient villages	MAF to provide	Forestry Management Act
	diseases		trainings, awareness	2011
		Improve	raising and support	2011
	Implement the Integrated Pest	preparedness	in supply of nursery	
	Management Programme	and readiness	trees, technology and	
		response to	infrastructure to have	
	Implement Sustainable Land	natural	a sustainable	
	Management (SLM) practices	disasters	mechanism for	
			replanting	
	Encourage organic farming and		MAE to provide	
	mixed planting system to		MAF to provide trainings and	
	promote ecological stability and soil protection		awareness on crop	
			diversification to suit	
	Responsibility: MAF/		the prolonged	
	MNRE/village		impacts of climate	
	·····) · ·····g ·		change such as	
			drought or rainy	
			seasons	
			MAF to assist in	
			establishment of pilot	
			sites to trial climate	
			ready plant varieties	
			MAF to provide	
			technical advice, seedlings and planting	
			material for village	
			and families as a trial	
			Awareness and	
			government support	
			in supply of nursery	
			trees, technology and	
			infrastructure to have	
			a sustainable mechanism for	
			replanting	
			replanding	
			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	
			aita	
			MNRE Forestry to	
L	1			

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





### Lufilufi Village Map

### LUFILUFI VILLAGE

-171 403170 -171.589683 Install fence around Relocate outside tones when building a replaceme and development Buildings adjacent to wetland area School Hongital Utilities 13.6 (MAM EPC-Los tool in the clear to be safe have 14 Reneviat witre In the . Sering Boundaries & Routes Centour - 28re Mangrove load Type Dealed Roat! Autola Unixed and Senied Road? Hagabar Welland\_region Hazard Zones Teoriano Hagar Line / Score in Le Sunami Immediate Plumal Hazard Zote Riserbank Encrosolvman Ropanan Zone Widershed\_ Coastel Landshite Hazart Zone Constal Flood Hazard Zone Coestal Erosia Hazard Zone 80 40 0 Meters ....

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

# 7. Manunu/Sauniatu/Solaua Village Interventions

#### **CIM Plan Solutions**

Infrastructure	Best Solutions	Benefits	Guideline to assist with	Relevant
			the Implementation	National, Sector Plans and Strategies
Access/work roads require maintenance and upgrade (4km)	Assess and upgrade Manunu Road (via Saoluafata village) Upgrade existing ford	Improve infrastructure resilience and rate of recovery	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs	CIM Strategy 2015 NISP2011 KESO 5
upgraue (4km)	at Manunu into a proper bridge to	Improve	Develop an Integrated Flood	TSP2014-2019
	improve access during flooding and extreme events.	preparedness and readiness	Management Plan for Anoama'a East District.	Goal 2 KO 1
	Implement regular	response to natural disasters	MNRE to develop zonation strategy for safe areas	Community Sector Plan
	drainage inspection and maintenance	Reduce impact from coastal erosion and	Develop an integrated land management plan with the aim of reducing any	Community Engagement Plan
	Village to restrict rubbish dumping into waterways and conduct	natural disasters Safer villages,	unnecessary actions that may adversely affect the natural habitats and	Village Fono Act (Amendment Bill 2016)
	regular clearance of rubbish behind homes	houses and roads Minimise national	ecosystems of the area Include in budget	
	Village to regulate developments near and around road shoulders	disaster recovery expenditure on damaged	programming CBA, design and construction. Road design standard to take	
	of all access roads	properties and public assets	account of forecast changes in sea level rise and	
	safeguards		increased rainfall intensity Designation of the IFHZ,	
	Responsibility: LTA/ MWTI/ MNRE/ District/ Village /Families/CSSP		CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
			Develop and register Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	
			Utilise Sui o Nu'u monthly meetings to monitor progress of village cleanup and awareness programmes	
Upgrade and extend water supply (reservoir)		Improve health and sanitation	Develop Integrated Catchment Strategy and Flood Management Plan for	CIM Strategy 2015
Independent Water Scheme		Reduce contaminant from	Anoama'a East district. MNRE to develop zonation strategy	Water and Sanitation
(IWS)/ village reservoir	Village and relevant authorities to conduct	overland flooding entering sea	for safe areas Develop an integrated land	Sector Plan SWA 10 Year
	water quality tests on a	Reduce	management plan with the	Investment Plan

	regular basis	contamination of	aim of reducing any	(2016)
		water supply	unnecessary actions that	
			may adversely affect the	Community
		Reduce impact	natural habitats and	Engagement
	Build a fence around the	from inland	ecosystems of the area	Plan
		flooding	ecosystems of the area	1 Iuli
	protect reservoir from	noounig	Implement SWA (2016) 10	Health Sector Plan
	contamination (illegal	Improvo	year investment plan to	fieattii Sector Fian
	rubbish dumping)	Improve	5	Village Ferre
	,	preparedness and	improve water supply	Village Fono
	Procure rainwater	readiness	network to support all	Act(Amendment
	harvocting systems for	response to	inland families without	Bill 2016)
	vulnerable families as a	natural disasters	access to drinking water	
	short term solution			
	Shore term solution	Safer villages,	Utilise Sui o Nu'u monthly	
	Enforce Watershed	houses and roads	meetings to monitor progress	
	Management Riparian		of village programmes and	
	Zone and Riverbank		responsibilities	
	Encroachment Control			
	and regulate agricultural		Develop/Update and	
	developments around the		register District/Village	
	-		bylaws to include regulating	
	upland forest area		developments around	
	Transaction of the Mit		catchment areas and	
	Investigate installing a		boreholes	
	water pump to improve		Sorenoies	
	water pressure			
	Description Child			
	Responsibility: SWA/			
	IWS/MWCSD/District/			
	Village/ CSSP			
Slope	Implement slope	Improve	Utilise hazard maps and	CIM Strategy
stabilization	stabilization at most	infrastructure	Geomorphologist Drainage	2015
	vulnerable landslide	resilience and	Infrastructure Database to	
	area at Manunu –	rate of recovery	inform designs	Draft NESP 2017-
	upland of Anoama'a			2021
	East district as part of	Improve	Develop and Implement	
	Anoama'a East District	preparedness	Anoama'a East Integrated	
	Integrated Catchment	and readiness	Catchment Strategy and Flood	
	Strategy and Flood	response to	Management	
	Management Plan	natural disasters		
			Utilise environmental and	
	Reduce sediment loads	Reduce impact	social safeguards including	
	and loss of top soil by	from erosion and	EIAs in screening and	
	discouraging building	landslides	designing built environment	
	and farming on steep		infrastructure projects for	
	slopes and keeping	Safer villages,	Anoama'a East district	
	livestock in areas away	houses and roads		
	from wetlands and		Include in budget	
	watershed sites	Minimise national		
		disaster recovery	and construction	
	Government, Village and	expenditure on		
	landowners to liaise and	damaged	Designation of the IFHZ,	
			CEHZ and CFHZ as an "at	
	collaborate on processes	properties and	risk" zone with appropriate	
	needed to protect upland	public assets	landuse planning controls	
	catchment area,		and restrictions	
	riverbanks from land			
	clearing and			
	1 1 .			
	developments			
	developments			
	developments			

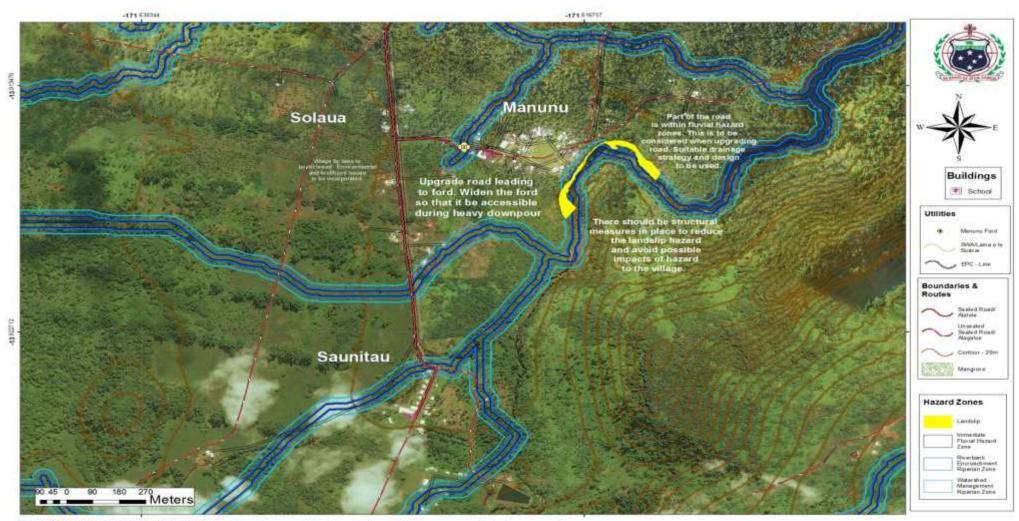
	Responsibility: MWTI /MNRE/ Villages			
Drainage in front of Primary	Village to install ditch/ drainage to divert	Minimise expenditure on	Village to seek funding to implement drainage	CIM Strategy 2015
school: requires upgrade and maintenance	flooding from storm surges and floodwaters and to increase regulation of water flow and reduce flooding onto village road and homes Consider building school building foundations at a level that takes into account site flooding when replacement is required Where reclamations are proposed, Government and district to manage	damaged properties & personal assets Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters Safer villages, houses and roads	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs Encourage insurance of significant investments and assets within hazard zones Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	Community Sector Plan
Causeway and	processes by requiring villagers to get the appropriate permits and consent <i>Responsibility: Village</i> <i>/ Families/CSSP</i> Village to upgrade	Minimise	Village to seek funding to	CIM Strategy
access road to Manunu	causeway Village to upgrade	expenditure on damaged properties &	upgrade ford and access road Utilise hazard maps and	2015 NISP 2011 KESO 5
	access road and resolve any land issues involved <i>Responsibility:</i> <i>Village/ CSSP</i>	personal assets Mitigate potential damage from inland flooding	Geomorphologist Drainage Infrastructure Database to	TSP 2014-2019 Goal 2 KO 1
		Reduce flooding of built up areas	EIAs in screening and designing infrastructure facilities	
		Safer villages, houses and roads	Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Organic Vegetable farming to promote ecological stability and soil protection	Promote and facilitate planting of rootcrops ( i.e yams, sweet potato) which are more	Maintains natural ecosystem	MAF to provide trainings, awareness raising and support in supply of nursery trees, technology	Agriculture Sector Plan 2016-2021 Community
	resilient to cyclones, droughts and floods	Builds resilience of community livelihood and	MAF to provide trainings	Engagement Plan Draft NESP 2017-

	Promote agro- forestry	food security	and awareness on crop	2021
	and mixed planting	-	diversification to suit the	
	including fruit trees	Improve	prolonged impacts of	Two Million Tree
	species to reduce crop	preparedness and	climate change such as	Strategy 2015-
	vulnerability to pests	readiness	drought or rainy seasons	2020
	and diseases	response to		
		natural disasters	MAF to assist in	Restoration
	Implement the		establishment of pilot sites	<b>Operational Plan</b>
	Integrated Pest		to trial climate ready plant	2016-2020
	Management		varieties	
	Programme			Forestry
	0		Develop an integrated land	Management Act
	Implement Sustainable		management plan with the	2011
	Land Management (SLM)		aim of reducing any	
	practices		unnecessary actions that	
			may adversely affect the	
			natural habitats and	
	Conduct pilot site trials		ecosystems of the area	
	for climate ready plant		-	
	varieties			
	Responsibility: MAF/			
	MNRE/villages/CSSP			
Governance	Best Solutions	Benefits	Guideline to assist with	Relevant Sector
			the Implementation	Plans, National
			•	Strategies &
				Policies
Strengthen the	Update and/or develop	Strengthen	Develop and register	Village Fono
governance of	bylaws to manage the	implementation	district/village bylaw to	Act
natural resources	use of natural	of all national	protect all district/ village	(Amendment
and land use	resources, and to	sector plans	and government assets,	Bill 2016)
through Bylaws	control land use	_	environment, livelihood and	-
	impacts; such as	Strengthen	food security especially	Community
	drainage maintenance,	monitoring of all	activities affecting water	Sector Plan
	rubbish dumping, sand	National Acts,	catchment areas and	
	mining, stray animals	Regulation,	coastline	Community
	and unregulated	Strategies, Plans		Development
	developments in water	and Policies	Utilise Sui o Nu'u monthly	Plan 2016-2021
	catchment areas and		meetings to monitor progress	
	near boreholes.	Improve ability of	of district/village bylaws	
		communities to		
	Collaborate with Sui o	adapt, respond		
	Nuu to monitor the use	and recover		
	of and impact on	quickly in the		
	natural resources	long term		
	Facilitate continuous	Improve		
	awareness raising	accountability		
	programs with the	and enabling		
	villages	environment of		
		communities		
	Responsibility: MWCSD			
	/Village			

Non-CR issues raised during consultations	Proposed Solution	Comments
Rubbish bins and access to TV/Radio <i>Responsibility: Village/STA</i>	Village to work together with STA on beautification of villages to support/supply rubbish bins	Not a direct CR issue but can be considered indirect as bins could actually reduce illegal rubbish dumping into rivers, fords and valley behind village homes

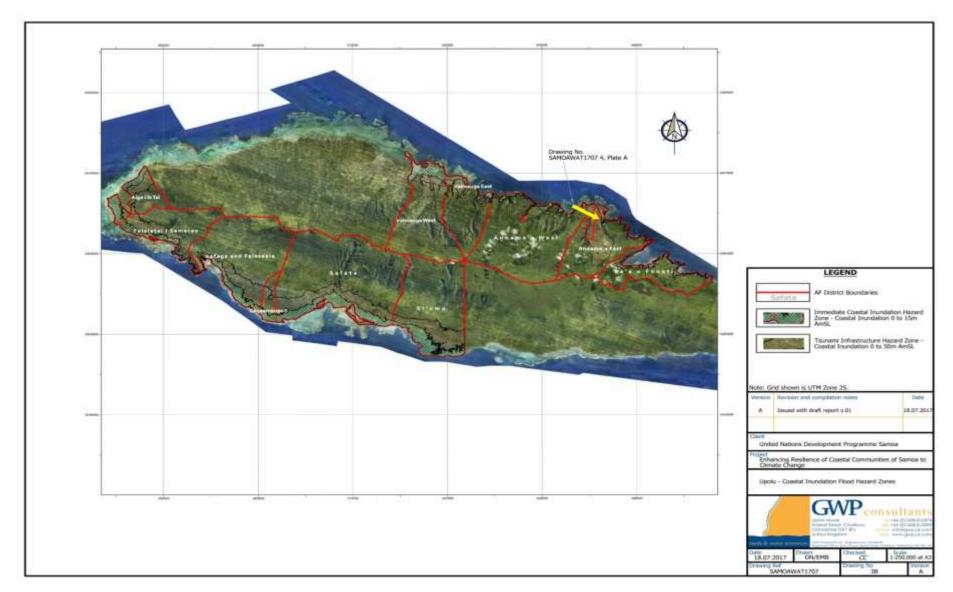






## MANUNU, SAUNITAU, SOLAUA VILLAGES

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



### Upolu AF Districts Overview Map of Coastal Inundation Zones