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PROFESSIONAL (A&E) SERVICES FOR "THE DESIGN AND PERMITTING OF ASBESTOS CEMENT PIPE REPLACEMENT AND WATER SYSTEM UPGRADE PROJECT

SCOPE OF WORK

This project will insure these AC pipes which are brittle and leaking a lot of water, and pose a safety and health threat, are replaced. The Project will also improve the water pressure in most areas of the islands and assure protection of drinking water from contaminant intrusion into the system and sustain safe, quality drinking water for the community as well as staying in compliance with requirements by EPA.

January 2021

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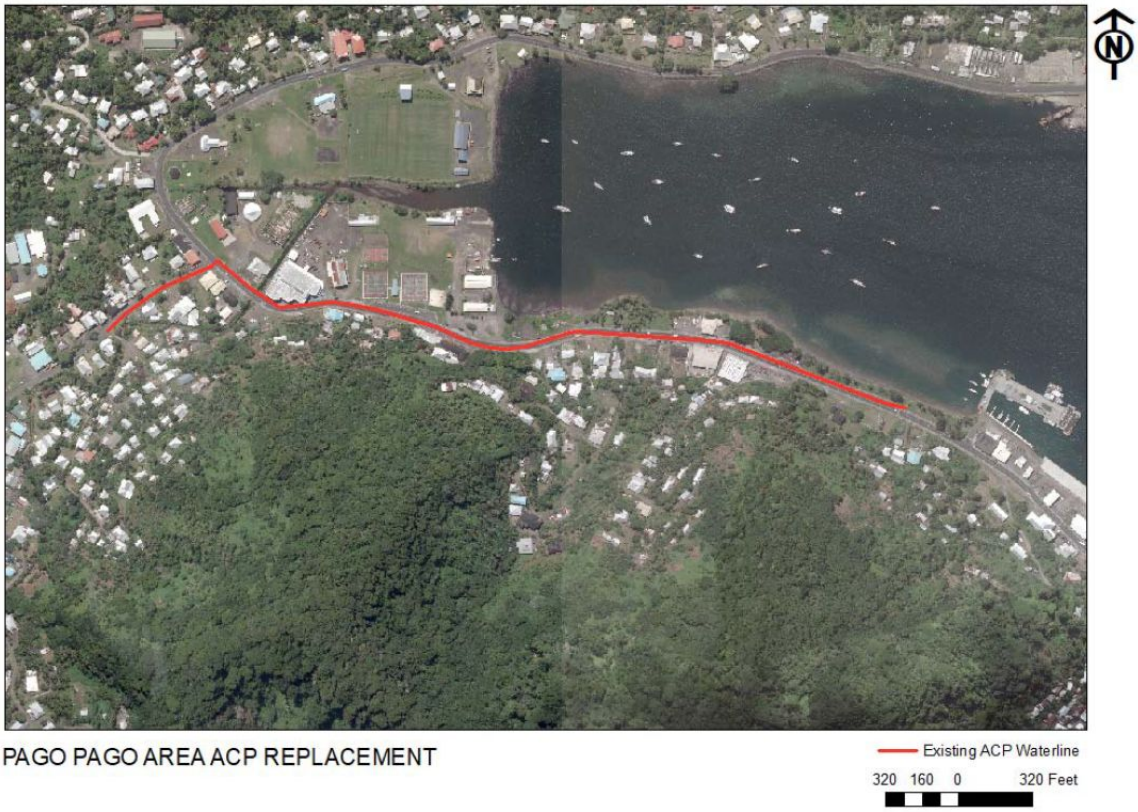
Section 1: General

1. The American Samoa Power Authority issues this Request for Proposal for A/E services from a professional consultant with experience in designing Water Distribution systems including water source exploration, water well drilling, booster stations. The design shall include all process control, mechanical, electrical, and structural components and related appurtenances to allow the facilities to be functional and operable according to ASPA maintenance and operation capabilities and requirements. Appurtenances shall include but will not necessarily be limited to gate valves, ARVs, blow-off valves, PRVs, fire hydrants, flow meters, flow control valves. The design shall be in accordance with Ten States Standards, Wastewater Pollution Control Federation, USEPA, or other comparable standards.
2. The selected A&E firm will be doing detailed topographic survey, raster imaging, civil 3d database and GIS shapefiles for all existing utility lines, fittings, appurtenances, structures and other features that will affect the generation of hydraulic model and construction design.
3. The selected A&E firm will develop detailed designs, specifications, drawings, cost estimate and the Scope of Work for the Owner for the purpose of Construction Bidding and for USEPA approval.
4. The selected A&E firm will provide designs and work methods that ensures minimum disruption to the daily operation of the water system during the construction phase
5. The selected A&E firm will provide cost estimates for design and construction, taking into account available funding for the project.
6. The selected A&E firm shall secure all necessary permits (Local & Federal) required during bidding, construction and operation.
7. The selected A&E firm will provide services needed during the planning, executing, monitoring and controlling and closing of the construction phase.
8. The selected A&E firm shall conduct a series of meetings with ASPA during the scope definition phase of the project to fully understand the specific project elements and to define the basic requirements for each of the project scope elements.
9. The selected A&E firm will provide as-built standards, receive, review and validate as-built drawings for Civil, Architectural, Electrical, Mechanical and Structural drawings to the Owner on a monthly basis.
10. Whether or not it is expressly stated, the A&E firm shall be responsible for the performance of any work that is either incidental to, or a prerequisite for, any of the tasks or services identified herein. Furthermore, the A&E firm shall be responsible for performing tasks and services that may not be specifically identified herein, but are clearly included in the intent of this SOW. Wherever in this SOW a task is described, without specifically stating who is responsible for performing said task, it shall be implicit that the responsibility for the completion of the work is that of the A&E engineer.

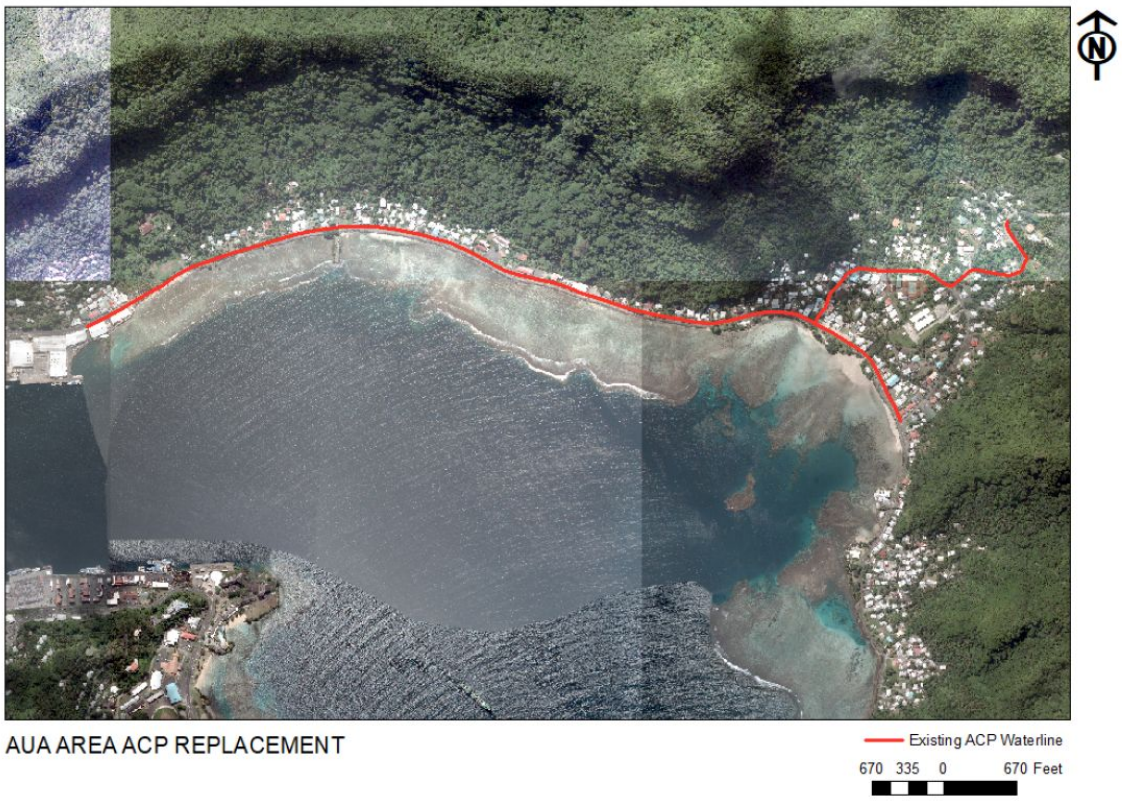
Section 2: Project Locations

A. Tafuna Area:

B. Pago Pago Area:



C. Aua Area:



Section 3: Inspection of Work Site

1. The selected A&E firm is expected to visit and thoroughly inspect the Project Site and become familiar with field conditions including accessibility and physical obstructions.
2. Familiarize itself with the survey, including the location of all existing buildings, utilities, conditions, street, equipment, components and other attributes having or likely to have an impact on the Project;
3. Bid submission indicates familiarity with, and acceptance of, field conditions. No claim for additional compensation will be allowed which is based upon a misunderstanding or lack of knowledge, examination, inspection and/or testing of any of the above items by the Offeror.

Section 4: Mobilization and Demobilization .

The work consists of the mobilization and demobilization of the contractor's forces and equipment necessary for performing the work required under the contract. It does not include mobilization and demobilization for specific items of work for which payment is provided elsewhere in the contract.

Mobilization shall include all activities and associated costs for transportation of contractor's personnel, equipment, and operating supplies and expenses to the site; permits, premiums paid for performance and payment bonds including coinsurance and reinsurance agreements as applicable; and other items specified in the contract documents.

Demobilization shall include all activities and costs for transportation of personnel, equipment, and supplies not required or included in the contract from the site; including the disassembly, removal, and site cleanup of offices, buildings, and other facilities assembled on the site specifically for this contract.

Measurement for payment shall be made as a lump sum (LS). Payment will be made as the work proceeds, after presentation of paid invoices or documentation of direct costs by the contractor showing specific mobilization and demobilization costs and supporting evidence of the charges of suppliers, subcontractors, and others. When the total of such payments is less than the lump sum contract price, the balance remaining will be included in the final contract payment. Payment of the lump sum contract price for mobilization and demobilization will constitute full compensation for completion of the work. Payment will not be made under this item for the purchase costs of materials having a residual value, the purchase costs of materials to be incorporated in the project, or the purchase costs of operating supplies.

Section 5: Temporary Facilities and Controls

The work shall consist of Temporary facilities and the necessary controls for the project including utilities, telephone, sanitary facilities, field office conducive to site meetings, storage sheds and building, safety requirements, first aid equipment, fire protection, security measures, protection of the Work and property, access roads and parking, environmental controls, disposal of trash, debris, and excavated material, pest and rodent control, water runoff and erosion control.

Measurement for payment shall be made as a lump sum (LS). Full compensation includes a lump sum cost for all equipment, labor, and materials. Payment will be made as the work proceeds, after presentation of paid invoices or documentation of direct costs by the contractor showing specific costs and supporting evidence of the charges of suppliers, subcontractors, and others. When the total of such payments is less than the lump sum contract price, the balance remaining will be included in the final contract payment. Payment of the lump sum contract price will constitute full compensation for completion of the work

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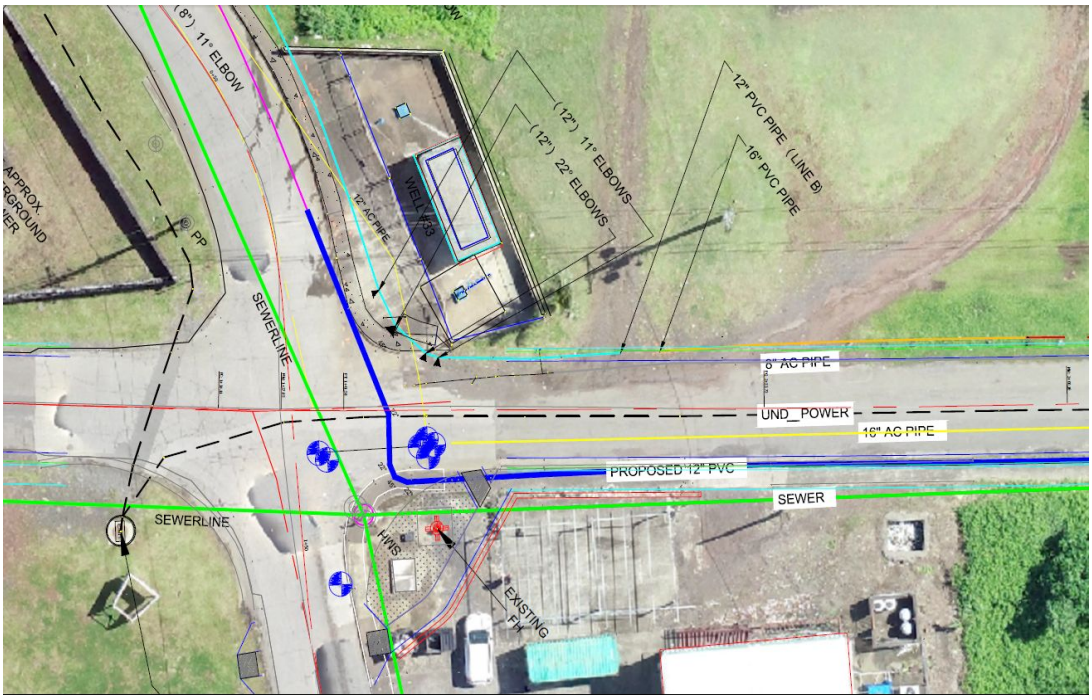
Section 6: Survey

This section shall cover the complete costs of providing all labor, equipment and materials required to complete all survey work needed for the design required under this SOW. It shall be the selected A&E firm's responsibility to have a Registered Surveyor and to coordinate and work with ASPA's Survey Department to make sure all survey output is in conformance to ASPA's standard datum and coordinates.

1. **Potholing**. The selected A&E firm shall perform exploratory excavations as required to collect as-built information verify the depth, location, alignment, size, and material of existing underground utilities or structures. Locate the existing utility, verify the required information, backfill the excavation, and restore the surfacing equal or better condition, suitable for traffic as required by DPS/DPW. The A&E firm shall waive ASPA from any liabilities resulting from inaccuracy and poor data gathering required under this section.
2. **Existing Utilities**. Data needed for the design and analysis of the water distribution system shall not be limited to survey of all existing water Pipes (transmission, distribution & service lines), survey of all Water Sources (Wells & Booster pumps), Water Storage (Tanks), Demand (all water meters, fire hydrants), apportunances (valves, PRVS/PSV, etc.) connected to the line indicated under section-2 of this SOW.
3. **Other utilities and structures**. The survey shall also include but not limited to all existing storm drains, bridge/stream crossings, sewer, existing asphalt/concrete pavement, sidewalk, curb & gutter, gravel driveway, fences, rockwall, plants/grass, trees, power/communication line and pole and all structures that may be affected during installation of water mains and service lines.
4. **Database:** The survey shall also include raw data in Excel format containing survey descriptions such as but not limited to; UniqueID, X-coordinate, Y-coordinate, Z-coordinate, Description and Size , etc..
5. **Basemap:** The survey shall also include basemap images (see sample raster image below) clear enough to identify existing water meters on the ground. It shall be properly projected to the same coordinates used in the development of the design. It must be submitted in CAD and GIS format.

Measurement for payment shall be made as a lump sum (LS). Full compensation includes a lump sum cost for all equipment, labor, and materials. Payment will be made as the work proceeds, after presentation of paid invoices or documentation of direct costs by the contractor showing specific costs and supporting evidence of the charges of suppliers, subcontractors, and others. When the total of such payments is less than the lump sum contract price, the balance remaining will be included in the final contract payment. Payment of the lump sum contract price will constitute full compensation for completion of the work. Poor data gathering required under this section resulting in additional cost during the construction phase will be charged to the selected A&E firm.



Sample Overlay Raster Image

Section 7: Hydraulic Analysis and System of Operation

This section shall cover the complete costs of providing all labor, equipment, software and materials required under this SOW.

A. Objective: The Hydraulic Model required under this SOW aims to provide ASPA a relevant information needed in Planning, System Design, Operations and Water Quality (refer to table summary below).

Planning	System Design	Operations	Water Quality
Capital Projects	Fire Flows	Training	Tracing
Mains Rehabilitation	Control Valve	Troubleshooting	Water Age
Conservation	Tank Sizing	Water Loss	Chlorine
Tank Siting	Pump Stations	Emergency Planning	Control
	Design Flow / Pressure	Supply/Storage Management	Monitoring
	Pressure Zones	Calibration	

		Flushing	
		Energy Use	

B. Software: ASPA's only license modelling software is Infowater Pro hence it is ASPA's recommendation to utilize the same software to complete the requirement under this SOW. The selected A&E must have EOR with a minimum of 1 year experience using the Infowater software knowledgeable enough for the successful water model.

C. Code/Standard: The model must conform to AWWA Manual of Water Supply Practices "M32" Computer Modeling of Water Distribution System. Water Model Report must discuss the following required data but not limited to ; Introduction of the System Model, Described the process of Building and Preparing the Model, Hydraulic Tests and Measurement, Hydraulic Calibration, Steady-State Simulation, Extended Period Simulation, Water Quality Modeling, Storage Tank Mixing and Water Age, Model maintenance, Transient Analysis and Advance Modeling Applications such as Asset Management, Energy and Optimization.

D. Model Scenarios: Several scenarios must be created for this project to simulate system performance with different system demands and operational settings.

- ➢ SCENARIO #1: Existing System and Operation base on ADD
- ➢ SCENARIO #2: Existing System and Operation base on MDD
- ➢ SCENARIO #3: Existing System and Operation base on MDD plus Fire Flow Demand
- ➢ SCENARIO #4: Proposed System and Operation base on ADD
- ➢ SCENARIO #5: Proposed System and Operation base on MDD
- ➢ SCENARIO #6: Proposed System and Operation base on MDD plus Fire Flow Demand

E. Water Demand: This section includes a description of how the water demands were developed for use in evaluating the water system and includes a description for existing and future development. A description of how these demands were allocated in the computer model and to be used in planning the needed upgrade to the system. A proper allocation and accounting of consumer water system demands is crucial to the development of an accurate hydraulic model.

F. Fire Flow: This section includes a description of how the fire flow demands were used in evaluating the water system and includes a description for existing and future development. All fire flow criteria must be based on this document and/or must conform to ASG fire department

Fire Flow Demand Criteria	
Customer Class/Land use	Required fire demand*
1 - Single family residential	1,000 gpm, 1-hour duration

2 - Multi-family residential	2,500 gpm, 2-hour duration
3 - Commercial/industrial/institutional	3,500 gpm, 3-hour duration
*required fire demand while maintaining 20 psi residual pressure.	

G. Supply Criteria

Supply Criteria			
Criterion		**Value/description**	**Reference, if applicable**
Capacity	Flow rate	Equal to average of MDD	WSC, 2012
Reliability	Power Supply	At least two independent power sources or a standby/auxiliary source should be provided (e.g. generator)	WSC, 2012

H. Piping Criteria: Identify existing pipes that are inadequately sized, determine the appropriate size for future piping improvements and identify pipes that should be relocated or extended for reliability purposes.

Pipe Criteria			
Criterion		**Value / description**	**Reference, if applicable**
Diameter	Required size (for mains)	As calculated based on flow demand to satisfy pressure, velocity, and head loss requirements listed below. Should not be smaller than 6 inches.	(WSC, 2012)
System Pressure	Maximum	100 psi	(WSC, 2012)
	Minimum working pressure	35 psi	
	Minimum under any demand condition including fire	20 psi	
	Nominal working pressure	40 to 80 psi	
Velocity	Maximum for MDD	5 fps	

	Maximum PHD or fire flow	10 fps	
Reliability	Distribution system pipe	Dead ends should be minimized by looping	(WSC, 2012)
Location	Transmission & Distribution	Water mains should be installed in public streets or other public access ways wherever possible. Existing water lines that are in easements and/or right-of- ways in alleyways or behind houses/buildings will be relocated wherever feasible.	ASPA ROW

I. **Pump Station Criteria:** Identify existing pumping stations that are inadequately sized, determine the appropriate size for future improvements base on the criteria below;

Pump Criteria			
Criterion		**Value / description**	**Reference, if applicable**
Minimum capacity	Booster	Average of MDD	(WSC, 2012)
	Closed-loop	MDD plus fire flow demand	
Reliability	Redundancy	Areas served by pumps should have a minimum of two supply pumps	(WSC, 2012)
	Redundant pump sizing	Pumps should be sized to meet the minimum capacity requirement with the largest pump out of service (redundant fire pumps are not necessary)	
	Power supply	At least two independent power sources or a standby/auxiliary source (e.g., generator) should be provided	
	Suction tanks	Wherever possible, booster pumps shall take suction from tanks and reservoirs to avoid the potential for negative pressures on the suction line which can result when the pump suction is directly connected to a distribution main	

Operations	Minimum suction pressure	Pumps that take suction from distribution mains for the purpose of serving areas of higher elevation shall be provided with a low-pressure cutoff switch on the suction side set at no less than 20 psi	ASPA
	Control settings	Adequate range shall be provided between high-/low-pressure or tank level settings to prevent excessive cycling of the pump	

J. Storage Criteria: Identify existing water storage that are inadequately sized, determine the appropriate size for future improvements base on the criteria below;

Storage Criteria			
Criterion		**Value / description**	**Reference, if applicable**
Capacity	Fire	Highest fire demand	ASEPA
	Emergency	1.5 days x ADD	

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Section 8: Geotechnical Evaluations.

This section shall cover the complete costs of providing all labor, equipment and materials required under this SOW.

The consultant shall conduct a geotechnical evaluation of selected areas along the proposed collection system route to allow determination of soil conditions, including presence of rock, and the impact of findings on design, construction and maintenance, presence of groundwater and its impact on design, construction, operation, and maintenance, preparation of geotechnical profile logs, incorporation of geotechnical considerations into a construction cost estimate.

Measurement for payment shall be made as a lump sum (LS). Full compensation includes a lump sum cost for all equipment, labor and materials. Payment will be made as the work proceeds, after presentation of paid invoices or documentation of direct costs by the contractor showing specific costs and supporting evidence of the charges of suppliers, subcontractors, and others. When the total of such payments is less than the lump sum contract price, the balance remaining will be included in the final contract payment. Payment of the lump sum contract price will constitute full compensation for completion of the work

Section 9: Designs, Plans & other requirements

This section shall cover the complete costs of providing all labor, equipment and materials required under this SOW. It shall be the selected A&E firm's responsibility to have a Registered Civil Engineer for civil design, Structural Engineer for structural design, Electrical Engineer for electrical design, Mechanical Engineer for mechanical design and/or as required.

A. **Supervisory Control and Data Acquisition System – SCADA/PLC/CLOUD.** The design shall include measures and components to be connected to and monitored by the existing ASPA SCADA/PLC/CLOUD System. The design shall be coordinated with the ASPA SCADA technician
B. **Restoration and Repair:** The design shall include all necessary restoration and/or repair for existing paved roads, utilities, driveways, curbs, sidewalks, walls, fences and other infrastructure that may need to be removed and/or replaced to install the facilities designed and to be constructed under this RFP. Lawns, gardens and other items that may pose an obstruction will be included in restoration.
C. **Erosion Control and Drainage:** Erosion control and drainage measures and facilities shall be included in the design including drainage structures, retaining walls, pipe dams, stream bed protection and other elements that will ensure erosion control and drainage is accomplished according to best management practices applied for similar projects or infrastructure.
D. **Traffic Control Plan:** A traffic control plan shall be prepared in accordance with American Samoa Department of Public Safety requirements and guidelines similar or equal to those issued by the U.S. Federal Highway Administration. The plan will minimize disruptions to traffic and identify the most suitable detours with identification of land ownership.
E. **Schedule:** The schedule shall include all tasks required to design, construct and commission the facilities. Tasks shall include but not necessarily be limited to acquisition of funding, rights-of-way and permits, operator training, procurement, design reviews, and testing. The schedule shall be presented in both Gantt and PERT Chart formats. Design tasks, as provided by the Offeror in their proposal, shall be appropriately highlighted in the schedule presentation.
F. **Construction Plans:** Detailed engineering/architectural drawings for construction will be prepared for all facilities designed under this RFP. All drawings shall be prepared in accordance with Standard US Industry Practices for civil, structural,

electrical, mechanical, highway, and environmental engineering design. The drawings shall include but not necessarily be limited to plan and profile sheets, site layouts, engineering data, material takeoff lists, geotechnical profile logs, hydraulic and energy profiles, hydraulic model, schematics, process diagrams and descriptions, standard details, and electrical schematics and one-line diagrams.

G. Specifications: Technical Specifications shall be prepared for all items to be constructed and/or or included in the Invitation for Bid for Construction Contract for the facilities designed under this RFP. The specifications shall be prepared according to the most recent Construction Standards Institute (CSI) format. In addition, any special conditions that must be addressed or followed in order to construct the facilities will be outlined in a separate draft contract document entitled "Special Conditions"

H. Operations Plan: An Operations Plan will be submitted outlining methods and means by which the facilities will be operated and maintained within the resources and/or capabilities of ASPA.

I. Bid Schedule: A draft Bid Schedule shall be prepared that includes all pertinent items included in the construction plans and specifications. The Bid schedule shall be prepared for a unit cost, firm fixed-price contract and allow ASPA to utilize it as the basis for a construction contract for the facilities designed under this RFP

J. Engineer's Cost Estimate: A detailed engineer's cost estimate shall be prepared in accordance with the items included in the draft bid schedule and applicable industry standards such as RS Means Estimating Manuals and Guidelines. Appropriate indexes that account for inflation and other factors that are pertinent to American Samoa including special logistical constraints are to be included.

K. Value Engineering: In accordance with USEPA Federal Funding requirements, a Value Engineering Analysis (VEA) will be completed for the facilities to be designed and upgraded. The VEA will strive to ensure the design results in maximum cost efficiency for operation and maintenance of the facilities.

L. **Design Calculations:** Provide structural analysis and design calculations for all and every structures necessary to complete the requirement of this SOW such as but not limited to; concrete encasement, reinforce concrete jacket, pavement design, thrust block, pipe support/hangers, box culvert, concrete vault, gratings, pipe bedding, pipe buoyancy protection and as needed and requested by ASPA.

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Section 10: Project Management Support

This section shall cover the complete costs of providing all labor, equipment and materials required under this scope of work;

A. **Bidding and Negotiation (ASPA Procurement Rules limit these activities):** If requested by ASPA, assist with preparing and distribution of bid package(s) for the construction phase. Attend construction pre-bid meetings, bid clarification meetings (as necessary) and pre-award meetings. If requested by ASPA, assist with bid evaluations and verify that contractor bids reflect the required scope of work.

B. Construction Administration: Provide construction administration services including, but not limited to review and respond to Request for Information (RFI's), bulletins, change orders, submittal and shop drawing review, punch lists, etc. Provide additional design drawings as needed. Attend weekly project meetings and provide support for coordination and scheduling issues. Perform job site visits at regular intervals, but no less than twice a month, to evaluate adherence to project plans and specifications. Assist in resolving field problems and disputes in the most economical and expeditious manner possible. Collect "As-Built" information from the General Contractor at the end of the project and update the construction drawings to reflect the as-built conditions and submit the updated drawings to ASPA upon completion of the project.

Measurement for payment shall be made as a lump sum (LS). Full compensation includes a lump sum cost for all equipment, labor and materials. Payment will be made as the work proceeds, after presentation of paid invoices or documentation of direct costs by the contractor showing specific costs and supporting evidence of the charges of suppliers, subcontractors, and others. When the total of such payments is less than the lump sum contract price, the balance remaining will be included in the final contract payment. Payment of the lump sum contract price will constitute full compensation for completion of the work

Section 11: Permits

This section shall cover the complete costs of providing all labor, equipment and materials required to develop all necessary submissions for Federal and Local authorities including ASPA. If required the A&E architect /engineer shall attend and participate in all meetings necessary to satisfy Federal, Local, State, and ASPA requirements. Applications for all applicable federal and local permits will be prepared and submitted to respective agencies upon determination of the appropriate action to pursue to satisfy NEPA requirements. No measurement of payment is to be made for this section hence it is incidental to the project..

Section 12: DELIVERABLES

This section shall cover the complete costs of providing all labor, equipment and materials required to under this SOW;

1. Hydraulic analysis report duly stamped by the Engineer of record (EOR).

2. Design calculations duly stamped by the Engineer of record (EOR).
3. Detailed Architectural and Engineering Construction Plans on 24" x 36" Bond Paper stamped by a U.S. Registered Professional Engineer (EOR) for all pertinent items within the SOW.
4. Detailed technical specifications, stamped by EOR for all items included in the Bid Schedule, in the Construction Standards Institute (CSI) 2000 format.
5. A Value Engineering Analysis for the completed design stamped by EOR
6. A Bid Schedule for finite components of the system and facility upgrades, and significant tasks within the SOW.
7. A detailed cost estimate for all items in the Bid Schedule including direct cost, overhead, contingencies, profit and bonding.
8. A schedule for provision of the deliverables by the Consultant to ASPA in Gantt and PERT Chart formats.
9. Copy of approved Permits per federal and local agency requirements.
10. Operation and Maintenance Manuals addressing all mechanical, process and control components.
11. Traffic Control Plan
12. Geotechnical Investigation reports.
13. An Operations Plan
14. Provide five (5) hard bound copies and electronic copies (autocad, pdf, spreadsheet) of all deliverables

No measurement of payment is to be made for this section hence it is incidental to the project..