GOVERNMENT OF SAMOA

USAID

SAMOA

INFRASTRUCTURE ASSET MANAGEMENT STRATEGY

(SIAMS 2018, updated 2022)

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Ministry of Health (MOH)
Ministry of Natural Resources and Environment (MNRE)
Ministry of Police and Prisons(MOPP)
Ministry of Public Enterprises (MPE)
Ministry of Women, Community and Social Development (MWCSD)
Ministry of Works, Transport and Infrastructure (MWTI)
Land Transport Authority (LTA)
Samoa Airport Authority (SAA)
Samoa Housing Corporation (SHC)
Samoa Ports Authority (SPA)
Samoa Shipping Corporation (SSC)
Samoa Water Authority (SWA)

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Adam Smith International

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Key Definitions

Asset Management (AM): Effective asset management is a shift in focus toward the long-term life cycle of an asset and its sustained performance, rather than the short-term, day-to-day aspects of the asset. The International Infrastructure Management Manual defines it as *"The systematic and coordinated activities and practices of an organisation to optimally and sustainably deliver on its objectives through the cost-effective lifecycle management of assets."*

Asset Management Policy: A document that broadly outlines the principles and mandated requirements for undertaking asset management in a systematic and coordinated way, consistent with the organisation's strategic plan – for Samoa this is the *Strategy for the Development of Samoa* (SDS). It provides the mandate for the AM Strategy and AM Plan.

Asset Management Strategy: The asset management strategy converts the objectives of the strategic plan(s) and the AM policy into an action plan for business improvement.

Asset Management Plan (AMP): Long-term plans (usually 10-20 years or more for infrastructure assets) that outline the asset activities and programmes for each service area and resources applied to provide a defined level of service in the most cost-effective way.

Climate Change: A change in the state of the climate that can be identified (for example, through use of statistical tests). This includes changes or trends in the mean and/or the variability of its properties which persist for an extended period (typically decades to centuries).

Level of Service (LoS): Level of service statements describe the outputs or objectives an organisation or activity intends to deliver to customers. They are customer outcome centric (e.g. provide safe drinking water) rather than the more asset centric "performance measures" (e.g. Litres of water pumped per day).

Rehabilitation (refurbishment): Remedial work to rebuild or replace parts or components of an asset, to restore it to a required functional condition and extend its life, which may incorporate some modification. Generally, it involves repairing the asset to deliver its original level of service (i.e. heavy patching of roads, slip lining of sewer mains, etc.) without resorting to significant upgrading or renewal.

Resilience: The ability of a system and its parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions.

Renewal (replacement): To replace existing assets or facilities with assets or facilities of equivalent capacity or performance capability. For example, replacing a 500 HP pump motor with the same make/model or a new 500 HP energy efficient motor would be considered aa "asset renewal" – both options provide the same capacity/performance in terms of function. The energy efficiency is a secondary benefit of the renewal.

Unfunded Liability: This is the "funding gap" that can arise within an organisation managing long-life assets. It is the difference between historic capital expenditure on maintenance, rehabilitation and renewals and what is now required to sustain the required levels of service. Asset management principles help assess the magnitude of an agencies unfunded liability.

1 Introduction

1.1 Samoa's Infrastructure Environment

Population: Samoa is a small island country in the southwest Pacific, comprising of two main islands (accounting for more than 99% of the total land area). Over the last 100 years the population of Samoa has increased by around 1.6% per year to a population of approximately 204,000[1] in 2021.

Topography: Samoa's topography is rugged and mountainous with the highest peak reaching 1,848 m in height. In most areas there is a flat to gently undulating coastal plain which passes into rolling slopes and into steeper foothills. In general, the upland plateaux are rolling and surmounted by extinct volcanic cones leading to 70% of Samoa's infrastructure being in low lying coastal areas.

Climate: Samoa's climate varies considerably from year to year due to the El Niño-Southern Oscillation. There are two extreme phases: El Niño and La Niña. In Samoa, El Niño events tend to bring wet seasons that are drier than normal, while La Niña events usually bring wetter and cooler than normal conditions. Tropical cyclones affect Samoa between November and April. Flooding associated with tropical cyclones and strong La Niña events have caused widespread damage in Samoa, particularly in Dec 2003 (Heta) and Dec 2012 (Evan)[2]. Drought impacts are most notable in the north-west regions of the main islands and at times are associated with forest fires. In Asau, there were major forest fires during the dry seasons of 1982, 1997, 2001 and 2002.

Land Ownership: The traditional (customary) land tenure system still controls over 80% of Samoa's land resources. The rules governing the allocation of access, use and ownership rights to land and resources under communal ownership are sometimes complicated. In some cases, the land tenure system is perceived as a stumbling block to development, because of difficulties of accessing land for development and investment.

Water Resources: Samoa has abundant water resources compared to many other Pacific Islands. The average rainfall is over 3,000mm/year with about 75 per cent of the precipitation occurring during November-January. Surface water provides approximately 65% of the water supply and groundwater the remaining 35%.

Energy Resources: Samoa has one of the highest levels of access to electricity in the region with around 95% of the population on-grid. Total energy demand for Samoa is met by 3 main sources, petroleum products (diesel, petrol, kerosene and LPG), biomass and hydropower. Currently approximately 80% of the total energy used is derived from imported petroleum products which makes electricity costly[3]. 17% of the total energy demand is from biomass (firewood) and the remaining 3% from hydropower. The contribution of solar energy to Samoa's current energy mix is extremely small but increasing steadily.

Transport Resources: There is approximately 1,200km of road network across the islands of Upolu and Savaii with 5 ports, one international airport and three domestic fields (two of which aren't operational). The port in Apia is the hub of goods in (60,000T/yr) and out (7,500T/yr) of Samoa. Passenger arrivals into Faleolo airport were around 145,000/yr of which 85% are visitors (prior to the 2020 global pandemic). Fagalii airport runs flights between Apia and Western Samoa. Recovery of inbound passenger arrivals awaits the conclusion of the global pandemic, and the redevelopment of international travel.

Natural Disasters: Samoa is vulnerable to a range of natural disasters. In addition to the impacts of tropical cyclones Samoa is also subject to tsunami. The 2009 tsunami caused damage to Samoa's public and private infrastructure e.g. the road network in Upolu.

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[1] *Source: Samoa Bureau of Statistics. Based on projections from 188,000 at last census, 2011*

[2] *The economic cost of Cyclone Evan was estimated at US$103 million, approximately 28% of the value of goods and services in 2011.*

[3] *Around 3-4 times higher than NZ (NISP)*

1.2 Benefits of Asset Management

Organisations throughout the world face continuous challenges to accomplish more with less as increases in demand, regulatory requirements, infrastructure deterioration, and political and economic forces have significantly outpaced increases in capital and operating budgets. These challenges and more are making infrastructure asset management essential to every successful utility operation.

The South Australian Government's Strategic Asset Management Framework for Buildings (2017) quotes the following as potential benefits of good asset management practice:

a) Agency services required by the community are delivered more efficiently and at better value by ensuring that assets are appropriately planned, built, acquired, used, maintained, and exited from or disposed of.
b) Support service delivery by providing the right assets at an appropriate time and location in appropriate quantities.
c) Improved financial performance and lower lifecycle costs.
d) Improved confidence in financial planning (Opex & Capex) using reliable processes and procedures.
e) Improved ability to justify business cases for expenditure, or prioritisation of works.
f) Improved understanding and management of asset and business risks.
g) Improvements and consistency in decision making.
h) Enhanced understanding of change implications across the stakeholders and the business;
i) Improved cross-business communication and breakdown of the 'silo' culture.
j) Improved management of internal and external resources.
k) Minimise demand for new assets through consideration of non-asset service delivery alternatives.

The "Water Infrastructure Asset Management Study" (McGraw Hill, 2012) researched 451 water utilities in the U.S. and Canada. Respondents considered to be asset management practitioners quoted the following benefits from their programs:

- 88% - Improved ability to explain and defend budgets.
- 70% - Better focused on priorities.
- 65% - Understood risk and consequence of investment strategies.
- 56% - Reduced costs without sacrificing service levels.
- 52% - Increased ability to balance between capital and operational expenditure

1.3 Benefits of Mainstreaming Climate Adaptation into Asset Management Processes

Samoa shares many of the climate-related challenges of other Small Island Developing States:

- Samoa is highly vulnerable to a range of natural hazards such as earthquakes, tsunami, cyclones and sea-level rise
- Approximately 70% of the population live within 1km of the coast. The majority of infrastructure is in the highly vulnerable coastal zone
- Financing of disaster losses remains an issue, and impacts on funds available for asset renewals and maintenance
- Some past engineering solutions are no longer effective or appropriate for withstanding the increasing intensity and frequency of climate and weather events

Asset management provides opportunities to meet the climate-related challenges:

i. Asset management comprises the entire process, from system planning, investment programming, and the design and construction of assets, to the operation and preservation of the system. It is characterised by a solid policy framework, measurable objectives, and effective tools and information systems that allow continuous performance monitoring. Samoa has already made good progress in implementing asset management systems and processes.

ii. The asset management framework assists in focusing investment on what matters most. Ultimately asset management services have to provide to the community needs. The asset management investment analysis processes can also help to prioritise resilient improvements that will significantly reduce climate risks.

iii. There are components of the asset management processes that can also address the needs from a resilience planning perspective, including:

a) Storing, managing and presenting of data and information (e.g. such as GIS maps);
b) Processing and analysis of data to assist in decision making;
c) Tracking reporting on infrastructure resilience and costs over time;
d) Provide a systematic process to plan and manage infrastructure works that include resilience improvements.

Resilience principles can be integrated across the entire lifecycle of infrastructure:

- Systems Planning
- Engineering and Design
- Operations and Maintenance
- Contingency Planning

Asset management principles feed into the resilience cycle of infrastructure as shown in *Figure 1-1* below. The top part of the figure shows activities associated with the improvement of resilience. The bottom half shows the asset management processes employed following an event.

Figure 1-1: Asset Management as part of the Resilience Cycle

Further information is included in Appendix C.

1.4 Asset Management Framework

There are many definitions of asset management. Common across these definitions are the concepts that:

1. Assets exist to deliver customers a service (e.g. water, power, shelter)
2. We must consider the whole-of-life costs of owning these assets (operating, recurrent, capital)
3. Asset management is about delivering appropriate levels of service in a cost-effective manner.

Asset management is the systematic and coordinated activities and practices of an organization to optimally and sustainably deliver on its objectives through the cost-effective lifecycle management of assets. The infrastructure Asset Management goal is to meet a required level of service, in the most cost-effective manner, through the management of assets for present and future customers.

– IIMM 2020.

Asset managers need to be able to answer 5-fundamental questions about their infrastructure:

1. What is the current state of my system and assets?
2. What levels of service are required by my customers?
3. Which assets are critical to providing those levels of service?
4. What is the optimum investment strategy for sustaining those assets?
5. What long-term funding do I need to meet my asset performance standards?

Answering these fundamental questions includes consideration of the impacts of climate change and the resilience of the assets to the impacts of climate change and natural disasters.

Asset management systems and practices should be focused on enabling an organisation to better manage the 'buckets of money' associated with maintaining, rejuvenating and renewing its **existing infrastructure** portfolio. Asset management practices can also help optimise operations (e.g. more energy efficient assets), improve planning of new infrastructure, including the possibility of NOT having to build that new infrastructure (e.g. optimising system performance, reducing water loss, managing peak demand etc). The impacts of climate change and subsequent disaster resilience are an integral part of this better management.

1.5 Purpose of this Strategy

This AM Strategy sits beneath the AM Policy and guides the overall improvement activities within the Government of Samoa. Being a strategy, its purpose is to explore longer term issues and ensure that improvements are linked to the key "strategic challenges" of the organisations involved. The strategy covers macro items and business improvement initiatives (people/process/technology) and leaves the detailed (micro) activities and project development needs to the more specific Asset Management Plans (AMP) including the Transport and Infrastructure Sector Plan that replaces the expired National Infrastructure Strategic Plan (NISP). To develop the strategy, the project team investigated:

1. The status of current asset management systems, practices and funding.
2. The main challenges facing infrastructure in Samoa.
3. The required improvements to asset management procedures, systems and staffing.
4. Climate change and disaster resilience.

Given the current state of AM in Samoa (Section 5) the improvement initiates included herein are more tactical in nature and address foundational improvements such as better-quality data upon which informed decisions can be made. Over time, as AM practices mature, this strategy will deepen the scope and extent of the improvement initiatives presented in Section 7.

1.6 Guiding Principles

The following two documents contain the knowledge base for asset management development in Samoa. These two foundational documents contain the key AM themes replicated throughout many of the other published reports and manuals on asset management.

ISO Standards for Asset Management (ISO55001/55002)

ISO 55000 provides an overview of the subject of asset management and the standard terms and definitions. ISO 55001 is the requirements specification for an integrated, effective management system for asset management. ISO 55002 provides guidance for the implementation of such a management system. The development of these standards was achieved by ISO Committee TC251, with 31 countries participating. The standards were published in February 2014 and are available from national standards bodies such as BSI.

International Infrastructure Management Manual (IIMM)

Now in its 6th Edition (2020) the International Infrastructure Management Manual (IIMM) provides a multidisciplinary set of guidelines for determining lifecycle investment strategies for public infrastructure assets. Recognising that the ISO55000 Asset Management Standards are very much the “What to do”, the IIMM provides the “How to do it” in terms of applying the standards for infrastructure asset management through case examples, templates and guidelines.

The IIMM, being a digital document is continuously updated, and now includes further guidance on sustainability, climate change adaptation and resilience management.

1.7 Key Stakeholders

A workshop was held in September 2017 to socialise and develop components of this strategy. The infrastructure stakeholders invited and represented at the workshop were:

Ministry of Finance
Ministry of Communications and Information Technology
Ministry of Health
National Health Services
Ministry of Natural Resources and Environment
Ministry of Agriculture and Fisheries
Ministry for Revenue
Ministry of Police
Ministry for Prisons and Corrections
Ministry for Public Enterprises
Ministry of Education, Sports and Culture
Samoa Water Authority
Ministry for the Prime Minister and Cabinet
Public Service Commission
Electric Power Corporation
Land Transport Authority
Samoa Fire and Emergency Services
Samoa Housing Corporation
Office of the Regulator
Samoa Airport Authority
Samoa Ports Authority
Samoa Shipping Corporation
Samoa Shipping Services

The review of the Strategy in 2021, involved key stakeholder engagement to monitor progress and develop a revised approach to asset management plan, with the view to align with national climate change and adaptation goals. The infrastructure stakeholders involved were:

- Electric Power Corporation (EPC)
- Ministry of Agriculture and Fisheries (MAF)
- Ministry of Communications and InformationTechnology (MCIT)
- Ministry of Education, Sports and Culture (MESC)
- Ministry of Finance (MOF)
- Ministry of Health (MOH)
- Ministry of Natural Resources and Environment (MNRE)
- Ministry of Police and Prisons(MOPP)
- Ministry of Public Enterprises (MPE)
- Ministry of Women, Community and Social Development (MWCSD)
- Ministry of Works, Transport and Infrastructure (MWTI)
- Land Transport Authority (LTA)
- Samoa Airport Authority (SAA)
- Samoa Housing Corporation (SHC)
- Samoa Ports Authority (SPA)
- Samoa Shipping Corporation (SSC)
- Samoa Water Authority (SWA)

2 Strategic Planning Context

Strategic Planning *is the process by which the Government of Samoa defines its long-term goals and makes decisions on allocating its resources to pursue its goals. There are three core strategic planning documents which provide the framework upon which infrastructure investment decisions are made in Samoa. It is important that the strategic Goals and Objectives within these planning documents cascade down to the AM Strategy.*

2.1 Relationship Between Strategic Planning Documents

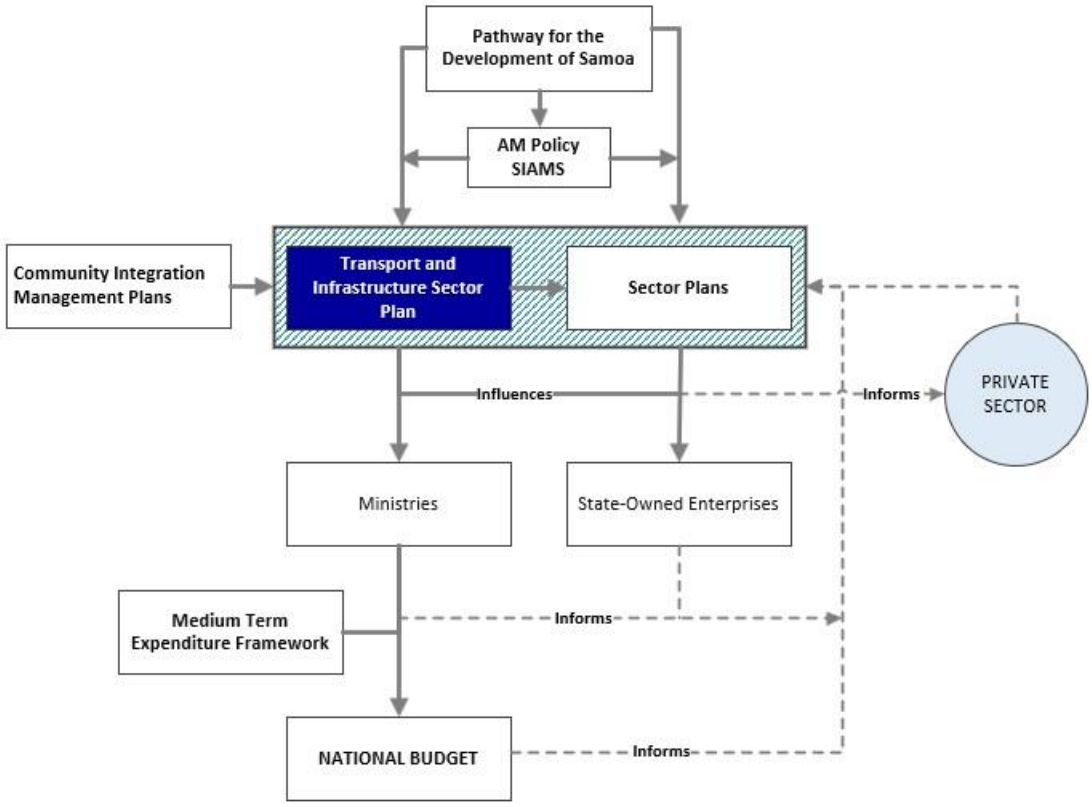


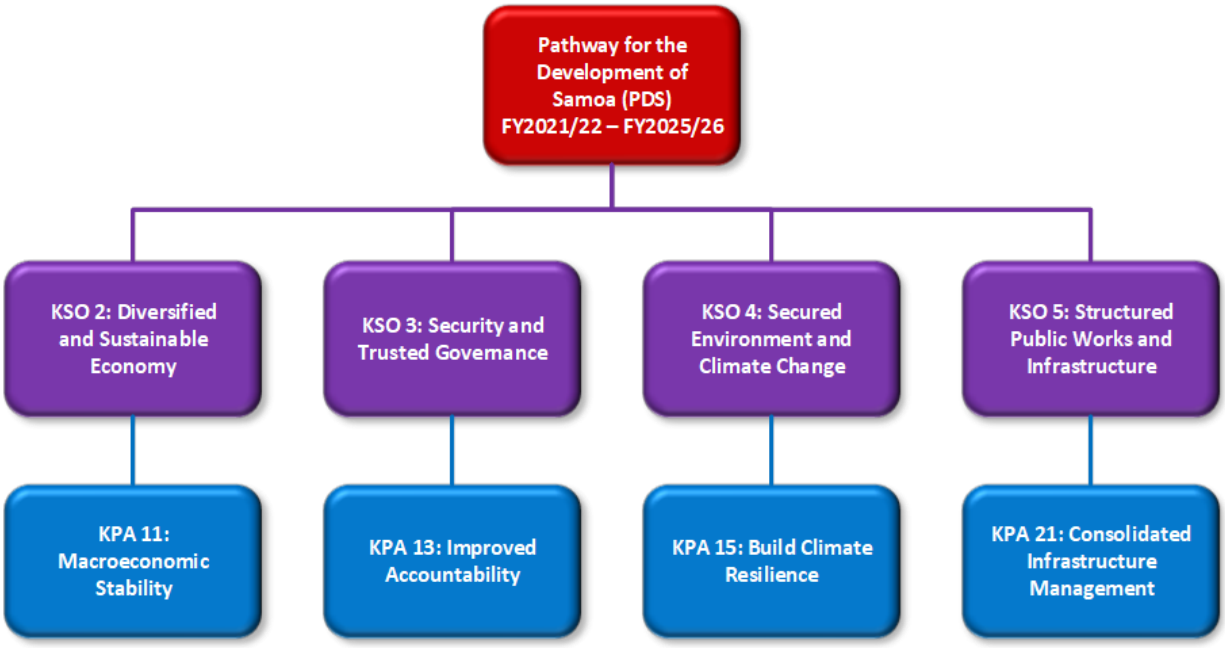
Figure 2-1: Relationship between Strategic Planning Documents

PDS, Sector and Corporate Plans	Strategic Objectives; Development Needs; Financial Projections.
Asset Management Policy	Guiding Principles for Asset Management; Commitments and Responsibilities.
Asset Management Strategy	Current State of AM Practice; Required Improvements; Action Plans, Timeframes and Responsibilities.
Asset Management Plans	Management Practices; Levels of Service; Long Term Funding Requirements; Annual Capital Renewal Requirement; Annual Maintenance Requirement
Community Integration Management Plans	Village level plans that include local asset issues and locally identified climate change and disaster resilience plans. National climate change policy and disaster resilence plans also feed into these Community Integration Management Plans.

2.2 Pathway for the Development of Samoa 2021/22-2025/26 (PDS)

Samoa's Pathway for the Development of Samoa (PDS, publication March 2022) is the parent planning document for all government ministries. Administered by the MOF's Economic Policy and Planning Division, the PDS aims at ***"Fostering social harmony, safety and freedom for all"***. It looks forward over a 3 to 5 year planning horizon and sets the development Theme for Samoa as "Empowering communities, building resilience, and inspiring growth" with infrastructure, supported by building climate resilience playing a key role in that vision.

The PDS defines 5 Key Strategic Outcomes and 21 Key Priority Areas.



KSO 2: Diversified and Sustainable Economy

- KPA 11: Macroeconomic Stability
    - To maintain our goal threshold in the longer term, the government will maintain a cautious fiscal position and proactively manage the risk of debt distress, regularly monitoring the relative magnitude of debt and receiving support and grant assistance from our development partners.

KSO 3: Security and Trusted Governance

- KPA 13: Improved Accountability
    - The Government will evaluate and reinforce applicable policies, management frameworks, and reporting mechanisms to improve compliance with anticipated quality standards and accountability to everyone involved.

KSO 4: Secured Environment and Climate Change

- KPA 15: Build Climate Resilience
    - The Government will continue to highlight the effects of the climate emergency on a global scale. Further efforts at the national level will include resilience and disaster risk management in all sectors, based on detailed risk mapping and highlighted actions in the CIM plans.

KSO 5: Structured Public Works and Infrastructure

- KPA 21: Consolidated Infrastructure Management
    - The Government will execute the Samoa Infrastructure Asset Management Strategy in order to streamline Samoa's national asset management plan.

The Pathway for the Development of Samoa is complemented by the report Samoa 2040: Transforming Samoa to a higher growth path (Ministry of Finance, 2021).

The current global pandemic will impact on the outcomes and aspirations of both the Pathway for the Development of Samoa and Samoa 2040. Future revisions of both these plans, and this SIAMS will need to be adjusted to any new reality and environment following the epidemic phase of the pandemic.

2.3 National Infrastructure Strategic Plan (NISP)

The NISP was first published in December 2010, reviewed in 2014 and updated in May 2017. It outlines Government priorities and plans for economic infrastructure for the next 5 to 10 years and lists priority themes and activities planned for this period. It is ***an integrated program of new infrastructure investments and supporting initiatives reflecting the Government's aspirations for the economic infrastructure sector.***[4]

In each sector, the Government's infrastructure priorities are structured around one or more strategic themes that reflect the goals and priorities of the SDS, and the specific development priorities for the economic infrastructure sector.

The NISP only covers five key infrastructure sectors: Transport (Roads, Ports, Airports), Water, Solid Waste, Energy, Telecommunications. The AM Policy expands this group to include the health sector and sectors responsible for a sizeable portfolio of buildings (e.g. Education, Recreation).

NISP is largely focused on capital development (projects) with its main purpose being the presentation of a consolidated view of infrastructure investments to assist in the national planning and budgeting process.

Moving forward from 2021 it is proposed that the NISP will be replaced by the updated Transport and Infrastructure Sector Plan.

2.4 Sector Plans (SP)

The Sectoral Planning Manual was first published in March 2000. It was endorsed by the Cabinet Development Committee as the basis for preparing Sector Plans for all sectors of the economy. The Manual was revised in 2003 and translated into Samoan, to make it more accessible to public officials involved in planning, and to reflect the 'Realignment of Government Departments' approved by Cabinet in April 2002 and implemented in mid-2003. The Manual was updated in 2009 as a key component of the 2008 'Public Finance Management Reform Plan' (PFMRP) and revised and reissued again in 2015 following a mid-term review of the Sector Plans.

The updated Infrastructure Asset Management Policy (2021) states:

'Asset Management practices are to be developed by Government Ministries for their respective infrastructure assets, and included in their Sector Plans. The asset management practices will be in compliance with the principles and guidelines of this policy and submitted for endorsement by MWTI and the Asset Management Steering Committee. These plans shall be informed by community needs, and integrated with government financial reporting frameworks.'

This requirement will be added to the Sectoral Planning Manual, and included in the next revision of each Sector Plan.

The Strategic Goals and Outcomes from the Sector Outcome Maps for three primary infrastructure sectors are set out below.

[4] *NISP Review Report May 2017*

Water Sector

Long-Term Goal: *Reliable, clean, affordable water and improved sanitation within the framework of Integrated Water Resources Management for a resilient Samoa, sustaining health and alleviating poverty.*

Water Sector Outcomes:

1. Strengthened sector governance to guide and sustain sector developments
2. Enhanced water resources resilience from 'Ridge to Reef'
3. Increased access and improved provision of reliable, clean and affordable water supply
4. Improved surveillance of drinking water quality and water borne diseases
5. Increased access to improved sanitation, wastewater management systems and promote hygiene practices, through accessibility to all available sanitation information
6. Strengthened flood mitigation measures to reduce incidence and magnitude of flooding in the CBD

Transport Sector

Long-Term Goal: *Sustainable, safe, secure and environmentally responsible transport network that supports Samoa's economic and social development and contributes to improving the quality of life for all Samoans.*

Transport Sector Outcomes:

1. Strengthen transport sector governance framework
2. Improve, sustain and climate proof the road transport network
3. Improve effectiveness, safety, security and competitiveness of maritime services
4. Upgrade the capacity, safety and security of air transport services
5. Ensure environmentally sustainable, energy efficient and socially responsible transport sector

Energy Sector

Long-Term Goal: *To enhance renewable energy development and to decrease Samoa's dependence on imported fossil fuels.*

Energy Sector Outcomes:

1. Efficient and effective coordination and management of the energy sector
2. Efficient, sustainable, safe and cost-effective energy use in the transport sector
3. Efficient, reliable, safe, affordable and sustainable electricity services
4. Efficient, reliable, affordable and sustainable heat source supply
5. Climate and disaster resilience management integrated into energy planning and implementation

2.5 Common Themes from Strategic Planning Documents

As evidenced in the outcomes summarised above and from a deeper read of the sector plans themselves, a few key infrastructure asset management themes emerge.

Common Infrastructure Management Themes	1. Strong governance and coordination 2. Climate resilience and environmental sustainability 3. Energy and resource efficiency 4. Safety and security (reduced risk) 5. Affordability and competitiveness

These themes have been incorporated into the overall SIAM development themes (Section 5.3) which underpin the improvement initiatives in this strategy and should guide improvement actions identified in the more detailed asset management plans (Section 2.7).

2.6 AM Policy and Governance

The **Asset Management Policy** is the regulatory document endorsed by Cabinet (June 2017 and updated 2021 to integrate climate change and disaster resilience requirements) to direct government agencies to improve the whole-of-life management of their critical infrastructure assets. The AM Policy:

- Specifies government's overarching intentions and guiding principles for asset management.
- Provides a governance framework for government to undertake the management of its physical infrastructure assets.
- Promotes sustainable development and accountability for prudent whole-of-life management and maintenance of physical infrastructure.
- Includes commitments to funding infrastructure renewal requirements, legislative compliance and to the continual improvement of infrastructure performance.

Under the AM Policy, the **Asset Management Steering Committee (AMSC)** has been established to provide oversight and advice, support coordination and facilitate the implementation of government's SIAMS governance framework. The **Ministry of Works, Transport and Infrastructure (MWTI)** is responsible for championing the AM Policy, strategy and planning process across the state entities (infrastructure managers). Coordination of AM Policy, strategy and planning process across the state entities (infrastructure managers) and government ministries is the role of the MWTI **Asset Management and Resilience Office (AMRO).**

2.7 Creating Asset Management Plans

Most AM literature dictates that the key next step in strengthening asset management practices is the development of Asset Management Plans (AMP). This section of the strategy lays out the proposed format of those plans to promote consistency across government.

Asset Management Plan practice in 2021 includes the integration of climate change adaptation and disaster resilience practice as key considerations in the asset management plan.

Asset management planning is specified in the updated Infrastructure Asset Management Policy as:

- Asset Management Plans are to be developed by State Entities for their respective infrastructure assets
- Asset Management practices are to be developed by Government Ministries for their respective assets and included in their Sector Plans

To prepare a **robust** AMP, you ideally need a good amount of data about your asset, the demand placed upon it, the level of service it needs to provide, and the costs incurred to achieve this. The US EPA promote this as a 10-Step approach.

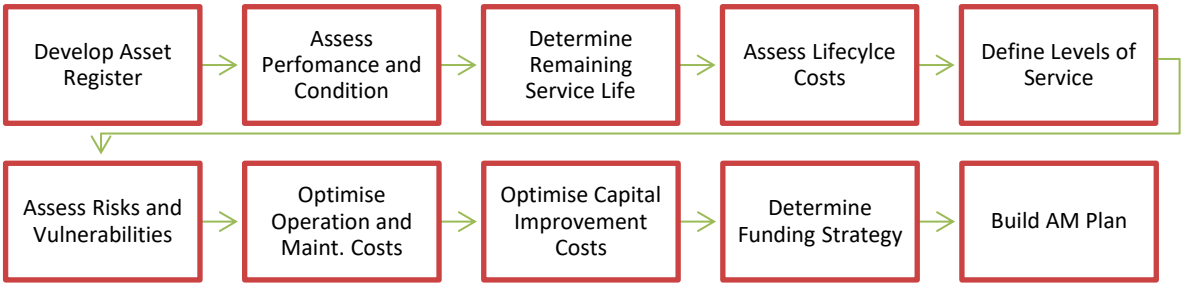


Figure 2-2: Key Information to Prepare a Robust AM Plan (US EPA)

The assessment of risks and vulnerabilities includes the issues of climate change and disaster resilience.

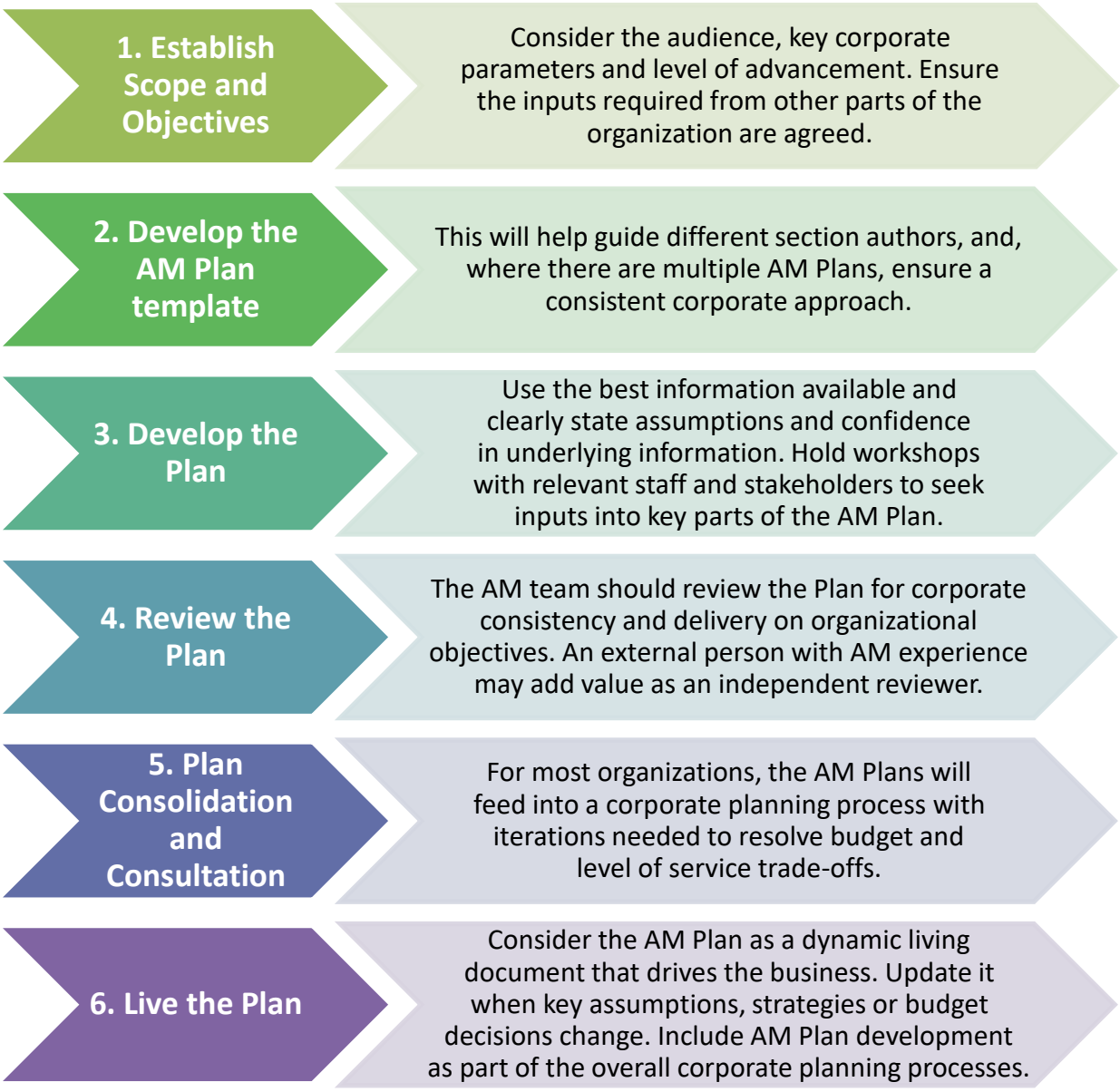


Figure 2-3: AM Plan Development Process (Developed from IIMM)

The International Infrastructure Management Manual (IIMM) provides an excellent knowledge base on how to compile an AMP. It provides guidance appropriate for the level of maturity different agencies are at (minimum, core, intermediate and advanced). The manual also contains examples of asset registers, condition assessment frameworks, risk assessments, setting level of service measures and the likes. It is recommended that AMP's developed for Samoa be done in accordance with the technical guidance provided in IIMM. Plans prepared using that knowledge base will also align with the requirements of ISO55000.

The integration of climate adaptation and disaster resilience planning is becoming an integral component of asset management planning. This can be completed as AMP's are developed using national climate change and disaster risk management policies and strategies.

It is possible to prepare early iterations of an AMP without having a complete set of data at hand. Sometimes it is better to start on a journey under-prepared and to adapt along the way – at least you are moving forward. That said, it would be prudent for only a couple of infrastructure agencies to prepare AMP's under this strategy. It is recommended that AMP development over the next 3 to 5 years focus on the agencies managing a sizeable asset base, namely:

- Ministry of Health (MOH)
- Samoa Water Authority (SWA)
- Land Transport Authority (LTA)
- Electric Power Corporation (EPC)
- Samoa Airport Authority (SAA)
- Samoa Ports Authority (SPA)
- Samoa Shipping Corporation (SSC)

2.7.1 Format of an AMP

Figure 2-4 below provides an outline of the content for an AMP. IIMM provides detailed instructions on the formulation of each section.

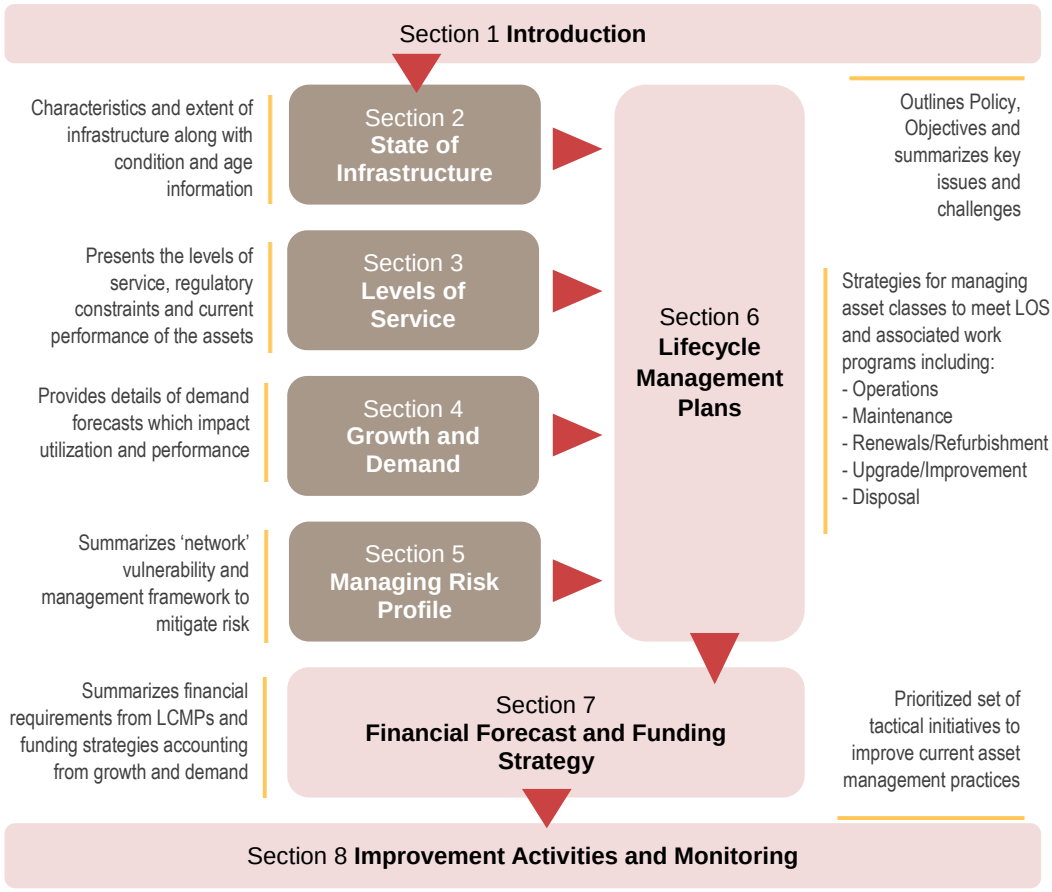


Figure 2-4: Content of an Asset Management Plan (IIMM)

With the increasing national focus on climate adaptation, risk mitigation and resilience a section should be added to the Asset Management Plan to address these issues – either as part of Section 5: Managing Risk Profile, or as a new Section 6: Climate Adaptation and Resilience Management.

3 What are our Infrastructure Assets?

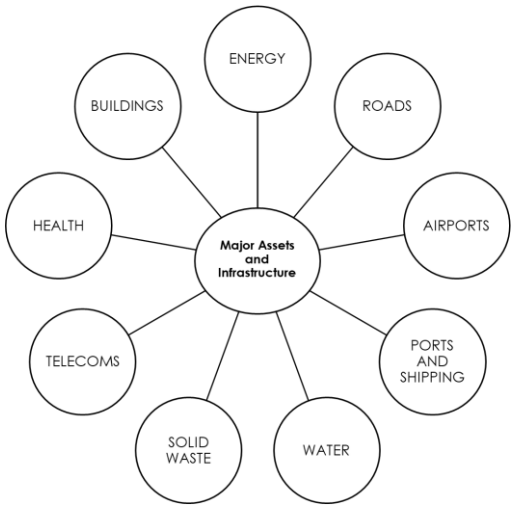
Infrastructure assets *are the facilities and physical networks which deliver critical services to our communities to provide for quality of life and ongoing economic development. Many of these critical assets have long service lives (>30 years) and require a systematic repair and maintenance regime over their lifetime in order to maintain performance and ensure the full service-life is achieved.*

3.1 Major Infrastructure Assets Covered under this Strategy

As defined in Samoa's AM Policy, the 'major' assets included under this Strategy include:

1. road transport network inclusive of roads, bridges, fords and drainages;
2. sea and air transport networks;
3. water and waste water systems;
4. energy supply systems; (gas/electricity/oil production, transmission and distribution);
5. information and communication technology networks;
6. coastal protection, flood protection and storm-water systems;
7. parks, playing fields, recreation facilities and cemeteries;
8. solid waste facilities;
9. buildings including community facilities and civic buildings;
10. high value and/or specialised plant and equipment such as used in healthcare, education, construction and manufacturing industries.
11. high value and/or specialized large vehicles, ships and boats
12. critical early warning and weather monitoring systems

Many of the government departments and state-owned enterprises managing Samoa's infrastructure assets would be considered 'capital-intensive' based on the ratio of the capital expenditure required to the amount of labour that is required. Oil and gas, telecommunications, water, power and transportation are some of the most capital-intensive industries in the world and require a large financial commitment to sustain their infrastructure. This is an important distinction to make as a small deferral of these capital investments can significantly improve the short-term financial performance of the organisation.



Capital-intensive organisations typically own a high proportion of long-life, high-value assets such as transmission lines, bridges, wharves, pipelines and drilling rigs. As these assets age, maintenance costs increase along with a decrease in their reliability and performance.

The following criteria have been used to quantify which assets are considered critical for this strategy:

Critical Asset Definition

a) Has a high capital value (>$100,000); and/or
b) Failure disrupts service (>6 hours); and/or
c) Requires regular planned maintenance (>1 day/month); and/or
d) Has significant operation and maintenance costs (>$1,000/month)

Table 3-1: Summary of Major Infrastructure Assets in Samoa

SECTOR SUMMARY	MAJOR ASSETS		
ROADS ❖ ~1,150km of road (95% sealed) ❖ **Bridges	LTA ▪ Roads ▪ Drains (Open/Closed) ▪ Bridges ▪ Footpaths	▪ Samalaeulu Bridge and road ▪ Seawalls ▪ Large culverts ▪ Traffic Signals	▪ Buildings ▪ Fords ▪ LTA compound Apia/Savaii
AIRPORTS ❖ 1 international airport ❖ 3 regional/domestic fields	SAA ▪ Terminal buildings ▪ Control tower ▪ D-VOR ▪ VHF/HF radio ▪ Generators	▪ Non-Direct. Beacon (NDB) ▪ Instrument Landing (ILS) ▪ VSAT/AFTN ▪ PAPI lights ▪ ARFS trucks	▪ Approach lighting ▪ AWOS ▪ Rescue boat ▪ Tractors ▪ X-ray equipment
WATER ❖ ~40 river systems ❖ ~85km of drainage channels ❖ ~1,080km of water pipeline ❖ 6 Water TPs, 8 Package TPs ❖ 1 STP with 11km of collection to ~120 CBD customers	SWA ▪ Pumps ▪ Generators ▪ Drilling rigs ▪ Buildings ▪ Water mains ▪ Water meters ▪ Valves and hydrants ▪ Water trucks	▪ Water tanks ▪ Borehole wells ▪ Intake structures ▪ Water treatment plants ▪ Wastewater treatment plant ▪ Wastewater pump stations ▪ Ocean outfall ▪ Pressurised sewer lines	MNRE ▪ River systems ▪ Monitoring stations ▪ Sea walls
SOLID WASTE ❖ 20ha Tafaigata landfill (Upolu)	MNRE ▪ Weigh bridge ▪ Water catchments and security fencing	▪ Access road ▪ Sewerage waste treatment ▪ Incinerator (NHS medical)	*Note that most services outsourced so heavy plant not owned*
PORTS AND SHIPPING ❖ 1 International port ❖ 4 Domestic ports ❖ Passenger services	SPA/SSC ▪ Vessels ▪ Tug boats ▪ Wharves ▪ Fenders ▪ Pilot boat	▪ Dredger ▪ Navigation aids (lighthouse) ▪ Mobile crane/truck ▪ Excavators ▪ Breakwater	▪ Slipway ▪ Generators ▪ VHF/HF radio ▪ Buildings
HEALTH ❖ 2 National Hospitals ❖ 5 District Hospitals ❖ 3 Medical Centres	NHS ▪ Oxygen plant ▪ Ultrasound equip ▪ Ventilators ▪ Arthroscope ▪ Endoscopes ▪ Generators	▪ Lithotripsy laser ▪ Histology autostainer ▪ Cystoscope/Hysteroscope ▪ Orthotic/Prosthetic W/Shop ▪ Rheumatic Van (mobile) ▪ Fire steam boiler	▪ PABX ▪ VHF/HF Radio ▪ Buildings ▪ Sewerage plant ▪ Incinerator
ENERGY ❖ Transport fleet fuel (54% PE) ❖ Electricity production (27% PE) ❖ Heating fuel (19% PE)	EPC ▪ Diesel engines ▪ Hydro turbines ▪ Wind turbine ▪ Generators ▪ Transformer stations	▪ Solar panels ▪ Fuel stations ▪ Scada equipment ▪ Switching equipment ▪ Cranes	▪ Power lines ▪ Buildings
INFORMATION TECHNOLOGY ❖ AM Radio Network ❖ Broadband Highway (SNBH)	MCIT ▪ Fibre optic cable ▪ Microwave network ▪ Undersea cable	▪ Landing station ▪ AM radio network ▪ AM antenna	▪ SNBH infrastructure ▪ Buildings
AGRICULTURE AND FISHERIES	MAF ▪ Farms ▪ Packhouse for exports ▪ Greenhouse and tunnel houses ▪ Crop buildings ▪ Crop stations	▪ Hatchery (fisheries) ▪ Fishing vessels ▪ Ice machines ▪ Boat ramps ▪ Fish Market ▪ Static slaughterhouse	▪ Mobile slaughter unit ▪ Quarantine Laboratory ▪ Meat processing unit ▪ Trucks ▪ Buildings
BUILDINGS	(Additional to Above) ▪ TATTE (MOF)	▪ Govt printing (MWCSD)	▪

❖ Buildings not under the sectors above. General building assets HVAC, Fire, Elevators, Electrical, IT networks	▪ FMFM (MOF) ▪ Government Prayer House (MOF) ▪ Media Centre – Tuana'imato (MOF) ▪ Rental houses (SHC) ▪ Police HQ (MOPP) ▪ Outpost stations (MOPP) ▪ Prison (MOPP)	▪ To'oa Salamasina (MWCSD) ▪ Salelologa (MWCSD) ▪ Headquarters (MESC) ▪ Museum (MESC) ▪ Nelson Memorial Library (MESC)	

4 How Effective are we at Managing our Assets?

*To be successful, **asset management** must be treated as a long-term business commitment focused on outcomes that allow asset owners to simultaneously optimize cost and risk while improving performance and value. It is not practical for all agencies to adopt the same standards of asset management, typically agencies with highly critical assets or stringent regulatory governance are required to have a higher level of maturity in applying asset management practices.*

4.1 Current State of Maturity

4.1.1 Stakeholder Interviews 2018

In formulating this strategy, interviews were conducted with eight of the key infrastructure departments to ascertain current levels of maturity. A questionnaire (Appendix A) was used to baseline the relative maturity of each department against the 5-fundamental AM questions (Section 1.3). These questions also helped to frame the subsequent conversations.

A summary of the maturity assessment is provided in the figures below:

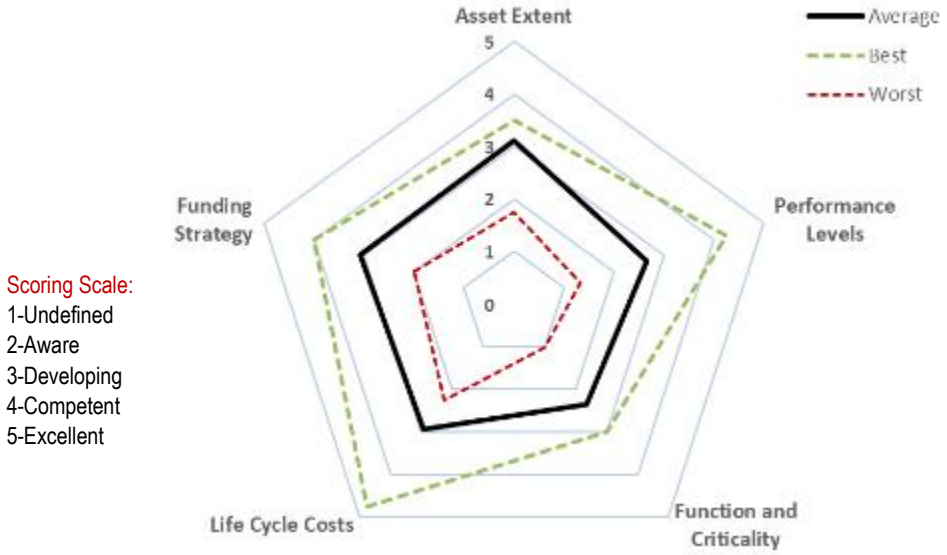


Figure 4-1: Radial Plot of AM Maturity

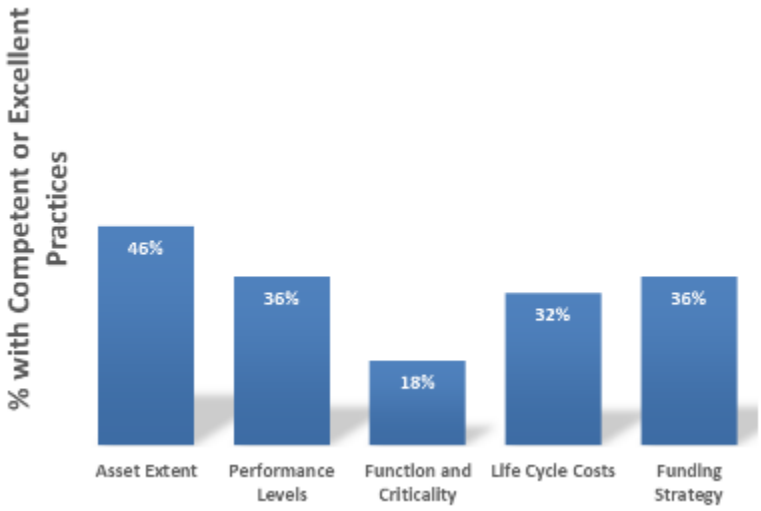


Figure 4-2: Percent of Responses Rated Competent (4) or Excellent (5)

4.1.2 Maturity Assessment Update 2021

The Maturity Assessment completed in Section 4.1.1 above was reviewed, and the information collection required to update the maturity assessment was included in the Questions for Consultation template.

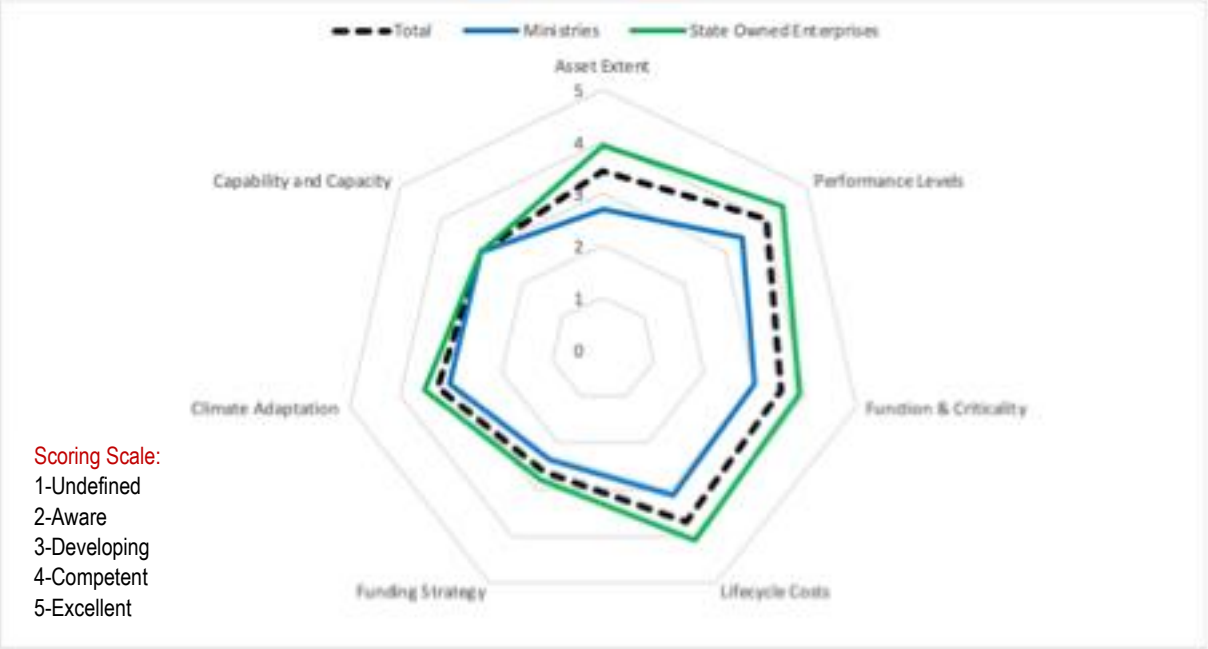
The Questions for Consultation template added two additional maturity assessment questions based on the 2021 SWOT analysis:

1. Climate Change Adaptation and Disaster Resilience
2. Department and Agency Capability and Capacity

Detailed analysis of the maturity assessment results is included in USAID Climate Ready Project – Samoa Review and Assessment Report, March 2022. Details of the Questions for Consultation are included in Appendix A.

The 2021 Asset Management Maturity Assessment results are briefly summarised below.

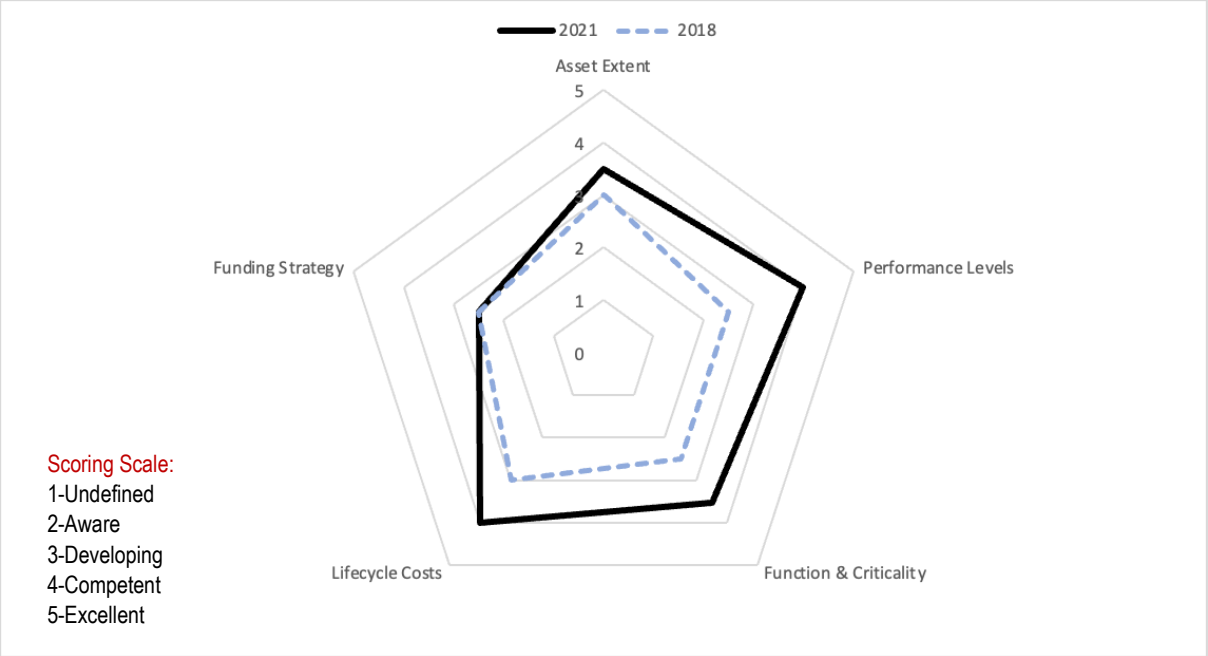
Figure 4-3: 2021 Asset Management Maturity Assessment Results Summary



The graphical representation of these results in the radial plot diagram above highlights the funding strategy, capability/capacity and climate adaptation gaps, and the relative maturity difference between SOE's and Ministries.

Removing the two new maturity assessment items – Climate Adaptation and Capability/Capacity allows direct comparison between the 2018 and 2021 asset management maturity assessments as shown in the radial plot diagram below.

Figure 4-4: Comparison of 2018 and 2021 Maturity Assessment Average Results



Examining the combined average results shown in the radial plot diagram above it is pleasing to note that maturity improvements can be observed in all categories with the exception on Funding Strategy, which remains at the same maturity across the two assessments.

In summary, progress is being made with regard to asset management maturity, with better results being observed in SOE's when compared with Ministries.

4.1.3 General Observations 2018

Overall, the survey identified room for improvement could be found across all departments. More specifically, the 2018 survey found:

- **Strong regulations** led to best AM practice areas
  e.g. Lloyds and SSC vessels – full preventive maintenance programme in CMMS
- Systems were more advanced for some **critical assets**
  e.g. Power generation plant (CMMS) and transmission lines (fault diagnostics)
- There is a general lack of **structured data** held about assets (make, install date etc).
  e.g. Many spreadsheets, incomplete or dated GIS, no register etc
- There is a lack of **performance data** being collected.
  e.g. Road Condition, Complaints, Faults/Failures, Runhours etc
- **AM systems** are not being fully implemented
  e.g. MEX not fully embraced, GIS, ROMDAS, Conquest CMMS etc
- There is a lack of **expertise** available in some specialist areas
  e.g. Navaids, CMMS, HDM-4, etc

The 2021 Stakeholder Consultation found that required improvements identified from the 2018 observations are on-going.

4.2 AM Support Systems

The following AM Support Systems were observed to be in use at the time of preparing this 2018 strategy.

MapInfo GIS

Description: A Geographic Information System (GIS) helps infrastructure agencies manage largely linear infrastructure (roads, powerlines, pipelines, rivers). Most assets have a spatial context and a GIS allows these to be mapped and analysed against information in different layers.

Used by:

- EPC transmission and distribution
- MNRE rivers, environment and property
- SWA water and wastewater networks
- LTA for roads

Observations: MapInfo is a robust GIS that got a foothold in the Pacific due to its competitive pricing structure and ease-of-use. It is good that the majority of Samoa's infrastructure agencies use the same product as it promotes resource sharing and can lead to more competitive pricing. However, it is more important that the data within the GIS is maintained to certain standards and the sharing of information between agencies is encouraged (e.g. aerial imagery and contour/terrain models).

There are no hosted datasets in Samoa so all contextual cadastre and geospatial information from MNRE's Technical Services Division (Spatial Information Agency) is obtained, normally at a cost, by GIS teams as a 'data dump'. Inter-agency charging inhibits collaboration and sharing and ultimately leads to people making bad decisions because they don't have access to the right information

Recommendations: Costly datasets captured by MNRE need to be made as readily available as possible to all agencies if the Government of Samoa is to extract the most value/return on the investment. Better data sharing formats, standards and guidelines need to be developed for key datasets such as property cadastre, aerial orthoimagery, LiDAR and topographic datasets. Refer to the improvement initiative AM02 in Appendix B.

MEX CMMS

Description: A Computerised Maintenance Management System (CMMS) helps infrastructure agencies manage and streamline day-to-day maintenance activities. This includes managing asset inventories, service requests, work orders, materials and special equipment.

Used by:

- EPC for power generation plant
- SSC for vessels maintenance

Observations: MEX has been recently (last 3 years) deployed at SSC for managing elements of maintenance on its vessels and at EPC for the management of assets at its power plant. Both agencies are only using a small part of the functionality on offer and for only a subset of assets. Some functions deployed are no longer used or maintained. This is perfectly understandable as a CMMS requires a great deal of "feeding" (e.g. entering job ticket information, updating assets and crew information and managing stock levels) and as such their initial application often focusses on highly critical mechanical assets such as vessel engine rooms and power plant turbines. It was noted that a CMMS implemented for SWA's use at treatment plants (Conquest) was no longer being used.

2021 Stakeholder Consultation observed that MEX use was continuing to develop across key State Entities, with asset registers and maintenance data being recorded.

Recommendations: MEX is a robust CMMS and while there is considerable choice with competing products by IBM, SAP, Oracle and Infor, the full value a CMMS can deliver to the Government of Samoa has little to do with the software. Refer to the improvement initiative AM06 in Appendix B.

ClearSCADA

Description: ClearSCADA is a Supervisory Control and Data Acquisition (SCADA) application which uses a telemetry network to monitor the status of the power network.

Observations: EPC are investigating additional hardware/software to add to the SCADA system to allow them to more accurately pinpoint faults.

Used by:

- EPC for power network

Skyeye Vehicle Tracking System

Description: Skyeye Geospatial is a local mapping company who provides a vehicle tracking and fleet management solution used by several departments to track their vehicles.

Observations: Skyeye's main function is to locate vehicles and ensure they are being used appropriately. It also provides summary statistics (e.g. km's travelled) to its subscribers. The relatively small size of Upolu, the outsourcing of maintenance, and the small volume of work does not make work dispatching systems a high priority. If such a system were installed in vehicles, the physical infrastructure used by Skyeye (data cards, GPS) could be leveraged.

Used by:

- Various departments for tracking vehicles

Daffron / SAGE / MYOB / TechnologyOne

Description: There are several different financial management and accounting software solutions in use across government body's for managing general ledger, accounts, payroll/HR, fixed assets and the likes. Daffron, SAGE, MYOB and TechnologyOne are all examples of financial management solutions active in Samoa.

Observations: In addition to the FMS functions in Daffron, SWA uses the Customer Information System (CIS) module to manage billing for its water customers and for tracking complaints. Systematic resolution of incidents and customer complaints across all infrastructure is an area for improvement in Samoa. If such improvements were considered, then SWA would be a useful case-study givens its current level of advancement in managing customer billing and customer complaints.

Used by:

- EPC, SWA use Daffron
- NHS use SAGE
- SHC, SAA use MYOB
- MOF use TechnologyOne (Finance One)

5 What are our AM Challenges?

Many government agencies are faced with juggling limited financial and human resources that must be directed at: maintaining and renewing infrastructure; addressing substandard levels of service; and comprehensively dealing with changes in demand. In Samoa, the economic challenges are well known with a small, partly impoverished population that is geographically dispersed. Asset management provides tools and techniques to make decisions that provide for more transparent, more effective and more efficient use of scarce financial resources.

5.1 Drivers for Improved Asset Management

Infrastructure managers are continually having to do more with less, given the aging base of infrastructure and the increasing demand for transport, water, energy and health services. Some of the key drivers for improving the management of these assets are as follows:

- **Affordability** (e.g. passenger fares, fuel levies, water charges)
- **Improved service** (e.g. safer roads, better parks, improved public transport)
- **Greater transparency** (e.g. quantitative planning decisions, data drive not political, justifiable charges)
- **Increased demand** (e.g. increasing sewer connections, population growth, social media pressures)
- **Ageing asset base** (e.g. higher failure rates, renewals funding, deteriorating quality)
- **Technology advancements** (e.g. Remote operation, solar energy, electric cars, membrane treatment)
- **Regulatory requirements** (e.g. Water quality - WHO, Vessel safety - Lloyds, Airport Operation - ICAO)
- **Climate Change requirements** (understanding and adapting to long term change in the state of the climate)
- **Resilience** (anticipating, absorb, accommodate, or recover from the effects of a hazardous event)

5.2 Summary of Samoa's Asset Management Challenges 2018

During the 2018 stakeholder interviews and SIAMS workshop, a number of infrastructure management challenges were identified and are tabulated below. The mitigation of some of these challenges is addressed through the *Improvement Initiatives* in **Chapter 6**.

Table 5-1: Summary of Key Challenges Facing Infrastructure Agencies

KEY CHALLENGE	DESCRIPTION	Examples
1. The asset base is deteriorating under current levels of expenditure.	There is evidence that some major assets are deteriorating as they reach the end of their life and more funding will be required for to repair or replace these assets.	▪ Road surfacing (LTA) ▪ Water pipelines (SWA) ▪ Medical equipment (NHS)
2. Current assets won't meet changing level of service requirements.	Demand is increasing for improved services from population growth, economic development and tightening regulations. Current revenue models won't meet the additional expenditure required.	▪ Rate of diabetes (NHS) ▪ Water reticulation (SWA) ▪ Sewer collection SWA) ▪ Safety standards (SAA/SSC)
3. Dormant assets are not being funded.	The viability and affordability of domestic airfares means that domestic airport facilities in Savaii remain dormant.	▪ Domestic airfields (SAA)
4. Rehabilitation and renewal rates are not sufficient.	The average age of infrastructure is increasing. To sustain current service levels there is a need to begin increasing R&R across some asset classes.	▪ Road rehabilitation (LTA) ▪ Pipe renewal (SWA) ▪ Septic tanks (SWA) ▪ Facility upgrades (EPC/SWA/LTA/NHS)
5. Due to climate change, **significant infrastructure**	Most infrastructure is located within 1 km of coastal zones with a high vulnerability to natural hazards as a result of climatic changes.	▪ Road infrastructure (LTA) ▪ Water pipelines and treatment plants (SWA)

KEY CHALLENGE	DESCRIPTION	Examples
losses occur during extreme weather events		▪ Footpaths and foot bridges
6. New technology is not well implemented and not sustained.	At times software is seen as a solution and not enough attention is placed on the training and embedment of these systems or they are implemented in areas where the benefits are not obvious.	▪ HDM-4 and road roughness surveys (LTA) ▪ Conquest (SWA)
7. New facilities funded by Donors increase the pressure on operational expenditure.	The full life-cycle costs of new infrastructure can be overlooked when new infrastructure is funded under a Loan/Grant. Interest payments and increases in operating budgets need to be factored in.	▪ Faleolo Terminal (SAA) ▪ TATTE Building (MOF) ▪ National Hospital (NHS)
8. Extreme weather events are increasing.	Climate change is leading to an increase in extreme weather events and rising sea levels. Tidal extremes are impacting wharves and eroding seawalls. High rainfall is leading to flooding and the erosion of bridge abutments. Storms are cutting power lines.	▪ Power lines (EPC) ▪ Wharves (SPA/SSC) ▪ Roads (LTA) ▪ Rivers (MNRE) ▪ Bridges (LTA)
9. Non-revenue water (losses) needs to be reduced.	Leaking pipes, overflows, faulty connections, inaccurate meters, high pressure zones and illegal connections all lead to lost revenue for SWA.	▪ Water supply network (SWA)
10. Water system costs are increasing due to pumping costs as people move inland.	As people move inland (uphill) for liveable land, new pumping systems are being introduced to move water above WTP levels. At the moment water reticulation is largely a gravity system.	▪ Water supply network (SWA)
11. Access to property is hindering maintenance and renewal works.	A lack of easements and ill-defined boundaries results in delays to construction works and difficulty in access for maintenance.	▪ Power lines (EPC) ▪ Pipelines (SWA) ▪ Roads (LTA)
12. Increasing salinity in borehole water.	Periodic drought conditions and excessive drawdown is leading to saltwater intrusion at borehole locations.	▪ Wells (SWA)
13. Poor coordination of services in road corridor.	At times roads are being dug up after new surfacing has been placed. There needs to be better coordination of underground services programmes.	▪ Pipelines (SWA) ▪ Power (EPC)
14. Affordability for users is limiting increases to revenue.	The low levels of household income and imposed caps on rates (e.g. ferry fares, water and electricity rates) leave little room to increase tariffs as a mechanism to gain higher revenues. Affordability is a key consideration when expanding infrastructure.	▪ Passenger charges (SSC) ▪ Fuel Excise (LTA) ▪ Departure fees (SAA) ▪ Water rates (SWA) ▪ Energy rates (EPC)
15. There are not enough specialist resources in some areas.	A relatively small population base limits the availability of skilled labour in Samoa. The private sector needs to be developed and new technology needs to be introduced with proper training and support.	▪ Navaids (SAA) ▪ HDM-4 (LTA) ▪ IWSA's (SWA) ▪ Biomed equipment (NHS) ▪ Enterprise technology (MCIT)
16. Procurement process is causing delays.	Access to spare parts and the general procurement process results in frequent delays.	▪ Spare parts ▪ Specialist services ▪ Contracted works
17. Fluctuating cost of commodities impacts financial projections.	Fuel makes up a large part of the operating budget for some agencies. Typically, high levels of fluctuation make it difficult to manage profitability when these costs can't be passed on to users.	▪ Fuel costs (SSC/EPC) ▪ Copper cabling (EPC) ▪ Asphalt (LTA)
18. Sometimes the wrong projects are prioritised.	There is a lack of transparent and quantitative prioritisation processes for projects. When budgets are constrained this can lead to new builds obtaining funding over more economically viable options.	▪ Capital improvements ▪ New facilities

KEY CHALLENGE	DESCRIPTION	Examples
19. Small community based water supplies are heavily subsidised.	Operation and maintenance of the 34 independent water schemes (IWS) lies with village water committees. Rates and revenue collection levels are low and don't cover the rehabilitation requirements.	▪ IWSA package plants (SWA)
20. Intergovernmental charging for data hinders informed decision-making.	G-to-G charging for national datasets means that the use of this data is not maximised for the benefit of all. Better data sharing arrangements would improve AM planning and decision-making results.	▪ Aerial imagery ▪ LiDAR terrain

These key challenges facing Infrastrucute Agencies are still valid during the 2021 SIAMS Update. Improvement Initiatives outlined in Section 6 and commenced in 2018 are on-going at the time of the 2021 SIAMS Update.

5.3 Summary of Samoa's Asset Management Challenges 2021

The section details a Strengths-Weaknesses-Opportunities and Threats(SWOT) to the national and public services relating to asset management, climate adaptation and disaster resilience. This SWOT analysis was completed as part of the USAID Climate Ready Project 'Samoa Review and Assessment Report' which provided the base analysis for the 2021 SIAMS Update.

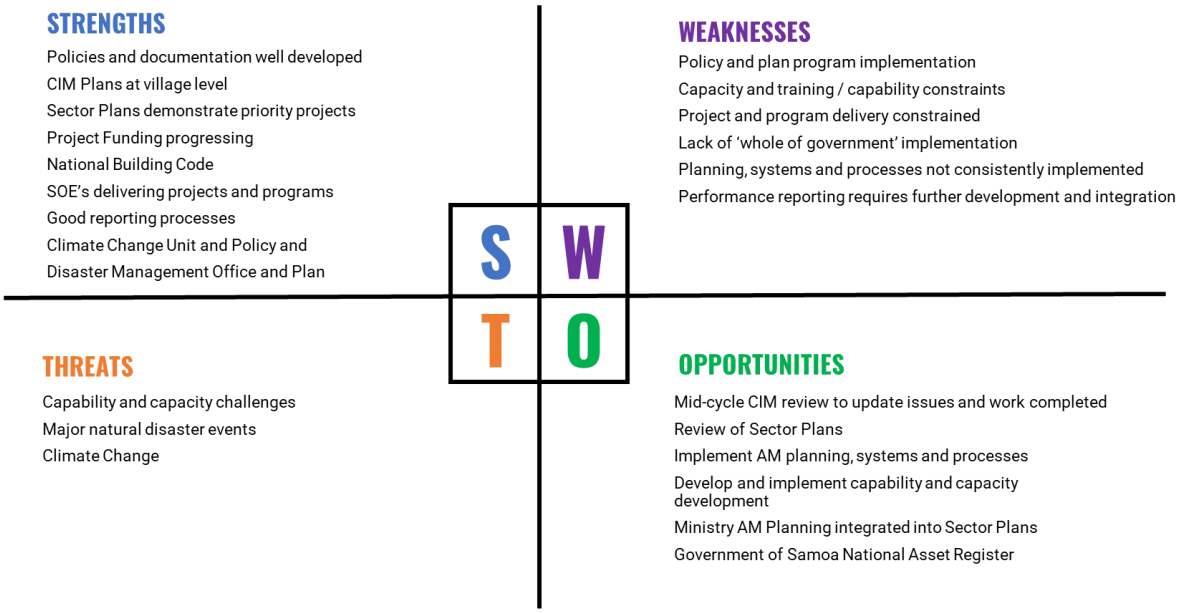


Table 1: SWOT Analysis

SWOT ANALYSIS	
STRENGTHS	
Policies and documentation well developed	Broad range of policies and documentation well developed with coverage of asset management, climate adaptation and disaster resilience (2011-2018)
CIM Plans at village level	Community Integrated Management Plans identify climate adaptation and disaster resilience at a village level
Sector Plans demonstrate priority projects	Sector Plans demonstrate priority projects, with climate adaptation and disaster resilience projects included
Project Funding progressing	Project funding is progressing with both local and development partner funding support
National Building Code	National Building Code includes climate adaptation and disaster resilience direction
SOE's delivering projects and programs	SOE's have made good progress on delivering projects and programs

SWOT ANALYSIS	
Good Reporting	Good reporting and accountability frameworks proposed
Climate Change Unit and Policy and Disaster Management Office and Plan	Existing institutional arrangements, policies and plans provide government management response to climate change and disaster management
WEAKNESSES	
Policy and plan program implementation	Policy and plan program implementation has yet to occur in many cases
Capacity and training / capability constraints	Many plans identified capacity and training/capability constraints, these constraints have yet to be resolved
Project and program delivery constrained	Project and program delivery constrained by funding, capacity and capability constraints
Lack of 'whole of government' implementation	Lack of 'whole of government' implementation of policies and programs
Planning, systems and processes not consistently implemented	Asset management planning, systems and processes not consistently implemented across 'whole of government'. Consultation results show marked differences between SOE and Ministry implementation of asset management
Performance reporting requires further development and integration	Performance reporting of asset management, climate adaptation and disaster resilience requires further development and integration across whole of government
OPPORTUNITIES	
Mid-cycle CIM review to capture issues and work completed	Mid-cycle review and update of Community Integrated Management Plans to capture emerging climate adaptation and disaster risk management issues
Review of Sector Plans	Review and update of Sector Plans to update • emerging asset management, climate adaptation and disaster risk management issues • Project delivery progress • Funding and project delivery constraints
Implement AM planning, systems and processes	Implement asset management planning, systems and processes across 'whole of government'
Ministry AM planning integrated into Sector Plans	There is potential for AM planning to be integrated into Ministry Sector Plans, removing the need for separate asset management plans. SOEs with larger asset portfolios should retain separate asset management plans
Government of Samoa National Asset Register (NARS)	Current asset information is included in the following systems MEX, Xero and FinanceOne. There is the opportunity to consolidate a Government of Samoa National Asset Register on one system to allow consistency of information availability and reporting
Develop and implement capability and capacity development	Develop and implement capability and capacity development for asset management, climate adaptation and disaster resilience
THREATS	
Capability and capacity challenges	Capability and capacity challenges have been a longstanding identified issue, that has yet to be resolved. Lack of capacity and capacity will continue to challenge Government of Samoa ability to implement and integrate asset management, climate adaptation and disaster resilience practice
Major natural disaster events	Major natural disaster events push governments into immediate response requirements, and take resources from medium to long term training, capacity building, project delivery and government planning and implementation functions
Climate Change	Climate change impacts on Samoa are increasing. Forward focused climate change adaptation measures need to be incorporated into asset management planning practices within Samoa.

The Opportunities identified in ths SWOT Analysis have been included in Section 6.2 Key SIAMS Improvement Initiatives 2021 and Appendix B – Initiatives 2021

5.4 Key AM Development Themes

To tackle the challenges set out above and to deliver on the promised benefits of asset management (Section 1.2), the AM strategy needs to focus on seven key development themes.

Theme 1: Collect the right data to make better planning decisions.

Focus on collecting more information on the extent of assets where good systems are in place to collate and manage updates to that data (e.g. MapInfo and MEX). There is little point collecting asset data if there is not a structured register and processes to maintain the currency of the data collected. Where good asset data and systems are in place (e.g. LTA, SWA, EPC, SSC) there needs to be more time-bound data collected on how assets are performing and if there is deterioration or a drop in the level of service being provided.

Theme 2: Ensure timely access to specialist expertise.

Whether it be through training, support contracts or more appropriate technology selection, this development theme needs to reduce the number of times assets fail or repairs are delayed due to staff not having the right expertise or by not having ready access to that expertise.

Theme 3: Better account and forecast rehabilitation and renewal (R&R) expenditure.

The SSC has a Vessel Replacement Fund (VRF) where it accounts for the depreciation of its fleet to ensure replacement funds are on hand when assets reach the end of their useful life. This accounting mechanism is not appropriate for longer life assets due to the cost of idle capital, however there does need to be better forecasting of capital maintenance expenditure across most asset classes (roads, pipes, transmission lines, plants etc). There is almost certainly a growing liability (backlog) of unfunded R&R and infrastructure agencies must get better at forecasting their R&R expenditures. Also agencies need to ensure ongoing operation and maintenance costs are budgeted for as new assets are constructed under donor grants/loans.

Theme 4: Improve safety and security of critical infrastructure.

Protecting assets from vandalism and ensuring the public are kept safe is a key concern for several infrastructure agencies. This initiative is about improving security with mitigation measures such as fencing and surveillance and improving safety of staff and the public through awareness, training and physical measures such as access control.

Theme 5: Improve asset reliability and availability.

The Minister of MWTI talks about his frustration with elevator reliability as a trigger for the need to improve asset management. As assets age and deteriorate, reliability will decrease. At the moment, availability of assets is within acceptable limits for most asset classes, but this development theme needs to focus on the better monitoring and tracking of those less reliable assets.

Theme 6: Better leverage technology to support good AM practices.

This development theme is about ensuring technology is in place to support AM planning. This extends to systems such as the GIS and CMMS and technology such as leak detection, smart metering, SCADA and the likes. Developments need to carefully consider the pros and cons and balance the cost of establishing and sustaining the technology against the potential efficiencies from the technology.

Theme 7: Be accountable for business improvements.

When budgets are constrained, resources are stretched, and incentives are not in place, longer-term business improvement activities generally take a back seat to near-term emergencies and reactive activities. This is the case in Samoa. If asset management improvements are to take hold, there will need to be clear actions and accountabilities assigned. For this reason, the AM Improvement Initiatives in Section 6 are clearly defined and largely accepted as worthwhile project. The program monitoring framework in Section 7 also exists to drive transparency and accountability.

6 How Do We Improve?

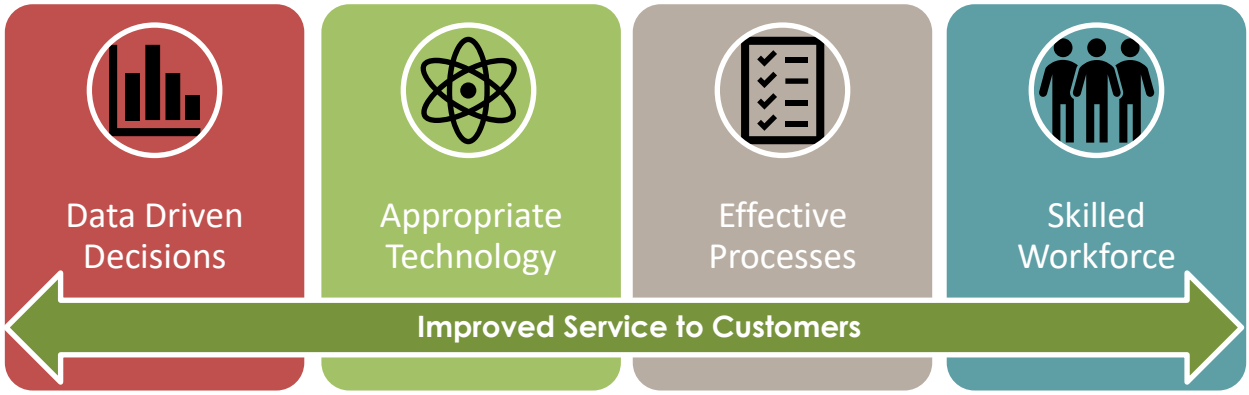
*Infrastructure managers are continually having to do more with less, given the aging base of infrastructure and the increasing demand for transport, water, energy, building and health services. A robust business transformation framework addresses change in four key pillars; **data, technology, process** and **people**. This section outlines the business improvement concepts which should be followed if the Strategy is to be effectively implemented and its desired outcomes achieved.*

6.1 Business Improvement Framework

To be successful, any business transformation strategy must address the 4-Pillars of successful change:

- PEOPLE: Awareness; competency and training; capacity; structure
- PROCESS: Policy and governance; best practices; performance monitoring
- TECHNOLOGY: Business systems; IT infrastructure; new innovations
- DATA: Data; monitoring; analytics

Generally, a successful business change initiative will involve some degree of focus on all 4-pillars of change. Too much focus on any one element is unlikely to be successful. For example, if the initiative was to simply capture data, it is unlikely it will justify the cost. There would also need to be an amount of investment in a system to hold the data, a stated process/practice improvement which the data will support and some degree of training.



Data Driven Decisions: It is important to store and maintain data in a structured database or information system (like MapInfo and MEX) if it is to support decision making. It is also important to remember data comes at a cost and there is a cost to implement the tools and procedures to maintain them. Any investment in data collection must clearly consider the costs and benefits.

Appropriate Technology: There is no shortage of innovative technology for extending the life of assets, improving their efficiency or in modelling performance and maintenance strategies. It is important not to be lured into the belief that technology alone is the solution. As with data, there is an ongoing cost with technology by way of training, upgrades and obsolescence.

Effective Processes and Practices: The best way to implement business improvement is to describe the project in terms of business outcomes. For example, "responding to an incident" which covers logging customer calls, dispatching someone to investigate, repairing the fault, recording work information, calling back customer etc. Business Continuity Planning to enable continued delivery of services during times of natural and other disasters should be included as part of this pillar

Skilled Workforce: There are plenty of examples where business improvements have failed because the workforce has not been adequately trained or has availability to take on the additional tasks. Managing the 'people side of change' is a key requirement if new initiatives are to be impactful.

6.2 Developing Improvement Initiatives

To be successful, improvements must consider the full cost and effort associated with change across the four pillars of Data, Technology, Process and People. Too much focus on any one pillar would generally lead to a failure of the initiative or a failure to fully realise the benefits from the initiative. For example, putting in place a new SCADA monitoring system (technology) to monitor the level of water tanks will be pointless if there is inadequate training in its operation (people) and more importantly ongoing maintenance considerations. SCADA systems can fail with lightning strikes and they require skilled operators to know what to do when alerts arise (process). Scada systems collect a large amount of historic information (data) which should be analysed to inform better decision making.

The table below estimates the proportion of effort (cost) that would be recommended against each of the four pillars of change.

Table 6-1: Key SIAMS Improvement Initiatives (2018)

Initiative	Development Theme Alignment	BI Focus			
2018 Initiatives					
AM01: Establish a Maintenance Support Contract for Aviation Infrastructure	1. Collect the right data to make better planning decisions 2. Ensure timely access to specialist expertise 3. Better account and forecast rehabilitation and renewal expenditure 4. Improve safety and security of critical infrastructure 5. Improve asset reliability and availability	20%	10%	30%	40%
AM02: Expansion of CMMS for SSC, EPC and SAA	1. Collect the right data to make better planning decisions 2. Ensure timely access to specialist expertise 6. Better leverage technology to support AM practices 7. Be accountable for business improvements	30%	30%	20%	20%
AM03: Health Sector Asset Collection and Lifecyle Cost Analysis	1. Collect the right data to make better planning decisions 3. Better account and forecast rehabilitation and renewal expenditure	50%	20%	20%	10%
AM04: Establish Road Condition Monitoring and Renewals Program	1: Collect the right data to make better planning decisions 3: Better account and forecast rehabilitation and renewal expenditure	30%	20%	20%	30%
AM05: Complete an Asset Valuation for Roads and Bridges	1. Collect the right data to make better planning decisions 3. Better account and forecast rehabilitation and renewal expenditure 6. Better leverage technology to support AM practices	30%	10%	20%	40%
AM06: GIS Data Consolidation and Sharing Platform for Government Agencies	1. Collect the right data to make better planning decisions 6. Better leverage technology to support AM practices	10%	20%	40%	30%
AM07: Pipe Renewals Program for Apia CBD	5. Improve asset reliability and availability	0%	10%	20%	70%
AM08: Implement Water Security and Disaster Resilience Mitigation Measures	2. Ensure timely access to specialist expertise 4. Improve safety and security of critical infrastructure 5. Improve asset reliability and availability	5%	10%	25%	60%
AM09: Review Heavy Vehicle Charges	3. Better account and forecast rehabilitation and renewal expenditure	5%	5%	30%	60%
AM10: Recommend Improvements to Road Asset Management System	1. Collect the right data to make better planning decisions 2. Ensure timely access to specialist expertise 3. Better account and forecast rehabilitation and renewal expenditure 6. Better leverage technology to support AM practices	10%	10%	30%	50%
AM11: Prepare an AM Plan for Buildings	1. Collect the right data to make better planning decisions 3. Better account and forecast rehabilitation and renewal expenditure 4. Improve safety and security of critical infrastructure 5. Improve asset reliability and availability	30%	10%	20%	40%
AM12: Capture CBD Drainage Assets for GIS	1. Collect the right data to make better planning decisions 4. Improve safety and security of critical infrastructure	50%	15%	15%	30%
	Total Distribution of Effort:	20%	15%	25%	40%

Table 6-2: Key SIAMS Improvement Initiatives (2021)

Initiative	Development Theme Alignment	BI Focus			
2021 Initiatives					
AM13: Community Integrated Management Plans Review (mid cycle)	1. Collect the right data to make better planning decisions 3. Better account and forecast rehabilitation and renewal expenditure 4. Improve safety and security of critical infrastructure 5. Improve asset reliability and availability	50%	20%	20%	10%
AM14: Update Sector Plan Manual and Sector Plans to includes Asset Management Practices Section	1. Collect the right data to make better planning decisions 3. Better account and forecast rehabilitation and renewal expenditure 5. Improve asset reliability and availability 7. Be accountable for business improvements	50%	20%	20%	10%
AM15: Review State Entity AMPs to include latest information	1. Collect the right data to make better planning decisions 3. Better account and forecast rehabilitation and renewal expenditure 5. Improve asset reliability and availability 7. Be accountable for business improvements	50%	20%	20%	10%
AM16: Review and Update Capital and Maintenance Investment Plans	1: Collect the right data to make better planning decisions 3: Better account and forecast rehabilitation and renewal expenditure 4: Improve safety and security of critical infrastructure 5. Improve asset reliability and availability	30%	10%	30%	30%
AM17: MWTI Establish and resource Asset Management and Resilience Office (AMRO)	1. Collect the right data to make better planning decisions 2. Ensure timely access to specialist expertise 3. Better account and forecast rehabilitation and renewal expenditure 5. Improve asset reliability and availability 7. Be accountable for business improvements	30%	10%	30%	30%
AM18: MWTI AMRO to facilitate asset management capacity development and training	1. Collect the right data to make better planning decisions 2. Ensure timely access to specialist expertise 3. Better account and forecast rehabilitation and renewal expenditure 4. Improve safety and security of critical infrastructure 5. Improve asset reliability and availability 6. Better leverage technology to support AM practices 7. Be accountable for business improvements	10%	20%	20%	50%
AM19: Develop National Asset Register Samoa (NARS)	1. Collect the right data to make better planning decisions 3. Better account and forecast rehabilitation and renewal expenditure 4. Improve safety and security of critical infrastructure 5. Improve asset reliability and availability 6. Better leverage technology to support AM practices 7. Be accountable for business improvements	30%	30%	20%	20%
AM20: Maintreaming Climate Adaptaiton (CA) **into Asset Management Processes**	1. Collect the right data to make better planning decisions 3. Better account and forecast rehabilitation and renewal expenditure 4. Improve safety and security of critical infrastructure 5. Improve asset reliability and availability 7. Be accountable for business improvements	30%	20%	20%	30%
	Total Distribution of Effort:	35%	19%	22%	24%

Key SIAMS Improvement Initiatives (2021) are to be added to the 2018 list of initiatives and managed by the MWTI Asset Management and Resilience Office (AMRO).

7 Monitoring the Improvement Program

Improving business practices requires the same level of project management that goes into building new infrastructure. When there is no monitoring and control measures in place, day-to-day activities and emergencies detract staff from forward looking improvements. This is known as a 'fire fighting' culture and there will need to be clear accountability for delivery if this Strategy is to be successful.

7.1 Roles and Responsibilities

Under the AM Policy 2017 (updated 2021), the **Asset Management Steering Committee** (AMSC) is responsible for providing oversight and coordination to facilitate the implementation of the adopted policy, strategy and plans. The **Ministry of Works, Transport and Infrastructure** (MWTI) is Chair to the AMSC and provides the secretariat support role. MWTI is also responsible for the technical and administrative facilitation for the Samoa Infrastructure Asset Management (SIAM) framework.

Membership of the AMSC shall consist of the Chief Executive Officers of the:

- Ministry of Works, Transport & Infrastructure (Chairperson)
- Ministry of Finance
- Ministry of the Prime Minister and Cabinet
- Ministry of Public Enterprises
- Ministry of Natural Resources and Environment
- Ministry of Women, Community & Social Development
- Ministry of Communication & Information Technology
- Ministry of Education
- Ministry of Health
- Electric Power Corporation
- Attorney General

The AMSC is convened at least quarterly and reports once a year to the Cabinet via the Minister of Works, Transport and Infrastructure. In its "technical and administrative" role and with reference to the requirements outlined in the AM Policy, MWTI will be required to fulfil the following requirements:

1. The Government through MWTI will develop and operate a National Samoa Infrastructure Asset Management Strategy with objectives which are aligned with Infrastructure Asset Management Policy. A monitoring, evaluation and reporting system with suitable performance indicators shall also be developed to measure and monitor achievements and progress against the Strategy and against state entities' Asset Management Plans. The feedback from monitoring will be used to achieve continual improvement of the performance and effectiveness of each state entity's infrastructure asset management framework.

2. MWTI will actively engage with state entities, government ministries and the community, to ensure adequate levels of service and performance are agreed upon and specified within Asset Management Plans. Customer satisfaction will be monitored against these levels of service.

3. MWTI shall actively engage with state entities and government ministries to promote the successful implementation of their Asset Management Plans, Asset Management practices and to ensure compliance with the Infrastructure Asset Management Policy and in alignment with the National Samoa Infrastructure Asset Management Strategy.

4. MWTI shall actively engage with state entities and government ministries in Asset Management capacity development and staff training on asset management.

5. MWTI will establish an Asset Management and Resilience Office (AMRO) to deliver these roles and responsibilities.

The Asset Management and Resilience Office (AMRO) function and roles are shown in the following figures:

Figure 7-1: Asset Management, Climate Change and Disaster Management Organisation

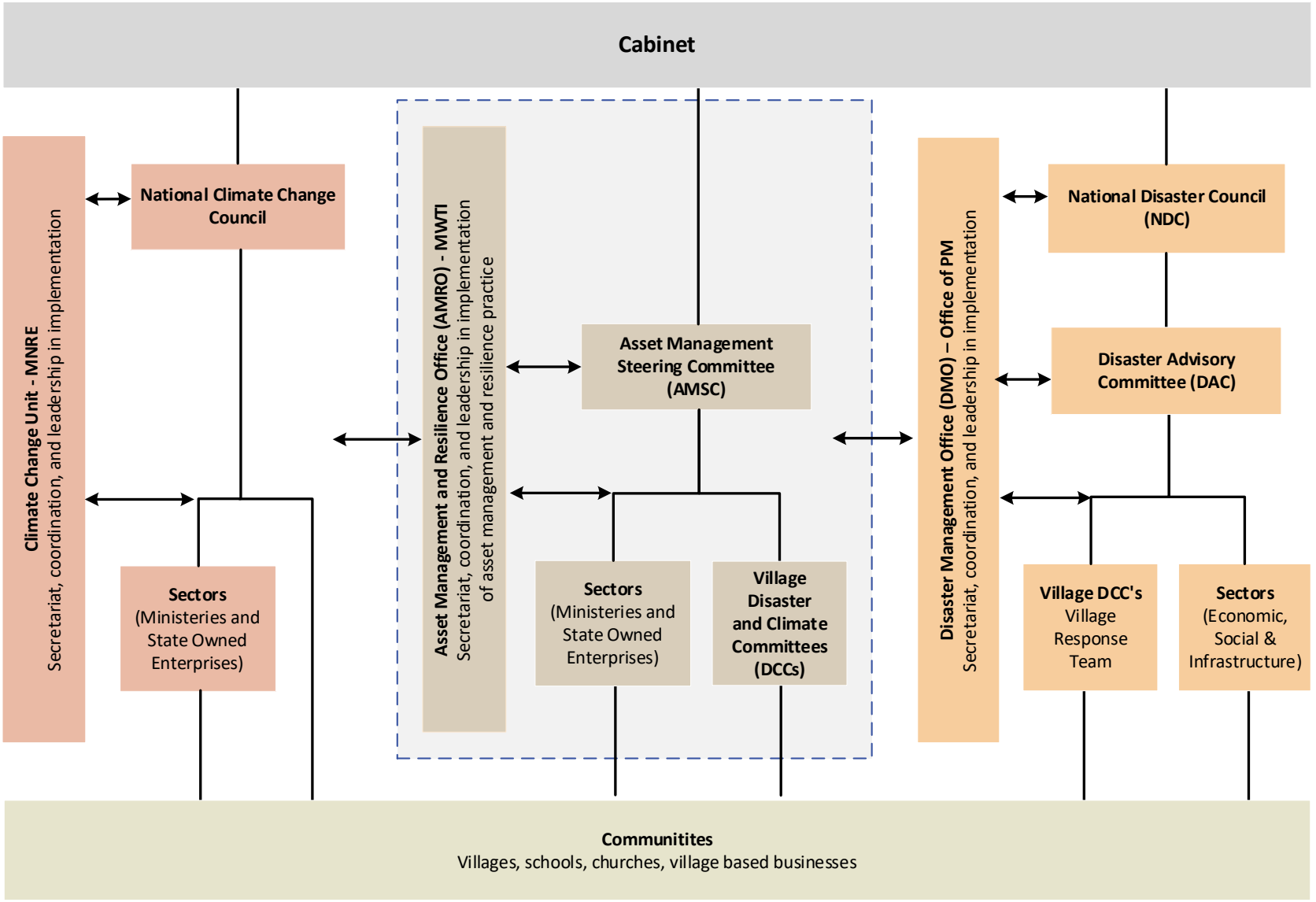
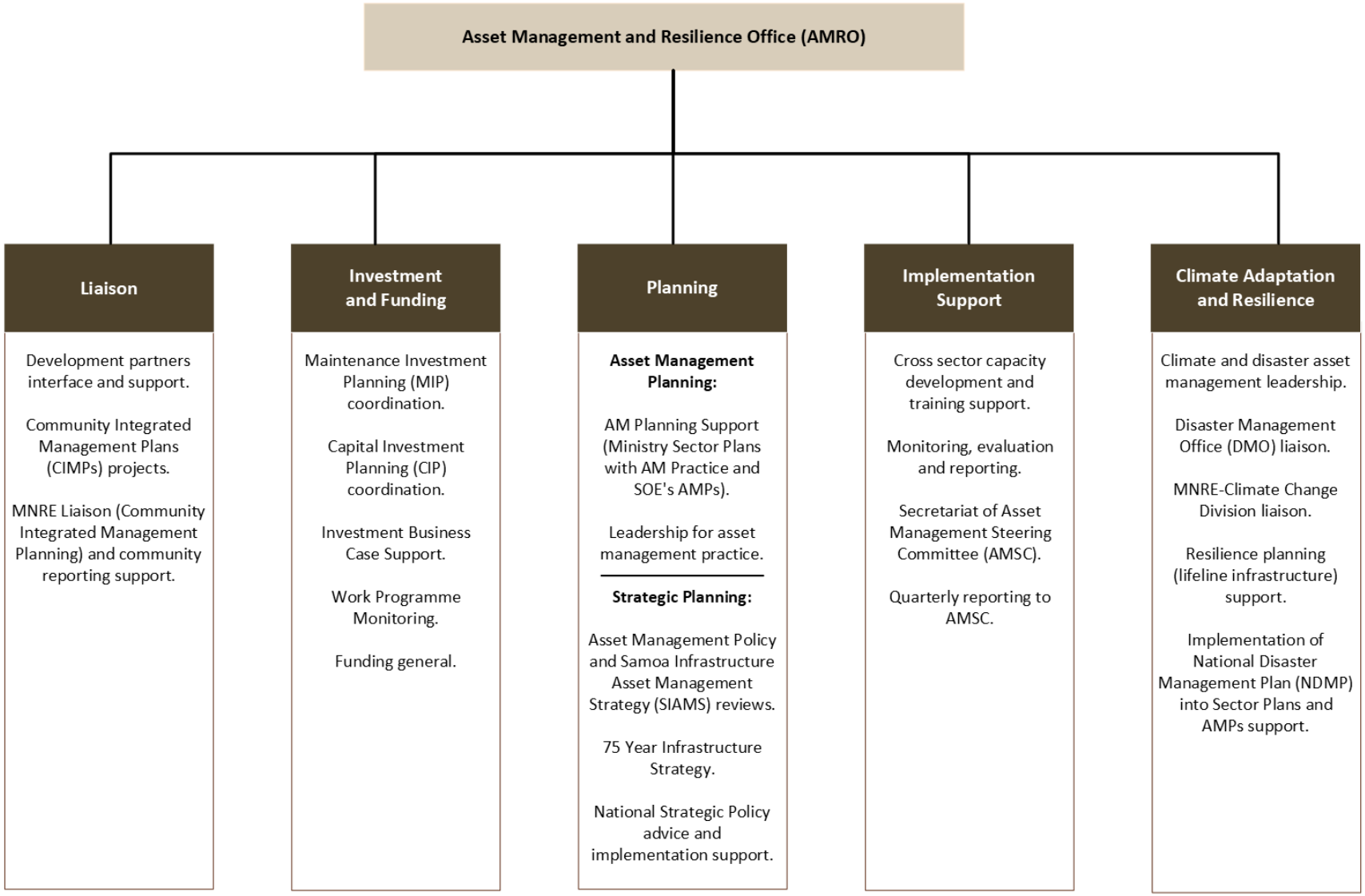


Figure 7-2: Asset Management and Resilience Office (AMRO)



7.2 Monitoring Frameworks in Samoa

Guidance for monitoring progress against Sector Plans in Samoa is provided in the Samoa Monitoring Evaluation Reporting Framework (SMERF) Manual, 2015. Produced for the Economic Policy and Planning Division, the SMERF Manual provides practical guidance on the tracking of performance goals against the sector plan outcomes.

7.3 Progress Tracking

The SIAMS initiative monitoring spreadsheet (SIAMS_Monitoring.xls) forms the basis for recording quarterly progress against the improvement initiatives in the AM Strategy. This is a 'living' document and will be updated by MWTI, in its administrative role, as government agencies take on new asset management activities.

MWTI will determine which new initiatives get added to the roadmap on a quarterly basis. It will apply the following logic in deciding which development initiatives should be tracked under SIAMS:

- Will the initiative result in improved asset management practices or will its outcomes benefit other departments or agencies?
- Does the initiative strongly align with the AM development themes (Section 5.3).
- Will the initiative need external donor funding? (Generally, all donor funded AM improvement initiatives should be tracked under SIAMS).

Physical construction projects would not typically be considered to be business improvement initiatives unless they included a substantial amount of new technology which would drive improved business practices (e.g. a new SCADA system for controlling reservoir tank levels) or resulted in business efficiency gains (e.g. installing solar energy panels to reduce power costs).

Samoa Infrastructure Asset Management Strategy (SIAMS 2018)
Investing to ensure current infrastructure delivers the right level of service to our customers

ASSET MANAGEMENT ACTION PLAN - MONITORING FRAMEWORK

STRATEGIC INITIATIVE						FUNDING				PERFORMANCE MONITORING		
Ref	Initiative Name	Scope Summary	Participating Agencies	Lead Unit	Date Added	Proj. Ref.	Source	Budget Estimate $ST	Budget Notes	Next Actions	March 2018	
											Q1	Comment
AM01	Establish a Maintenance Support Contract for Aviation Infrastructure	Implement a 5+ year term-maintenance contract which provides on-call support for aviation maintenance services at Faleolo Airport.	SAA, MOF	SAA	Aug-17	TBD	WBG	$500k p.a	Consultants to review legislations and costs associated with consultations	Contract drafted by Nov 2018. Tender likely Q1 2018	G	*progress comment here*
AM02	Expansion of CMMS for SSC, EPC and SAA	Review current implementation of CMMS within SSC and EPC. Develop business requirements on where to expand and what additional support is required. Investigate application to SAA.	SSC, EPC, SAA	SSC	Nov-17	TBD	-	$200k-$700k	Budget dependant on outcome of internal review and TA scope.	Form working group to discuss scope of TA. Identify and secure funding source by Q2 2018.		
AM03	Health Sector Asset Collection and Lifecyle Cost Analysis	Establishment of a central asset register for critical equipment and infrastructure. Assess condition and develop remaining life and forecast or recurrent and renewal costs for next 10-20 years.	NHS, MOF	NHS	Nov-17	TBD	-	$200k-$500k		Form working group to discuss scope of TA. Identify and secure funding source by Q2 2018.		
AM04	Establish Road Condition Monitoring and Renewals Program	Establish a repeatable road referencing and quantitative condition assessment practices for monitoring the health of the road network and supporting R&R works	LTA	LTA	Nov-17	TBD	-	$600k-$1m	Budget dependant on duration of support to embed practices.	Develop TOR and establish TA Q3-Q4 2018		
AM05	Asset Valuation and Renewals/Depreciation Funding Gap Assessment	Calculate annualised depreciation of roads and bridges and compare with current expenditure on resurfacing, rehabilitation and reconstruction to understand and report on any funding gap.	LTA, MOF, MWTI	LTA	Nov-17	TBD	Samoa TA Facility / DFAT	$200-$400k	PCN delivered to TA Facility on 6/11/17.	Develop TOR and establish TA Q1-Q2 2018		

Figure 7-3: SIAMS Initiative Monitoring Template

Table 7-4: SIAMS Monitoring Spreadsheet Field Definitions

Field	Definition
Initiative Description	First six columns summarise the initiative and which agency is responsible for driving it forward.
Proj Ref.	Update with project reference when funding established.
Source	The source of funding. Funding could come through donor agency or internal government/agency budget.
Budget Estimate and Notes	The budget estimate will change as scope is developed. Key assumptions about the stated budget are held in the Notes column.

Next Actions	Actions for the next reporting period (upon which progress will be reported). These will be overwritten during each quarterly review with a saved version of the spreadsheet providing an audit trail.
Performance Monitoring Q1-Q4	Given the significant number of activities across the sector it is generally a good idea to report and manage by exception. For this reason, the monitoring framework accommodates a "Traffic Light" reporting concept: ▪ Green – Demonstrated progress of the stated activity and KPI's being reported and achieved. ▪ Orange – Some progress but generally behind budget and in need of some closer management. Corrective actions being taken. ▪ Red – Progress is challenged or activity has been abandoned. Follow-up meetings and actions are required.
Comments	Comments provide a log of progress and corrective actions (in the case of an orange or red flag).

Appendix A

Asset Management Maturity Questionnaire

AM Questionnaire 2018

1. ASSET EXTENT: Know the current state of your network assets.

The first step in managing your assets is knowing their current state. Because some of this information may be difficult to find, you should use estimates when necessary. Over time, as assets are rehabilitated, repaired or replaced, your inventory will become more accurate.

Basic Objective for Effective Asset Management	Score*	Comments on Status
a) Physical information on major assets is stored in a central electronic inventory (register).		
b) Condition of major assets is assessed and stored in structured manner.		
c) Remaining life of major assets can be calculated in a structured manner.		
d) Replacement costs are known and stored against major assets.		

** (1) Undefined; (2) Aware; (3) Developing; (4) Competent; (5) Excellent*

2. PERFORMANCE LEVELS: Know the levels of service assets need to deliver.

Knowing your required "sustainable" level of service will help you implement an asset management program and communicate to stakeholders what you are doing. Quality, quantity, reliability, and environmental standards are elements that can define level of service and associated short- and long-term performance goals.

Basic Objective for Effective Asset Management	Score*	Comments on Status
a) Current and anticipated customer demands are well understood and documented.		
b) A level of service statement is published and shared with customers.		
c) Regulatory requirements require measurable compliance targets and these are tracked regularly.		
d) A comprehensive set of service and asset performance measures are tracked over time.		

** (1) Undefined; (2) Aware; (3) Developing; (4) Competent; (5) Excellent*

3. FUNCTION AND CRITICALITY: Know which assets are critical to meeting service levels.

Because assets fail, how you manage the consequences of failure is vital. Not every asset presents the same failure risk, or is equally critical to your operations. Critical assets are those you decide have a high risk of failing (old, poor condition, etc.) and major consequences if they do fail (expense, shutdown, safety, etc.).

Basic Objective for Effective Asset Management	Score*	Comments on Status
a) An asset criticality assessment is complete and assists with planning decisions.		
b) Asset failures are recorded in a structured manner, analysed and tracked.		
c) An assessment of risks inform maintenance practices (e.g run-to-fail for low risk assets).		
d) Relationship between levels of service and the role assets play in delivering the service is well understood		

** (1) Undefined; (2) Aware; (3) Developing; (4) Competent; (5) Excellent*

4. LIFE CYCLE COSTS: Know the optimum investment strategy for sustaining your assets.

Operation, maintenance and refurbishment of existing assets account for an estimated 85 percent of typical infrastructure agency expenditure. You want to optimize the work O&M crews are doing, and make whole-of-life, risk-based decisions when planning for renewals.

Basic Objective for Effective Asset Management	Score*	Comments on Status
a) A structured preventive maintenance program with regular scheduled maintenance is in place.		
b) Maintenance costs (time and materials) are recorded against major assets and inform planning.		
c) Failure information is stored and analysed to refine the maintenance strategy.		
d) Whole-of-life costs are used when developing business cases for capital construction.		

** (1) Undefined; (2) Aware; (3) Developing; (4) Competent; (5) Excellent*

5. FUNDING STRATEGY: Know long-term funding needs to meet asset performance standards.

Knowing the full economic costs to operate, maintain, refurbish and replace assets over their service life will enable the development of robust financial forecasts. Your system's financial forecast can then help you decide what changes need to be made to your system's long-term funding strategy.

Basic Objective for Effective Asset Management	Score*	Comments on Status
a) 10+ year financial forecasts reflect an assessment of remaining asset life and projected renewal costs.		
b) Financial forecasts reflect a bottom-up assessment of operating, recurrent and capital expenses.		
c) Revenues are sufficient to maintain service and accommodate aging assets and increasing demand.		
d) Revenue streams are sustainable and predictable and sufficient to meet robust financial forecasts.		

** (1) Undefined; (2) Aware; (3) Developing; (4) Competent; (5) Excellent*

Other Notes:

AM Questionnaire 2021

The AM Questionnaire was updated for the 2021 SIAMS Review, and used in the stakeholder consultation that was completed with Government Ministries and State Entities

Note this template was customised for use with each Department and Agency to include specific questions regarding assets and practices.

Status of Documentation

Question 1

Please confirm the completeness of the list of documents relevant to your State Entity and record any further updates which may be available.

Asset Management Objectives And Principles

Samoa National Asset Management Policy

The review of the Samoa National Asset Management Policy has included the recommended inclusion of Asset Management Objectives and Principles. Referring to these, consider how your State Entity would sit.

Proposed Principles	Proposed Objectives
1. Information is a strategic asset. Information leads to evidenced based policies for the delivery of responsive, reliable, and efficient public services. Conversely, poor management of asset information can lead to lack of transparency, accountability, and legitimacy. 2. Government and State Entities are the stewards of assets. All infrastructure and services are delivered for the benefit of the people of Samoa. The government's role is to ensure the good investment and appropriate use of the resources to support effective Asset Management, implement the Climate Change Policy (2020) and to contribute towards the National Sustainable Development Goals. 3. Effective collaboration processes among stakeholders as key. An effective process means stakeholders engagement in the transparent, open, and regular updating of asset information, interoperability, and tools.	1. The Policy aims to operationalize Asset Management for all State Entities for their respective infrastructure assets to ensure appropriate service delivery, increase efficiency, improve decision making, manage risks better, reduce costs in government and incorporate Climate Change adaptation and resilience. 2. The implementation of the Policy shall ensure the efficient and cost-effective utilization of resources by fostering the following: a. Service delivery focus – appropriate service delivery remains the priority for asset management decision making; b. Efficient/cost-effective decision making — supports efficient decision making and funding of the management of State Entities infrastructure, in alignment with Government's corporate and business plans, budgets and reporting process; c. Greater budget control — provides increased confidence in and oversight of State Entity budgets and plans, as well as ability to manage the financial requirements of assets at the State Entity and national level; d. Inter-agency collaboration — serves as a mechanism for the effective collaboration among the State Entities for greater efficiency and improved service delivery, including working with MWTI and the Asset Management Steering Committee; e. Faster and regular deployment of maintenance and management— reduces the amount of new infrastructures and assets required to be built by State Entities; f. More focused investments — investments can be more oriented towards achieving specific infrastructure service

Proposed Principles	Proposed Objectives
4. This asset management policy is aligned with the principles of openness, collaboration, preference for open standards, promoting trust, security and inclusiveness, and shall incorporate global standards.	delivery outcomes, in line with government long-term priorities and addressing specific asset challenges such as risk management, climate change adaption, resilience and asset performance; g. Sustainable decision making – grounding decision making in customer focused, sustainable, and efficient asset management practices, through implementation of the Climate Change Policy (2020), and the National Sustainable Development Goals.

Question 2

To what extent has your State Entity aligned with the proposed Policy objectives and principles?

Status of Assets

Question 3

Referring to the status of assets outlined in the Samoa National Infrastructure Strategic Plan (NISP), please provide an update of your State Entities assets.

Assets disclosed in SIAMS listed by State Entity.

Asset Management Questionnaire

Asset Extent

Know the current state of your network assets.

Question 4

The first step in managing your assets is knowing their current state. Because some of this information may be difficult to find, you should use estimates when necessary. Over time, as assets are rehabilitated, repaired or replaced, your inventory will become more accurate.

Basic Objective for Effective Asset Management	Score*	Comments on Status
e) Physical information on major assets is stored in a central electronic inventory (register).		
f) Condition of major assets is assessed and stored in structured manner.		
g) Remaining life of major assets can be calculated in a structured manner.		
h) Replacement costs are known and stored against major assets.		

** (1) Undefined; (2) Aware; (3) Developing; (4) Competent; (5) Excellent*

Performance Levels

Know the current state of your network assets.

Question 5

The first step in managing your assets is knowing their current state. Because some of this information may be difficult to find, you should use estimates when necessary. Over time, as assets are rehabilitated, repaired or replaced, your inventory will become more accurate.

Basic Objective for Effective Asset Management	Score*	Comments on Status
a) Current and anticipated customer demands are well understood and documented.		
b) A level of service statement is published and shared with customers.		
c) Regulatory requirements require measurable compliance targets and these are tracked regularly.		
d) A comprehensive set of service and asset performance measures are tracked over time.		

** (1) Undefined; (2) Aware; (3) Developing; (4) Competent; (5) Excellent*

Function and Criticality

Know which assets are critical to meeting service levels.

Question 6

Because assets fail, how you manage the consequences of failure is vital. Not every asset presents the same failure risk, or is equally critical to your operations. Critical assets are those you decide have a high risk of failing (old, poor condition, etc.) and major consequences if they do fail (expense, shutdown, safety, etc.).

Basic Objective for Effective Asset Management	Score*	Comments on Status
a) An asset criticality assessment is complete and assists with planning decisions.		
b) Asset failures are recorded in a structured manner, analysed and tracked.		
c) An assessment of risks inform maintenance practices (e.g. run-to-fail for low risk assets).		
d) Relationship between levels of service and the role assets play in delivering the service is well understood		

** (1) Undefined; (2) Aware; (3) Developing; (4) Competent; (5) Excellent*

Lifecycle Costs

Know the optimum investment strategy for sustaining your assets.

Question 7

Operation, maintenance and refurbishment of existing assets account for an estimated 85 percent of typical infrastructure agency expenditure. You want to optimize the work O&M crews are doing, and make whole-of-life, risk-based decisions when planning for renewals.

Basic Objective for Effective Asset Management	Score*	Comments on Status
a) A structured preventive maintenance program with regular scheduled maintenance is in place.		

Basic Objective for Effective Asset Management	Score*	Comments on Status
b) Maintenance costs (time and materials) are recorded against major assets and inform planning.		
c) Failure information is stored and analysed to refine the maintenance strategy.		
d) Whole-of-life costs are used when developing business cases for capital construction.		

** (1) Undefined; (2) Aware; (3) Developing; (4) Competent; (5) Excellent*

Funding Strategy

Know long-term funding needs to meet asset performance standards.

Question 8

Knowing the full economic costs to operate, maintain, refurbish and replace assets over their service life will enable the development of robust financial forecasts. Your system's financial forecast can then help you decide what changes need to be made to your system's long-term funding strategy.

Basic Objective for Effective Asset Management	Score*	Comments on Status
a) 10+ year financial forecasts reflect an assessment of remaining asset life and projected renewal costs.		
b) Financial forecasts reflect a bottom-up assessment of operating, recurrent and capital expenses.		
c) Revenues are sufficient to maintain service and accommodate aging assets and increasing demand.		
d) Revenue streams are sustainable and predictable and sufficient to meet robust financial forecasts.		

** (1) Undefined; (2) Aware; (3) Developing; (4) Competent; (5) Excellent*

Projects – Capital Program Delivery (Improvement Initiatives)

Question 9

Referring to your State Entity's capital programme outlined in the Samoa Infrastructure Asset Management Strategy, please provide an update on the status of these initiatives. Please provide details of these.

Initiatives listed by State Entity.

Question 10

Are there other initiates for your State Entity which should be incorporated into the revised Samoa Infrastructure Asset Management Strategy? Please provide details of these.

Natural Hazard Resilience Risk Planning (including Climate Risk)

Readiness and Resilience

Developing a framework for resilience risk management and planning helps identify the potential impacts of the highest risks, and take decisions on actions to mitigate those risks. This process reduces the Department's **exposure**

to the risks of damage and destruction of assets and facilities, the ability to maintain service delivery during disaster events, and the coping capacities of the Government and State Entities – including financially.

Question 11

Referring to the Climate Change Policy 2020, climate objectives, please confirm that status of your State Entity in progressing these.

Objective 1: having an effective governance framework and supporting systems in place for effective climate change action.

Objective 2: implementing adaptation measures to protect Samoa from the impacts of climate change.

Objective 3: implement mitigation measures to reduce greenhouse gas emissions including matters relating to the nationally determined contributions (NDC).

Objective 4: enhance access to sustainable climate finance.

Objective 5: climate change effectively mainstreamed into national and community planning, implementation and monitoring processes.

Objective 6: improved data and information management on climate change for informed decision making.

Objective 7: effective coordination and representation at the national, regional and international levels.

Objective 8: promote and implement effective awareness, education and advocacy activities on climate change issues.

Question 12

To what extent is risk management and resilience planning integrated into your Asset Management decision making?

Question 13

To what extent does your State Entity prioritize climate change adaptation into asset investment decisions?

Question 14

Does your State Entity plan programs and prioritize investments using spatial planning and financial information to minimise and mitigate hazard exposure?

Response

Question 15

What are the processes or procedures that help your State Entity to respond to the disaster events (i.e. what is the role of your State Entity during a disaster event)?

Recovery

Question 16

Does your State Entity have plans prepared, which provide guidance on maintaining **operational continuity**, or returning State Entity assets, facilities, and Levels of Service to a usable standard following an emergency event?

Question 17

Has your State Entity developed and used business recovery planning in establishing how services are to be restored following adverse natural or man-made crises events? Has capital planning included where assets and facilities would be prioritised for upgrade, rather than "like-for-like" replacement?

Sustainable Development

Developed in collaboration with the United Nations, the Samoa Government committed to 17 Sustainable Development Goals (SDGs) which have informed subsequent policy and strategic development including the Strategy for the Development of Samoa (SDS), Samoa 2040 and the Climate Change Policy 2020.

Figure 7-5: United Nations Sustainable Development Goals (SDGs)

Question 18

How does your State Entity Asset Management process, systems and delivery incorporate and address the National Sustainable Development Goals (SDS)?

Capacity Development

Competency Framework for Asset Management

The proposed revision to the Samoa National Asset Management Policy requires State Sector Plans to have a capacity development framework which shall include a competency framework, needs assessment, and the interventions needed to develop the capability of the State Entity to implement the respective Asset Management plans/Sector Plans.

Question 19

How is your State Entity planning to ensure that it continues to develop its Asset Management capabilities?

Question 20

Has your State Entity already looked at the training needs within the agency to support the development of your Asset Management systems?

Appendix B

Description of SIAMS Improvement Initiatives

List of Initiatives 2018

The list of Asset Management Initiatives identified in 2018 have been retained in this Appendix for reference. The implementmentation of many of these initiatives is on-going at the time of the 2021 review.

AM01: Establish a Maintenance Support Contract for Aviation Infrastructure

AM02: Expansion of CMMS for SSC, EPC and SAA

AM03: Health Sector Asset Collection and Lifecyle Cost Analysis

AM04: Establish Road Condition Monitoring and Renewals Program

AM05: Asset Valuation and Renewals/Depreciation Funding Gap Assessment

AM06: GIS Data Consolidation and Sharing Platform for Government Agencies

AM07: Pipe Renewal Program for Apia CBD

AM08: Implement Water Security and Disaster Resilience Mitigation Measures

AM09: Review Heavy Vehicle Charges

AM10: Recommend Improvements to Road Asset Management System

AM11: Prepare an AM Plan for Buildings

AM12: Prepare an AM Plan for Buildings

AM01: Establish a Maintenance Support Contract for Aviation Infrastructure

Tasks / Scope: Implement a 5+ year term-maintenance contract which provides on-call support for maintenance services including: ▪ Establishment of a central asset register ▪ Condition assessment and creation of a corrective maintenance plan ▪ Evaluating current spares and building a list of important spares to maintain on site ▪ Building preventive maintenance schedules and job plans and oversee implementation ▪ Providing supplementary donor funding to support critical maintenance activities ▪ Online support for troubleshooting and technical assistance	***Drivers:*** ▪ There are specialist pieces of equipment for which there are no in-country experts (e.g. DVOR). ▪ Current maintenance support contracts are adhoc and with different providers. ▪ There is a backlog of corrective maintenance needed and insufficient revenue to reduce the backlog. ▪ We don't have easy access to online support for our technicians. ▪ We need rapid mobilisation of resources after natural disasters.
Responsibilities: ▪ SAA working with WBG and Pacific Aviation Investment Project	***Project Champion(s):*** ▪ ***TBD***, SAA

AM02: Expansion of CMMS for SSC, EPC and SAA

Tasks / Scope: Scope of this initiative likely to include: ▪ Form a working group to develop scope for TA to support a CMMS improvement project ▪ Needs assessment/ business process discovery ▪ Develop business requirements on where to expand function of MEX system. Consider expansion to SAA terminal assets ▪ Determine training and remote support requirements ▪ Determine additional data collection needs ▪ Improve reporting and performance analysis ▪ Obtain fund to appoint TA to develop specification and procure consulting services to perform upgrade	***Drivers:*** ▪ MEX CMMS is used by EPC and SSC ▪ The system needs to be improved to get full benefits ▪ Both agencies feel they can get more use from the system and expand its function ▪ SAA investigating a CMMS for new infrastructure
Responsibilities: ▪ EPC, SSC and SAA to work together ▪ MWTI to assist with TA funding	***Project Champion(s):*** ▪ Pipi Ioane Fomai, SSC ▪ Sala Kalolo Bartley, SSC

AM03: Health Sector Asset Collection and Lifecyle Cost Analysis

Tasks / Scope: Form a working group to develop TOR for a TA to complete this project. TA scope likely to include: ▪ Establishment of a central asset register and mechanism for updating the register. Likely to be in Access/Excel ▪ Condition assessment and estimation of remaining life and replacement cost ▪ Bottom up forecast or recurrent maintenance costs and rehabilitation and renewal costs for next 10-20 years ▪ Review of MTEF and identification of funding gap	***Drivers:*** ▪ NHS has a significant portfolio of assets ▪ Many of these assets have been donor funded ▪ There is no central projection of the remaining life and R&R requirements for these assets ▪ Funding is heavily based on previous years achievements (top down).

▪ Discussions with MOF on funding forecasts and risks	
Responsibilities: ▪ NHS working with MOF to develop TOR for TA ▪ MWTI to assist with TA funding	*Project Champion(s):* ▪ Leilua Olataga, NHS ▪ ***TBD***, MOF

AM04: Establish Road Condition Monitoring and Renewals Program

Tasks / Scope: The main objective of this initiative is to establish a repeatable road referencing and quantitative condition assessment practices for monitoring the health of the road network. An LTA working group will need to develop a TOR for a TA to complete this project. TA scope likely to include: ▪ Review of existing systems and historic data ▪ Review road referencing system and GIS network model ▪ Onsite support to establish appropriate survey program (roughness and surface condition) and train staff ▪ Establishment of GIS data tables to hold information ▪ Development of training materials (simple workflows and survey procedures) ▪ Development of reporting templates ▪ Remote support over 2 years to assist support ongoing surveys	*Drivers:* ▪ There is no baseline tracking of road condition metrics ▪ Unable to plot deterioration and impact of under investment in R&R ▪ Equipment has been procured but needs review (ROMDAS?) ▪ No specialist support so some systems not being used ▪ Can leverage recent work on 'vulnerability' survey ▪ Update and expand use of GIS
Responsibilities: ▪ LTA working with MWTI to develop TOR for TA ▪ MWTI to assist with sourcing TA funding	*Project Champion(s):* ▪ Matthew Wendt, LTA ▪ Galumalemana Sofai Eteuati, LTA ▪ Leilani Galuvao, MWTI

AM05: Asset Valuation and Renewals/Depreciation Funding Gap Assessment

Tasks / Scope: The main objective of this initiative is to compare annualised depreciation with current expenditure on resurfacing, rehabilitation and reconstruction to understand and report on any funding gap. Scope of this initiative likely to include: ▪ Extract key road information from GIS, construction records and other information sources ▪ Determine unit rates from historic contracts and complete a bottom-up, component level valuation of road and bridge elements ▪ Complete valuation in accordance with ANZ guidelines (component level breakdown)	*Drivers:* ▪ Need to understand the annualised depreciation of road pavement and bridges to assess potential funding gap on current expenditure. ▪ Signs of underinvestment in road surfacing. Periodic maintenance being deferred. ▪ MOF provide top-up funding. Competing with other government agencies for funds.
Responsibilities: ▪ LTA working with MWTI to develop TOR for TA ▪ MWTI to assist with sourcing TA funding	*Project Champion(s):* ▪ ***TBD***, LTA

AM06: GIS Data Consolidation and Sharing Platform for Government Agencies

Tasks / Scope: The main objective of this initiative is to improve GIS data sharing and to create a consolidated (read-only) view of critical asset infrastructure and to strengthen the capability of asset owners in maintaining GIS information. The scope of this initiative will likely include: ▪ Create TA for specialist support and procurement of additional licenses ▪ Identify GIS datasets ▪ Establish GIS working group ▪ Documents metadata standards (layers, attributes, quality) ▪ Establish data sharing procedures ▪ Identify training needs ▪ Identify data development needs ▪ Establish GIS at MWTI AM Unit and consolidate ▪ Ensure parallel initiatives (e.g. survey of school buildings) work with GIS standards	*Drivers:* ▪ Adhoc supply of GIS information to departments ▪ No centralised GIS view of infrastructure ▪ Little attribute information on assets ▪ Some software needs updating ▪ Formal training to GIS users
Responsibilities: ▪ MWTI to identify TA in consultation with donors ▪ EPC, SWA, LTA, MNRE to participate as largest datasets	*Project Champion(s):* ▪ *TBD*, MWTI

AM07: Pipe Renewal Program for Apia CBD

Tasks / Scope: The main objective of this initiative is to increase the renewals program for failing water pipelines in the CBD. Scope of this initiative will include: ▪ Review of NRW program findings and the ADB Funded Master Plan ▪ Packaging works and coordination with LTA and streetscape activities ▪ Developing funding application and business case ▪ Development of contract documents and construction management	*Drivers:* ▪ Lost revenue through high leak rates ▪ Ongoing disruption to road corridor with unplanned repairs ▪ Reducing EU funding of the capital program ($15m in 2012/13 to $8.7m in 2016/17)
Responsibilities: ▪ SWA	*Project Champion(s):* ▪ Philip Kerslake, SWA

AM08: Implement Water Security and Disaster Resilience Mitigation Measures

Tasks / Scope: The main objective of this initiative is to improve the resilience of water treatment plants and reservoirs to withstand storm events (severe weather) by implementing improvements to mitigate risks identified in ADB 2017 workshops. Scope of this initiative likely to include: ▪ Review of identified risks to WTP and Reservoirs ▪ Recommendation on mitigation measures ▪ Implementation of mitigation measures	*Drivers:* ▪ Increasing occurrence of extreme weather ▪ Previous disruptions ▪ Security of water supply ▪ Speed of recovery ▪ ADB risk workshops
Responsibilities: ▪ SWA	*Project Champion(s):* Heseti Vaai, SWA

AM09: Review Heavy Vehicle Charges

Tasks / Scope:	*Drivers:*
The main objective of this initiative is to recommend an appropriate taxation/user charges structure for heavy vehicles. Scope of this initiative likely to include: ▪ Review and report on international practices ▪ Assess current vehicle fleet and determine revenue model ▪ Provide recommendations on how to implement the process ▪ Manage the implementation	▪ Commercial vehicles don't contribute fair share to road maintenance ▪ Current levels of rehabilitation are not sustainable given increasing traffic growth ▪ Need to align heavy vehicle charges with charging systems in NZ and Australia ▪ Need to increase revenue from increasing number construction and commercial vehicles
Responsibilities: ▪ LTA and MOF working together	*Project Champion(s):* ▪ ***TBD***, LTA

AM10: Recommend Improvements to Road Asset Management System

Tasks / Scope:	*Drivers:*
The main objective of this initiative is to complete an in-depth review of the current systems and recommend an upgrade or development path for RAM to ensure there is a robust decision support system for one of Samoa's most valuable infrastructure portfolios. Scope of this initiative likely to include: ▪ Develop business process model which RAMS supports including mapping roles and responsibilities ▪ Investigate the role RAMS can play in supporting each process ▪ Understand unmet needs and gaps in service ▪ Recommend enhancements and estimate program budget ▪ Prepare summary of recommendations ▪ Develop TOR for system upgrade work	▪ The current RAMS system is not being kept up to date with changes to the network (e.g. new surfacing, condition etc) ▪ GIS software is out of date. Upgrade will likely disrupt some functions ▪ There needs to be better availability of data ▪ There needs to be better coordination of activities in the road corridor (dig-once) ▪ Costs of works is not being kept for analysis ▪ HDM-4 and ROMDAS systems not being used as staff not familiar and no immediate value
Responsibilities: ▪ LTA to seek TA for the review	*Project Champion(s):* ▪ ***TBD***, LTA

AM11: Prepare an AM Plan for Buildings

Tasks / Scope:	*Drivers:*
The main objective of this initiative is to prepare an AM Plan in line with IIMM 2011 guidelines for schools, hospitals, office buildings and the likes (excludes PTB/SOE buildings). Scope of this initiative likely to include: ▪ Review MOP, SPA, EPC AMP's prepared by others ▪ Review MOF data templates and enhance for AMP ▪ Collect inventory and complete assessment of all buildings ▪ Develop corrective maintenance needs and present maintenance options ▪ Develop levels of services ▪ Assess risks and mitigation plans ▪ Review historic expenditures	▪ Maintenance contracts are only in place for a few buildings (e.g. TATTE) ▪ There is no consolidated inventory of building and the condition they are in ▪ There needs to be coordinated response following natural disasters ▪ MOP are working with LGNZ to prepare an AMP for the newly constructed Police Dog Shelter

▪ Develop lifecycle cost projections ▪ Compile AMP and review with key stakeholders (esp.MOF) ▪ Understand revenue models (donor, user pays, government contributions from tax etc) ▪ Presentation of the AMP and investment strategy to MOF	
Responsibilities: ▪ MWTI to lead initiative ▪ NHS, MOE, MOF as key building owners	***Project Champion(s):*** ***TBD***, MWTI

AM12: Capture CBD Drainage Assets for GIS

Tasks / Scope: The main objective of this initiative is to capture drainage assets (channels, culverts and pipes) in the Apia CBD area and to populate a GIS layer with the information. Scope of this initiative likely to include: ▪ Establish location of drains from as-built records, aerial images, local engineers ▪ Assemble a consolidated GIS dataset as background layers ▪ Validate drainage layers in the field using GPS and take photos of key assets ▪ Transfer datasets to MNRE/LTA for ongoing maintenance and upkeep	***Drivers:*** ▪ No complete dataset for drainage assets makes improvement planning difficult ▪ Part of EU fund for improving drainage still to be delivered
Responsibilities: ▪ MWTI to lead initiative ▪ LTA and MNRE	***Project Champion(s):*** ***TBD***, MWTI

List of Initiatives 2021

AM13: Complete mid-cycle review of Community Integrated Management Plans
AM14: Update Sector Plan Manual and Sector Plans to include an Asset Management Practices Section
AM15: Update State Entity Asset Management Plans to include latest information (2022)
AM16: Review and update Capital and Maintenance Investment Plans (AMRO)
AM17: MWTI establish and resource Asset Management and Resilience Office (AMRO)
AM18: Capacity development and training in asset management facilitated by AMRO
AM19: Develop a National Asset Register Samoa (NARS)
AM20: Mainstream Climate Adaptation into Asset Management Processes

AM13: Community Integrated Management Plans Review (mid-cycle)

Tasks / Scope:	*Drivers:*
There is a strong suite of Community Integrated Management Plans, prepared at a village and community level. These plans were updated in 2017, with a 10 year time horizon from preparation. The Community Integrated Management Plans would benefit from a high level mid-cycle (5 year) review in 2022 confirming works completed since 2017, and documenting any changes that have occurred since 2017, to provide updated information for input into: ▪ Sector Plans ▪ SOE Asset Management Plans ▪ Response/Contingency Plans ▪ Maintenance Investment Plans ▪ Capital Investment Plans MNRE working with MWTI to develop TOR for Ministries or TA to assist with the high level updating of the Community Integrated Management Plans	▪ Update the project lists with any completed projects ▪ Capture any changed or additional climate resilience or climate change related projects ▪ Gather additional feedback from communities as knowledge and awareness of climate change impacts has grown over the past 5 years
Responsibilities: ▪ MNRE, MWCSD working with MWTI to develop TOR for Ministry staff or TA to complete project review ▪ MWTI to assist with sourcing TA funding if required	*Project Champion(s):* ▪ ***MNRE***, MWCSD MWTI

AM14: Sector Plan Manual and Sector Plan update to include Asset Management Practices Section

Tasks / Scope:	*Drivers:*
The main objective of this initiative is to develop guidelines in the Sector Plan Manual to include an asset management practices section, then use the developed guidelines to update Sector Plans: ▪ Document assets being managed, including the value of assets ▪ Document asset lifecycle considerations including capital and maintenance investment requirements ▪ Document risk, resilience and climate adaptation requirements including any investment required	▪ Government Depatments and SOEs to develop and document asset management practices. ▪ Minimise the number of key documents to be updated. ▪ Standardise asset management practices across whole of government.
Responsibilities: ▪ MWTI AMRO to develop TOR for TA ▪ The CRICD of the MOF to assist in scoping Sector Plan and Manual Update to ensure that climate and disaster resilience is integrated throughout the documents ▪ PASCD to ensure all government entities have updated Sector Plans with AM integrated.	*Project Champion(s):* ▪ ***MWTI***, CRICD (MOF), PASCD (PSC)

AM15: Review State Entity AMPs to include latest information (2022)

Tasks / Scope:	*Drivers:*
The main objective of this initiative is to update the State Entity Asset Management Plans to include:	Update SOE Asset Management Plans to incorporate the latest information from:

▪ Additional and updated information following the completion of the high level Community Integrated Management Plans review ▪ Results of the National Climate Change Policy 2020 implementation	▪ Community Integrated Management Plan review ▪ Climate Change Policy 2020 implementation ▪ Sector Plans ▪ Sustainable Development Goal implementation
Responsibilities: ▪ MWTI AMRO to coordinate update ▪ State Entities to update AMPs (2022)	*Project Champion(s):* ▪ ***MWTI***, State Entities

AM16: Review and update Capital and Maintenance Investment Plans

Tasks / Scope: ▪ The Infrastructure Asset Management Policy (2017) introduced a robust mechanism for managing infrastructure asset maintenance through the Maintenance Investment Program and Capital Investment Program specified in the Policy. ▪ Further implementation of the Maintenance Investment Program and Capital Investment Program, and the inclusion of Government Ministries into the requirements to develop and report a Maintenance Investment Program and Capital Investment Program would assist in the understanding and management of maintenance investment requirements across the Government of Samoa.	*Drivers:* ▪ Unified assessment of capital and maintenance investment requirements across Government Departments and State Entities ▪ Ensure infrastructure maintenance is not a 'hidden' issue with a growing backlog ▪ Manage the risks and liabilities associated with capital and maintenance investment requirements ▪ Applying latest information from CIMS, Sector Plans and AMPS to developing updated investment programs
Responsibilities: ▪ MWTI AMRO to complete update ▪ Government Ministries and State Entities to provide updated information from Sector Plans and AMPs ▪ CRICD to review new and updated investment plans	*Project Champion(s):* ▪ ***MWTI***, Government Ministries, State Entities, CRICD (MOF)

AM17: MWTI establish and resource Asset Management and Resilience Office (AMRO)

Tasks / Scope: The main objective of this initiative is to meet the Government of Samoa asset management practice, infrastructure climate adaptation and resilience coordination and guidance requirements by: ▪ MWTI establishing an Asset Management and Resilience Office (AMRO) ▪ The AMRO functions being defined as Liaison, Investment and Funding, Planning, Implementation Support, Climate Adaptation and Resilience	*Drivers:* ▪ Leadership in the implementation of asset management and resilience practice ▪ Coordination and guidance for Government Ministries and State Entities in asset management practice, infrastructure climate adaptation and resilience. ▪ MWTI capability and resource to support, liaise and coordinate with the MNRE Climate Change Unit and Office of the Prime Minister Disaster Management Office. ▪ Secretariat for the Asset Management Steering Committee.
Responsibilities: ▪ MWTI to establish and resource AMRO	*Project Champion(s):* ▪ ***MWTI***

AM18: MWTI AMRO to facilitate asset management capacity development and training

Tasks / Scope:	*Drivers:*

The main objective of this initiative is to address the ongoing and sustained capability and capacity gaps that are observed in asset management, climate adaptation and resilience planning, practice and implementation by: ▪ Sustained, ongoing cross sector capacity development and training support in asset management, climate change adaptation and resilience planning, practice and implementation ▪ Capacity development and training support be organised and delivered the MWTI Asset Management Resilience Office	▪ On-going and long term capability and capacity gaps.
Responsibilities: ▪ MWTI AMRO to facilitate AM capacity development and training	*Project Champion(s):* ▪ ***MWTI***

AM19: Develop National Asset Register Samoa (NARS)

Tasks / Scope: ▪ Information from the Stakeholder Consultation indicated that current Government of Samoa infrastructure asset information is included in the following systems MEX, Xero and FinanceOne. There is the opportunity to consolidate a National Asset Register Samoa (NARS) on one system for infrastructure assets to allow ease and consistency of information availability and reporting. ▪ A separate investigation should be undertaken, and recommendations developed on which of the current systems should become the NARS system for infrastructure assets. ▪ The existing MOF fixed asset register for non-infrastructure assets would remain separate from the proposed NARS system for infrastructure assets. ▪ Thresholds for which assets are included in the proposed NARS system, and which assets would remain in the MOF fixed asset register would be determined during the proposed investigation and report on the NARS system.	*Drivers:* ▪ The limited number of asset management information systems used by Government of Samoa Ministries and SOE's, and the current state of information system development provides the opportunity to consolidate asset management information systems to a single National Asset Register for infrastructure assets. The advantages of a National Asset Register are: ▪ One system to maintain and update ▪ One set of system training and cross Department/SOE support and training opportunities ▪ Ease of reporting and developing system outputs for all users ▪ Ease of developing single national views/report of asset values, insurance, risks, projects, maintenance ▪ Ease of consolidated data availability for national disaster, risk and response management ▪ Ease of consolidated data availability for infrastructure climate risk, adaptation and response analysis and programme development
Responsibilities: ▪ MWTI to develop TOR for TA ▪ MWTI to assist with sourcing TA funding	*Project Champion(s):* ▪ ***MWTI,*** *Government Departments, State Entities*

AM20: Mainstream Climate Adaptation into Asset Management Processes

Tasks / Scope: The main objective of this initiative is to ensure Climate Adaptation is integrated into asset management policies and strategies: ▪ MWTI AMRO will coordinate this integration	*Drivers:* ▪ Integrate Climate Adaptation into asset management policies and strategies ▪ Collect and manage climate risk data in AM systems

▪ Appendix C provides guidance and an implementation Road Map ▪ Integration will need to embedded in asset management plans, processes and practices	▪ Review AM planning processes to include adaptation works ▪ Establish a protocol for data sharing between sectors ▪ Undertake capacity and capability development in CA
Responsibilities: ▪ MWTI to integrate Climate Adaptation into Asset Management Plans, Processes and Practices	***Project Champion(s):*** ▪ ***MWTI,*** *Government Ministries, State Entities*

Appendix C

Mainstreaming Climate Adaptaiton into Asset Management Process

Importance of Mainstreaming Climate Adaptation into Asset Management Process

Using Asset Management as a Vehicle for Improving Climate Resilience of Infrastructure

Challenge: Samoa shares many of the climate-related challenges of other Small Island Developing States

1. As with other archipelagic nations, Samoa is highly vulnerable to a range of natural hazards such as earthquakes, tsunamis, cyclones and sea-level rise. In addition, with a changing climate, infrastructure assets are exposed to increasing climatic hazards such as cyclones, droughts, and floods.
2. Approximately 70% of the population live within 1km of the coastline. The implication is that a majority of infrastructures, such as hospitals, schools, port facilities, power plants, airports and roads, are in the highly vulnerable coastal zone. As expected, natural climate and weather events can result in the devastation of livelihoods and significant losses to the country. For example, during 2012, Tropical Cyclone Evan caused combined damage of US$210 million that accounts for 30% of the countries' GDP[5].
3. Financing of disaster losses remains an issue, often resulting in the budgets being earmarked for renewal and replacement of existing infrastructure to be diverted to recovery and rebuilding efforts. As a result, the condition and functional effectiveness of existing infrastructure decline, reducing the resilience of the infrastructure, making it more vulnerable to the impact of the next weather event.
4. Some engineering solutions that worked in the past are simply not appropriate for withstanding the increasing intensity and frequency of climate and weather events.

Opportunities Offered through Asset Management

1. Asset management comprises the entire process, from system planning, investment programming, and the design and construction of assets, to the operation and preservation of the system. It is characterised by a solid policy framework, measurable objectives, and effective tools and information systems that allow continuous performance monitoring. Samoa has already made good progress in implementing asset management systems and processes.
2. The asset management framework assists in focusing investment on what matters most. Ultimately asset management services have to provide to the community needs. The asset management investment analysis processes can also help to prioritise resilient improvements that will significantly reduce climate risks.
3. There are components of the asset management processes that can also address the needs from a resilience planning perspective, including:
    a. Storing, managing and presenting of data and information (e.g. such as GIS maps);
    b. Processing and analysis of data to assist in decision making;
    c. Tracking reporting on infrastructure resilience and costs over time;
    d. Provide a systematic process to plan and manage infrastructure works that include resilience improvements.

Elements of Mainstreaming Climate Adaptation into Asset Management Process

Using Resilience Principles across the entire Lifecycle of Infrastructure

Figure C1 shows the four stages in the lifecycle of infrastructure managed as part of asset management. Table C1 shows the application of asset management processes through the lifecycle of the infrastructure.

[5] World Bank. (2017). Climate and Disaster Resilient Transport in Small Island Developing States: A Call for Action (Issue World Bank Group).

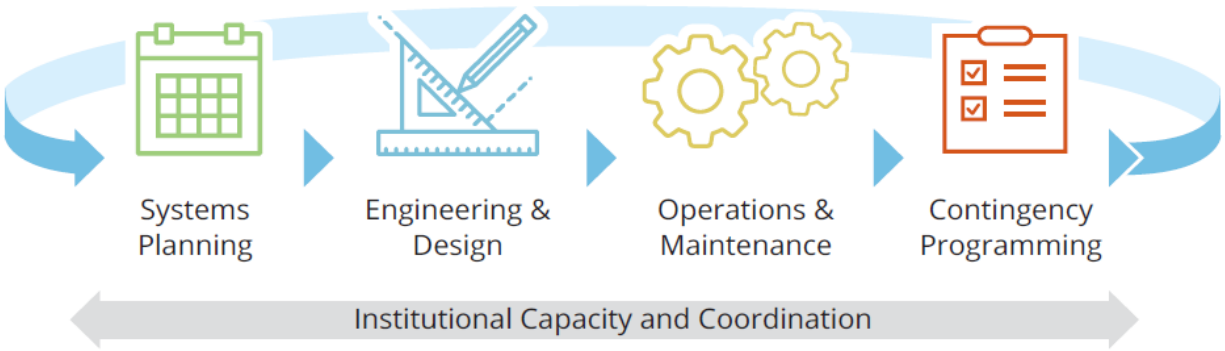


Figure C1: The Lifecycle of Infrastructure[5]

Table C1: Asset Management Applications during the Lyfecycle of Infrastructure

Lifecycle Stage / Resilience Consideration	*Asset Management Processes*
System Planning: ▪ Analysing systems at network level to identify critical infrastructure, choke points, and redundancy. ▪ Consider relocating of infrastructures to less vulnerable areas. ▪ Designing infrastructure from a disaster risk management perspective.	*Data and Information:* ▪ Information on the assets (inventory and condition). ▪ Data on climate risk and vulnerability assessments. ▪ Data on the asset utilisation and redundancy *Analysis and Decision Making* ▪ Climate risk assessment; ▪ Prioritising projects and investments *Performance Reporting and Management:* ▪ Reporting and condition, risk and investment trends. ▪ Monitor impact of adaptive technologies and design. ▪ Record lessons learned from past events.
Engineering Designs: ▪ Resilient materials. ▪ Resilience improvements and design.	*Tactical Strategies and Decisions:* ▪ Diagnostics on physical infrastructure vulnerability (potential failures in climatic events) ▪ Identify adaptive opportunities and interventions through the climate risk assessment process ▪ Integrated planning processes to renew assets and improve resilience.
Operations and Maintenance: ▪ Improving operations management, including financing, procurement and institutional arrangements ▪ Improved maintenance practices and controls.	*Maintenance Planning* ▪ Include resilience improvements as part of maintenance programmes. (E.g. drainage maintenance and debris removals) ▪ Prioritise maintenance on critical infrastructure *Procurement* ▪ Include incentives for resilience improvements in contracts. ▪ Include disaster response as part of maintenance contracts.
Contingency Planning: ▪ Improved disaster and emergency response. ▪ Post-disaster planning processes.	*Asset Data input into Disaster Planning* ▪ Integrate disaster planning with asset criticality framework and planning; *Post-disaster Planning* ▪ Use the asset management tools and processes for post-disaster planning, including rapid damage assessment tools, decision and work planning tools.

Asset Management as Part of the Resilience Cycle

Figure C2 present the asset management processes that feed into the resilience cycle of infrastructure. The top part of the figure shows activities associated with the improvement of resilience. The bottom half shows the asset management processes employed following an event.

Figure C2: Asset Management as Part of Resilience Cycle[6]

The asset management processes correspond to those activities listed in Table C1. Two additional points worth highlighting are:

- Capabilities and Capacity / Asset Management enablers. The key to successful asset management implementation is to have sufficient staff who are trained for their retrospective roles with the necessary equipment and tools to undertake their activities. Also, asset management is only effective if it underpins sound business processes that ensure the planning is executed in the field. Establishing the required capacity and capabilities takes political will and executive buy-in and support. These principles also apply when integrating climate adaptation into asset management.
- Build Back Better should become a central theme in any post-disaster considerations. Replacing like-for-like is a futile and costly approach. Improving the resilience of existing infrastructure is not always that affordable, yet once destroyed, the rebuilding approach should be carefully considered. Questions such as the location of the infrastructure, the design standard, and material should be weighed up for future-proofing infrastructure services.

A Road Map for Implementing Climate Adaptation into Asset Management

Samoa has made strong progress with implementing asset management across the different infrastructures. Likewise, there is a strong scientific-based understanding of the climate hazards, exposure and impacts on infrastructure. For integrating these processes, the following activities should be undertaken:

- Integrate climate adaptation into asset management policies and strategies. This has been completed as part of the review of the SIAMS;
- Develop a data collection and management approach that incorporate climate information into existing asset inventory and management systems;
- Review all asset management planning and business processes to incorporate specific allowance of climate adaptation interventions and needs;
- Establish institutional and inter-departmental collaboration and data sharing arrangements. Resilience planning often requires an understanding of interdependencies of infrastructure groups;

[6] World Bank. 2020. DEVELOPMENT OF A RESILIENT ROAD ASSET MANAGEMENT FRAMEWORK STRATEGY for SOLOMON ISLANDS GOVERNMENT MINISTRY OF INFRASTRUCTURE DEVELOPMENT. Washington D.C.

- Consider all capacity and capability developments to facilitate climate considerations as part of the asset management processes.