Community Integrated Management Plan

Vaisigano 2 District - Savaii

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 Vaisigano 2 (Fagasa, Sataua and Papa Sataua villages)

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

Date of Signing: 15 June 2018

Representative:	**Signature:**
Fagasa Village	
• Tofuimoana Uliese	
• Tailoa Sione	
• Tuitama Vaitau	
• Faitau Tuitama	
• Peteli Faitau	
Sataua Village	
• Fefua Poasa	
• Failagi Poasa	
• Vaelua Iona	
• Leilua Iulio	
• Maaga Samasoni	

Papa Sataua Village

- Tagi Eteuati
- Lava Iefata
- Tauatele Taumaia

The Government of Samoa adopts the Community Integrated Management Plan for the Faipule District of Vaisigano 2 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:

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

Glossary

"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.
Food Security	Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life
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)
Food availability:	The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid)
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
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
Hazard	A source of potential harm or a situation with a potential to cause loss.
Hazard Zones	Defined areas 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 six hazard zones: *ASCHs* (areas sensitive to coastal hazards); *CEHZs* (coastal erosion hazard zones); *CFHZs* (coastal flood hazard zones) and *CLHZs* (coastal landslip hazard zones) *CIHZ* (coastal inundation hazard zones) - Coastal Inundation 0 to 15mASL – immediate coastal inundation hazard zone - Coastal Inundation 15 to 20mASL – 5-metre uncertainty buffer on the immediate coastal inundation hazard zone (due to potential LiDAR inaccuracies) - Coastal Inundation 20 to 50mASL – additional hazard zone for the purpose of assessing/planning the location of tsunami protection infrastructure beyond the 0-20mAmSL contour. Please note tsunami risk includes 0-20mASL, so tsunami hazard zones need to include the 0-15mASL and 15-20mASL polygons as well as the 20-50mASL polygon - Coastal Inundation 50 to 55mASL – 5-metre uncertainty buffer on the tsunami infrastructure hazard zone (due to potential LiDAR inaccuracies) *IFHZ* (immediate fluvial hazard zone) within the steep banks of the river gorges - River bank encroachment control – 5m buffer on either side of river banks - Watershed management riparian zone – 20m buffer on either side of the river banks
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 Guideline	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).
Livelihood	Livelihood refers to a person or group's "means of securing the necessities -food, water, shelter and clothing- of life".
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

1. *Introduction to the CIM Plan*

1.1 The Strategic Vision

The District Community Integrated Management (CIM) Plan for Vaisigano 2 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).***

1.2 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.

1.3 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.

2. Implementation Guidelines

2.1 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.

2.2 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.

2.3 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 neutral 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-GEF SGP.

- ***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).

3. Description of Vaisigano 2 District

3.1 Physical and Natural Resource Setting

Vaisigano2 District is located on the north-western edge of Savaii. The villages of Vaisigano 2 include Fagasa, Sataua and Papa. This district is very distinct with large expanse of exposed lava rock providing a hard rocky coastline broken into small bays edged with white coral sand. Coral reefs 100 to 200m offshore protect the coastline to some extent, but the reefs were severely damaged during the last 24 years[1]. These large areas of lava rocks make it unsuitable for livestock and crops supporting only shallow soils. The district is within a dry zone and is exposed to northerly storm swells and fishing is limited (Dews, 2016).

Away from the coast, relatively fertile but seasonally dry land rises to an elevation of 300 metres. Both along the Main North Coast Road and along adjacent work roads, housing and plantations are now scattered across the landscape. There are four rivers in the district but all are seasonal. There are also springs in each of the three original coastal villages which are now no longer fit to be used. There is a borehole in Sataua which provides piped water to Sataua and Fagasa and up to the main road in part of Papa. The borehole in Falealupo also supplements the Sataua borehole but most people have to rely on rainwater collected in private roof tanks, as water quality as reported by residents is often quite saline or unclean. There is often a water shortage in the district with Papa-Uta as the most vulnerable with no reticulated water supply.

At Vaisigano 2, the reefs vary between 20 and 150m from land in the three villages in the district. In many places, the reef hugs the rocky coast line with waves breaking onto the rocky headlands creating rough waters too difficult to navigate. The entire Papa village has moved inland away from the hazard zones and there has been a decrease in fishing activities on the reef and lagoon as a result. Past sand mining operations are believed to be responsible for the loss of sand from the districts beaches and foreshores (Reti, 2016).

The coastal ecosystem of Vaisigano varies from Fagasa with heavy vegetation on the eastern side and a stretch of sparsely vegetated beach area on the western side towards Sataua village dotted by planted Indian banyan trees at Fagasa. At the boundary between Sataua and Papa village, the vegetation has recovered after the village of Papa has relocated away from its former coastal location. Mango trees lines the main road towards the Sataua Hospital and lusina is common throughout the district. Some large timber trees can be seen within village plantations providing an indication of native species found in this area before the cyclones in the 1990s (Reti, 2016). Remnants of certain native tree species can be seen scattered in the lowland and upland areas of the district indicating what kind of species were once present in the district. They include magaui(*Garuga floribunda)*tavai, *(Rhustaitensis),* mango (*Mangiferaindica)* and maota (*Dysoxylummaota)* (Reti, 2016).

The lowland area of the district is dominated by Tamaligi (*Albizziafalcataria)* and other species of Terminalia including *Albizziachinensis,* and monkey pod (*Samaneasaman)* that have replaced many of the indigenous species. Village plantations of coconuts, cocoa, taro and taamu follow the access roads and many family land boundaries are demarcated by old stone walls that also keep stray pigs out of food crops. Lack of water is restricting the movement of people to forested areas of the district (Reti, 2016).

The upland areas of Vaisigano2 district is dominated by cocoa and coconut plantations except for forest plantations on the Cornwall Estate which cuts across the ridge and crossing over to the Alataua district land on the south side of the island. The montane forest above the Masamasa forest plantations is targeted for conservation purposes by MNRE and other like-minded organisations which to some extent has prevented further damage to the upland forests of the district. Prior to forest logging in the 1970s, the dominant species of Vaisigano included, tava (*Pometia pinnate),* magaui*(Garuga floribunda),* mamalava *(Planchonellasamensis),*maota (*Dysoxylummaota),* aoa (*Ficusobliqua), o'a (Bischofiajavanica),*tamanu (*Calophyllum neo-ebudicum),*talie*(terminaliacatappa),*mosooi (*Canagaodorata),*filimoto (*Flacourtiarukam),* and fuafua (*Kleinhoviahospita)* (Reti, 2016).

Sataua has requested assistance in constructing two new access roads[2]to accommodate for easier transportation and movement for residents who have moved inland. Both these access roads currently sit in the fluvial hazard zone. The 'Catholic' access road is actually recorded in official records as the Sataua Primary School Road. The road is narrow with encroaching vegetation (MWTI, 2016) and has a sharp curve with an EPC post located in the shoulder of the curve creating a safety risk for the community during a disaster, and the Sataua Primary School and Catholic Church are designated as Evacuation Shelters.

[1]Since 1991 from Cyclones Val, Ofa and Heta. No damages recorded for Cyclone Evans for this district
[2]Mataisasau and Catholic Access Roads

The main North Coast Road running through the district is considered a lifeline access as it is part of the national road network connecting the East (from Salelologa Wharf) to the West (Falealupo) and back around to the South. The main road is an important part of the district's infrastructure as it provides easy access to other work roads, schools, churches and village buildings. The main North Coast Road is also used by other neighbouring districts to access the Sataua Hospital. The Sataua Hospital used to be located on a prominent lava outcrop directly on the coast, sitting directly in the CEHZ and CFHZ. The Sataua Hospital was relocated inland in 2015 however; the DRM map shows the Hospital currently sitting within a fluvial hazard zone.

This district has 5other roads within LTA's normal road maintenance programme; Sataua Primary School Road, Ala Road, Alapefu Road, Papa Loop Road and Papa-Uta Access Road[3]. 4 of these roads are listed as requiring major upgrades to structural makeup. The Papa Loop Road services the Papa Sataua Primary School which has been marked on the Papa village map as a potential Evacuation Shelter. This district is prone to landslips and a potential relocated inland road is proposed for the most vulnerable area in Fagasa, where the road sits in a high risk area with a combination of 3 hazard zones; less than 5metres from the tsunami shore exclusion zone, immediate inundation and fluvial hazard zones.

3.2 Social and Economic Setting

The Vaisigano 2 District currently has a population of 1,603; Fagasa265, Sataua 833 and Papa 505. Of the total 1,603 total male 842, female 761[4]. Development is mostly scattered along or near the main national road. Developments in this village run ribbon like in parallel with the main South-west Coast Road.

Primary services such as water, power and telephone generally follow the main road and are vulnerable to extreme events. Telephone service coverage is provided by both Bluesky and Digicel. There is one SWA borehole in this district located at Sataua. The Sataua Hospital services this district as well as neighbouring districts; Vaisigano 1, Falealupo and Alataua West. There are two schools in Vaisigano 2; Papa/Sataua and Sataua/Fagasa Primary schools.

The district has requested the assistance of EPC to install streetlights at access roads especially in areas where there is a vast distance between houses. Streetlights are not a climate change adaptation priority however- the concern is more on the low clearance of high voltage power lines on the main road (refer photo in District intervention section) and access roads. During extreme events, this would be extremely dangerous for the residents, as well as the traveling public.

The cash economy of the District is dominated by traditional work. The majority of residents are largely sustained by cattle farms and fishing as unlike Vaisigano 1, Vaisigano 2 soil suitability for key agricultural food crops such as taro, banana, breadfruit is 'nil'[5]. There are also employment opportunities in local shops, both local schools and the Sataua Hospital. There are also employment opportunities at nearby tourist facilities, businesses, schools and government departments at the neighbouring Vaisigano 1 district.

3.3 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 Vaisigano 2.

Vaisigano 2 district has a total area of 2,715 hectares. The Tsunami shore exclusion zone covers only about 50 hectares of the total district area. There are 36 buildings located within this 50 hectares. The watershed management riparian buffer covers 280 hectares, leaving 2,109 hectares in the "safe" zone. Therefore about **78%** of the total area of the district is safe from coastal inundation and fluvial hazards. Church buildings, schools and halls located within the tsunami evacuation zone orange but are not in the fluvial hazard or coastal hazard zones can be used as Evacuation Shelters (Tokalauvere, 2017).

Beach replenishment needs to be considered for Sataua and Fagasa in areas severly eroded. Revegetation in a low energy environment is also a solution for areas along the coast that has been eroded. Reinforcing criticial lands, buildings and/or infrastructure within the hazard zones if they must remain where they are is crucial. Otherwise, relocation is recommended.

[3]MWTI, 2016 Inspection report
[4] SBS Village Directory Census 2016 preliminary count
[55] Samoa Agricultural Census 2015

The Fagasa village DRM map for instance clearly shows the beach along Fagasa has been drastically eroded. A suggested relocation road of approximately 2km is plotted on the map but is highly dependent on land availability and agreement of landowners. The Sataua/Fagasa Primary School is located in Fagasa village and is within the Watershed Management Riparian Zone; the school should be reinforced and elevated if relocation is a problem. New residential construction in the regulated floodplain must be elevated, anchored, and otherwise protected against flood damage from a flood event.

Some areas of the North Central Road labeled in the medium high physical hazards index (i.e. coastal hazard, landslip hazard) lie within this district.

Due to most of the agriculture being away from the coast the impacts from storms and sea level rise is low for this district. Impact from extended periods of dry conditions will impact household crops. The cropping and production of livestock inland from the coast will be impacted by future alterations to rainfall patterns and increased surface temperatures (Dews, 2016).

4. Vaisigano 2 District Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Main North Coast Rd: exposure to high risk hazard zones (inundation, fluvial and tsunami shore exclusive zone)	Investigate relocating main road inland (approx length 2km) from the coast as **long term solution** for high risk hazard area in Asau where road sits less than 5mtrs from the tsunami shore exclusive zone, the immediate inundation and fluvial zones. Area also identified in *Assessment of the Samoa Road Network* and *Road Network Adaptation Strategy* as medium severity from coastal hazards Where reclamations, sand mining 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 /MWTI/ MNRE/ Villages/Families***	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	Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Community Sector Plan Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Coastal protection for most vulnerable area	Upgrade or strengthen existing rockwalls in areas where road sits less than 5mtrs from the tsunami shore exclusive and immediate inundation zones as **short term solution** Implement beach replenishment at critical locations along the beach to protect coastal road and infrastructure against inundation and coastal erosion Where reclamations, sand mining or other major coastal works are proposed Government and village to manage processes by requiring	Minimise expenditure on damaged properties & personal assets Mitigate potential damage from coastal erosion and flooding accommodating the hazard Maintain lifeline access for all of Savaii Improve recovery to create more resilient villages Improve	Use existing information for guidance but not limited to: *"Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)"* Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Community Sector Plan

	villagers to get the appropriate permits and consent ***Responsibility: LTA /MWTI/ MNRE/ Villages/Families***	preparedness and readiness response to natural disasters Safer villages, houses and roads	as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	
Drainage systems require maintenance and upgrade in high risk areas of main North Coast Road especially at junctions of access roads (Sataua Primary School Rd, Alapefu Rd, Papa Loop Rd and Papa uta Access Rd)	Upgrade drainage and culverts in accordance with *Vulnerability Assessment of the Samoa Road Network* recommendations Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance ***Responsibility: LTA /MWTI/MWCSD /Village/ Families***	Improves climate resilience of infrastructure resilience and rate of response and recovery to natural hazards and disasters Minimises national disaster recovery expenditure on damaged properties, public and private assets	Use existing information for guidance but not limited to: *"Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)"* Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Community Sector Plan
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting rainwater harvesting systems for vulnerable families as a short term solution District and villages to support SWA water rationing programs during times of drought District to support SWA efforts at exploratory	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop/Update and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016) 10year 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 Utilize Hazard Maps and	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan(2016) Community Engagement Plan

	boreholes in district ***Responsibility: SWA /MNRE/ District /Villages/ CSSP***		Geomorphologist findings to inform location and design Utilize Sui o Nu'u monthly meetings to monitor progress of village programs and responsibilities	
Village houses, school, churches, government and other village assets in high risk hazard zones	Relocate outside of high risk hazard zones when building/infrastructure requires replacement Investments within the hazard zones to adopt appropriate mitigation measures 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 Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: Village / Families /MWTI/ MNRE***	Minimise expenditure on damaged properties & personal assets Mitigate potential damage from coastal erosion and flooding accommodating the hazard Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters Safer villages, houses and roads	MNRE to develop zonation strategy for safe areas Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs Enforcement of National Building Code 2017 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	National Building Code CIM Strategy 2015
Evacuation Shelter and a connected escape route needed for emergency preparedness and	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter	Improve resilience of public infrastructure Improve preparedness	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

response	Conduct evacuation shelter assessment and mark on CIM Plan hazard maps Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement 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***	and readiness response to natural disasters		National Policy for People with Disabilities
Electricity supply	Provide underground lines in the long term Install and connect power supply for inland residents Relocate overhead lines to a more resilient location when being replaced Install streetlights along the roads where needed for community safety Install and connect to solar power supply if made available Families to limit building and developments near electricity posts	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

	Responsibility: EPC/ MWTI/ Village/ Families			
Beach nourishment / offshore breakwaters	Investigate beach replenishment at critical locations along the beach as **long term alternative** option to protect coastal road and other assets against inundation, coastal erosion and natural disasters 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 *R**esponsibility: MNRE/ STA/ Village /Families***	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 & personal assets	Undertake EIA Utilise recommendations of EIA and lessons learnt from Manase beach replenishment project to design beach replenishment to suit Vaisigano 2 district conditions Benefit cost analysis to include appropriate design loads and engineering design and supervision costs on top of capital work estimates	CIM Strategy 2015 PUMA Act NISP 2011 KESO 5 NESP 2017-2021 Tourism Sector Plan Vaisigano 2 District Plan
Natural Resources and Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Soft coastal protection measures needed for most vulnerable areas	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Vaisigano 2 district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area 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	Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020 Forestry Management Act 2011
Sand mining	Continue ban on sand mining Research on the impacts of sand mining Village consultation on sand mining policy and regulation	Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads Reduce impact from coastal	MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks Undertake assessments of identified sites Undertake consultation with villages affected by proposed	Draft Soil Resource Management Bill

	Responsibility: MNRE/ Village	erosion	sand/rock mining Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers	
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 ***Responsibility: MWCSD /Village***	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

Vaisigano 2 District Map


electricity lines a health hazard


Newly relocated district hospital

4.1 Fagasa Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village houses, school, churches, government and other village assets in high risk hazard zones	Relocate outside of high risk hazard zones when building/infrastructure requires replacement Investments within the hazard zones to adopt appropriate mitigation measures 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 Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: Village / Families /MWTI/ MNRE***	Minimise expenditure on damaged properties & personal assets Mitigate potential damage from coastal erosion and flooding accommodating the hazard Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters Safer villages, houses and roads	MNRE to develop zonation strategy for safe areas Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs Enforcement of National Building Code 2017 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	National Building Code CIM Strategy 2015

Main North Coast Rd: exposure to high risk hazard zones (inundation, fluvial and tsunami shore exclusive zone)	Investigate relocating main road inland (approx length 2km) from the coast as **long term solution** for high risk hazard area in Fagasa where road sits less than 5mtrs from the tsunami shore exclusion zone, the immediate inundation and fluvial zones. Area also identified in *Assessment of the Samoa Road Network* and *Road Network Adaptation Strategy* as medium severity from land slips (coastal hazards) Where reclamations, sand mining 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 /MWTI/ MNRE/ Villages/Families***	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	Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Community Sector Plan Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA

Drainage systems require maintenance and upgrade in high risk areas of main North Coast Road especially at junctions of Access Rd	Upgrade drainage and culverts in accordance with *Vulnerability Assessment of the Samoa Road Network* recommendations Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance ***Responsibility: LTA /MWTI/MWCSD /Village/ Families***	Improves climate resilience of infrastructure resilience and rate of response and recovery to natural hazards and disasters Minimises national disaster recovery expenditure on damaged properties, public and private assets	Use existing information for guidance but not limited to: *"Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)"* Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Community Sector Plan

Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting rainwater harvesting systems for vulnerable families as a short term solution District and villages to support SWA water rationing programs during times of drought District to support SWA efforts at exploratory boreholes in district ***Responsibility: SWA /MNRE/ District /Villages/ CSSP***	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop/Update and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016) 10year 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 Utilize Hazard Maps and Geomorphologist findings to inform location and design Utilize Sui o Nu'u monthly meetings to monitor progress of village programs and responsibilities	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan(2016) Community Engagement Plan
Natural Resources and Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Marine Protected Area and inshore fishery resources	Village to restock marine reserve with suitable species Collect and dispose of crown-of-thorns (alamea) on a regular basis to prevent major outbreaks Continue to ban the use of dynamites, herbal poisons (avaniukini), chemicals and other unsustainable fishing methods including sand mining and extraction Enforce village bylaws on ban on rubbish dumping in coastal areas ***Responsibility: Village/ MAF/ CSSP***	Protect coral reefs and inshore fisheries Protect marine biodiversity Protects and enhance local species diversity Sustains ecosystem services and functions	MAF Fisheries to support implementation and provide technical backstopping and monitoring Develop Village Bylaws to include management of natural resources (spring pools, marine reserve, forest etc)	Agriculture Sector Plan 2016-2021 Community Engagement Plan

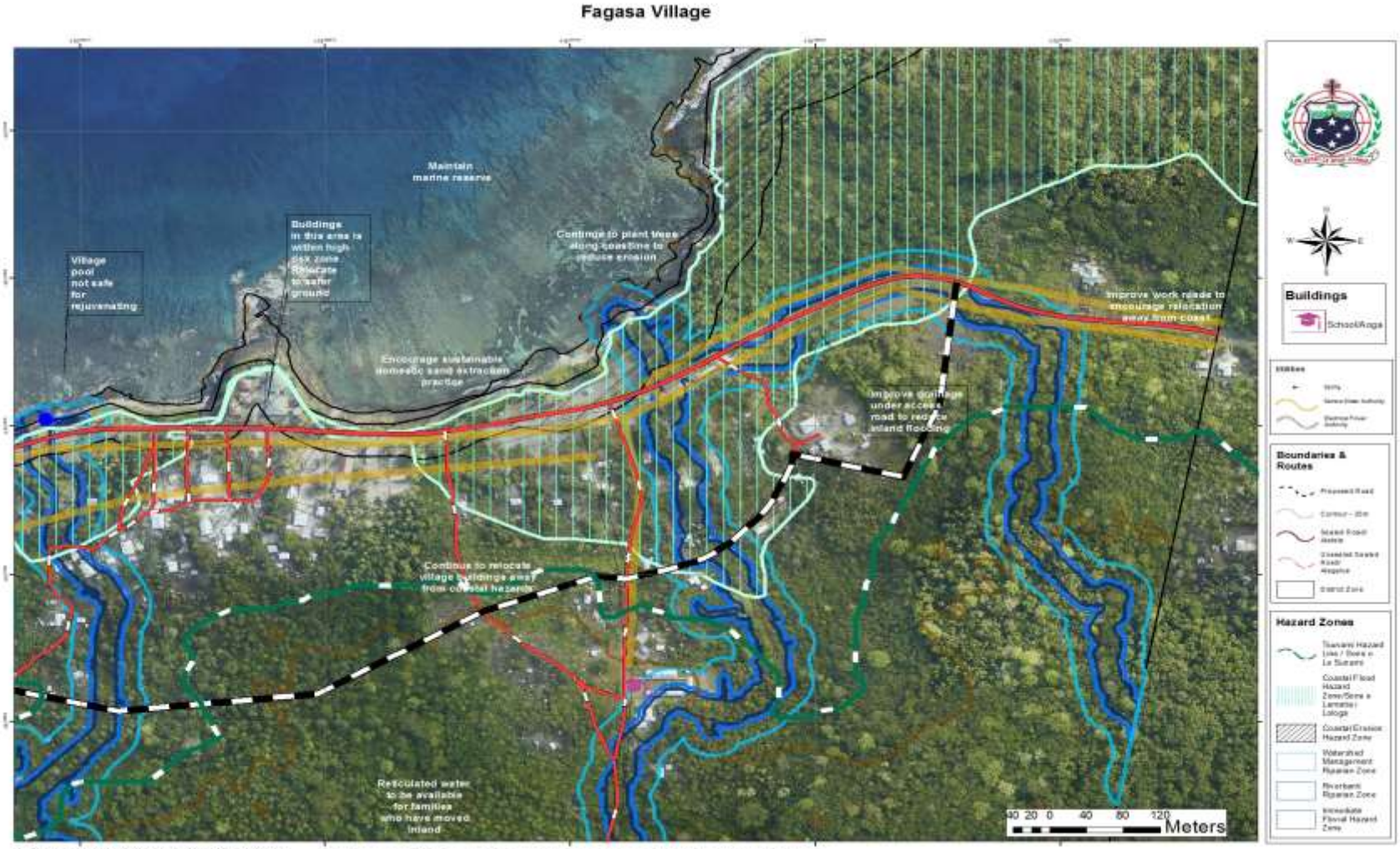
Soft coastal protection measures needed for most vulnerable areas	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Vaisigano 1 district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area 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	Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020 Forestry Management Act 2011
Village pool located in high risk hazard zones (coastal erosion and flooding from fluvial inundation, wave impacts and storm surges)	Village pool is currently in a poor location with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works) ***Responsibility: CSSP/ NGOs/MNRE/Villages***	Increase adaptation during drought periods Improve health and sanitation Reduce contamination of water supply	Utilise Hazard Maps and Geomorphologist findings for planning purposes MNRE Water & Sanitation to conduct water testing and analysis of village pool prior to any intervention Update Village bylaws to include managing and maintaining village natural resources	CIM Strategy 2015 Water and Sanitation Sector Plan Community Engagement Plan
Illegal rubbish dumping	Implement village awareness and cleanup programme to reduce illegal rubbish dumping Implement district/village drainage cleanup and awareness programme Produce posters and village signs for public awareness Introduce ban on illegal rubbish dumping in district especially around fluvial hazard zones Conduct campaign for public awareness of district ban and establish a "neighbourhood watch" agreement with district to	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	National Waste Management Strategy National Waste Management Policy Draft NESP 2017-2021

	monitor and report on illegal dumping activities Government, district and villages to monitor, report and apply penalty on offenders ***Responsibility: MNRE/ District/ Village***		programmes on waste management	
Sand mining	Continue ban on sand mining Research on the impacts of sand mining Village consultation on sand mining policy and regulation ***Responsibility: MNRE/ Village***	Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads Reduce impact from coastal erosion	MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks Undertake assessments of identified sites Undertake consultation with villages affected by proposed sand/rock mining Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers	Draft Soil Resource Management Bill
Livelihood and Food Security	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Pest management; invasive species	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	Maintains natural ecosystem Builds resilience of community livelihood and food security *Reduce forest loss and land clearance*	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 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	Agriculture Sector Plan 2016-2021 Draft NESP 2017-2021 Samoa's National Invasive Species Action Plan (NISAP)

	Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources Conduct pilot site trials for climate ready plant varieties District to fence domestic animals ***Responsibility: Villages /District/ MNRE/MAF/ SROS***		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) Training for farmers on pests management particularly affecting fruit trees and crops	
Food security: threatened by changes in climate and inadequate soil for planting	Promote and facilitate planting of rootcrops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods Promote agro- forestry and mixed planting including fruit trees species to reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Conduct pilot site trials for climate ready plant varieties ***Responsibility: MAF/ MNRE/villages/CSSP***	Maintains natural ecosystem Builds resilience of community livelihood and food security Improve preparedness and readiness response to natural disasters	MAF to provide trainings, awareness raising and support in supply of nursery trees, technology and infrastructure MAF to provide trainings and awareness on crop diversification to suit the prolonged impacts of climate change such as drought or rainy seasons MAF to assist in establishment of pilot sites to trial climate ready plant varieties 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	Agriculture Sector Plan 2016-2021 Community Engagement Plan Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

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 ***Responsibility: MWCSD /Village***	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

Fagasa Village Map



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

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


Access in the wetland to family homes


electricity lines a health hazard

4.2 Sataua Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant National, Sector Plans and Strategies
Village houses, school, churches, government and other village assets in high risk hazard zones	Relocate outside of high risk hazard zones when building/infrastructure requires replacement Investments within the hazard zones to adopt appropriate mitigation measures 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 Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Where reclamations are proposed, Government and district to manage processes by requiring	Minimise expenditure on damaged properties & personal assets Mitigate potential damage from coastal erosion and flooding accommodating the hazard Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters Safer villages, houses and roads	MNRE to develop zonation strategy for safe areas Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs Enforcement of National Building Code 2017 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	National Building Code CIM Strategy 2015

	villagers to get the appropriate permits and consent ***Responsibility: Village / Families /MWTI/ MNRE***			
Main North Coast Rd: exposure to high risk hazard zones (inundation, fluvial and tsunami shore exclusive zone)	Investigate relocating main road inland (approx length 2km) from the coast as **long term solution** for high risk hazard area in Sataua where road sits less than 5mtrs from the tsunami shore exclusion zone, the immediate inundation and fluvial zones. Area also identified in *Assessment of the Samoa Road Network* and *Road Network Adaptation Strategy* as medium severity from land slips (coastal hazards) Where reclamations, sand mining 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 /MWTI/ MNRE/ Villages/Families***	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	Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Community Sector Plan Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Drainage systems require maintenance and upgrade in high risk areas of main North Coast Road especially at junctions of Access Rd	Upgrade drainage and culverts in accordance with *Vulnerability Assessment of the Samoa Road Network* recommendations Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection	Improves climate resilience of infrastructure resilience and rate of response and recovery to natural hazards and disasters Minimises national disaster recovery expenditure on damaged properties, public and private	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	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Community Sector Plan

	and maintenance ***Responsibility: LTA /MWTI/MWCSD /Village/ Families***	assets	Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	
Coastal protection for most vulnerable area	Upgrade or strengthen existing rockwalls in areas where road sits less than 5mtrs from the tsunami shore exclusive and immediate inundation zones as **short term solution** Implement beach replenishment at critical locations along the beach to protect coastal road and infrastructure against inundation and coastal erosion Where reclamations, sand mining 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 /MWTI/ MNRE/ Villages/Families***	Minimise expenditure on damaged properties & personal assets Mitigate potential damage from coastal erosion and flooding accommodating the hazard Maintain lifeline access for all of Savaii Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters Safer villages, houses and roads	Use existing information for guidance but not limited to: *"Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)"* Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Community Sector Plan

Upgrade access/ work roads to facilitate relocation of houses away from hazard zones– and as potential escape route	Upgrade Sataua Primary School Rd to national road standards where necessary Assess feasibility of current access road/ track to Catholic Church (as potential escape route) and tar seal if approved Enforce environmental safeguards ***Responsibility: LTA /MWTI/MNRE / Villages / Families /District/MWCSD***	Improve preparedness and readiness response to natural disasters Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and public assets	Consult landowners about dedicating areas for road upgrades Utilise Hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and design Include in budget programming CBA, design and construction	CIM Strategy 2015 National Disaster Management Plan 2017-2021 Community Sector Plan Vulnerability Assessment of the Samoa Road Network
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting rainwater harvesting systems for vulnerable families as a short term solution District and villages to support SWA water rationing programs during times of drought District to support SWA efforts at exploratory boreholes in district ***Responsibility: SWA /MNRE/ District /Villages/ CSSP***	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop/Update and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016) 10year 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 Utilize Hazard Maps and Geomorphologist findings to inform location and design Utilize Sui o Nu'u monthly meetings to monitor progress of village programs and responsibilities	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan(2016) Community Engagement Plan

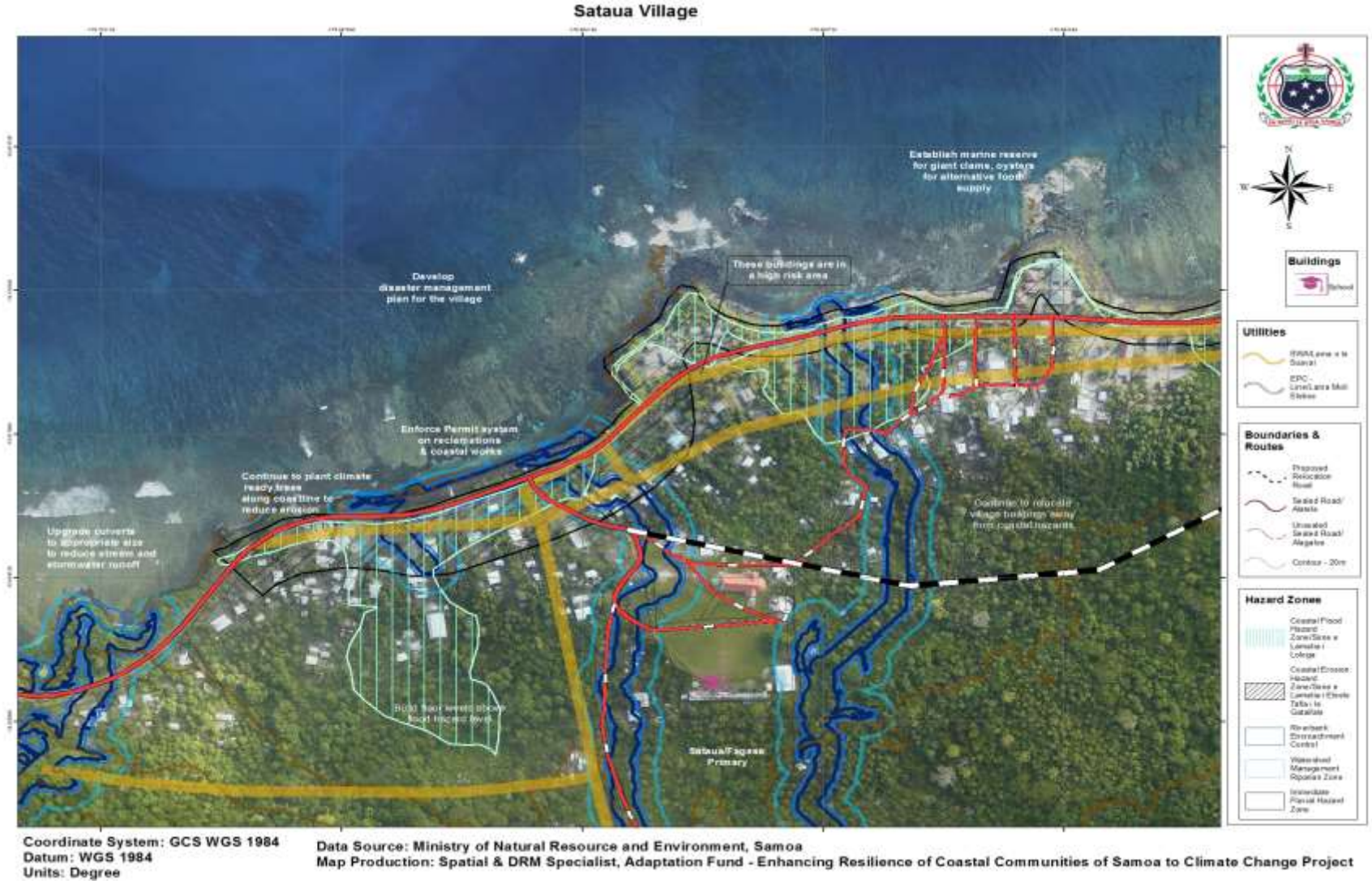
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Conduct evacuation shelter assessment and mark on CIM Plan hazard maps Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement 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***	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
Electricity supply	Provide underground lines in the long term Install and connect power supply for inland residents	Maintain electricity supply at all times including natural disasters	*Monitor distribution networks to avoid overloading poles and contributing to line failures*	EPC Strategic Plan

	Relocate overhead lines to a more resilient location when being replaced Install streetlights along the roads where needed for community safety Install and connect to solar power supply if made available Families to limit building and developments near electricity posts ***Responsibility: EPC/ MWTI/ Village/ Families***	Avoid accidents from fallen electricity posts		
Natural Resources and Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Coral reefs, lagoons and inshore fishery	Village to restock marine reserve with suitable species Collect and dispose of crown-of-thorns (alamea) on a regular basis to prevent major outbreaks Continue to ban the use of dynamites, herbal poisons (avaniukini), chemicals and other unsustainable fishing methods including sand mining and extraction Enforce village bylaws on ban on rubbish dumping in coastal areas ***Responsibility: Village/ MAF/ CSSP***	Protect coral reefs and inshore fisheries Protect marine biodiversity Protects and enhance local species diversity Sustains ecosystem services and functions	MAF Fisheries to support implementation and provide technical backstopping and monitoring Develop Village Bylaws to include management of natural resources (spring pools, marine reserve, forest etc)	Agriculture Sector Plan 2016-2021 Community Engagement Plan
Illegal rubbish dumping at old quarry	Implement village awareness and cleanup programme to reduce illegal rubbish dumping	Improve health and sanitation Reduce leachate into environment and water supply	Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and	National Waste Management Strategy National Waste Management Policy

	Implement district/village drainage cleanup and awareness programme Produce posters and village signs for public awareness Introduce ban on illegal rubbish dumping in district especially around fluvial hazard zones Conduct campaign for public awareness of district ban and establish a "neighbourhood watch" agreement with district to monitor and report on illegal dumping activities Government, district and villages to monitor, report and apply penalty on offenders ***Responsibility: MNRE/ District/ Village***	Reduce contaminant from overland flooding entering sea	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	Draft NESP 2017-2021
Soft coastal protection measures needed for most vulnerable areas	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Vaisigano 2 district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area 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	Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020 Forestry Management Act 2011

Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Giant clam farm as alternative food source	Assess feasibility of establishing giant clam farm for village consumption Ban the use of dynamites, herbal poisons (avaniukini), chemicals and other unsustainable fishing methods ***Responsibility: Village, MAF-Fisheries***	Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters	MAF Fisheries to support implementation and provide technical backstopping and monitoring Update and register Sataua 2007 Village bylaws to include management and maintenance of natural resources	Agriculture Sector Plan 2016-2021 Sataua Village Bylaws Village Fono Act(Amendment Bill 2016)
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 ***Responsibility: MWCSD /Village***	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

Sataua Village Map




Old location of village Primary School


Well maintained drainages

4.3 Papa Village Interventions

CIM Plan Solutions

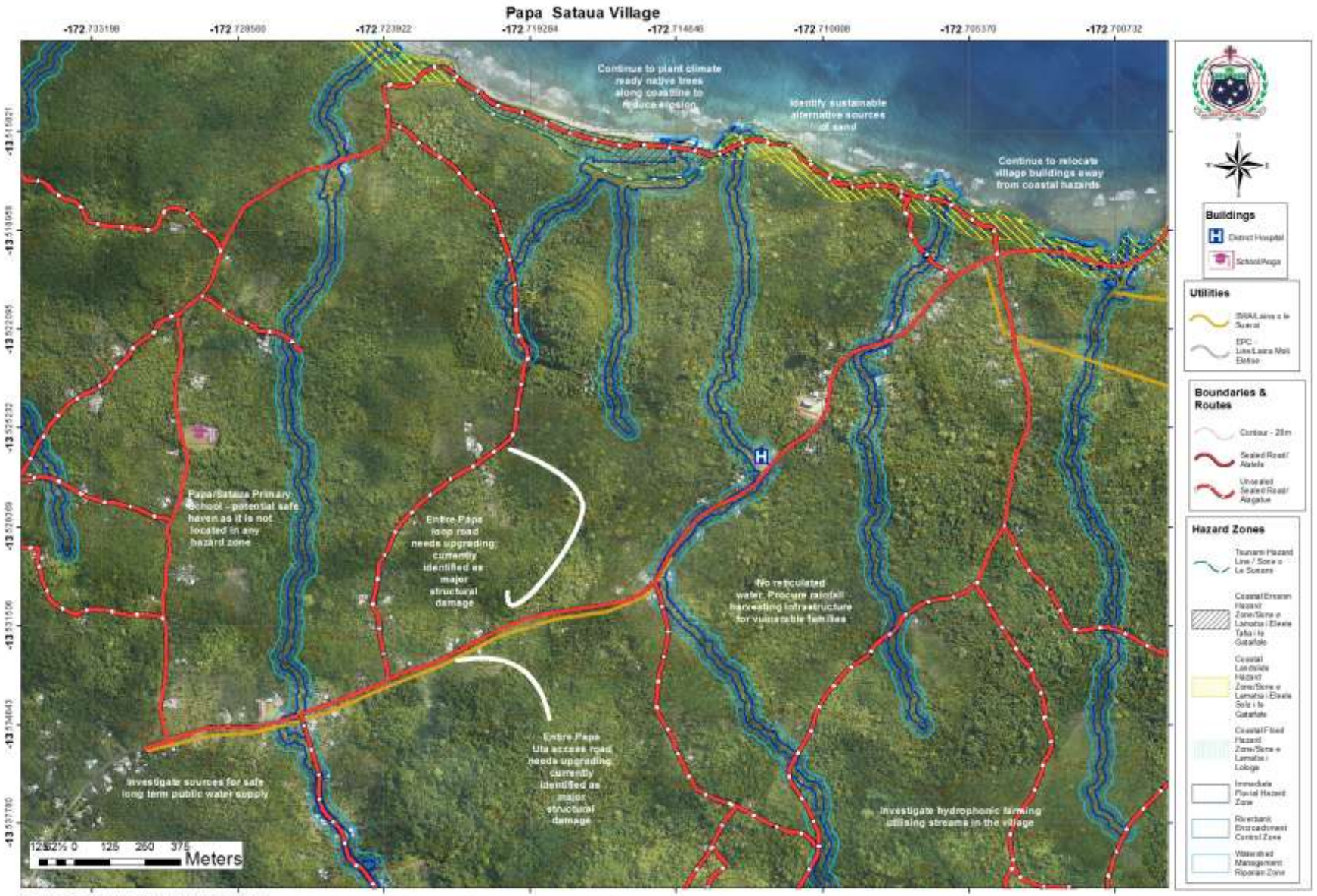
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village houses, school, churches, government and other village assets in high risk hazard zones	Relocate outside of high risk hazard zones when building/infrastructure requires replacement Investments within the hazard zones to adopt appropriate mitigation measures 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 Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: Village / Families /MWTI/ MNRE***	Minimise expenditure on damaged properties & personal assets Mitigate potential damage from coastal erosion and flooding accommodating the hazard Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters Safer villages, houses and roads	MNRE to develop zonation strategy for safe areas Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs Enforcement of National Building Code 2017 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	National Building Code CIM Strategy 2015

Upgrade access roads to facilitate movement of residents and as emergency escape route Papa Loop Rd and Papa-uta Access Road : upgrade to national standards	Upgrade both Papa Loop Road and Papa-uta Access Road in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Upgrade to include adequate drainage /culverts Enforce environmental safeguards ***Responsibility :LTA /MWTI/ MNRE/ Villages /***	Improve preparedness and readiness response to natural disasters Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and public assets	Consult landowners about dedicating areas for road upgrades UtiliseHazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and design Include in budget programming CBA, design and construction	CIM Strategy 2015 National Disaster Management Plan 2017-2021 Community Sector Plan Vulnerability Assessment of the Samoa Road Network
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting rainwater harvesting systems for vulnerable families as a short term solution District and villages to support SWA water rationing programs during times of drought District to support SWA efforts at exploratory boreholes in district ***Responsibility: SWA /MNRE/ District /Villages/ CSSP***	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop/Update and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016) 10year 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 Utilize Hazard Maps and Geomorphologist findings to inform location and design Utilize Sui o Nu'u monthly meetings to monitor progress of village programs and responsibilities	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan(2016) Community Engagement Plan
Natural Resources and Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Soft coastal protection measures needed for most vulnerable areas	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau,	Soft coastal protection measures will support and strengthen existing and	Develop an integrated land management plan for Vaisigano 1 district with the aim of reducing any unnecessary actions that may adversely affect the	Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan

	Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	natural habitats and ecosystems of the area 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	2016-2020 Forestry Management Act 2011
Livelihood and Food Security	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Food security: threatened by changes in climate and inadequate soil for planting	Promote and facilitate planting of rootcrops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods Promote agro- forestry and mixed planting including fruit trees species to reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Conduct pilot site trials for climate ready plant varieties ***Responsibility: MAF/ MNRE/villages/CSSP***	Maintains natural ecosystem Builds resilience of community livelihood and food security Improve preparedness and readiness response to natural disasters	MAF to provide trainings, awareness raising and support in supply of nursery trees, technology and infrastructure MAF to provide trainings and awareness on crop diversification to suit the prolonged impacts of climate change such as drought or rainy seasons MAF to assist in establishment of pilot sites to trial climate ready plant varieties 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	Agriculture Sector Plan 2016-2021 Community Engagement Plan Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020
Access to fishing grounds	Improve conditions for fishers to use the lagoon and increase access to fishing grounds ***Responsibility: MNRE/ Village***	Increase adaptation during drought periods Improve health	MNRE DEC to provide technical advice on management of reef opening to enable village access to fishing grounds	NESP 2017-2021

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 ***Responsibility: MWCSD /Village***	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

Papa Village Map



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

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


Unsustainable Practice

5 Savaii AF Districts Overview Map of Coastal Inundation Zones