

# UNDP Global Environment Facility

## Vaisigano River Wall

**KA PROJECT REFERENCE:** 15032W

**INDUSTRY:** Maritime & Waterways

**DISCIPLINES:** Climate Resilience, Civil Engineering, Structural Engineering, Geotechnical Engineering, Hydrological Engineering, Project Management and Supervision Services.

### PROJECT SUMMARY

#### CLIENT

Ministry of Natural Resources & Environment (MNRE)

#### LOCATION

Vaisigano River, Upolu, Samoa

#### PROJECT TYPE

Maritime & Waterways,  
Flood Protection Structure,  
Climate Resilience.

#### YEAR COMPLETED

2019



### PROJECT DESCRIPTION

This Flood Protection Wall project is funded by Green Climate Fund (GCF) under the Vaisigano Catchment Project (VCP), administered through the Ministry of Natural Resources and Environment (MNRE) on behalf of the Government of Samoa.

The overall objective of constructing the flood mitigating river wall is to accommodate increased water flow and to decrease flood risks thereby providing protection for the assets, properties and residents of the lower reach of the Vaisigano River Catchment area from flooding events. The development of this infrastructure is considered an 'Economy-Wide integration of Climate Change Adaptation' project. The project serves as part of the disaster risk management to reduce climate vulnerability in Samoa.

The flood wall is composed of a concrete gravity or piled wall where permitted, with a combination of reno mattress & gabion basket scour protection across all three segments. This concrete river wall will address up and down-stream causes and effects of climate vulnerability within the watersheds of the Apia area.

### PROJECT ROLE

Kramer Ausenco was engaged to carry out Design and Construction Supervision of a flood retaining wall spanning from the Vaisigano Bridge up to the Magiagi village. Services included:

- Hydrological Engineering
- Civil Engineering
- Structural Engineering
- Geotechnical Engineering
- Project Management
- Supervision Services

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## Vaisigano River Wall

Project Reference: 15032W

Industry: Bridge

<b>ASSIGNMENT NAME:</b>	<b>APPROX. VALUE OF THE CONTRACT:</b>
Vaisigano River Wall Project	Approx. SAT\$50 million
<b>LOCATION &amp; COUNTRY:</b>	<b>DURATION OF ASSIGNMENT (MONTHS):</b>
Vaisigano River, Upolu, Samoa	48 Months
<b>NAME OF FUNDING AGENCY:</b>	<b>TOTAL NO. OF STAFF-MONTHS OF THE ASSIGNMENT:</b>
Ministry of Natural Resources & Environment (MNRE)	24 Months
<b>ADDRESS OF AGENCY:</b>	<b>APPROX. VALUE OF THE SERVICES PROVIDED BY YOUR FIRM UNDER THE CONTRACT:</b>
Main Office at Tuiatua Tupua Tamasese Efi – Sogi, Apia, Samoa	SAT1,200,000
<b>START DATE (MONTH/YEAR): COMPLETION DATE (MONTH/YEAR):</b>	<b>NUMBER OF PROFESSIONAL STAFF-MONTHS PROVIDED BY ASSOCIATED CONSULTANTS:</b>
Start date: June 2015 Completion date: January 2020	2 Person-months
<b>NAME OF ASSOCIATED CONSULTANTS, IF ANY:</b>	<b>NAME OF SENIOR PROFESSIONAL STAFF OF YOUR FIRM INVOLVED AND FUNCTIONS PERFORMED:</b>
Margaret Rimoni – Environmental & Social Safeguards SRK – Geotechnical Jac Baru – Geotechnical Le Vikz – Quantity Surveyor	Jenny Loveday – Principal Engineer (Marine/Coastal/Hydro) Peter Moodie – Team Leader / Principal Civil Engineer Stalin Muniswamy - Civil/Structural Engineer Konrad Lober – Civil/Structural Engineer, In-Country PD Faufata Levi – Project Manager/Site Engineer

**NARRATIVE DESCRIPTION OF PROJECT:**

This Flood Protection Wall project is funded by GEF through the Ministry of Natural Resources and Environment on behalf of the Government of Samoa. Kramer Ausenco was engaged to carry out Design and Construction Supervision of a flood retaining wall spanning from the Vaisigano Bridge up to the Magiagi village.

The flood wall is composed of a concrete gravity or piled wall where permitted with a combination of reno mattress & gabion basket scour protection across all three segments. This concrete river wall will address up and down-stream causes and effects of climate vulnerability within the watersheds of the Apia area.

**DESCRIPTION OF ACTUAL SERVICES PROVIDED BY YOUR STAFF WITHIN THE ASSIGNMENT:**

Kramer Ausenco was engaged to carry out Design and Construction Supervision of a flood retaining wall spanning from the Vaisigano Bridge up to the Magiagi village. Disciplines included Hydrological Engineering, Civil Engineering, Structural Engineering, Geotechnical Engineering, Project Management, and Supervision Services.

Details of services, tasks, and activities included:

**Task 1 - Task Appreciation**

- A kick-off meeting with the Ministry of Natural Resources and Environment offices, attended by the Project Manager.
- Data gathering prior to the kick-off meeting.
- Data review and additional published information acquired where readily available.
- Identified missing data critical to work scope and liaised with the client to develop a plan for acquisition of missing data.

**Task 2 - Design Basis/Criteria**

- A Design Basis/Criteria Report was prepared which outlined the applicable design information and any constraints known.

**Task 3 - Concept Design and Documentation**

Concept designs for flood mitigation were developed for each of the following flood events - 1 in 10 year, 1 in 20 year and 1 in 50 year. This included an assessment of:

- geotechnical parameters from existing data and geotechnical investigations
- concrete retaining structure requirements for Segment 1
- assess implications of straightening the river approaches to the Vaisigano Bridge
- revetment armour requirements for batter slopes for Segments 2 to 4 (max. three cross sections).
- Preparation of the Environmental Impact Assessment Report
- A Bill of Quantities will be developed for each concept design and preliminary cost estimates prepared for the flood protection structures.
- A high level cost versus benefits analysis will be prepared to assist the Ministry of Natural Resources
- and Environment in determining the flood immunity level to be adopted for the detailed design of the flood protection structures.
- Construction rates from local contractors will be used to establish realistic rates.

- The Draft Design Report submitted included:
  - concrete retaining concept design for Segment 1
  - description of the rock armour concept designs
  - high level costs/benefits analysis for the 3 flood events for each segment
  - Bill of Quantities for each concept
  - Cost Estimates for each concept
  - basis for the Cost Estimate.

#### **Task 4 - Detailed Design and Documentation**

Following submission of the Draft Design Report, and confirmation of the flood design event to be adopted for the detailed design from the Ministry of Natural Resources and Environment, a detailed design of the concrete and rock protection structures was undertaken.

Detailed design activities included:

- detailed assessment of Segment 1 concrete retaining wall
- desktop geotechnical review of available geotechnical information
- slope stability including seismic stability for the rock armour sections
- rock armour design for up to three cross sections
- preparation of Issued for Construction Drawings
- preparation of Issued for Construction Specification
- technical review of the proposed design
- Survey plans identifying land acquisition

A Bill of Quantities was prepared from the Issued for Construction (IFC) drawings and cost estimates prepared.

The Final Design Report was submitted which includes:

- description of the detailed design
- IFC Drawings and Technical Specifications
- Bill of Quantities
- Cost Estimates
- basis for the Cost Estimate.

#### **Task 5 - Project Management and Reporting**

##### **5.1 Bid Documents**

Drafted bid documents for contractors upon completion of Detailed Design. Bid documents were prepared in accordance with MNRE/GoS Procurement guidelines. Documents were prepared based on consultation with MNRE, AG Office and relevant stakeholders, these included:

- Instructions to Tenderers, Conditions of Tender, Contract Terms/Conditions
- Tender Advertisement form
- Construction Drawings, Specifications & Bill of Quantities, Detailed Scope of Works & Environmental Management Plan.

Incorporated comments received from MNRE & AG Office on the Draft bid documents and these formed the Final Bidding Documents.

##### **5.2 Bidding Period**

Our contract administration role included:

- Provide Bidding Documents
- Provide clarifications to bidders
- Amend bid documents as required during this period
- Participate in the pre bid meeting

##### **5.3 Evaluation of Bids/Tenders**

Supported the bid evaluation process as required:

- Bid evaluation committee participation
- Prepare the Bid Evaluation Report (Draft & Final)

##### **5.4 Project Management**

Our contract administration and construction supervision included;

- Preparation of Contract documents for successful bidder(s)
- Conduct the Pre-Construction Meeting with MNRE and Contractor
- Quality Assurance site inspections and carry out any necessary testing of compacted material
- Review of all Contractor documents required under the Contract i.e. Insurances, bonds, EMP
- Contractors progress claim review/verification
- Site meetings schedule as agreed with MNRE
- Monitor Health & Safety & EMP on site.
- HSEC & QA procedures govern by Kramer Ausenco policy attached in following documents
- Regular communications with MNRE.
- Reporting schedule as required by the TOR section 2.6
- Carry out defects inspections & issue Practical Completion Certificate
- Monitor the Defects Liability Period and upon completion of the DLP issue the Completion Certificate

Throughout the duration of the project, Reports were provided to the Ministry of Natural Resources and Environment via email to advise on accomplishments during the previous period and to highlight critical action Items.