

Coastal Infrastructure Management Plan

Gagaifomauga II District



Implementation Guidelines

April 2007

Participants in the Plan

The CIM Plan is a Partnership between the Government of Samoa and the villages within the Plan area. Both partners have responsibility for different levels of infrastructure in the local communities 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 Gagaifomauga II.

The Committee for the Faipule District of Gagaifomauga II, confirms the participation of the Villages in the preparation of this Coastal Infrastructure Management Plan for Gagaifomauga II District in partnership with the Government of Samoa and its adoption as a Management Plan for the implementation of the Coastal Infrastructure Management Strategy.

Village Meetings:

Village Representatives:

- Samauga Village 20 February 2007
- Paia Village 19 February 2007
- Lefagaoali'i Village 21 February 2007
- Matavai a Safune Village 22 February 2007
- Faletagaloa a Safune Village 23 February 2007
- Fatuvalu Village 26 February 2007

Handwritten notes for village representatives, separated by dashed lines. The notes are in Samoan and list names of representatives for each village meeting.

The CIM Plan Committee representing all of the Villages in the area met on 27 February 2007
Comments on the draft CIM Plan were received from the Committee during March 2007.

Government Ministries and Corporations:

- Ministry of Natural Resources & Environment
Planning and Urban Management Agency
- Ministry of Works Transport and Infrastructure -
- Ministry of Women, Community and Social
Development (including Internal Affairs)
- Ministry for Revenue
- Samoa Water Authority
- Electric Power Corporation
- Samoa Communications Ltd
- Samoa Land Corporation

The Planning and Urban Management Agency, 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 Coastal Infrastructure Management Plan and its adoption as a Management Plan for the implementation of the Coastal Infrastructure Management Strategy.

Signed:

Thina

Chief Executive Officer, Ministry of Natural Resources and Environment

Date: 3.08.2007

The Government of Samoa adopts the Coastal Infrastructure Management Plan for the Faipule District of Gagaifomauga II as a Management Plan for the implementation of the Coastal Infrastructure Management Strategy (CIMS).

Signed:

[Signature]

Honourable Minister, Ministry of Natural Resources and Environment

Table of Contents

Introduction to the CIM Plan	1
Implementation Guidelines	1
Participants in the Plan	i
1 Description of Gagaifomauga II District Environment	2
2 Gagaifomauga II District Infrastructure	3
3 Samauga Village Infrastructure	5
4 Paia Village Infrastructure	7
5 Lefagaoali'i Village Infrastructure	9
6 Matavai a Safune Village Infrastructure	11
7 Faletagaloa a Safune Village Infrastructure	13
8 Fatuvalu Village Infrastructure	15

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 an as 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.
<i>Lifeline infrastructure</i>	Infrastructure that contributes directly to the survival of the community and its ability to respond and recover at the time of extreme events.
<i>Secondary infrastructure</i>	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 defences 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.
<i>Community Resilience -</i>	The ability for the community to be adaptive, responsive and quick to recover from the adverse effects of hazard.
<i>Natural Resilience -</i>	The ability of natural systems to be adaptive, responsive and quick to recover from coastal 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 Coastal Infrastructure Management Plan context it is the likelihood that infrastructure will be subject to coastal hazards and the potential for loss of property, life or land due to natural processes.
Stakeholders -	Those people and organisations 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 defined vision.
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.

Acknowledgement

This plan reflects the partnership between each of the villages within the District and the Government of Samoa in the management of coastal infrastructure. Its preparation involved substantial contributions from many people; in particular, the village representatives to the District Committee, the support from the Ministry of Women, Community and Social development and the Pulenu'u in each village, without whom the plan would not have been completed.

In addition we also wish to recognise the significant contribution of the key government stakeholders, in particular:

- Ministry of Natural Resources and Environment
- Samoa Water Authority
- Electric Power Corporation
- Samoa Telecommunications
- Ministry of Works, Transportation and Infrastructure
- Ministry of Agriculture and Fisheries
- Samoa Land Corporation

On behalf of everyone involved, we extend our sincere thanks to each of these groups for enabling this plan to be developed.

Introduction to the CIM Plan

The Strategic Vision

The District Coastal Infrastructure Management (CIM) Plan for Gagaifomauga II District has been prepared as part of the Government of Samoa's Second Infrastructure Asset Management Programme (SIAM-2). 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, as providing the Strategic direction for the management of infrastructure (both public and private) within the coastal area.

The Strategy has as its central vision "Resilience – Coastal Infrastructure and Communities Resilient to Natural Hazards". 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, January 2001).

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. 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 both infrastructure and communities.

The CIM Plan will:

1. Improve the community's awareness of coastal hazard risks;
2. Enable the community and infrastructure providers to reduce coastal hazard risks in villages;
3. Enable the community and infrastructure providers 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 each of the infrastructure items that have moderate to low resilience. Where one solution will provide benefits to other items of infrastructure 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, while villages are responsible for local and community infrastructure. The responsibility for implementing the proposed actions is also defined. Solutions for both District infrastructure and Village infrastructure, and the responsibility of both partners, should be considered together as they combine to provide for the integrated management of all coastal infrastructure.

The solutions for village infrastructure will usually be the responsibility of the Village and Families in the village to implement. Advice and resources may be available from 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 should be considered an integral part of managing coastal infrastructure at both levels.

Duration of the Plan

The CIM Plan should be reviewed at five-yearly intervals. During the Plan period, the solutions implemented will be monitored to ensure that they are effective in improving resilience. Some solutions are likely to take longer than five years to implement and the review will take the progress of these into account.

The review of the *Implementation Guidelines* and the solutions proposed will be undertaken:

1. As part of the Five-yearly CIM Plan review programme.
2. Once implemented, the solutions will be monitored on either an annual or five-yearly basis to check the effectiveness of the solution. Detailed implementation of the solution will determine the monitoring requirements and Key Performance Indicators.

1 Description of Gagaifomauga II District Environment

Physical Setting

The District of Gagaifomauga II is located on the northern side of the island of Savaii west of the tourist precinct of Manase. The district is characterised by rocky coastal shores and estuaries as well as steep coastal cliffs susceptible to erosion and landslip. The inland area is steep and mountainous, covered by plantations and forest and a small number of village houses.

The villages of Gagaifomauga II include, Paia, Samauga, Lefagaoali'i, Matavai Safune, Faletagaloa Safune and Fatuvalu. All villages except Paia and part of Lefagaoali'i are located on the coast. Paia is a small village approximately 1.5 km inland, while three quarters of Lefagaoali'i is located inland away from the coast. The coastal villages are all susceptible to coastal hazards.

The village of Paia is the custodian for the Dwarves Caves, a tourist attraction and mythical heritage site for the village and district. The caves are located at the end of an unsealed and un-sign posted access road. The road is in good condition in spite of poor drainage.

The district has one river that passes through the village of Paia and reaches the sea north of Safotu. This stream causes flooding to the access road within Paia and also floods the village during periods of heavy rain. The Vailolo River supplies Paia with its water supply via a small reservoir in the mountains, the water is then piped to the village for use. The reservoir is uncovered and does not currently have a filter.

There are three reef breaks in the district, north west of Fatuvalu, north of Lefagaoali' and at Samauga (which is partially closing over), that influence tidal flows and sediment transport along the coast. The reef system ranges from 200 metres to more than six hundred metres offshore.

The villages of Matavai and Faletagaloa share a spit (safune) of land that extends in an east west direction from the shore connected to the mainland near Lafagaoalii. The Government reclaimed 20 metres of land at Faletagaloa to connect the spit through to Lefagaoali'i, and built a bridge over the small channel. The bridge has since disappeared. There is a considerable amount of siltation occurring within water sheltered by the spit. A number of buildings are located on the spit including three churches and corresponding pastors' houses. These buildings are within the Coastal Erosion and Flooding Hazard Zones and are very susceptible to storms and flooding from both the sea and the lagoon.

The majority of buildings within the district are located within the hazard zones, with the exception of inland settlements of part Lefagaoali'i and Paia. The villages of Faletagaloa, Lefagaoali'I, Samauga and Fatuvalu have varied Coastal Sensitivity Indices, ranging from low (Samauga), medium (Faletagaloa) to high (Lefagaoali'i, Fatuvalu). As the 1954 coastline data is unavailable, the only measure of coastal change is anecdotal, however, there is evidence of coastal erosion in Lefagaoali'i where remnants of the old coast road can be seen on the spit. There is also a 500m (approximately) long revetment along the coastal frontage of the spit at Lefagaoali'i as well as along the coast line from Faletagaloa to Fatuvalu. Although the revetment is consistent along the coast, it has been poorly constructed and has been damaged by storms. It does however provide some protection to several existing houses, village pools, churches and the main road.

Social Setting

The Gagaifomauga II District currently has a population of 1920 (2001 census data) persons. Development is mostly scattered along or near the coast. The main road is an important part of the district's infrastructure. It follows the coastline throughout the district however deviates inland slightly at Utuimo Point between the villages of Safe'e (neighbouring district) and Samauga. The main road is in good condition, although where it is close to the coast it lacks appropriate drainage. There is a safety barrier along the main road between Samauga and Lefagaoali'i. The main road provides easy access to other work roads, schools, churches and village buildings, including a neighbouring district hospital at Sofotu. It also provides access to other districts and services.

Primary services such as water, power and telephone generally follow the main road and extend along the spit at Lefagaoali'i. The villages of Paia and Matavai both have water reservoirs that supply the district while a number of springs and communal water tanks provide alternative sources of water. Telephone services are provided by both SamoaTel and Digicel, while EPC provides electricity to all of the settlements along the coast, however is limited along the access roads.

From the main road seven work roads extend both inland to village plantations and toward the coast. The condition of these roads varies between villages. A number of these roads are within the coastal hazard zones and are degraded as a result. The coastal access roads extending from the main road are located within Samauga and Lefagaoali'i and are within the CEHZ and CFHZ. The first ten metres of most access roads inland are also within the hazard zones. It is common across the district for roads extending inland to be unsealed, with poor drainage systems and no lighting, electricity and water supply.

Economic Setting

The cash economy of the District is dominated by traditional work. The majority of local residents are largely sustained by plantation work and fishing. Some families also graze cattle. The cultural heritage of the district also provides a tourism function, which provides income for the respective custodian villages of Paia (Dwarves Caves) and Matavai (Sina's Pool). The District supports two primary schools at Samauga, and Faletagaloa and a secondary school at Fatuvalu, as well as multiple churches per village. The primary school at Faletagaloa was relocated from its inland location to the coast, within the coastal hazard zones. This was due to flooding reasons and accessibility however its new location is adjacent to a swamp and is highly susceptible to coastal surges and overflow from the swamp. There are a number of small shops throughout the area.

2 Gagaifomauga II District Infrastructure

CIM Plan Solutions

Infrastructure	Best Solutions and Other Solutions Proposed	Other Benefits	Implementation Guidelines
Main road including drainage systems and the Vailolo River crossing in CEHZ and/or CFHZ	<ul style="list-style-type: none"> To implement a regular drainage inspection programme in the District and to ensure that maintenance is undertaken regularly To undertake a local education programme on the importance of maintaining drains To ensure that the existing drains and culverts are large enough and in the right place, to clear flood waters quickly Introduce culverts and drainage ditches to facilitate the overland flow of stormwater and reduce flooding Investigate whether the current seawall needs maintenance and reconstruction <p><i>Responsibility: MWTI</i></p>	<p>Improved resilience and rate of recovery.</p> <ul style="list-style-type: none"> Improved coastal protection Safer village houses and roads Improved tourism potential Improved sustainability of natural resources Improved access to elevated areas. Improved coastal protection Improved biodiversity Improved health Improves preparedness of District for cyclones. Improves resilience and ability to respond 	<ul style="list-style-type: none"> Provide for maintenance and minor improvements to existing seawalls in budget programmes Prepare a local education programme on drainage systems Prepare design and contract for upgrading the bridge and the ford Undertake safety audit of the main road in the District and implement its recommendations Provide for works in budget programmes.
Electricity and Telephone Distribution Network within CEHZ and CFHZ	<ul style="list-style-type: none"> Provision of underground lines in the long term Relocate overhead lines to a more resilient location as and when replacement is required To provide public notices before any power shut down Upgrade mobile telephone coverage for the whole of the District <p><i>Responsibility: EPC/Samoatel</i></p>		<ul style="list-style-type: none"> Ensure regular maintenance of electricity and telephone lines. Provide for works in budget programmes
Main water supply	<ul style="list-style-type: none"> To inspect the main water supply and extend the water supply to families inland Upgrade and protect village pools Construct more water tanks in case the main water supply is cut off or for families inland with no access to water <p><i>Responsibility: SWA</i></p>		<ul style="list-style-type: none"> Provide for works in budget programmes
Emergency Management	<ul style="list-style-type: none"> Identify schools and churches outside of the CEHZ and CFHZ as safe havens. Prepare a District Emergency Response Plan identifying resources needed for the safe havens. Prepare signs in English and Samoan to be erected throughout the District identifying actions in the event of emergencies including a location map of nearest emergency facilities and safe haven. <p><i>Responsibility: MNREM/District/Village</i></p>		<ul style="list-style-type: none"> District response plan should include procedure for who prepares, maintains and opens the safe haven as well as procedures to notify villagers and visitors in an emergency and to maintain and replenish supplies. Identify location of facilities on CIM Plan maps.

3 Samauga Village Infrastructure

CIM Plan Solutions

Infrastructure	Best Solutions and Other Solutions Proposed	Other Benefits	Implementation Guidelines
Village Pool – Vai Aisa	<ul style="list-style-type: none"> Construct protective wall surrounding the spring pools To ensure that the light pole at the pool is working at all times Upgrade and maintain track to the pool Investigate protecting the spring pool from landslips areas. <p><i>Responsibility: MWTI/Village</i></p>	<ul style="list-style-type: none"> More resilient to natural hazards, Better use of economic resources 	<ul style="list-style-type: none"> MWTI to advise on work needed to upgrade pool protection Provide for works in budget programmes

Other Solutions Considered and Further Issues Raised

Infrastructure	Solutions/Issues	Comment
Coastal area	<ul style="list-style-type: none"> Identify a safe channel at to the lagoon for fishing 	<ul style="list-style-type: none"> The issue is outside the scope of the Coastal Infrastructure Assets Management Plan but is noted as it was raised during discussion and appropriate action by the village
Village work roads	<ul style="list-style-type: none"> Upgrade work road to village standard and paved remaining section to plantations Install more streetlights along work road 	<ul style="list-style-type: none"> Work roads are critical assets to the development of the village plantation but they are outside the coastal hazard areas. The issue is noted for further action as required.
Samauga Primary School	<ul style="list-style-type: none"> Upgrade school facilities i.e. toilets and provide more teachers for the school 	<ul style="list-style-type: none"> Not enough teachers for the school Poor condition of school facilities





Historic rocks



Village spring on coast

Main road crossing near school



4 Paia Village Infrastructure

The solutions considered below are not required to implement the CIM Strategy as the village lies outside the coastal hazard zones. They are provided for consideration by the village or the appropriate ministry to improve the resilience of the community to natural emergencies.

Other Solutions Considered or Further Issues Raised

Infrastructure	Solutions/Issues	Comment
Village houses, committee house and other infrastructure subject to flooding and erosion along the stream	<ul style="list-style-type: none"> To build new houses and relocate existing houses away from the stream when upgrading is required, or raise foundation levels, as required. 	<ul style="list-style-type: none"> The villages lie outside of the coastal hazard zones but may be subject to flooding from the streams that flow through the village. Any new buildings should be built away from these flood areas to avoid damage in the future and any existing buildings in these areas should be relocated when upgrading is considered The committee house is located near the gully.
Reservoir / Water Supply	<ul style="list-style-type: none"> Install a filter for the reservoir Investigate providing a roofing over the reservoir Upgrade and construct additional reservoirs to hold more water Regular maintenance to ensure that the reservoir is clean at all times Conserve trees and upper catchment areas Installation of water tanks as an alternative when water supply is cut off OR for families with no access to water supply at the moment 	<ul style="list-style-type: none"> To increase the capacity of the reservoir to hold more water To ensure clean water supply Water supply is also considered in Section 3, District Infrastructure.
Electricity Lines	<ul style="list-style-type: none"> Install more streetlights along main road Provide public notification before any power shut down 	<ul style="list-style-type: none"> Reduce damage costs Improve rate of recovery To reduce damage to home appliances Limited streetlights
Main road	<ul style="list-style-type: none"> Install drainage culverts where required along the main road 	<ul style="list-style-type: none"> Construction of road without proper drainage in place result in over road flooding Improve safety on roads
Paia Primary School	<ul style="list-style-type: none"> Provide more teachers for the school 	<ul style="list-style-type: none"> Not enough teachers for the school
Tourist Attraction - "Dwarves Cave"	<ul style="list-style-type: none"> Provide awareness for the site- signage, information centre Upgrade the access road to the site 	<ul style="list-style-type: none"> The issue is not affected by coastal hazards and is therefore outside of the scope of the Coastal Infrastructure Assets Management Plan. The issue is noted as it was raised during consultation and for appropriate action by the village and relevant ministries





5 Lefagaoli'i Village Infrastructure

CIM Plan Solutions

Infrastructure	Best Solutions and Other Solutions Proposed	Other Benefits	Implementation Guidelines
<p>Village houses, access road and other infrastructure in the coastal hazard zones</p>	<ul style="list-style-type: none"> • Where reclamations or other major coastal works are proposed Government and village to manage processes by requiring villagers to get the appropriate permits and consent. <p><i>Responsibility: MNREM/Village / Families</i></p> <ul style="list-style-type: none"> • Relocate outside or set back from CEHZ and CFHZ when buildings require replacement. Alternatively, ensure any investment in structures located within the hazard zones takes into account the potential for damage from coastal erosion and flooding. <p><i>Responsibility: Village / Families</i></p> <p>Best Solution</p> <ul style="list-style-type: none"> • Continue building foundations at a level that takes into account the CFHZ. <p><i>Responsibility: Families</i></p> <ul style="list-style-type: none"> • Continue planting vegetation in coastal areas and protect plants from damage. • Encourage the village to provide proper fencing for domestic animals at all times <p><i>Responsibility: Village / Families</i></p> <ul style="list-style-type: none"> • Upgrade work roads to facilitate relocation of houses away from the coast. Upgrading to include widening, construction of drains across and paved remain sections of the road. Investigate raising the road at the river crossing. • Install streetlights along the access/work roads <p><i>Responsibility: MWTI/Village</i></p>	<ul style="list-style-type: none"> • Safer houses • Improved biodiversity • Better use of economic resources • Improved protection and resilience. • Improved sustainability of natural resources 	<ul style="list-style-type: none"> • Family decision when building to provide long-term protection from flooding. • Village / Family decision to relocate in long term. • Village/Families to recognize the role that vegetation plays in stabilizing coastal areas. • Coastal areas to be planted as soon as possible with suitable species. • MNREM to advise on appropriate tree species and where possible, provide seedlings. • MWTI to advise on work needed to upgrade work roads and pool protection • Provide for works in budget programmes
<p>Village pool - Vaga</p>	<ul style="list-style-type: none"> • Construct protective wall surrounding the spring pools • Upgrade the access road to the spring pool • Provide a light pole at the pool <p><i>Responsibility: MWTI/Village</i></p>		

Other Solutions Considered or Further Issues Raised

Infrastructure	Solutions/Issues	Comment
Village Primary School	<ul style="list-style-type: none"> Investigate it is economical and appropriate to build a school in the village 	<ul style="list-style-type: none"> The issue is not affected by coastal hazards and is therefore outside of the scope of the Coastal Infrastructure Assets Management Plan. The issue is noted as it was raised during consultation and for appropriate action by the village and relevant ministries
Coastal area	<ul style="list-style-type: none"> Identify a safe canoe pathway out to the lagoon 	<ul style="list-style-type: none"> The village to identify a safe pathway for fishing canoes



Village spring



Village springs



Steep access path



6 *Matavai a Safune Village Infrastructure*

CIM Plan Solutions

Infrastructure	Best Solutions and Other Solutions Proposed	Other Benefits	Implementation Guidelines
Village houses, access road and other infrastructure in the coastal hazard zones	<ul style="list-style-type: none"> Where reclamations or other major coastal works are proposed Government and village to manage processes by requiring villagers to get the appropriate permits and consent. <i>Responsibility: MWTI/Village / Families</i> Relocate outside or set back from CEHZ and CFHZ when buildings require replacement. Alternatively, ensure any investment in structures located within the hazard zones takes into account the potential for damage from coastal erosion and flooding. <i>Responsibility: Village / Families</i> <p>Best Solution</p> <ul style="list-style-type: none"> Continue building foundations at a level that takes into account the CFHZ. <i>Responsibility: Families</i> Continue planting vegetation in coastal areas and protect plants from damage. Encourage the village to provide proper fencing for domestic animals at all times <i>Responsibility: Village / Families</i> Upgrade work roads to facilitate relocation of houses away from the coast. Upgrading to include widening, construction of drains across and paved remain sections of the road. Install and/or maintain streetlights along the main road and the work road <i>Responsibility: MWTI / Village</i> 	<ul style="list-style-type: none"> Safer houses Improved biodiversity Better use of economic resources Improved protection and resilience. Improved sustainability of natural resources 	<ul style="list-style-type: none"> Family decision when building to provide long-term protection from flooding. Village / Family decision to relocate in long term. Village/Families to recognize the role that vegetation plays in stabilizing coastal areas. Coastal areas to be planted as soon as possible with suitable species. MNREM to advise on appropriate tree species and where possible, provide seedlings. MWTI to advise on work needed to upgrade work roads and pool protection Prepare Environmental Impact Assessment to upgrade work roads Programme and budget works Obtain permits for work in the coastal area
Water Spring - "Mata-o le-Alelo"	<ul style="list-style-type: none"> Construct protective wall surrounding the spring pools Provide historical information on the meaning of the water spring Provide signage for the pool <i>Responsibility: MWTI / Village</i> 		<ul style="list-style-type: none"> Prepare Environmental Impact Assessment to upgrade pool wall and access road Programme and budget works
Wetland	<ul style="list-style-type: none"> To introduce replanting appropriate trees at areas currently eroding Propose a mangrove conservation programme for the village Enforce village laws against the use of dynamite and other chemicals for fishing as it will destroy the reef Provide fencing for domestic animals <i>Responsibility: MNREM / Village</i> 		<ul style="list-style-type: none"> Prepare conservation programme for mangrove areas Programme and budget works recommended in programme



Exposed pipeline



Area desired for sports field



Unsealed access road with poor drainage



Wetland free of rubbish



7 **Faletagaloa a Safune Village Infrastructure**

CIM Plan Solutions

Infrastructure	Best Solutions and Other Solutions Proposed	Other Benefits	Implementation Guidelines
<p>Village houses, access road and other infrastructure in the coastal hazard zones</p>	<ul style="list-style-type: none"> • Where reclamations or other major coastal works are proposed Government and village to manage processes by requiring villagers to get the appropriate permits and consent. <p><i>Responsibility: MNREM/Village / Families</i></p> <ul style="list-style-type: none"> • Relocate outside or set back from CEHZ and CFHZ when buildings require replacement. Alternatively, ensure any investment in structures located within the hazard zones takes into account the potential for damage from coastal erosion and flooding. <p><i>Responsibility: Village / Families</i></p> <p>Best Solution</p> <ul style="list-style-type: none"> • Continue building foundations at a level that takes into account the CFHZ. <p><i>Responsibility: Families</i></p> <ul style="list-style-type: none"> • Continue planting vegetation in coastal areas and protect plants from damage. <p><i>Responsibility: Village / Families</i></p> <ul style="list-style-type: none"> • Upgrade work roads to facilitate relocation of houses away from the coast. Upgrading to include widening, construction of drains across and paved remain sections of the road. • Ensure drains are clear at all times. • Install and/or maintain streetlights along the main road and the work road <p><i>Responsibility: MWTI / Village</i></p> <ul style="list-style-type: none"> • Encourage the village to provide proper fencing for domestic animals at all times • To identify a safe haven outside of the coastal hazard zones <p><i>Responsibility: Village/Families</i></p>	<ul style="list-style-type: none"> • Safer houses • Improved biodiversity • Better use of economic resources • Improved protection and resilience. • Improved sustainability of natural resources 	<ul style="list-style-type: none"> • Family decision when building to provide long-term protection from flooding. • Village / Family decision to relocate in long term. • Village/Families to recognize the role that vegetation plays in stabilizing coastal areas. • Coastal areas to be planted as soon as possible with suitable species. • MNREM to advise on appropriate tree species and where possible, provide seedlings. • MWTI to advise on work needed to upgrade work roads and pool protection • Prepare environmental impact assessments for upgrade to work roads • Programme and budget works • Prepare emergency management plans • Erect signs for safe haven
<p>Village pools – Salafai, Funefeai</p>	<ul style="list-style-type: none"> • Construct protective wall surrounding the spring pools • Provide fence for domestic animals • Construct drains along the pool <p><i>Responsibility: MWTI / Village</i></p>		<ul style="list-style-type: none"> • Prepare Environmental Impact Assessment to upgrade pool wall • Programme and budget works

Other Solutions Considered or Further Issues Raised

Infrastructure	Solutions/Issues	Comment
Tourist attraction site - " Ana o Peapea"	<ul style="list-style-type: none"> • Within CFHZ • Investigate an appropriate solution to protect this historical site from flooding 	<ul style="list-style-type: none"> • Village to seek funding to protect " Ana o Peapea" and further action by the relevant ministry
Coastal area	<ul style="list-style-type: none"> • Propose a mangrove conservation programme for the village • Enforce village laws against the use of dynamite and other chemicals for fishing as it will destroy the reef • Provide fencing for domestic animals 	<ul style="list-style-type: none"> • Some people still reside along the coast and it is important to protect/ conserve the mangroves as well as tree replanting as this will be a protection against waves and cyclones. • The issue is noted for appropriate actions by the village and the relevant ministry



Local secondary school



8 Fatuvalu Village Infrastructure

CIM Plan Solutions

Infrastructure	Best Solutions and Other Solutions Proposed	Other Benefits	Implementation Guidelines
<p>Village houses and other assets within CFHZ and CEHZ</p>	<ul style="list-style-type: none"> Where reclamations or other major coastal works are proposed Government and village to manage processes by requiring villagers to get the appropriate permits and consent. <p><i>Responsibility: MNREM/Village / Families</i></p> <ul style="list-style-type: none"> Relocate outside or set back from CEHZ and CFHZ when buildings require replacement. Alternatively, ensure any investment in structures located within the hazard zones takes into account the potential for damage from coastal erosion and flooding. <p><i>Responsibility: Village / Families</i></p> <p>Best Solution</p> <ul style="list-style-type: none"> Continue building foundations at a level that takes into account the CFHZ. <p><i>Responsibility: Families</i></p> <ul style="list-style-type: none"> Continue planting vegetation in coastal areas and protect plants from damage. <p><i>Responsibility: Village / Families</i></p> <ul style="list-style-type: none"> Upgrade village work roads <p><i>Responsibility: MWCS D / Village</i></p> <ul style="list-style-type: none"> Upgrade work roads to facilitate relocation of houses away from the coast. Upgrading to include widening, construction of drains across and paved remain sections of the road. Investigate raising the road at the river crossing. Ensure drains are clear at all times. Install streetlights along the access/work roads <p><i>Responsibility: MWTI/Village</i></p> <ul style="list-style-type: none"> To properly fence domestic animals Village council to enforce laws against dumping rubbish in the wetlands and the river Publicly notify rubbish collection days and times and provide rubbish bins <p><i>Responsibility: MNREM / Village</i></p>	<ul style="list-style-type: none"> Safer houses Better use of economic resources Improved tourism opportunities Healthy environment Improved biodiversity Improved protection and resilience. Improved sustainability of natural resources 	<ul style="list-style-type: none"> Family decision when building to provide long-term protection from flooding. Village / Family decision to relocate in long term. Village/Families to recognize the role that vegetation plays in stabilizing coastal areas. Coastal areas to be planted as soon as possible with suitable species. MNREM to advise on appropriate tree species and where possible, provide seedlings. MWTI to advise on work needed to upgrade work roads Prepare Environmental Impact Assessment to upgrade work roads Programme and budget works Obtain permits for work in the coastal area



Area suggested for re-planting mangroves



Deep pool



Exposed pipeline



Good coastal protection



