AMERICAN SAMOA POWER AUTHORITY

SCOPE OF WORK

Inflow and Infiltration Study Project

1. Project Background:

ASPA's 2025 Wastewater Utility Plan (WWUP) identified high Inflow and Infiltration (I&I) in the wastewater collection systems (WWCS) as a challenge due to their proximity to the ocean, collection system pipes at elevations below sea level, and aging infrastructure. As a result, the WWUP recommends conducting an I&I study to help determine the cause of I&I into our collection system. Tutuila has two WWCS, Tafuna WWCS and Utulei WWCS; the study will evaluate both. We should be able to update our Wastewater Book once this study is completed.

2. Project Description:

The project will focus on the marked Tutuila Wastewater Collection System, and will carry out an I& I Study within the priority area marked in the location plan below. This I&I Study will cover status analysis of manholes, gravity pipe and force main with the marked priority areas. However, with the priority areas, there are 25 miles of pipeline, 1000# manholes, 10 existing Lift Stations. They shall provide recommendation on status of wastewater utilities and course of action to address the challenges of inflow and infiltration to these identified priority area within the marked collection systems. They will provide ASPA the direction on how ASPA can eliminate or minimize on I&I. To do this they will need to use updated I&I tools available in the market such as CCTV Camera, Flow measurement, using flow meters, smoke test, Dye Water Testing, electrical leak location, acoustic, and/or sewer scanning evaluation technology (SSET). The target is for ASPA to have a clear direction on how we need to address I&I within the identified areas.

3. Project Area:

This project will focus on the coverage area marked for the Tafuna and Utulei Wastewater Collection System. Within the projected area we have more than 25 miles of sewer pipes, 10# of Lift Stations and about 20,000+ people are connected to our system.

4. Project Goal and Objective

The key objective and goal of this I&I Study Project is to:

1. Review structural integrity of all existing manholes and sewer pipe for any potential I&I within the Wastewater Collection System within the location plan above.
2. Establish I&I Benchmark that ASPA can use to manage I&I within the wastewater collection system.
3. Review and evaluate current I&I using flow meters and other means of measuring sewer flow and I&I.
4. Provide a detailed report and analysis on I&I to help ASPA address this challenging subject. This shall include a prioritized list of improvements that can be made to reduce I&I.
5. Provide capital cost improvement and life cycle cost comparison that will help ASPA to decide on the priority of implementation.
6. Update our current Wastewater Book for the area within the location map.

5. SCOPE OF WORK (SOW)

A. Generals:

- The intention of this study project is for any qualified Consultants/Engineering firm to be engaged by ASPA to carry out detail study for I&I within the wastewater collection system as shown on the location map (Coverage Area). The I&I study will develop a benchmark and provide the direction into the level of I&I our collection systems have and also highlight critical areas that will need to be addressed. The study shall consider the recommendations in the WWUP on the I&I and use this as a guide towards their approach to this study.
- As expected, the qualified Consutants/Engineering firm shall include in their proposal monthly meeting schedule with ASPA to review progress and provide monthly report and updates of the project.

1. **Project Drive & Objectives**

I. The primary focus of this study is gathering empirical data to determine the severity of I&I, however somce WWCS modeling is also required. The project uses temporary flow meters to isolate and quantify wet-weather anomalies, directly followed by CCTV internal visual inspections to pinpoint exactly where structural leaks, cracked joints, and illicit connections reside.

II. The fieldwork findings will be used to verify information in the ASPA Wastewater Map Book. Instead of updating all 57 miles, engineering updates will focus on updates within the selected 25 miles of high-risk gravity lines and neighboring infrastructure.

2. **Scope of Work Activities**

Activity 1: Flow Measurement & Metering Campaign

- Meter Deployment: Install, maintain, and monitor electronic sewer flow meters at critical sub-basin nodes across Tafuna and Utulei for a minimum of 90 days.
- Data Capture: Continuously log depth, velocity, and volumetric flow rates to capture baseline dry-weather flows and corresponding spikes during wet-weather rain events.
- Rainfall Correlation: Pair flow data with local rain gauge data to isolate rain-induced infiltration and inflow (RIII) rates.

Activity 2: Targeted 25-Mile CCTV Inspection

- Line Selection: Review the flow monitoring data and isolate the highest contributing sub-basins within the 25 miles study area.
- Pipe Inspection: Execute internal robotic or push-camera CCTV inspections on the priority sub-basins within the 25 miles study area.

- Defect Coding: Grade and catalog structural, operational, and maintenance defects using standard industry protocols (such as NASSCO PACP standards) to tag cracked pipes, root intrusions, and offset joints.

Activity 3: Data Integration & Engineering Analysis

- I&I Mapping: Correlate specific flow anomalies from Task 1 with physical pipe failures found in Task 2.
- Quantification Matrix: Generate an I&I volume-per-foot metric across the 25 miles to determine where the highest concentration of groundwater is entering the utility network.

Activity 4: Rehabilitation Action Plan

- Prioritized CIP: Deliver a localized Capital Improvement Plan (CIP) specifically targeting the 25 miles inspected.
- Fix Matrix: Provide clear engineering recommendations and cost-benefit breakdowns for corrective repairs, such as cured-in-place pipe (CIPP) lining, point repairs, or manhole modifications.

B. Study Expectation

The I&I Study outcomes shall include:

Better assessment of our current status of I&I, causes of I&I, action plan to be taken and means to address I&I etc.

1. Comprehensive assessment on status of our current assets, manhole, sewer mains pipe, lateral pipe, lift stations, pumps, etc.
2. Should any information in the Wastewater Book found to be incorrect or out of date, update our Wastewater Book accordingly.
3. Comprehensive assessment of flow, flow measurement and means of addressing various flow regime.
4. Cost Analysis to reflect current operation and maintenance cost and future cost once I&I is addressed.
5. Develop a prioritized plan of projects to reduce I&I.
6. Put together a cost analysis and capital cost investment for ASPA review and action.
7. To build models of the Wastewater Collection Systems that ASPA can use for future wastewater development forecast and train ASPA on how to use the model.

C. Study Report:

The study report shall include but not limited to the following:

1. Status and level of I&I within our collection system
2. Analysis of flow measurements to estimate I&I
3. Causes of I&I with some benchmarks stated.
4. Impact of I&I to our Operation and Maintenance
5. Capital Improvement cost
6. CIP prioritizing actions to address I&I
7. Updated Wastewater Book on the section identified for the study.

D. Assumption and Constraints

1. Our As-built is not that accurate and this study will have to make sure we have an updated Wastewater Book.
2. Some of our sewer mains and laterals may be under some newly constructed buildings.
3. ROW issues will be managed by ASPA with 2-day notice
4. Mobilization refers to fieldwork crews only, not construction mobilization
5. Some of our sewer mains and laterals may be crossing private property and community own land.

E. Quality Control

1. We will require QA/QS Plan from consultant to monitor review process
2. Consultant shall maintain a response log to capture all comments
3. Schedule monthly meeting to review project progress and provide monthly progress report and updates.

F. Reporting Format

1. The report shall be submitted in logical increments similar to the following:

    i. Milestone schedule and timeline
    ii. Outline of report submittal
    iii. 30% submittal
    iv. 60% submittal
    v. 90% Submittals
    vi. 100% Submittals
    vii. Final draft submittal. Final report is complete once ASPA and USEPA approves of and signs Final submittal.
    viii. Each submittal will be succeeded by an ASPA and USEPA review with comments within 20 calendar days. These comments shall be addressed and incorporated into the next submittal if recommended. Also, an ASPA comment and selected firm response list shall be maintained and shared with ASPA.

G. Selection Criteria

The Scope of Work forms part of the evaluation criteria for selecting the consultant. By submitting a proposal, the consultant acknowledges full understanding of the project requirements, existing conditions, and all constraints outlined in this document, and agrees to comply with them without claims of misunderstanding or lack of awareness.