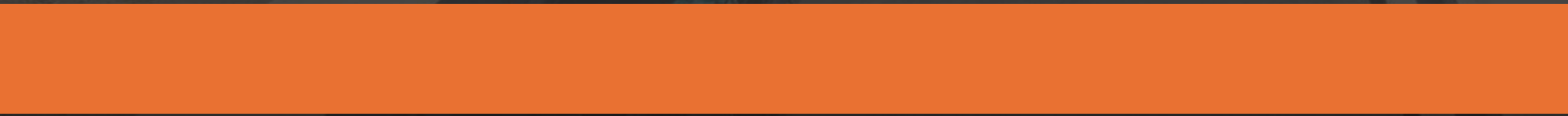
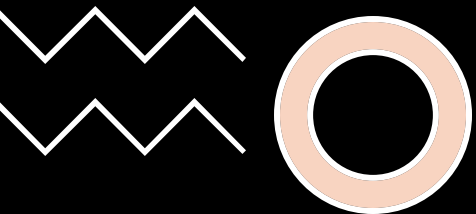


WELCOME TO VAISIGANO BRIDGE

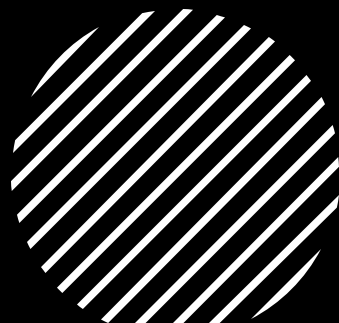
Apia Town	1 km
Vaitele	6 km
Faleolo Airport	30 km
Mulifanua Wharf	34 km

# LAND TRANSPORT AUTHORITY – SAMOA





# Roles & Responsibility



Managing National Road Network & Infrastructure within the Road Reserve

Principal Licensing Authority for vehicle registration & license drivers

Construction, Routine Maintenance & Operations

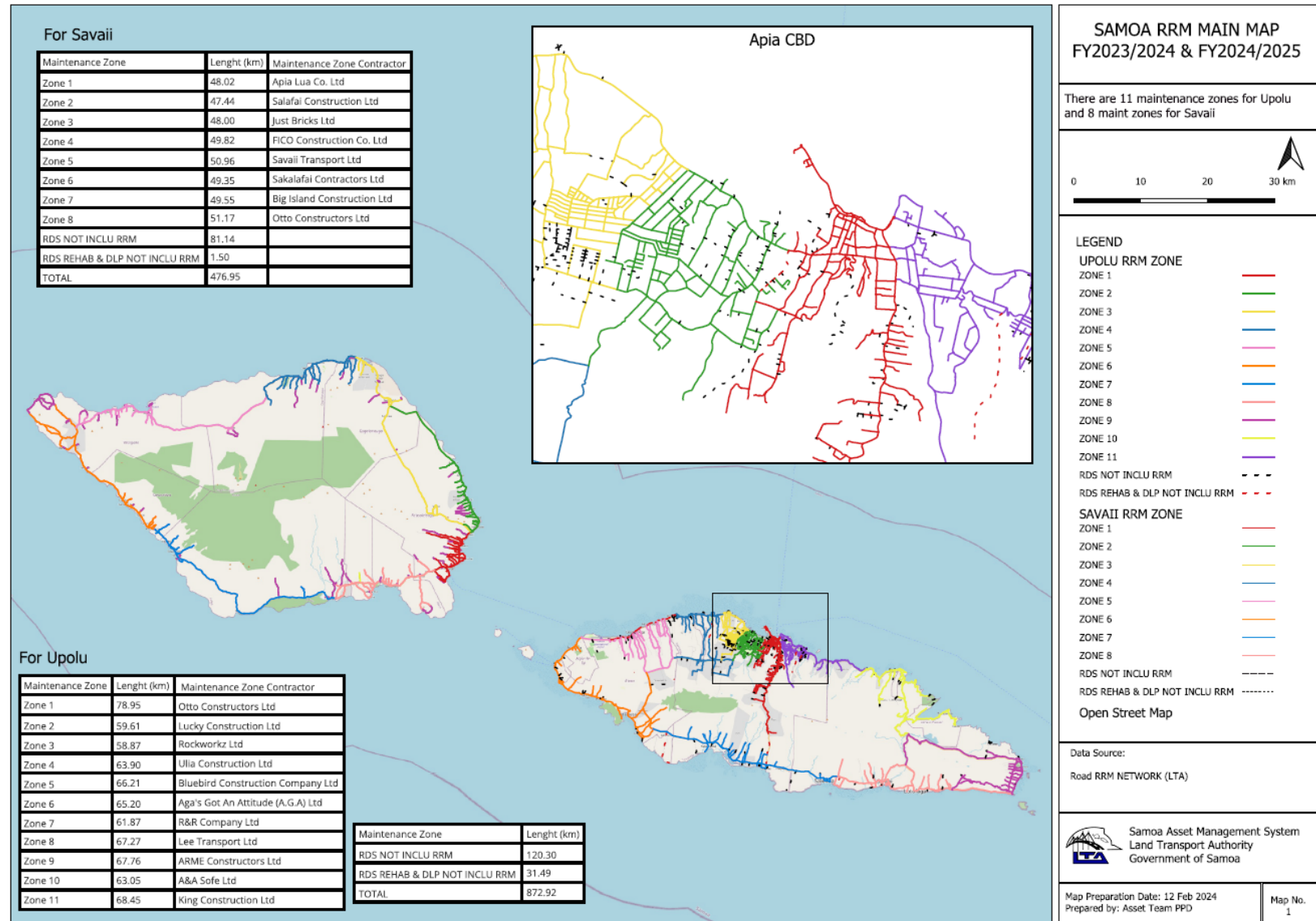
Procurement & Programming

Project Management of Donor-Funded Works

Quality Assurance & Surveying

# Routine Maintenance

- 4 programs:
  - Roads
  - Lawnmowing
  - Drainage (funded by EU)
  - Traffic Signals
- Road Contract schedules:
  - Sch1: routine monthly
  - Sch2: reseal & reconstruction
  - Sch3: emergencies





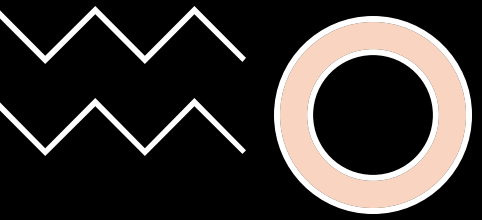
Climate Impacts – Landslides

A night-time photograph showing a flooded street. On the left, a large, messy pile of debris, including branches, sticks, and some trash, blocks the way. In the background, a red traffic light is illuminated, and its reflection is visible in the water. The street is dark, with some lights from buildings and street lamps visible in the distance. The overall scene depicts the aftermath of a flood.

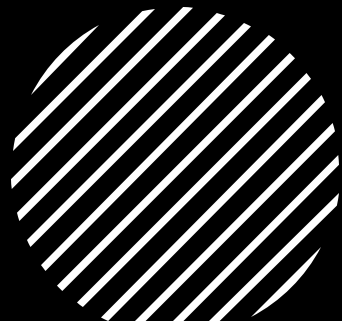
# Climate Impacts - Flooding



Climate Impacts – Road Washout



# Routine Maintenance Response Model



Climate Impact: Landslides, Flooding, Road washouts

Safety Focus: Public safety and accessibility

Response Model:

- Zone-based contractors & Utilization of Sch 3 funds.
- Rapid Mobilization for clearance
- Temporary Traffic control
- Public Notice

# Slope Stabilization – Temporary Measures

- Slope Investigation:  
Tonkin & Taylor
- Mitigation works:  
Geover






# Asset Management System & Network Mapping

- Initial:
  - MapInfo (Annual Registration)
  - Handheld GPS
- New System – 2023 (World Bank-Funded):
  - QGIS (Open Source)
  - GNSS survey equipment (Emlid Reach RS2)
    - Base & Rover
  - Roughness (IRI) Survey Equipment
  - On the Job Training
- New Equipment – 2024 (ADB-Funded):
  - Falling Weight Deflectometer
  - On the Job Training
  - Data Analysis Training

# IRI Data Analysis

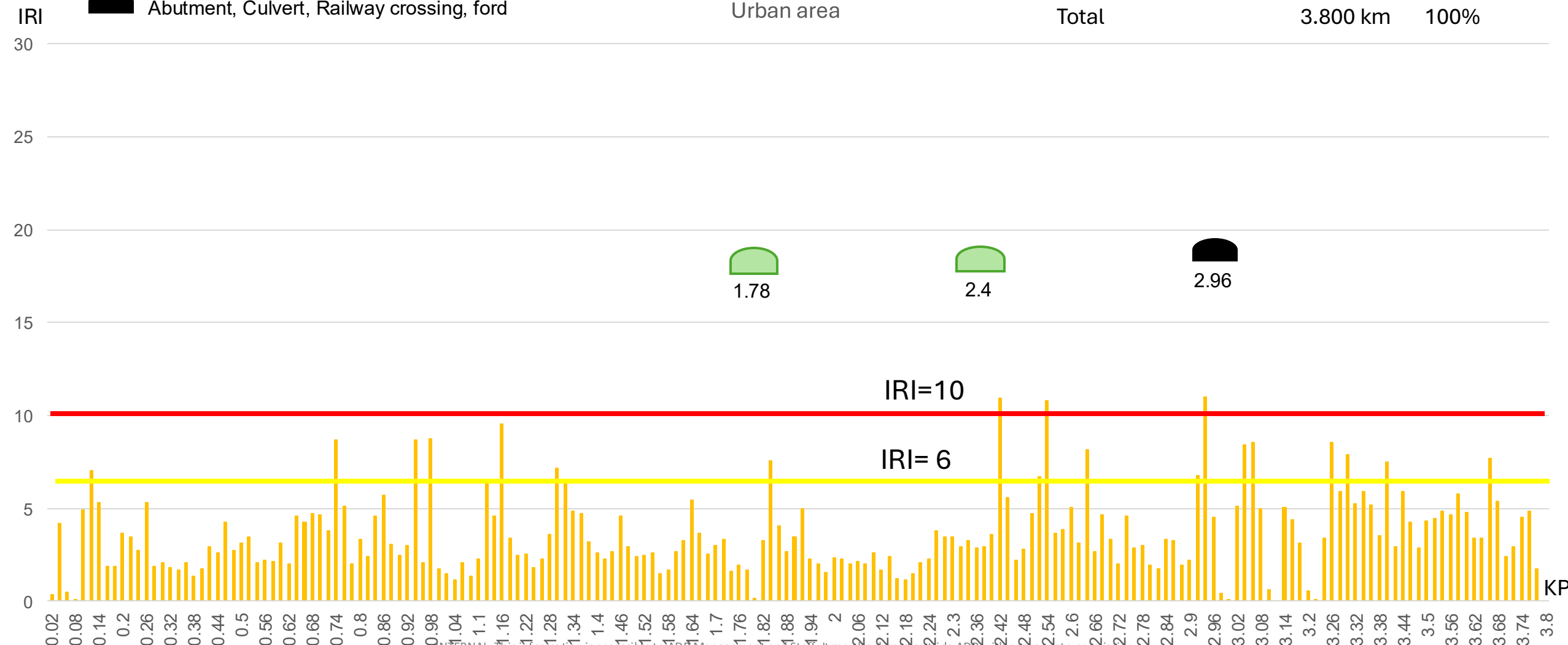
## • Toagaimato – Lotopa (Roughness Data\_2024)

 Speed hump

 Abutment, Culvert, Railway crossing, ford

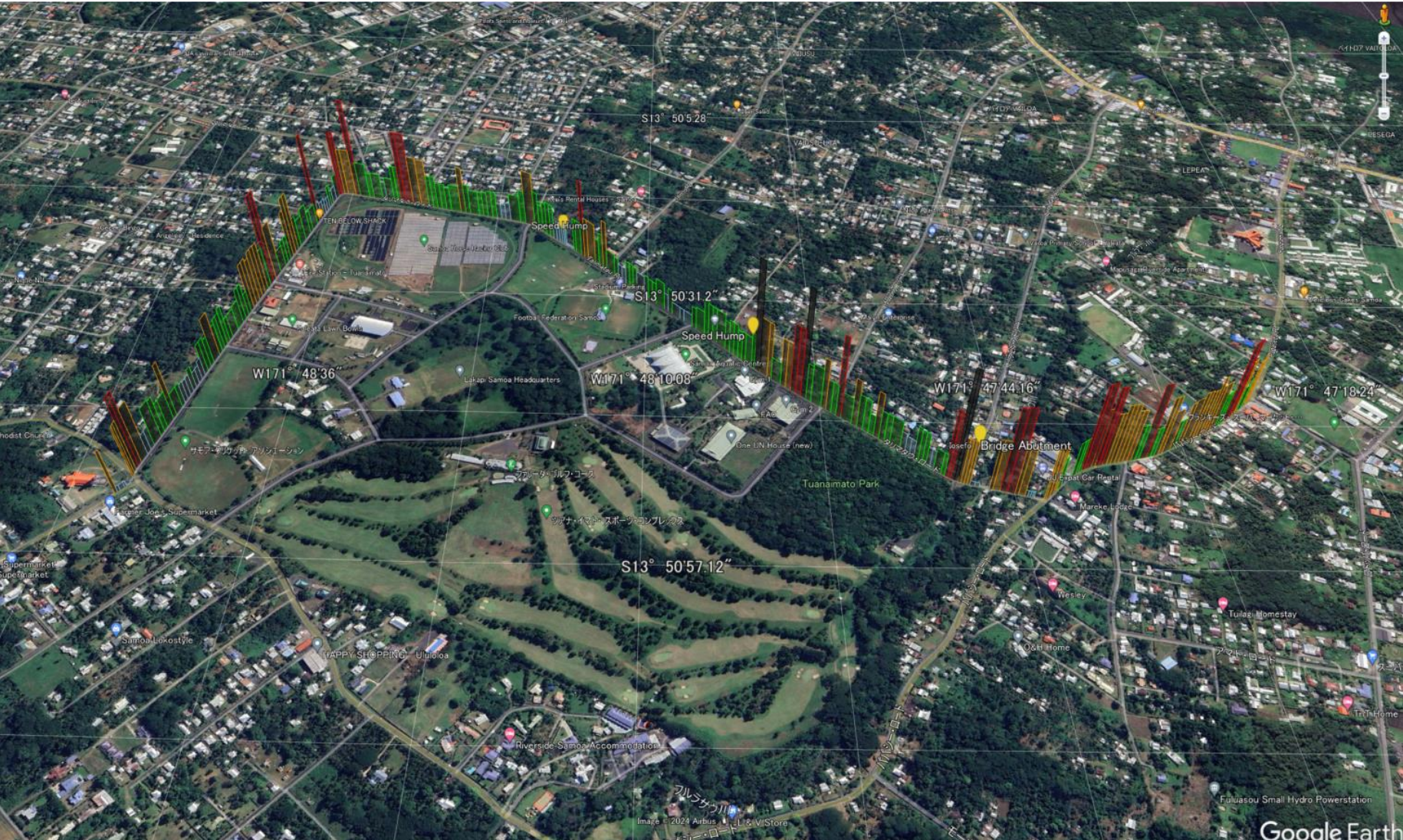
Urban area

Excellent (IRI < 2)	0.724 km	19.1%
Good (2 <= IRI < 4)	1.740 km	45.8%
Fair (4 <= IRI < 6)	0.876 km	23.1%
Poor (6 <= IRI < 10)	0.360 km	9.5%
Bad (IRI >= 10)	0.100 km	2.6%
<b>Total</b>	<b>3.800 km</b>	<b>100%</b>



# IRI Data Analysis

- Toagaimato – Lotopa (Roughness Data\_2024)



## Example: Development of Repair Plan

- Determine the construction schedule based on priorities, ensuring it fits within the five-year budget and annual budgets.

	(1) Repair Cost (WST)	(2) Priority			(3) First 5-year plan					Second 5-year plan
		Traffic Volume	Safety	Damage	FY1	FY2	FY3	FY4	FY5	FY1 -
Route 1	3.18	Low	High	Low						3.18
Route 2	4.0	Moderate	Moderate	Moderate		1.0	1.0	1.0	1.0	
Route 3	5.0	Moderate	Moderate	Moderate			1.0	2.0	2.0	
Route 4	10.0	High	Low	High	5.0	3.0	2.0			
Route 5	7.0	Moderate	Moderate	Moderate				3.0	3.0	1.0
Route 6	8.0	Moderate	High	Moderate				2.0	2.0	4.0
Route 7	2.0	Low	Moderate	Low						2.0
Route 8	11.0	High	Low	Moderate	3.0	4.0	4.0			
<b>Total Cost</b>	<b>50.18</b>				<b>8.0</b>	<b>8.0</b>	<b>8.0</b>	<b>8.0</b>	<b>8.0</b>	<b>10.18</b>
First 5 years Budget = 40 WST (8 WST/year)					<b>8.0 WST</b>	<b>8.0 WST</b>	<b>8.0 WST</b>	<b>8.0 WST</b>	<b>8.0 WST</b>	

# Summary

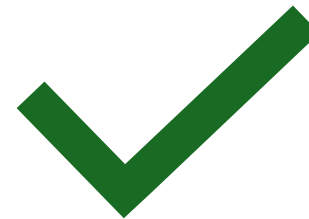


## **Assets Management System**

Infrastructures: Roads, Bridges

Event History

Condition Data



## **Next steps under the 10-year masterplan Delivery**

Prioritization: Works, Budget

Packaging



# Infrastructure Cook Islands

## Rarotonga

One of the Main challenges maintaining assets in Cook Island because of natural disasters and climate change?

**Protection on National Historic Landmarks & Round Island Roads from Coastal Erosion – Caused by King tide events, Tropical cyclones/depressions.**



# Coastal Remedial Projects



Temporary concrete blocks installed to protect scouring under grave.

Old concrete wall & graves broken and washed away by high & rough sea events.

**RSA Cemetery Preservation – 2016**  
200k Project



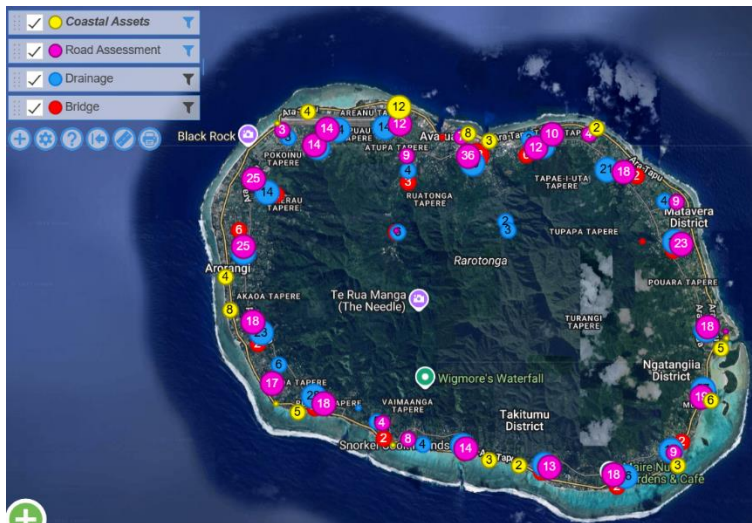
**Sheraton Foreshore & Road Protection – 2019**  
530k Project





## Rarotonga Asset Management System

- Currently using Asset & Work Manager (formerly known as RAMM) to manage all Infrastructure Assets.
- Data collection and assessment of Infrastructure assets completed.





## Pa Enea Infrastructure Assets Data Collection & Assessment phase

11 Inhabited Pa Enea Islands.

Infrastructure Assets collected and assessed for Mauke, Mitiaro, Atiu, Aitutaki, Mangaia, Manhiki, Pukapuka & Nassau.

Infrastructure Assets include – Public roads, Airport runway, Harbor, Community water tanks, Community drinking water stations, Water pipe line, Public power utilities,

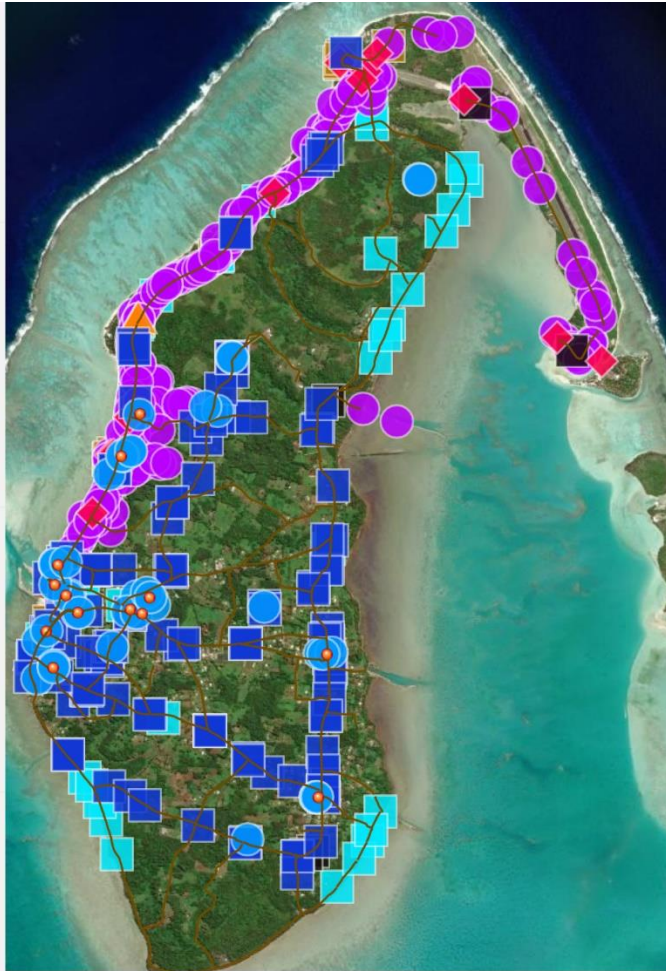
Joint operation with PacificTA and ICI.

# ArcGIS Map Pa Enuu



## Keys

- Community Water Tanks - ●
- Street Lights/Power Assets - ●
- Coastal Assets/Harbor/Drinking Stations - ●
- Government building, Cyclone shelters, Airport terminal - ■
- Water Valves/Water Shelter - ■
- White lines – Road sections/Runway
- Water asset/bores - ◆
- Signs/Location Markers/Info Markers - ◆
- Drainage - ■



Aitutaki



Mitiaro



## Asset Office future plans.

### RAROTONGA

- Implement Asset Management Improvement Plan for ICI.

### PA ENUA

- Complete Asset Data collection and assessment of Pa Enea.
- Develop Asset Maintenance Program for each Pa Enea.
- Prioritization, budgeting for maintenance and/or renewal.



Australian Government  
Department of Foreign Affairs and Trade



Australian  
Infrastructure  
Financing Facility  
for the Pacific



live & learn  
ENVIRONMENTAL EDUCATION

ARUP

# Climate Infrastructure for Resilient Coastline and Riverbanks project (CIRCAR)

**Community Engagement for Resilient Road Infrastructure  
Development**



Australian Government  
Department of Foreign Affairs and Trade



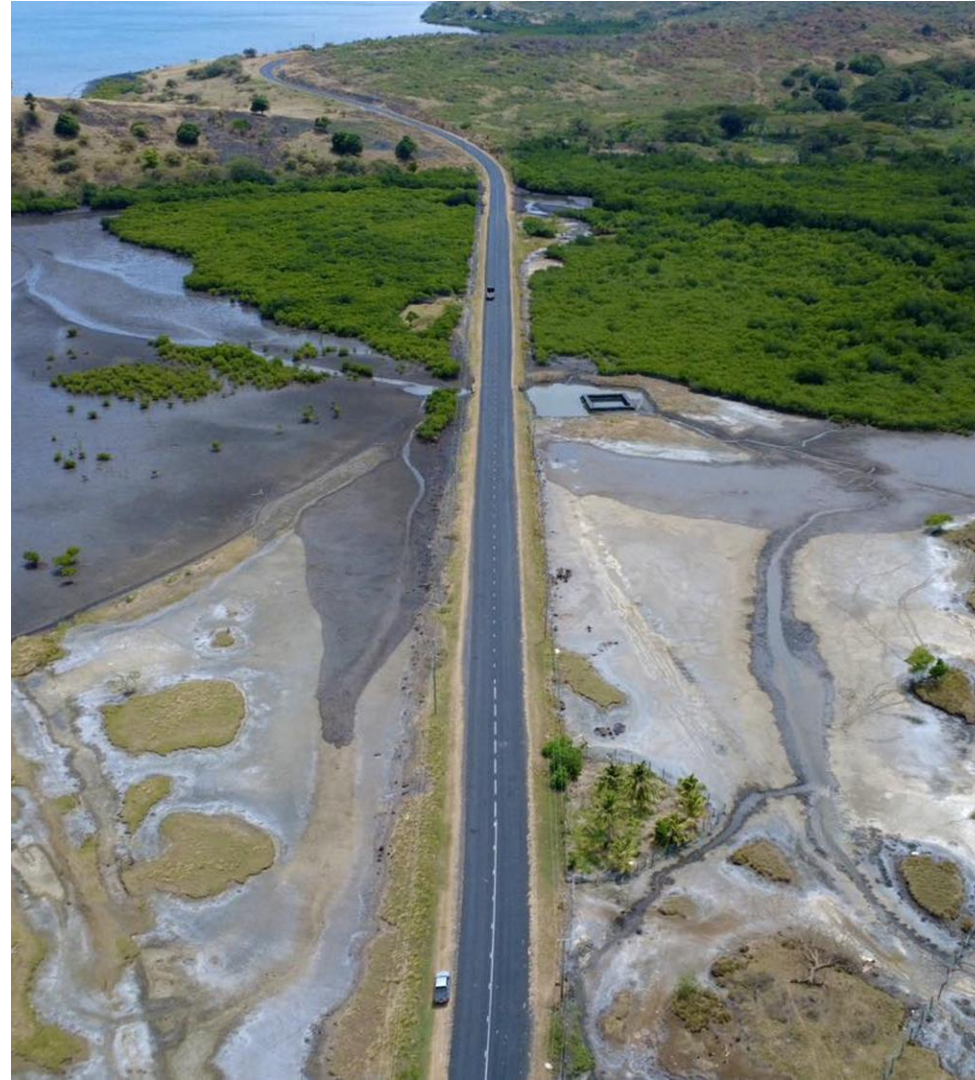
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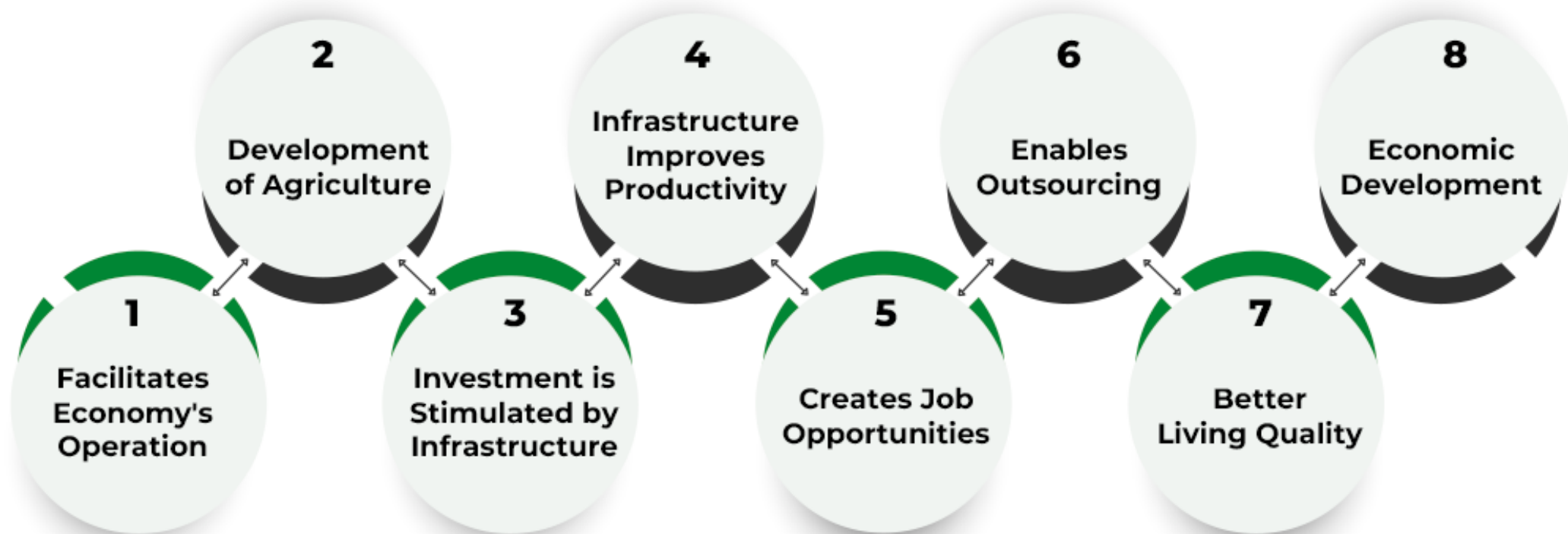
ARUP

# Infrastructure Development





# Importance of Infrastructure





Australian Government  
Department of Foreign Affairs and Trade



Australian  
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for the Pacific



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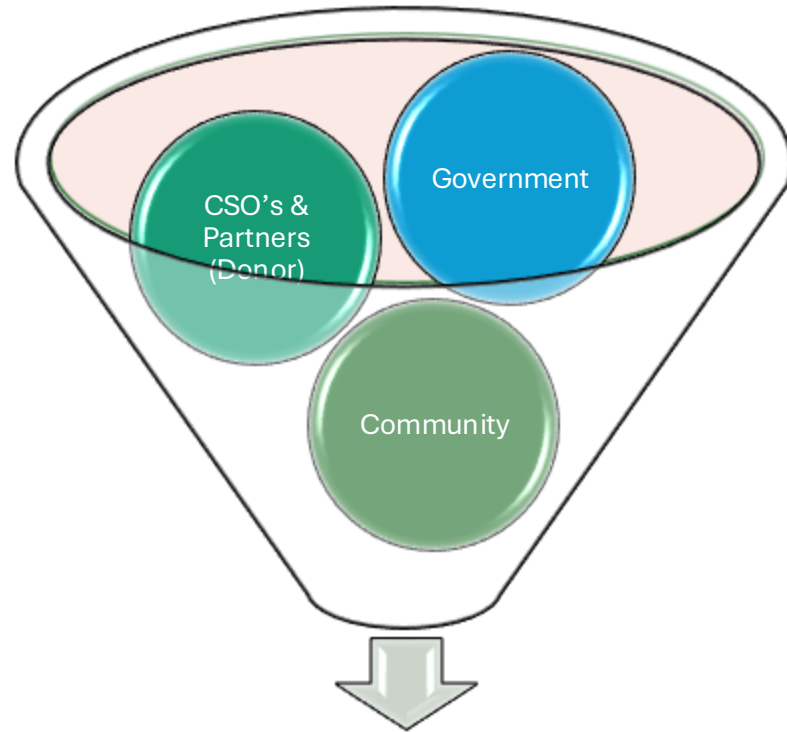
ARUP

# Issues – Roads Infrastructure





# Partnership



**Resilient Development**

- **Government Led Initiative**
- **Sub-National Stakeholders – Strong rural development planning structure.**
- **CSO's & Partners**
- **Community**



# Collaboration





## Example 1: CIRCAR Projects NbS Intervention – Caboni Stretch (Kings Highway)

- **Issues**
  - Flooding during stormy weather or king tide
  - Affects movement along the Kings Highway
- **Proposed Intervention**
  - Revegetation (Mangrove replanting)
  - 9000m<sup>2</sup>
- **Technical Support**
  - Sub national stakeholders
- **Implementation Strategy**
  - Community Engagement – Togavere Village (Traditional Fishing Ground Owner)
    - **Monitoring & Evaluation.**
- **Partners**
  - IUCN
  - WWF
  - Conservation International
  - WCS





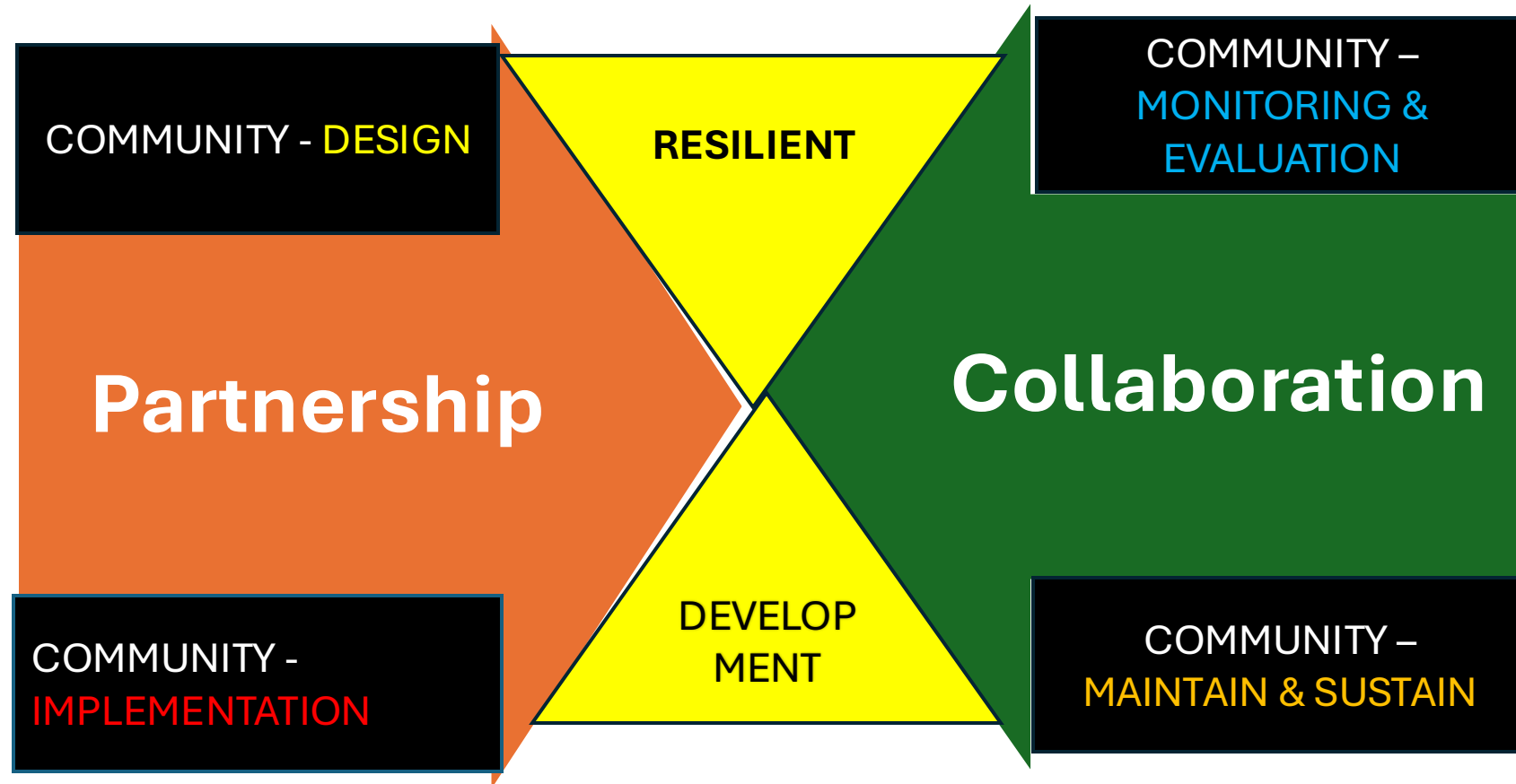
## Example 2: CIRCAR Projects Grey & Green Intervention – Vatukarasa Coastal Protection

- **Issues**
  - Flooding during stormy weather or king tide
  - Affects movement along the Queens Highway
- **Proposed Intervention**
  - **Grey Intervention**
    - Extend the concrete wave barrier
    - 20m
    - Place Sand Bags in between the Storm Surge Concrete Wave Barrier and the high tide mark.
  - **Green Intervention**
    - Revegetation of mangrove and other associated plant species in between the sand bags and the Storm Surge Concrete Wave Barrier
- **Technical Support (Sub-National Stakeholders)**
  - Sub National Stakeholders
- **Implementation Strategy**
  - FRA responsible for grey measures
  - Vatukarasa Youths fill and stack sand bags.
  - LLEE with the support of key government agencies and other partners will guide the community on green intervention
  - Community Engagement – Vatukarasa Village (Traditional Fishing Ground Owner)
    - Women's Group Grew Seedlings
    - Youth Group Replanting
    - **Monitoring & Evaluation.**
- **Partner**
  - IUCN
  - WWF
  - Conservation International
  - WCS





# Conclusion





## NADI FLOOD ALLEVIATION PROJECT (NFAP)



Australian  
Infrastructure  
Financing Facility  
for the Pacific



FIJI GOVERNMENT



Japan International  
Cooperation Agency

# Flooding in Fiji



## Background

- Flooding is a recurring natural disaster in Fiji, exacerbated by tropical cyclones, heavy rainfall, resulting in significant economic losses, displacement and loss of life.
- Since 1991, 26 major floods have occurred in the Nadi catchment area.
- The last major floods were in 2016, 2012, 2009, 2008, 2007, 2004, 2001, 1999 and 1997 and just recently before Christmas 2024 flood impacts were again experienced in Nadi.



## January 2009 Floods

- The total damage in Fiji was estimated to FJ\$113 million with an estimated total damage of FJ\$81.2 million for the Nadi region alone.
- Affected 12,000 people.

## March 2012 Floods

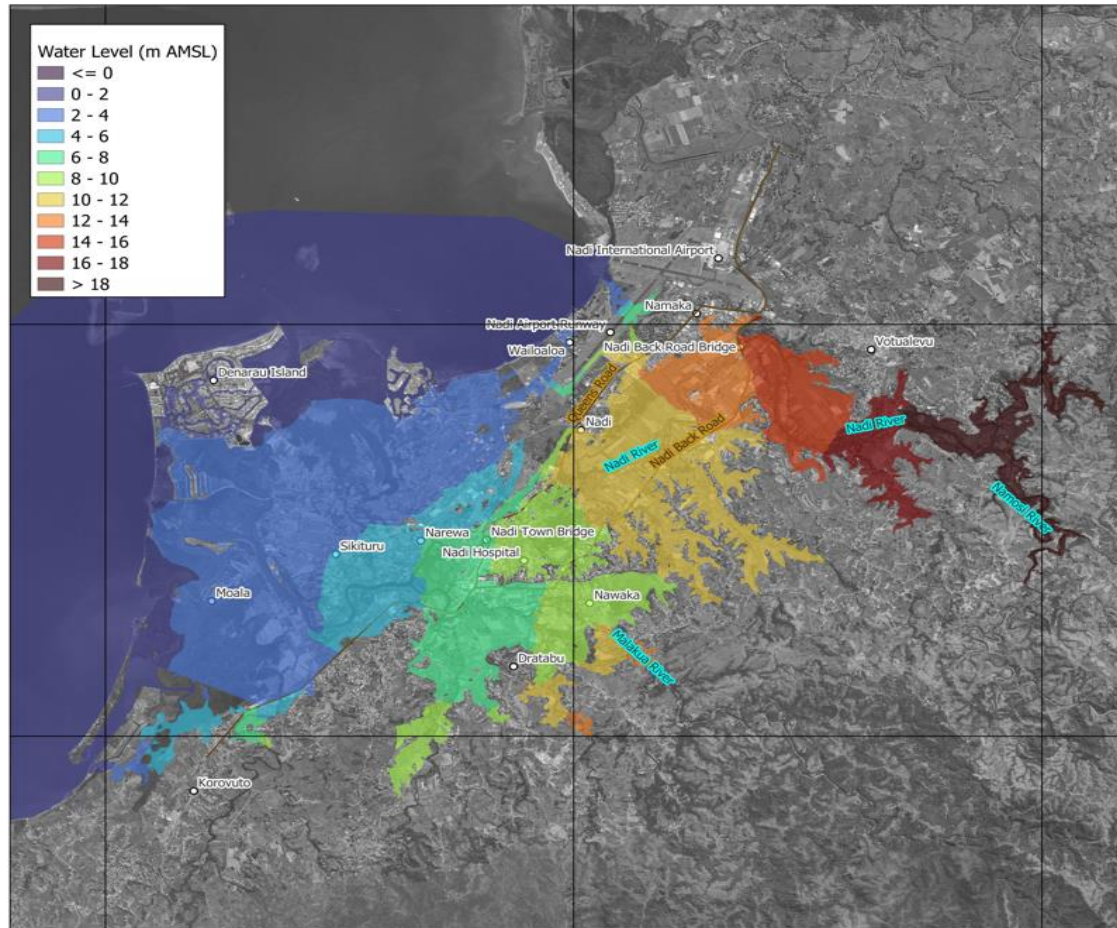
- Projected loss of about FJ\$194.9 million (2.6 % of Fiji's GDP).
- Affected over 150,000 people.



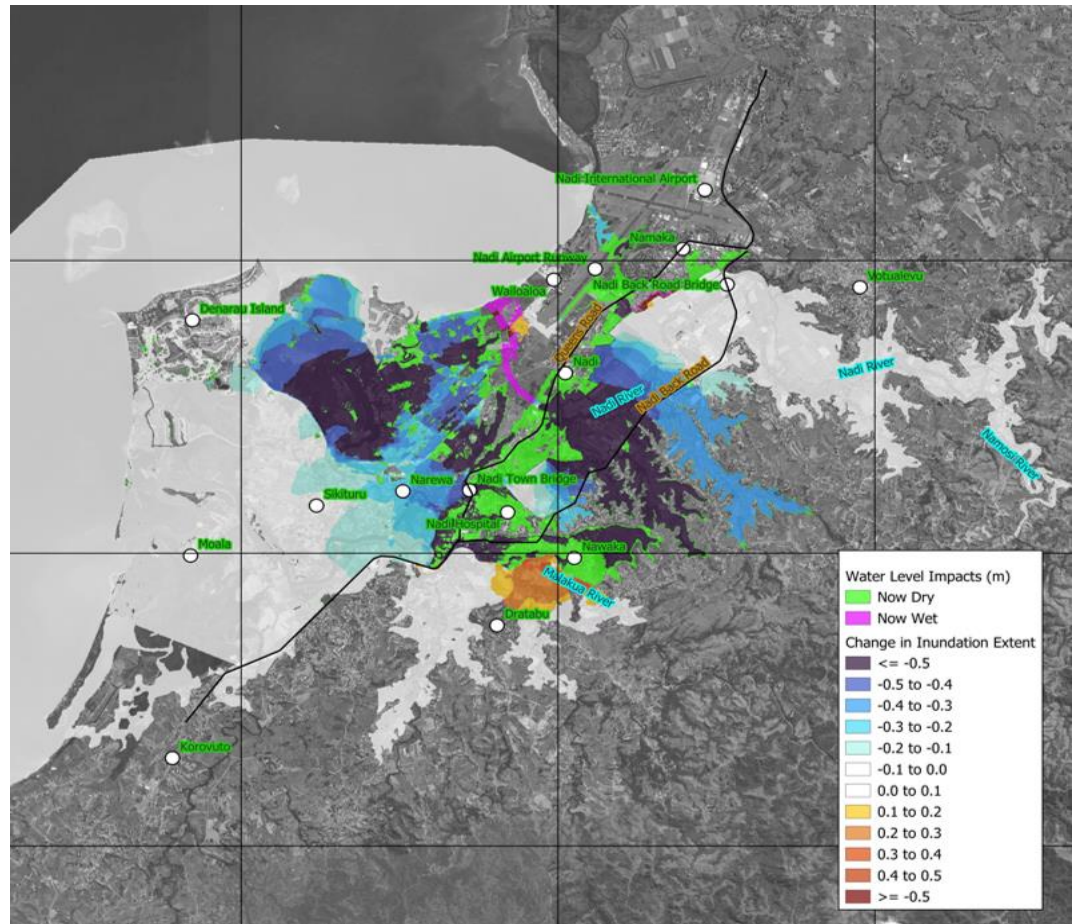


# 1 in 50 Year Flood Maps

AIFFP has developed a flood modelling for a 1 in 50-year flood event for Nadi. The below maps show the extent and depth of flooding that can be expected with and without flood mitigation in place.



Without Flood Mitigation



With Flood Mitigation

# Coordination Approach

The Governments of Fiji, Australia, and Japan are working together to address flood risks and improve resilience and flood management capacity across Nadi town and the surrounding areas of the Nadi River basin.



## NFAP Steering Committee

- Ministry of Finance, Strategic Planning, National Development and Statistics
- Ministry of Agriculture and Waterways
- Ministry of Environment and Climate Change
- Ministry of Lands and Mineral Resources
- Ministry of Public Works, Meteorological Services and Transport,
- Ministry of Local Government
- Nadi Town Council



## Joint Financing Group

- Ministry of Finance, Strategic Planning, National Development and Statistics
- All Financiers for NFAP project (AIFFP, JICA)



## Technical Working Group (TWG)

- Comprised of JICA, AIFFP and relevant Government Ministries.

# Next Steps

- Full establishment of a Project Management Unit (PMU)
- Preliminary design and feasibility report and surveys
- Stakeholder engagement framework and strategic communication
- Moratorium on new developments
- Environmental and Social Impact Assessment (ESIA) and Management Plan (ESMP)
- Developing urban resilience opportunities
- Land acquisition
- Implementation of Early works (Airport Protection Project)



**VINAKA**

