American Samoa Power Authority

Engineering Services Division

Water Department

TRAMWAY TANK REHABILITATION PROJECT PHASE II-REBID

GENERAL CONDITION
SUPPLIMENTARY CONDITIONS
&
TECHNICAL SPECIFICATIONS

SEPTEMBER 2016

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GENERAL CONDITION

1 DEFINITIONS

Contract contains legally binding provisions governing the Contractor and the Contractor's work during the construction and warranty period. Certain definitions pertaining to measurements and measurement quantities are set forth in a separate section below. Wherever in the Contact Documents the following terms are used, the intent and meaning shall be interpreted as follows:

2 ABBREVIATIONS

Whenever in these Contract Documents the following abbreviations are used, the intent and meaning shall be interpreted as follows:

"AASHTO" means the American Association of State Highway and Transportation Officials.

"ACI" means the American Concrete Institute.

"AISC" means the American iron and Steel Construction.

"AISI" means the American Iron and Steel Institute.

"ANSI" means the American National Standards Institute.

"API" means the American Petroleum Institute.

"ASCE" means the American Society of Civil Engineers.

"ASME" means the American Society of Mechanical Engineers.

"ASTM" means the American Society for Testing Materials.

"AWS" means the American Water Society.

"AWWA" means the American Water Works Association.

"FED. SPEC." means the Federal Specifications.

"IEEE" means the Institute Of Electrical and Electrical Engineers, Inc.

"NEC" means the National Electrical Code.

"NEMA" means the National Electrical Manufacturers' Association.

"NESC" means the National Electric Safety Code.

"NEPA" National Fire Protection Association.

"OSHA" means the Occupational Safety and Health Act (Federal And State)

"SSPC" means the Steel Structures Painting Council.

"UBC" means the Uniform Building Code.

"UL" means the Underwriters' Laboratories, Inc.

"AS APPROVED," unless otherwise qualified, shall be understood to be followed by the words "by the Engineer and/or the Procurement Manager."

"AS SHOWN," AND "AS INDICATED" shall be understood to be followed by the words "on the technical specifications or drawings."

"BIDDER" means the person or persons, partnership, firm, or corporation that submitted a proposal or bid for the work contemplated under the IFB.

"CONTRACT" means the written agreement governing the performance of the work and the furnishing of labor, materials, incidental services, tools and equipment in the construction of the work. It includes supplemental agreements amending or extending the work contemplated and which may be required to complete the work in a substantial and acceptable manner. Supplemental agreements are written agreements covering alterations, amendments or extensions to the contract and include contract change orders.

"CONTRACT DOCUMENTS" has the same meaning as set forth in Section 4 of the instruction to bidders.

"CONTACTOR" means the person or persons, partnership, firm or corporation who enters into the contract awarded to it by the American Samoa Power Authority pursuant to a solicitation.

"CONTRACTING OFFICER," means the ASPA Procurement Manager.

"DAYS," unless otherwise specifically stated, will be understood to means calendar days.

"ENGINEER" means the ASPA engineer, whose decisions concerning the acceptability of material and work shall be final.

"GOVERNMENT," OR "ASG" means the American Samoa Government.

"NOTICE", or the requirement to notify means a written communication delivered in person or by certified or registered mail to the individual, or to a member of the firm, or to an officer of the corporation for whom it is intended. Certified or registered mail shall be addressed to the last business address known to he/she who gives the notice

"OR EQUAL," shall be understood to indicate that the "equal" product is the same or better than the product named in function, performance, reliability, quality and general configuration. Determination of equality in reference to the project design requirements will be made by the engineer. Such "equal" products shall not be purchased or installed by the Contractor without the engineer's written approval.

"OWNER" means the American Samoa Power Authority.

"PLANS" means the drawings, plans, profiles, cross sections, elevations, details and other supplementary drawings or reproductions thereof, signed by the engineer, which show the location, character, dimensions and details of the work to be performed. Plans may either be bound in the same book as the balance of the contract documents or bound in separate sets and are a part of the contract documents, regardless of the method of binding.

"SPECIFICATIONS" means the terms, provisions and requirements contained herein. Where standard specifications, such as those of ASTM, ASSHTO, etc., have been referred to, the applicable portions of such standard specifications shall become a part of these contract documents.

“SUBSTANTIAL COMPLETION,” means that degree of completion of the project or a defined portion of the project, sufficient to provide ASPA, at its discretion, the full-time use of the project or defined portion of the project for the purposes for which it was intended.

“WORK,” means all material, labor, tools and all appliance, machinery, transportation and appurtenances necessary to perform and complete the contract, and such additional items not specifically indicated or described which can be reasonably inferred as belonging to the item described or indicated as required by good practice to provide a complete and satisfactory system or structure. As used herein, “provide” shall be understood to mean “provide complete in-place”, that is, “furnish and install”.

"WORK SITE," means the location of at which the Contractor, including but not limited to the Contractor's employees, performs the tasks and responsibilities related to the completion of the contract.

3 CONTRACT DOCUMENTS

The contract documents are complementary, and what is called of by one shall be as binding as if called for by all. The intent of the contract documents is to include all work (except specific items to be furnished by the ASPA) necessary for completion of the contract. Materials or work described in words which so applied have a well-known technical and trade meaning shall be held to refer to such recognized standards. Any discrepancies of omissions found in the contract documents shall be reported to the engineer immediately. The engineer will clarify discrepancies or omissions, in writing within a reasonable time.

4 ALTERATION

This contract may be amended at any time during the term hereof, with or without additional consideration, provided, however, no amendments or other variation of this contract shall be valid unless in writing and signed by the Contractor and ASPA. ASPA, without invalidating the contract, may order changed in the work within the general scope of the contract by altering, adding to, or deducting from the work, the contract being adjusted accordingly. All such work shall be executed under the conditions of the original contract, except as specifically adjusted at the time of ordering such change. In giving instructions, the engineer may order minor changes in the work not involving extra cost and not inconsistent with the purposes of the project, but otherwise, except in an emergency endangering life or properly, additions or deductions from the work shall be performed only in pursuance of an approved changed order from ASPA, signed by ASPA’s chief executive officer. If the work is reduced by alterations, such action shall not constitute a claim for damages based on loss anticipated profits.

5 VERBAL STATEMENT AND AGREEMENTS

No oral statements of any person whosoever shall in any manner or degree, modify or

otherwise affect the terms of the contract. The Contractor is advised that ASPA assumes no responsibility for any of its officers or agents prior to the execution of this contract, unless such understandings or representations by ASPA are expressly stated in writing in this contract. The Contractor shall thoroughly examine and become familiar with all of the various parts of the contract documents and determine the nature and location of the work, the general and local conditions, all other matters which can in any way affect the work under this contract. Failure to make an examination necessary for this determination shall not release the Contractor from the obligations of this contract. The Contractor warrants that no verbal agreement or conversation with any officer, agent, or employee of ASPA, or with the engineer either before or after the execution of this contract, has affected or modified any of the terms or obligations herein contained.

6 DOCUMENTS TO BE KEPT ON THE JOB SITE

The Contractor shall keep one copy of the contract documents on the job site, in good order, available to the engineer and to his representatives. The Contractor shall maintain on the job site, and make available to the engineer upon request, one current marked up set of the drawings that accurately indicate all approved variations in the completed work. This set of marked up drawings shall be used by the Contractor along with field notes and other appropriate data for the preparation of the final “as built” drawings.

7 OWNERSHIP OF DRAWINGS

All plans, drawings, technical specifications and copies thereof furnished by the engineer are his property. They are not to be used in other work and, with the exception of the signed contract set, are to be returned to him/her on request at the completion of the work. Any reuse of these materials without specific written verification or adaptation by the engineer will be at the risk of the user and without liability or legal expense to the engineer or the project’s design firm.

8 DUTIES OF CONTRACTOR

Within the term provided, and in accordance with the provisions of this Contract, the Contractor shall faithfully and competently be responsible for accomplishing the duties and tasks (the "Work") as set forth in the Contract Documents.

9 SUPERCEDURE

If the contract is preceded by a letter of dispatch of intent, a notice of award, or a notice to proceed, anticipating the execution of the contract, then such aforementioned letter, dispatch, notice, or directive and all rights and obligations of the parties there under are superseded and merged into the contract. All acts of the Contractor and ASPA under said letter, dispatch, notice, or directive shall be deemed to have been under the contract. The American Samoa power authority (“ASPA”) will make no payment under the award until the formal contract has been prepared and executed by ASPA and the Contractor.

10 REPRESENTATIONS

In order to induce ASPA to enter into this contract, Contractor makes the following representation(s): Contractor has familiarized itself with the nature and the extent of the contract documents, work site, locality, and all local conditions and laws and regulations that in any manner may affect cost, progress, performance, or furnishing of the work. Contractor is duly licensed to perform the work as required by local laws and regulations.

11 CONTRACTOR'S LOCAL ADDRESS

The Contractor must provide and maintain a post office address within the territory of American Samoa and file the same with the engineer. Any written notice that is required or desirable shall be served on the Contractor personally, delivered to his representative on the sire, left at the last known place of residence or business of the Contractor, and/or sent through the mails to previously mentioned local post office address. All notices addressed in compliance with the said directions of the Contractor and properly mailed shall become effective when so mailed or at the time of delivery by any of the above methods.

12 CONTRACTOR COMPOSITION

The term "Contractor," whenever used herein, refers to and means the parties or party (individual, co-partnership, corporation or joint-venture) who or which shall have duly entered into a contract with ASPA to perform the work described in the contract documents. If the Contractor hereunder is comprised of more than one legal entity, Contractor expressly agrees that each such entity shall be jointly and severally liable hereunder. Within thirty (30) days after receipt of notice to proceed or award of contract, the Contractor shall provide the engineer with a copy of any supplemental documents, which set forth in detail exactly how the contract will be sponsored, managed and controlled. The Contractor shall also provide, on or before this time, power(s) of attorney or other acceptable documents that attest to the authority and right of designated representatives to commit and sign documents for the Contractor.

13 CONTRACTOR STATUS

It is agreed that the Contractor shall be an independent contractor of ASPA in the performance of this contract. The relationship of the parties hereto shall in no event be deemed or construed to be that of employer and employee of principal and agent, or of any other relationship other than the Contractor as an independent Contractor.

14 ASSIGNMENT

Neither party to the contract shall assign the contract or sublet it as a whole, without the written consent of the other, nor shall the Contractor assign any monies due or to become due to it hereunder without the previous written consent of ASPA.

15 SUBCONTRACTORS

The Contractor agrees that it shall fully indemnify and hold harmless ASPA for the acts and/or omissions of its subcontractors, and of persons either directly or indirectly employed by such subcontractors. Nothing contained in the contract documents shall create any contractual relationship between any subcontractor and ASPA. ASPA shall not be liable to or pay any subcontractor for Contractor's failure to pay said subcontractor.

16 COVENANT AGAINST CONTINGENT FEES

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure the contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bonafide employees or bonafide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty, ASPA shall have the right to annul this contract without liability or, at its discretion, to deduct from the contract price of considerations, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

17 PROHIBITED INTEREST

No official of ASPA who is authorized in such capacity and on behalf of ASPA to negotiate, make, accept, or approve, or to take part in negotiating, making, accepting or approving any architectural, engineering, inspection, construction, or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly integrated personally in this contract or in any part thereof. No officer, employee, architect, attorney, engineer, or inspector of or for ASPA who is authorized in such capacity and on behalf of ASPA to exercise any legislative, executive, supervisory, or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part thereof, any material supply Contractor, subcontract, insurance contract, or any other contract pertaining to the project.

18 KICKBACKS PROHIBITED

ASPA may, by written notice to the Contractor, terminate the contract for cause if ASPA finds that any payment, gratuity (in the form of entertainment, gifts, or otherwise), or offer of employment was made by or on behalf of the Contractor to any ASPA employee, his/her representatives, family members, partners or assigns, any employee of the united states, any employee of the American Samoa government, including members of the FONO of American Samoa; with a view toward securing an agreement or securing favorable treatment with respect to obtaining or performance of this contract in the event that ASPA terminates the contract under this subsection, ASPA shall be entitled to:

Pursue the same remedies against the Contractor which ASPA could pursue in the event of a breach of contract by the Contractor; and

Recover the full amount of such payment gratuity from the person so employed by ASPA.

The rights and remedies of ASPA provided for in this subsection shall not be exclusive and are in addition to any other rights and remedies provided by law or under the Contract Documents.

19 COVENANT AGAINST COLLUSION

The Contractor warrants that neither it nor any of its employees have directly or indirectly entered into any secret or non-secret agreement, participated in any collusion, or otherwise taken any action in restraint of competition in connection with the bid or proposal submitted. For breach or violation of this warranty, ASPA shall have the right to annul this Contract without liability or in its discretion to pursue the same remedies against the Contractor that ASPA could pursue in the event of breach of contract by the Contractor, and as a penalty in addition to any other damages to which it may be entitled by law, to exemplary damages.

20 REPORTS, RECORDS, DATA AND DRAWINGS

The Contractor shall submit to ASPA such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as ASPA may request concerning work performed or to be performed under the contract. The Contractor shall submit to ASPA an electronic copy of "as built" drawings either in AutoCAD 2010 at the end of the construction period. These drawings shall represent a complete and accurate record of the actual work accomplished and shall be based upon first hand observations by the project superintendent or his designated representative. A detailed survey of all in-place structures shall be conducted and this data incorporated into said drawings. The Contractor shall include the following items in the "as built" drawings:

Project location and site (community and project description and number);

Name of project engineer, inspector and Contractor;

North arrow and scale;

Legend;

Requests for partial payments will not be approved if a set of marked drawings are not kept current, and request for final payment will not be approved until the drawings are delivered to the Engineer.

The Contractor agrees that ASPA, the Comptroller General of the United States, or the Secretary of the Interior, or any of their duly authorized agents or representatives, shall, until the expiration of three years after final payment under the Contract shall have access to and the right to examine any directly pertinent books, document, papers, and records of the Contractor involving transactions related to the Contract.

The Contractor further agrees to include in all its subcontracts hereunder a provision to the effect that the subcontractor agrees that ASPA, the Comptroller General of the United States, or the Secretary of the Interior, or any of their duly authorized agents or representatives, shall, until the expiration of three years after final payment under the subcontract, shall have access to and the right to examine any directly pertinent book, documents, papers and records of such subcontractor, involving transactions related to the Contract.

21 INSURANCE

The Contractor shall obtain the insurance coverage designated herein and pay all costs associated therewith. Such insurance shall be for the coverage, amounts and limits as set forth in subsection below. Before commencing the Work under the Agreement, the Contractor shall furnish ASPA with certificates of insurance showing the type, amount, class of operations covered, effective dates and date of expiration of policies. The Contractor's public/general liability and automobile liability policies shall name ASPA as an additional insured. The Contractor's insurance shall be maintained for the full period of this Agreement.

In the case of a breach of any provision of this section, ASPA, at its option, may take out and maintain, at the expense of the Contractor, such insurance as ASPA may deem proper and may charge the Contractor with such amounts due. Nothing contained in these insurance requirements is to be construed as limiting the extent of the Contractor's responsibility for payments of damages resulting from its operations under this Agreement.

Requirements:

The Contractor shall maintain during the term of this Agreement such insurance as follows:

1. Workmen's Compensation. The Contractor shall maintain such statutory amounts of workmen's compensation insurance as are set forth in the American Samoa Code Annotated and American Samoa Administrative Code.
2. Employer's Liability. The Contractor shall maintain employer's liability insurance in the amount of Five Hundred Thousand Dollars ($500,000.00 USD).
3. Public/General Liability. Public/General liability shall include coverage for wrongful death claims, and shall not exclude coverage for explosion, collapse or underground exposure.
4. Bodily/personal injury. The Contractor shall maintain public/general liability insurance covering third party bodily/personal injury for Five Hundred Thousand Dollars ($500,000.00 USD) per person/per occurrence with an aggregate of One Million Dollars ($1,000,000.00 USD).
5. Property damage. The Contractor shall maintain public/general liability insurance covering property damage for One Hundred Thousand Dollars ($100,000.00 USD) per person/per occurrence with an aggregate of Two Hundred Thousand Dollars ($200,000.00 USD).
6. Automobile Liability
    i. Bodily/personal injury. The Contractor shall maintain automobile liability insurance covering third party bodily/personal injury for Five Hundred Thousand Dollars ($500,000.00 USD). Per person/per occurrence with an aggregate of One Millions Dollars ($1,000,000.00 USD).

ii. Property damage. The Contractor shall maintain automobile liability insurance covering property damage for One Hundred Thousand Dollars ($100,000.00 USD) per persona/per occurrence with an aggregate of Two Hundred Thousand Dollars ($200,000.00 USD).

7. Builder's Risk Insurance. Unless otherwise modified in the Supplementary Conditions, the Contractor shall secure and maintain during the life of the Contract Builders Risk Insurance coverage for 100 percent of the Contract amount. Such insurance shall not exclude coverage for earthquake, landslide, flood, collapse, or loss due to the results of faulty workmanship, and shall provide for losses to be paid to the Contractor and ASPA as their interests may appear.

The above policies shall protect the Contractor from claims for damages for personal injury, including accidental death, as well as from claims for direct property damage, which may arise from negligent operations under this Agreement, whether such operations are by itself or by ASPA employees.

When the construction is to be accomplished within a public or private right-of-way requiring special insurance coverage, the Contractor shall conform to the particular requirements and provide the required insurance. The Contractor shall include in his liability policy all endorsements that the said authority may require for the protection of the authority, its officers, agents and employees. Insurance coverage for special conditions, when required, shall be provided as set forth in the Supplementary Conditions.

22 INDEMNITY

The Contactor shall indemnify, defend and hold harmless ASPA, its directors, officers, employees and agents from and against any and all claims and demand whatsoever, including costs and attorney's fees, resulting from Contractors negligent acts or omissions, or any other tortuous conduct, in connection with performance of this Contract, Contractor shall indemnify, defend and hold harmless ASPA, its directors, officers, employees and agents from and against any and all claims and demands whatsoever, including costs and attorney's fees, under the doctrine of strict liability as it may be applied by a court of competent jurisdiction to Contractor's performance under this Contract.

23 PAYMENT OF TAXES

The Contractor shall pay and shall assume exclusive liability for all taxes levied or assessed on or in connection with its performance of the Contract, whether before or after acceptance of the work, including but not limited to federal payroll taxes or assessments, and Government of American Samoa income and excise taxes. The Contractor may be required to show that all taxes due or accrued to American Samoa have been paid or guaranteed before leaving American Samoa.

24 LAW, PERMITS AND LICENSES

The Contractor shall keep itself fully informed of all local and federal laws and regulations that affect in any manner the work set forth in the Contract Documents. The Contractor shall at all times comply with said laws and regulation, and protect and indemnify ASPA, its directors, officers, agents, representatives, and employees against any claim or liability arising from or based on the violation of any such laws or regulations. All permits licenses and inspection fees necessary for prosecution and completions of the work shall be secured and paid for by the Contractor, unless otherwise specified.

25 SUPERINTENDENT

During the term of the Contract, the Contractor shall keep English speaking, competent supervisory personnel. The Contractor shall designate in writing, before starting work, an authorized representative acceptable to the Engineer who shall have complete authority to represent and act for the Contractor. The residential address and telephone number of the authorized representative shall be made available to the Engineer for emergency communication during off-hours. The Contractor shall give efficient supervision to the work, using his best skill and attention. The Contractor shall be solely responsible for all construction means, methods, techniques and procedures, and for providing adequate safety precautions and coordinating all portions of the work under the Contract.

26 ENGINEER'S FIELD OFFICE

Contractor shall provide, maintain, and subsequently remove as its property a field office as specified below, for the exclusive use of Engineer and its representatives.

Engineer's field office, equipped as specified below, shall be available for Engineer's use prior to the start of work at project site, and shall remain on the site for 30 days after final acceptance of all work. The field office shall be located where directed by the Engineer; leveled, blocked, tied down, and skirted as directed; and, relocated, when necessary, and approved.

Contractor shall maintain field office in good repair and acceptable appearance. Provide daily cleaning service, maintenance, and replenishment, as applicable, of paper towels, paper cups, soap, tissue paper, and bottled water service.

Provide gravel or crushed rock under and around the field office to a minimum distance of 10 feet. Provide sanitary facilities in compliance with local health authorities.

Field office shall be trailer-type mobile structure or approved equal with the following features and equipment, new or like new in appearance and function:

Security guard screens on all windows.

Toilet and washbasin in separate compartments

Insulated double walls, floor, and roof.

Self-contained, window air conditioner.

Fluorescent ceiling lights.

27 ENGINEER’S DIRECTION

The superintendent or other duly authorized representative of the Contractor shall represent the Contractor in all directions given to the Contractor by the Engineer. Directions of major importance will be confirmed in writing. Any direction will be so confirmed, in each case, on written request from the Contractor.

28 EMPLOYEES

The Contractor shall employ American Samoa labor to the fullest extent possible. It shall be responsible for hiring its own labor. It shall be the responsibility of the Contractor to ascertain that any foreign recruitment complies in full with all applicable laws may subject it to termination of the Contract for cause or withholding of amounts payable to the Contractor. The Contractor shall employ only competent, skillful workers to do the work, and whenever any person shall appear to be incompetent or to act in a disorderly or improper manner; such person shall be removed from the work. Such removal shall not be the basis of any claim for compensation of damage against ASPA. In connection with the performance of work under his Contract, the Contractor agrees not to employ any person undergoing sentence of imprisonment at hard labor. Contractor shall, at all times, provide competent, suitable personnel to survey and layout the work and perform construction as required by the Contract. Contractor shall at all times maintaining proper discipline and order at the work site.

29 DISCREPANCY WITH LOCAL OR FEDERAL LAW

If any discrepancy or inconsistency is discovered between any provision of the Contract Documents and any law, ordinance, regulation, order decree of the American Samoa or United States government, the Contractor shall forthwith report the same to the Engineer in writing. The Contractor shall at times observer and comply with all such existing and future laws, ordinances, regulations, orders and decrees, and shall protect and indemnify ASPA, its directors, officers, agents, representatives and employees against any claim or liability arising from or based upon the violation of any such law, ordinance, regulation, order or decree, whether by the Contractor or by its employees. Particular attention is called to prevailing wage and overtime compensation.

30 HOURS OF WORK

The Contractor shall schedule all work to be performed during the period from 6:00 a.m. to 6:00 p.m., Monday through Friday and, if permitted, on Saturday. No work will be permitted on Sunday or holidays without specific approval of ASPA. The Contractor may be permitted to work at night, if it can satisfactorily demonstrate the need, in order to maintain the required progress or protect the work from the elements. If permitted to work at night, the Contractor shall provide sufficient and satisfactory lighting and other facilities therefore. For night work, if any be performed, the Contractor shall receive no extra payment, but compensation shall be considered as having been included in the price stipulated for the work. The Contractor shall, however, be charged for such additional inspection and administrative costs as ASPA may incur.

31 EQUAL OPPORTUNITY

This subsection is applicable unless the Contract is exempt under the rules, regulations, and relevant orders of the Secretary of Labor (41CFR, ch. 60). During the performance of the Contract, the Contractor agrees as follows:

The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and election for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Engineer setting forth the provisions of this subsection.

The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Engineer, advising the labor union or workers' representative of the Contractor's commitments under this subsection, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, and of the rules, regulations, and relevant orders of the Secretary of Labor.

The Contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

A. In the event of the Contractor's noncompliance with this subsection, or with any of the said rules, regulations, orders, the Contract may be cancelled, terminated, or suspended, in all or in part, and the Contractor may be declared ineligible for further government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

B. The Contractor will include the provisions of this subsection in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the government may direct as a means of enforcing such provisions, including sanctions fort noncompliance.

32 SAFETY REQUIREMENTS

The Contractor shall be solely and completely responsible for safety conditions on the site where work is to be performed, including that safety of all persons and property during the term of the Contract. This requirement shall apply continuously and not be limited to normal working hours. Safety provisions shall conform to United States Department of Labor, Occupational Safety, and Health Act ("OSHA") and other applicable laws. Contractor shall become thoroughly familiar with governing safety provisions and shall comply with the obligations set forth therein. Contractor shall develop and maintain for the duration of the Contract, a safety program that will effectively incorporate and implement required safety provisions. Contractor shall appoint a qualified employee who is authorized to supervise and enforce compliance with the safety program. The Engineer's duty to conduct construction review of the Contractor's performance is not intended to include a review or approval of the adequacy of Contractor's safety supervisor, safety program, or safety measures taken in, on, or near the construction site.

As part of the safety program, Contractor shall maintain at its office or other well-known place at the site of the work, safety equipment applicable to the work as prescribed by the governing safety authorities and articles necessary for giving first-aid to the injured. Contractor shall do all work necessary to protect the general public from hazards, including, but not limited to, surface irregularities and/or unramped grade changes in pedestrian sidewalk or walkway, and trenches or excavations in roadway. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the work. Contractor shall construct and maintain satisfactory and substantial temporary chain link fencing, solid fencing, railing, barricades or steel plates, as applicable, at all openings, obstructions, or other hazards in streets, sidewalks, floors, roofs, and walkways. Such barriers shall have adequate warning lights as necessary or required for safety. The Contractor shall comply with Owner's safety rules while on the Owner's property.

If death or serious injuries or damages are caused, the accident shall be reported immediately by telephone or messenger to the Engineer. In addition, Contractor shall promptly report to ASPA in writing all accidents whatsoever arising out of, or in connection with, the performance of the work whether on or adjacent to the site, giving full details and statements of witnesses. If claim is made by anyone against the Contractor or any subcontractor on account of accident, Contractor shall promptly report the claim to ASPA in writing, giving full details of the claim.

The Contractor's tools and equipment used on the work shall be furnished in sufficient quantity and of a capacity and type that will safely perform the work specified, and shall be maintained and used in a manner that will not create a hazard to person or property, or cause a delay in the progress of work.

The Contractor will comply with the rules and regulations of the Territory authorities regarding closing or restricting the use of public streets or highways. No public or private road shall be closed, except by written permission of the proper authority. The Contractor will make every effort to avoid obstruction to traffic and normal commercial pursuits. Where traffic will pass over backfilled trenches before they are paved, the Contractor will maintain the top of the trench to allow normal vehicular traffic to pass over and provide temporary access driveways when required. Contractor agrees that its cleanup operations shall follow immediately after backfilling. When flagmen and guards are required by regulation or when deemed necessary for safety, the Contractor will furnish them with appropriate apparel and other traffic control devices. Traffic control procedures and devices used on all rights-of-way shall meet the requirements of the applicable current laws and regulations for traffic control. Contractor will notify the fire and police departments before closing any street or portion thereof and notify said departments when the streets are again passable for emergency vehicles. The Contractor shall leave it night emergency telephone number or numbers with the police department, so that contact may be made easily at all times in case of barricade and flare trouble or other emergencies.

The Contractor shall perform all work in a fire safe manner. The Contractor shall furnish and maintain on site adequate firefighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable American Samoa and United States fire prevention laws and regulations. Where these regulations do not apply, the Contractor agrees to follow the applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPS No.241).

33 PROTECTION OF WORK AND/OR PROPERTY

The Contractor shall at all times safely guard ASPA's property from damage or loss. The Contractor shall at all times safely guard and protect from damaging its own work. All loss or damages arising from any unforeseen obstruction or defects which may be encountered in the prosecution of the work, or from the action of the elements, shall be sustained by the Contractor.

34 MATERIALS AND WORKMANSHIP

Unless otherwise specified in the Contract Documents, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, supplies, transportation and other facilities or incidentals necessary for the furnishing, performance, testing, start-up, execution and completion of the work. Contractor shall additionally furnish all fuel, power, light, telephone, water sanitary facilities, temporary facilities, and any other facilities or incidentals necessary for the furnishing, performance, testing, start-up, execution and completion of the work. Unless otherwise specified in the Contract Documents, all materials shall be new, and both workmanship and materials shall be of good quality. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the applicable supplier or industry standards. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials. All work shall be done and completed in a thoroughly workmanlike manner notwithstanding any omission from the Technical Specifications or the Drawings, and it shall be the duty of the Contractor to call the Engineer's attention to apparent errors or omissions and request instructions before proceeding with the work. All work performed by the Contractor after it learns or should have learned of an error or omission in the Technical Specifications or Drawings without notifying the Engineer will be at the Contractor's own expense. The Engineer may, by appropriate instructions, correct errors and omissions, and these instructions shall be as binding upon the Contractor as though contained in the original Technical Specifications or Drawings. All defective work or materials shall be removed from the premises by the Contractor, whether in place or not, and shall be replaced or renewed as the Engineer may direct. All materials and workmanship of whatever description shall be subjected to the inspection of and rejection by, the Engineer if not in conformance with the Technical Specifications. Contractor shall repair or replace, at Contractor's sole expense, every portion of the work that is damaged or destroyed prior to the final completion of the work and caused in whole or in part by the acts or omissions of the Contractor.

35 PNRS CONDITIONS

The Contractor shall inform ASPA upon discovery of any historic artifacts or properties found at the construction site(s). Contractor must ensure that any excess dirt, cinder, spoils, concrete, pavement and/or drilling materials, must be properly disposed of. Any other uses of these materials shall require a separate land use permit. Associated costs shall be borne by the Contractor and shall be incidental to the undertaking of the scope of this project. The Contractor shall make every effort to prevent soil erosion and the escape of debris to the ocean. The Contractor shall not leave the project site in condition that would cause soil erosion in the future. The Contractor shall identify a staging area acceptable to the ASPA and the PNRS. Any other work not within the scope of this project conducted at this site shall require a separate land use permit application.

36 THE ENGINEER

Authority of the Engineer

A. The Engineer shall be ASPA's representative during the construction period. His authority and responsibility shall be limited to the provisions set forth in these Contract Documents. The Engineer shall have the authority to reject work and materials whenever such rejection may be necessary to ensure execution of the Contract in accordance with the intent of the Contract Documents.

B. Duties and Responsibilities of the Engineer

C. The Engineer will make periodic visits to the site of the project to observe the progress and quality of the work and to determine, in general, if the work is proceeding in accordance with the intent of the Contract Documents. He shall not be required to make comprehensive or continuous inspections to check quality or quantity of the work, and he shall not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the work. Visits and observations made by the Engineer shall not relieve the Contractor of his obligation to conduct comprehensive inspections of the work and to furnish materials and perform acceptable work, and to provide adequate safety precautions in conformance with the intent of the Contract.

D. The Engineer will make decisions, in writing, on all claims of ASPA or the Contractor arising from interpretation or execution of the Contract Documents. Such decision shall be necessary before the Contractor can receive additional money under the terms of the Contract. Changes in work ordered by the Engineer will be made in compliance with section entitled "Alterations."

E. One or more inspectors may be assigned to observe the work and to act in matters of construction under this Contract. It is understood that such inspectors shall have the power to issue instructions and make decisions within the limitations of the authority of the Engineer. Such inspection shall not relieve the Contractor of his obligations to conduct comprehensive inspections of the work, and to provide adequate safety precautions in conformance with the intent of the Contract.

37 REJECTED MATERIAL

Any material condemned or rejected by the Engineer or his authorized inspector because of non-conformity with the Contract Documents shall be removed at once from the vicinity of the work by the Contractor at his own expense, and the same shall not be used on the work.

38 UNNOTICED DEFECTS

Any defective work or material that may be discovered by the Engineer before the final acceptance of work, or before final payment has been made, or during the guarantee period, shall be removed and replaced by work and materials which shall conform to the provisions of the Contract Documents. Failure on the part of the Engineer to condemn or reject based on inferior work or materials shall make such deductions in the final payment therefore as may be just and reasonable.

39 RIGHT TO RETAIN IMPERFECT WORK

If any part or portion of the work done or material furnished under this Contract shall prove defective and not in accordance with the Technical Specifications and Drawings, and if the imperfection n the same shall not be of sufficient magnitude or importance as to make the work dangerous or unsuitable, or if the removal of such work will create conditions which are dangerous or undesirable, ASPA shall have the right and authority to retain such work but shall make such deductions in the final payment therefore as may be just and reasonable.

40 SHOP DRAWINGS

After execution of the Contract, the Contractor shall submit, n quadruplicate, to the Engineer for his review, such shop drawings, electrical diagrams, and catalog cuts for fabricated items and manufactured items (including satisfactory identification of items, units and assemblies in relation to the Drawings and Technical Specifications). Unless otherwise approved by the Engineer, shop drawings shall be submitted only by the Contractor, who shall indicate by a signed stamp on the shop drawings, or the other approved means, that the Contractor has checked the shop drawings, and that the work shown is in accordance with Contract requirements and has been checked for dimensions and relationship with work of all other trades involved. The practice of submitting incomplete or unchecked shop drawings for the Engineer too correct for finish will not be acceptable, and shop drawings which, in the opinion of the Engineer, clearly indicate that they have not been checked by the Contractor will be considered as non-complying with the intent of the Contract Documents and will be returned to the Contractor for resubmission in the proper form.

When the shop drawings have been reviewed by the Engineer, two sets of submittals will be returned to the Contractor appropriately stamped. If major changes or corrections are necessary, the shop drawings may be rejected and one set will be returned to the Contractor with such changes or corrections indicated, and the Contractor shall correct and resubmit the shop drawings in quadruplicate, unless otherwise directed by the Engineer. No changes shall be made by the Contractor to resubmitted shop drawings other than those changes indicated by the Engineer.

The review of such shop drawings and catalog cuts by the Engineer shall not relieve the Contractor from responsibility for correctness of dimensions, fabrication details and space requirements, or for deviations from the Contract Drawings or Specification, unless the Contractor has called attention to such deviations in writing by a letter accompanying the shop drawings and the Engineer approves the change or deviation in writing at the time of submission; nor shall review by the Engineer relieve the Contractor from the responsibility for errors in the shop drawings. When the Contractor does call such deviations to the attention of the Engineer, the Contractor shall state in his letter whether or not such deviations involve any deduction or extra cost adjustment.

41 DETAILED DRAWINGS AND INSTRUCTIONS

The Engineer will furnish, with reasonable promptness, additional instructions by means of Drawings or otherwise, if, in the Engineer’s opinion, such are required for the proper execution of the work. All such Drawings and instructions will be consistent with the Contract Documents, truce developments thereof, and reasonably inferable therefrom.

42 WARRANTY OF TITLE

No material, supplies, or equipment for the work shall be purchased subject to any chattel mortgage security agreement or under a conditional sale or other agreement by which an interest therein or any part thereof is retained by the seller or supplier. The Contractor warrants good title to all material, supplies and equipment installed or incorporated in the work and agrees upon completion of all work to deliver the premises together with all improvements and appurtenances constructed or placed thereon by it to ASPA free from any claim, lien, security interest, or charge and further agrees that neither it nor any person, firm, or corporation furnishing any materials or labor for any work covered by the Contract shall have any right to a lien upon the premises or any improvements or appurtenances thereon, provided that this shall not preclude the Contractor from installing metering devices and other equipment of ASPA, the title of which is so commonly retained by ASPA. The provisions of this section shall be inserted by the Contractor into all subcontracts, and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

43 SUBSTITUTION OF MATERIALS

Except for ASPA-selected equipment items, and items where no substitution is clearly specified, whenever any material, article, device, product, fixture, form, type of construction, or process is indicated or specified by patent or proprietary name, by name of manufacturer, or by catalog number, such specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired. This procedure is not to be construed as eliminating from competition other products of equal or better quality by other manufacturers where fully suitable in design. The Contractor may, in such cases, submit complete data to the Engineer, within thirty (30) days following the award of the Contract, for consideration of another material, type, or process which shall be substantially equal in every respect to that so indicated or specified. Substitute materials shall not be used unless approved by ASPA in writing. The Engineer will be the sole judge of the substituted article or material.

44 TESTS SAMPLES AND INSPECTIONS

The Contractor shall furnish, without extra charge, the necessary test pieces and samples, including facilities and labor for obtaining the same, as requested by the Engineer. When required, the Contractor shall furnish certificates of tests of materials and equipment made at the point of manufacture by a recognized testing laboratory. The Engineer, and authorized ASPA agents, and their representatives shall at all times be provided safe access to the work wherever it is in preparation or progress, and the Contractor shall provide facilities for such access and for inspection, including maintenance of temporary and permanent access. If the Technical Specifications, the Engineer's instructions, or any laws or regulations require any work to be specially tested or approved, the Contractor shall give timely notice of its readiness for inspection. Inspections to be conducted by the Engineer will be promptly made, and where practicable, at the source of supply. If any work should be covered up without approval or consent of the Engineer, it shall, if required by the Engineer, be uncovered for examination at the Contractor's expense. Re-examination of questioned work may be ordered by the Engineer, and, if so ordered, the work shall be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, ASPA will pay the cost of reexamination and replacement. If such work is found to be not in accordance with the Contract Documents, the Contractor shall correct the defective work, and the cost of reexamination and correction of the defective work shall be paid by the Contractor.

45 ROYALTIES AND PATENTS

The Contractor shall pay all royalty and license fees, unless otherwise specifies. The Contractor shall defend all suits or claims for infringement of any patent rights and shall defend, indemnify and hold harmless ASPA from any such suits or claims.

46 DEFECTIVE WORK

The Contractor warrants and guarantees to ASPA that all work will be in accordance with the Contract Documents and will not be defective. Contractor hereby agrees to make, at its own expense, all repairs or replacements necessitated by defects in materials or workmanship, supplied under the Contract, which become evident to ASPA within one (1) year after the date of final acceptance of the work or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents. If defective work is found, Contractor shall promptly, without cost to ASPA and in accordance with ASPA's written instructions, promptly either correct such defective work, or if it has been rejected by ASPA, remove it from the work site and replace it with non-defective work. The Contractor further assumes responsibility for a similar guarantee for all work and materials provided by the subcontractors or manufacturers of all work and materials provided by the sub-contractors or manufacturers of packaged equipment components. The Contractor also agrees to defend, indemnify and hold harmless ASPA from and against liability of any kind arising from damage due to said defects. The Contractor shall make all repairs and replacements promptly upon receipt of written order for same from ASPA. If Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk or loss of damage, ASPA may have the defective work corrected or the rejected work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) will be paid by Contractor.

47 COMMENCEMENT OF THE WORK

Before work shall be started and materials ordered, the Contractor shall meet and consult with the Engineer to discuss the materials, equipment and all arrangements for prosecuting the work. Work shall not commence until the Contractor receives the Notice of Proceed in writing from ASPA.

48 SCHEDULES AND PROGRESS REPORTS

Prior to starting work, the Contractor shall accept ASPA’s Milestone Schedule or submit to the Engineer its own progress schedule for acceptance showing approximately the dates on which each part or division of the work is expected to be started and finished, including an estimated timeline for use of the materials. ASPA’s Milestone Schedule for purposes of progress payments (“Milestone Payments”) to the Contractor shall determine ASPA’s payment duties, unless the Engineer determines in writing that the Contractor’s progress schedule shall be considered the official Milestone Schedule.

The Contractor shall also forward to the Engineer, at the end of each month, an itemized report of the delivery status of major and critical items of purchased equipment and material, including the status of shop drawings and the status of shop and field fabricated work. These progress reports shall indicate the date of the purchase order, the current percentage of completion, estimated delivery and cause of delay, if any.

The Contractor's progress schedule must conform to the calendar days set forth for the completion of the work and shall be subject to modification by the Engineer. The Engineer shall be advised in advance by the Contractor when construction work is scheduled and the days when no construction work will take place. If the Contractor fails to notify the Engineer in advance of a the day or days when no construction work will be done, the Contractor will be charged the cost of inspection for that day or days and such charges may be deducted from any payment due the Contractor. If the completion of any part of the work or the delivery of materials is behind the approved schedule, the Contractor shall submit in writing a plan acceptable to the Engineer for bringing the work up to schedule.

ASPA shall have the right to withhold Milestone Payments for the work if the Contractor fails to prosecute the work in accordance with the Milestone Schedule. It is expressly understood and agreed that the time of beginning, rate of progress and time of completion of the work are the essence of the Contract. The work shall be prosecuted at such time, and in or on such part or parts of the project as may be required, to complete the project as contemplated in the Contract Documents and the approved Milestone Schedule.

49 NIGHT WORK

No work at night request will be granted.

50 ASPA'S RIGHT TO PERFORM WORK

If in the opinion of the Engineer the Contractor neglects to prosecute the work in a timely manner or in accordance with the Milestone Schedule, or neglects or refuses at its own cost to perform and/or replace work rejected by the Engineer, then ASPA shall notify the Contractor and its surety of the condition, and after ten (10) days' written notice to the Contractor and the Surety, and without prejudice to any other right or remedy which ASPA may have under the Contract Documents, including the section entitled "ASPA's Right to re-Contractor Work," and take over that portion of the work which has been neglected or improperly executed and make good the deficiencies and deduct its costs thereof from the payments then or thereafter due the Contractor.

51 TERMINATION FOR CONVEINANCE

ASPA may terminate the Contract in whole or, from time to time, in part, if the Chief Executive Officer (the "CEO") determines that a termination is in the best interest of ASPA. In such case, the CEO shall terminate the Contract by delivering to the Contractor a two-week notice of termination specifying the extent of termination and the effective date. Within two weeks of termination, the Contractor shall cease its prosecution of the work, turn over to ASPA all data and other materials acquired for purposes of the Contract, and submit to ASPA a claim for materials acquired for purposes of the Contract, and submit to ASPA a claim for materials and/or labor supplied prior to termination. ASPA shall pay the Contractor an equitable price for materials purchased and labor expended by the Contractor prior to termination, provided that such price not to exceed a fair proportion of the original Contract price.

After receipt of a notice of termination issued pursuant to this section, and except as directed by the CEO, the Contractor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this section:

Stop the supply and delivery of goods and labor as specified in the notice;

Place no further orders for goods, materials, services, labor or facilities, except as necessary to complete any continued portion or portions of the Contract;

Terminate all subcontracts to the extent they relate to the supply and delivery of goods terminated;

Assign to ASPA, as directed and approved by the CEO, all right, title, and interest of the Contractor under the subcontracts terminated, in which case ASPA shall have the right to settle or to pay any termination settlement proposal arising out of those terminations;

With approval or ratification to the extent required by the CEO, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts; the approval or ratification will be final for purposes of this section;

Complete performance of the supply and delivery of goods not terminated;

Take any action that may be necessary or that the CEO may direct, for the protection and preservation of the goods related to the Contract that is in the possession of the Contractor and in which ASPA has or may acquire an interest; and

Submit a final termination settlement proposal to the CEO in the form and with the certifications prescribed by the CEO. The Contractor shall submit the proposal promptly upon notice of termination, but no more than one (1) month from the effective date of termination, unless extended in writing by the CEO upon written request of the Contractor within this one (1) month period. However, if the CEO determines that the facts justify it, a termination settlement proposal may be received and acted on after one (1) month or any extension. If the Contractor fails to submit the proposal within the time allowed, the CEO may determine, on the basis of information available, the amount, if any, due to the Contractor because of the termination and shall pay the amount determined.

52 TERMINATION FOR CAUSE

ASPA may discharge the Contractor and terminate the Contract at any time when ASPA shall determine that it has sufficient cause arising from (a) Contractor's dereliction or unsatisfactory performance of a duty, (b) Contractor's failure to perform the work in accordance with the provisions of the Contract Documents, (c) misrepresentation by the Contractor, or (d) conviction of the Contractor or any of its directors and/or officers of a felony. If ASPA terminates the Contractor for cause prior to completion of the Contractor's duties, in addition to any other rights or remedies granted ASPA in the Contract Documents and at law, ASPA shall require repayment by the Contractor of all advanced payments or Milestone Payments made and may require delivery of any partially completed work. ASPA shall finish the remaining work to be performed by whatever method ASPA may deem expedient and the Contractor shall not be entitled to receive any further compensation. In the event that the cost, including additional managerial and administrative services, to ASPA to complete the work exceeds the contract price, such excess costs shall be paid by the Contractor.

53 TERMINATION FOR DEFAULT

If the Contractor refuses or fails to perform any provision of the Contract or Contract Documents with such diligence as will ensure its completion within the time specified in the Contract or any extension thereof, otherwise fails to timely satisfy any provision set forth in the Contract Documents, or commits any other substantial breach of the Contract Documents, ASPA may notify the Contractor in writing of the delay or non-performance, and if not cured within ten (10) days or any longer time specified in writing to ASPA, ASPA shall terminate the Contractor's right to proceed under the Contract or such part of the Contract Documents as to which there has been delay or a failure to properly perform. In the event of termination in whole or in part under this section, ASPA may procure similar supplies, materials and/or services in a manner and upon terms deemed appropriate by ASPA, as further set forth in the section entitled "ASPA's Right to Re-contract Work". Notwithstanding termination of the Contract and subject to any directions from ASPA, the Contractor shall take timely, reasonable, and necessary action to protect and preserve property in the possession of the Contractor in which ASPA has an interest.

Payment for completed work shall be at the sole discretion of ASPA. Payment for the protection and preservation of property shall be in an amount agreed upon by the Contractor and ASPA. ASPA may withhold from amounts due the Contractor such sums as ASPA deems to be necessary to protect ASPA against loss because of outstanding liens or claims of former lien holders and to reimburse ASPA for the excess costs incurred in procuring similar goods, material and/or services.

Except with respect to defaults of subcontractors, the Contractor shall not be in default by reason of any failure in performance of the Contract in accordance with its terms if the Contractor has notified ASPA within ten (10) days after the cause of the delay and the failure arises out of causes such as acts of God, acts of the public enemy, acts of ASPA and any other ASPA entity in its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes or other labor disputes, freight embargo, or unusually severe weather. If the failure to perform is caused by the failure of a subcontractor to perform or to make progress, and if such failure arises out of causes similar to those set forth above, the Contractor shall not be deemed to be in default, unless the supplies and/or services to be furnished by the subcontractor were reasonably obtainable from other sources in sufficient time to permit the Contractor to meet the Contract requirements.

If, after notice of termination for default, it is determined for any reason that the Contractor was not in default under the provisions of this section, the rights and obligations of the parties shall, be the same as if the notice of termination had been issued pursuant to the subsection entitled "Termination for Convenience."

The rights and remedies provided in this subsection are in addition to any other rights and remedies provided by law or under the Contract Documents.

54 TERMINATION FOR NATIONAL EMERGENCIES

ASPA shall terminate this Contract or portion thereof by written notice when the Contractor is prevented from proceeding with this Contract as a direct result of an Executive Order of the President or Governor of American Samoa with respect to the prosecution of war or in the interest of national defense. ASPA shall not be liable for any claims for loss of anticipated profits.

55 ASPA'S RIGHT TO RE-CONTRACT WORK

If (a) ASPA determines that the Contractor has abandoned the work, (b) the Contractor is adjudged to be bankrupt, (c) the Contractor makes a general assignment, with ASPA's approval, for the benefit of the Contractor's creditors, (d) a receiver is appointed on account of its insolvency, (e) the Contractor, on more than one working day, refuses or fails to supply enough properly skilled workers or proper materials, (f) the Contractor fails to make prompt payment to subcontractors for materials or labor, (g) the Contractor disregards the laws or regulations of American Samoa or the United States, or (h) ASPA finds that the Contractor is in material breach of any provision of the Contract Documents or any laws or regulations, then ASPA may, without prejudice to any other right or remedy provided to ASPA under the Contract Documents or at law, and after giving the Contractor and its surety ten (10) days' written notice of its intent to terminate for default, terminate the employment of the Contractor in accordance with this section and the section entitled "Termination for Default" and take possession of the premises and of all materials, tools and appurtenances thereon and finish the work by whatever method ASPA may deem expedient. In such case, the Contractor shall not be entitled to receive any further compensation. In the event that the cost, including additional managerial and administrative services to ASPA to complete the work exceeds the contract price such excess costs shall be paid by the Contractor.

56 SUSPENSION OF THE WORK

ASPA shall have the authority to suspend the work wholly, or in part, for such period or periods as it may deem necessary, due to severe weather or such other conditions as are considered by ASPA to be unfavorable to the prosecution of the work. ASPA shall also have the authority to suspend the work for such time as is necessary due to the failure on the part of the Contractor to carry out orders given by ASPA or any other Contract (collectively all of the above shall constitute a "Foreseeable Suspension").

In the event that the Contractor is ordered by ASPA to suspend the Work for a Foreseeable Suspension, the period of shutdown shall be computed from the effective date of ASPA's order to suspend work to the effective date of ASPA's order to resume the Work. ASPA shall, at its sole discretion, determine whether a contract amendment is appropriate, whose determination will not be unreasonable. In the event that the Contractor is ordered by ASPA to suspend the Work for some unforeseen cause not otherwise provided for in this Agreement and over which the Contractor has no control (an "Unforeseen Suspension"), the period of suspension shall be computed from the effective date of ASPA's order to suspend work to the effective date of ASPA's order to resume the Work (the "Suspension Period"). In the event of an Unforeseen Suspension, ASPA and the Contractor shall execute an appropriate contract amendment extending the term of this Contract to account for the Suspension Period.

No provision of this section shall be construed as entitling the Contractor to compensation for delays due to inclement weather, for suspension made at the request of the Contractor, or for any other delay.

57 EXAMINATION OF EXISTING FACILITIES

After the Contract is executed and before the commencement of work, the Contractor and Engineer shall make a thorough examination of all existing building, structures, and other improvements in the vicinity of the work, as applicable, which might be damaged by construction operations. Periodic examinations of existing buildings, structures, and other improvements in the vicinity of the work shall be made jointly by authorized representatives of the Contractor, Engineer, Owner, and the affected property owners. The scope of the examination shall include cracks in structures, settlement, leakage, and similar conditions. Records in triplicate of all observations shall be prepared by the Contractor and each copy of every document shall be signed by the authorized representatives of the Owner and Contractor and signed in the manner specified above. One signed copy of every document and photograph will be kept on file in the office of the Engineer. These records and photographs are intended for use as indisputable evidence in ascertaining whether, and to what extent, damage occurred as a result of the Contractor's operatives and are for the protection of the adjacent property owners, the Contractor, and the Owner.

58 DIFFERING SITE CONDITIONS

The Contractor shall promptly, and before such conditions are disturbed, notify the Engineer in writing of: (a) subsurface or latent physical conditions at the site differing materially from those indicated in the contract, or (b) unknown physical conditions at the site of an unusual nature, differing materially from those ordinarily encountered and generally recognized as being work of the character provided for in the Contract. The Engineer shall promptly investigate the conditions, and if he/she finds that such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the work under the Contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made by ASPA and the Contract shall be modified in writing accordingly. No claim of the Contractor under this clause shall be allowed unless the Contractor has given the notice required above. No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this Contract.

59 UNFORSEEN DELAYS

If the Contractor is delayed in the progress of the work by any act or neglect of ASPA, or by strikes, lockouts, fire, unusual weather conditions, or unavoidable casualties, the Contractor shall, within 48 hours of the start of the delay give notice to the Engineer of the cause of the delay and estimate the possible time extension involved. Within seven (7) days after the conclusion of the delay, the Contractor shall give notice to the Engineer of any actual time extension requested as a result of the aforementioned occurrence. No extension of time will be granted to the Contractor for delays occurring to parts of the work that have no measurable impact on the completion of the total work under the Contract, nor will extension of time be granted for delays to parts of work that are not located on the critical path if the Critical Path Method ("CPM") is used for scheduling the work. No extension of time will be considered for weather conditions normal to the area in which the work is being performed. Unusual weather conditions, if determined by the Engineer to be of a severity that would stop all progress of work, may be considered as cause for an extension of Contract completion time.

The Engineer may order the Contractor to suspend the work that may be subject to damage in climatic conditions. When delay is caused by an order to suspend work given on account of climatic conditions which, in the opinion of the Engineer, could have been reasonably foreseen, and for damage that could have been forestalled by diligent and reasonable action on the part of the Contractor, the Contractor will not be entitled to any extension of time on account of such order. The Contractor shall maintain all drainage ways through the work open and clear for drainage and store water flow. The Contractor's attention is directed to the average annual rainfall in American Samoa which is approximately 200 inches.

Delays in delivery of equipment or material purchased by the Contractor or his subcontractors (including ASPA selected equipment) shall not be considered as a just cause for delay. The Contractor shall be fully responsible for the timely ordering, scheduling, expediting, delivery and installation of all equipment and materials.

Within a reasonable period after the Contractor submits to the Engineer a written request for an extension of time, the Engineer will present his written opinion to the Contractor as to whether an extension of time is justified, and, if so, his recommendation as to the number of days for time extension. The Engineer will make the final decision on all requests for extension of time.

In no event shall the Contractor be entitled under the Contract to collect or recover any damages, loss or expense incurred by any delay other than as caused by ASPA.

60 FAILURE TO COMPLETE THE WORK IN THE TIME AGREED UPON

It is agreed by the parties to the Contract that time is of the essence, and that in case all the work is not completed before or upon the expiration of the term of the Contract, damages will be sustained by ASPA, and it is therefore agreed that the Contractor will pay to ASPA the amount stipulated in the Contract Documents. A late penalty of Two Hundred Dollars ($200.00) per day shall be assessed by ASPA and shall be payable by the Contractor for each day the Contractor fails to successfully complete the Work before or upon the expiration of the term of the Contract. The parties explicitly agree that payment and acceptance of any late penalties shall not constitute accord and satisfaction of the Contractor's failure to complete the Work within the term of this Contract. In addition, ASPA will have the right to charge to the Contractor and to deduct from the final payment for the work the actual cost to ASPA of engineering, inspection, construction, review, and other overhead expenses, which are directly chargeable to the Contract and which accrue during the period of such delay.

In the event that the Contractor fails to complete the work within the term of the Contract, ASPA may then relet the Contract for the unfinished portion of the work, or complete it by Force Account. Such reletting or doing said work by Force Account shall not relieve the original Contractor or its Sureties from liabilities on their bonds, or relieve the Contractor of its responsibilities set forth in the Contract Documents for all portions of this work completed by the Contractor.

61 DISPUTES

Except as otherwise provided in the Contract, any dispute concerning a question of fact arising under the Contract or the Contract Documents which is not disposed of by agreement, shall be decided by the Engineer, who shall reduce his/her decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Engineer shall be final and conclusive unless, within thirty (30) days from the date of receipt of such copy, the Contractor mails or otherwise furnishes to the Engineer a written appeal addressed to ASPA's Chief Executive Officer ("CEO"). The decision of the CEO or his/her duly authorized representative for the determination of such appeals shall be final and conclusive. This provision shall not be pleaded in any suit involving a question of fact arising under the Contract as limiting judicial review of any such decision to cases where fraud by such official or his representative or board is alleged; provided, however, that any such decision shall be final and conclusive, unless the same is fraudulent or capricious or arbitrary or so grossly erroneous as necessarily to imply bad faith or is not supported by substantiating evidence. In connection with any appeal proceeding under this section, the Contractor shall be afforded an opportunity to be heard by the CEP and to offer evidence in support of its appeal. After a final decision by the CEO of a dispute hereunder, and during any further appeals to a court of competent jurisdiction, the Contractor shall proceed diligently with the performance of the Contract and in accordance with the CEO's decision. This section does not preclude considerations of questions of law in connection with decisions provided for above.

62 JURISDICTION

This Contract shall be construed according to the laws of American Samoa. All disputes under this Contract and all judicial proceedings shall be brought in the High Court of American Samoa. The Contactor hereby appoints the Treasurer of the American Samoa Government as agent for service within the jurisdiction, if an agent of the Contractor cannot be found in American Samoa after a reasonable search.

The Treasurer of American Samoa is hereby appointed agent of the Contractor for service of process in all judicial proceedings. At the time of service of papers upon the agent above-referenced, ASPA shall also cause confirming copies to be posted in the U.S. Mail, certified mail, properly stamped and addressed to the Contractor's address of record.

63 OTHER CONTRACTS

ASPA reserves the right to let other Contracts in connection with the work. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with theirs. If any part of the work under the Contract depends on the prior acceptable completion of work by others under separate Contract(s), the Contractor shall inspect and promptly report to the Engineer any defects in such work that would adversely affect the satisfactory completion of the work under the Contract. The Contractor's failure to so inspect and report shall constitute acceptance of the work by others as being suitable for the proper reception and completion of the work under this Contract, excluding, however, those defects in the work by others that occur after the satisfactory completion of the work specified hereunder.

64 USE OF PREMISES

The Contractor shall confine its equipment, the storage of materials, and the operation of its workers to limits shown on the Functional Specifications and/or Drawing, and shall not unreasonably encumber the premises with its materials. The Contractor shall provide, at its own expense, the necessary rights-of-way and access to the work which may be required outside the limits of ASPA's property or acquired right-of-way. The Contractor shall not load or permit any part of a structure to be loaded with a weight that will endanger its safety.

65 ENVIRONMENTAL CONTROLS

The Contractor, in executing the work, shall maintain affected areas within and outside project boundaries free from environmental pollution that would be in violation of applicable laws. The Contractor shall not impair the operation of existing water systems and shall maintain original site drainage whenever possible.

66 WATER POLLUTION CONTROLS

The Contractor, in executing the work, shall comply with all applicable laws prohibiting the pollution of marine waters, lakes, wetlands, streams, or river waters. Prior to commencing excavation and construction, the Contractor shall obtain the Engineer's approval of the Contractor's detailed plans showing procedures intended to handle and dispose of groundwater, and storm water flow, including dewatering pump discharges. Dewatering pump discharges shall be conveyed to an existing storm water outfall. The Contractor shall comply with the procedures outlined in the U.S. Environmental Protection Agency manuals entitled "Guidelines for Erosion and Sedimentation Control Planning and Implementation," "Processes, Procedures, and Methods to Control Pollution Resulting from All Construction Activity," and "Erosion and Sediment Control-Surface Mining in Eastern United States."

67 WASTE MATERIAL DISPOSAL

The Contractor shall comply with all ASPA and ASEPA pollution control, solid waste and landfill requirements, regulations and laws. The Contractor shall not burn or bury rubbish or waste materials on the premises. The Contractor shall not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Disposal of wastes into streams or waterways is specifically prohibited. The Contractor shall provide acceptable containers for collection and disposal of waste materials, debris, and rubbish. The Contractor shall, prior to transporting any materials to the premises, submit to and obtain approval by the Engineer of all planned routes of passage. Routes shall be developed to minimize the impact of the additional traffic on the functioning of the transportation in American Samoa.

68 USE OF PREMISES

The Contractor shall at all times, keep the work site free from waste, materials, and rubbish caused by his operations, including all materials, tools, equipment, machinery and surplus. Should it become necessary for ASPA to remove any of the aforementioned materials from its facilities, ASPA may do so and charge all costs incurred thereof to the Contractor. Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the work site, or a safe storage facility not adjacent to the work site. The Contractor shall not unreasonably encumber the work site with materials or equipment. Contractor shall be fully responsible for any damage to the work site or areas contiguous thereto resulting from the performance of the work. During the progress of the work, Contractor shall keep the work site free from accumulations of waste materials, rubbish, and other debris resulting from the work. At the completion of the work, Contractor shall remove all waste materials, rubbish and debris from and about the work site as well as the removal of all tools, construction equipment, machinery, and surplus material, and shall leave the work site clean.

69 SUBSTANTIAL COMPLETION DATE

The Engineer may, at his/her sole discretion, issue a written notice of substantial completion for the purpose of establishing the date that ASPA will assume the responsibility for the cost of operating such equipment. Said notice shall not be considered as final acceptance of any portion of the work or relieve the Contractor from completing the remaining work within the specified time and in full compliance with the Contract Documents.

70 ASPA'S USE:

ASPA shall have the right to take possession of and use any completed or partially completed portions of the work. Such use shall not be considered as final acceptance of any portion of the work, nor shall such use be considered as cause for an extension of the Contract completion time, unless authorized in writing by ASPA.

If, after installation, the operation or use of the materials or equipment to be furnished under this Contract proves to be unsatisfactory to ASPA, ASPA shall have the right to operate and use such materials or equipment until it can, without damage to ASPA, be taken out of service for correction or replacement. Such period of use of the defective materials or equipment pending correction or replacement shall in no way decrease the guarantee period required for the acceptable corrected or replaced items of materials or equipment.

71 PAYMENT

In consideration of the faithful performance of the work prosecuted in accordance with the provisions of these Contract Documents, the American Samoa Power Authority (ASPA) will pay the Contractor in United States dollars for all such work on the basis of percentage of completion for lump sum items and unit price for all other items

72 GUARANTEE OF STRUCTURES

The Contractor shall guarantee the work done under this Contract against leaks, breaks, malfunctions, or other unsatisfactory conditions due to defective equipment, materials, or workmanship for a period of 1 year from the date of his acceptance of the final payment under the Contract. Any repair work or replacement required, in the opinion of the Engineer, shall be done immediately by the Contractor at his own expense.

Neither the final certificate of payment nor any provision in the Contract nor partial or entire use or occupancy of the premises by ASPA shall constitute an acceptance of work not done in accordance with the Contract nor relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the work and pay for any damage to other work resulting there from which shall appear within a period of 1 year from the date of final acceptance of work. ASPA will give notice of observed defects with reasonable promptness.

ASPA may make such repairs, if, within 5 days after mailing of a notice in writing to the Contractor or to his agent, the Contractor shall neglect to make or undertake with due diligence the aforesaid repairs; provided, however, that if, in the opinion of the Engineer, delay would cause serious loss or damage, repairs may be made without notice being sent to the Contractor, and the Contractor shall pay the cost thereof.

73 CONTRACTORS' AND MANUFACTURERS' COMPLIANCE WITH SAMOAN SAFETY, OSHA AND OTHER CODE REQUIREMENTS

The completed work shall include all necessary permanent safety devices, such as machinery guards and similar ordinary safety items required by the federal (OSHA) industrial authorities and applicable local and national codes. Further, any features of the work (including ASPA-select equipment) subject to such safety regulations shall be fabricated, furnished and installed in compliance with these requirements. Contractors and manufacturers of equipment shall be held responsible for compliance with the requirements included herein. Contractors shall notify all equipment suppliers and subcontractors of the provisions of this Article.

In selecting and/or approving equipment for installation in the project, ASPA and Engineer assume no responsibility for injury or claims resulting from failure of the equipment to comply with applicable national, Samoan and local safety codes or requirements or the safety requirements of a recognized agency, or failure due to faulty design concepts, or defective workmanship and materials.

74 SUBSTITUTION OF MATERIALS

Except for ASPA-selected equipment items, and items where no substitution is clearly specified, whenever any material, article, device, product, fixture, form, type of construction, or process is indicated or specified by patent or proprietary name, by name of manufacturer, or by catalog number, such specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired. This procedure is not to be construed as eliminating from competition other products of equal or better quality by other manufacturers where fully suitable in design, and shall be deemed to be followed by the words "or equal". The Contractor may, in such cases, submit complete data to the Engineer, within 35 days following award of Contract, for consideration of another material, type, or process, which shall be substantially equal in every respect to that so indicated or specified. Substitute materials shall not be used unless approved in writing. The Engineer will be the sole judge of the substituted article or material.

75 MATERIALS AND EQUIPMENT OF FOREIGN MANUFACTURE

Foreign-made materials and equipment proposed for use on this Contract shall meet with the full intent and purpose of these Contract Documents; and documentation substantiating compliance with the specified requirements shall be submitted in English to the Engineer for review and approval prior to the Contractor's purchase and delivery to the project site. The ready availability of manufacturer's services and replacement parts for maintenance purposes shall be described and warranted. Bidders shall notify prospective suppliers of foreign-made material of this requirement, and the requirement for correcting defective workmanship and materials for a period of one year following final acceptance of the work under this Contract.

76 CORRECTION OF DEFECTIVE WORK AFTER FINAL ACCEPTANCE

The Contractor hereby agrees to make, at his own expense all repairs or replacements necessitated by defects in materials or workmanship, supplied under terms of this Contract, which become evident within 1 year after the date of final acceptance of the work or within 1 year after the date of substantial completion established by the Engineer for specified items of equipment, or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents. The Contractor further assumes responsibility for a similar guarantee for all work and materials provided by subcontractors or manufacturers of all work and materials provided by the subcontractors or manufacturers of packaged equipment components. The Contractor also agrees to hold ASPA harmless from liability of any kind arising from damage due to said defects. The Contractor shall make all repairs and replacements promptly upon receipt of written order for same from ASPA. If the Contractor fails to make the repairs and replacement promptly, ASPA may do the work, and the Contractor and his Surety shall be liable for the cost thereof.

77 RELEASE OF LIENS AND CLAIMS

Before ASPA pays the Contractor the final payment for the work, the Contractor shall sign and deliver to ASPA a release of liens or claims sworn to under oath and duly notarized. The release shall state that the Contractor has satisfied all claims and indebtedness of every nature in any way connected with the work, including (but not limiting the generality of the foregoing) all payrolls, amounts due to subcontractors, accounts for labor performed and materials furnished, incidental services, liens and judgments. If any lien or claim remains unsatisfied after all payments to the Contractor are made, the Contractor shall refund to ASPA all monies that the latter may be compelled to pay in discharging such a lien or claim, including all costs and attorney's fees. In addition to the above, final payment will not be made until the Contractor has filed with ASPA the following:

Consent of the surety for final payment;

Satisfactory evidence by affidavit or otherwise that the Contractor's debts resulting from the Contract have been fully paid or satisfactorily received;

Tax clearance from the American Samoa Government that all delinquent taxes levied or allowed under Territorial statutes have been paid; and

A properly executed non-gratuity affidavit.

78 FINAL PAYMENT

Upon completion of all the work under the Contract, the Contractor shall notify the Engineer, in writing, that it has completed the Contract and requests final payment. If the work has been completed as provided in the Contract Documents, the Engineer will recommend acceptance of the completed work and submit a final estimate for the amount due the Contractor under this Contract. Upon approval of this final estimate by ASPA and compliance with provisions in the section entitled "RELEASE OF LIENS OR CLAIMS," and other sections or provisions of the Contract Documents as may be applicable; ASPA shall pay to the Contractor all monies due it under the provisions of these Contract Documents.

The acceptance by the Contractor of the final payment shall release ASPA, its directors, officers, employees, agents and representative from any and all liability to the Contractor for every act or omission of ASPA relating to or arising out of the Contract or the work performed. No payment, however, final or otherwise, shall operate to release the Contractor or its sureties from obligations under the Contract Documents, the Payment Bond, and any other bonds and/or warranties as provided for in the Contract Documents.

79 NO WAIVER OF RIGHTS

Neither the inspection by the Engineer, nor any order by ASPA for payment of money, nor any payment for, or acceptance of, the whole or any part of the work by the Engineer, nor any extension of time, nor any possession taken by ASPA or its employees, shall operate as a waiver of any provision of the Contract Documents, or any power therein reserved to ASPA, or any right to damages therein provided, nor shall any waiver of any breach of the Contract Documents be held to be a waiver of any other or subsequent breach.

80 MEASUREMENT DEFINITIONS

This Section includes specifications for measurement as they apply to the Work, and includes provisions applicable to lump sum prices, measurement by volume and unit prices as indicated.

Work to be paid for at a Contract price per unit measurement, as indicated in the Contract Documents, will be measured by the Engineer in accordance with United States Standard Measures.

A. LUMP-SUM MEASUREMENT

Lump-sum measurement will be for the entire item, unit of work, structure, or combination thereof, as specified and as indicated in the Bid Schedule of the Bid Form.

B. MEASUREMENT BY VOLUME

Measurement by volume will be by the cubic dimension indicated in the Schedule. Method of volume measurement will be by the unit volume in place or removed as shown on the Contract Drawings as specified.

When material is to be measured and paid for on a volume basis and it is impractical to determine the volume by the specified method of measurement, or when requested by the Contractor in writing and accepted by the Engineer in writing, the material may be weighed in accordance with the requirements specified for weight measurement. Such weights will be converted to volume measurement for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the Engineer and shall be agreed to by the Contractor before such method of measurement of pay quantities will be accepted.

C. LINEAR MEASUREMENT

Linear measurement will be by the linear dimension listed or indicated in the Contract Documents. Unless otherwise indicated, items, components, or work to be measured on a linear basis will be measured at the centerline of the item in place.

81 THIRD PARTY BENEFICIARY

This Contract is not intended to create in the public or any member thereof a third party beneficiary or to authorize anyone not a party to this Contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of this Contract.

82 PROHIBITION AGAINST INTEREST IN THIS CONTRACT

No member of or delegate to the Congress of the United States or FONO of American Samoa shall be admitted to any share or any part of this Contract or to any benefit to arise from the same; provided that the foregoing provision of this contract is made with a corporation for its general benefit. No employee of ASPA who exercises any functions or responsibilities in connection with the carrying out of the project to which this Contract pertains shall have any private interest, direct or indirect, in this Contract.

83 FORCE MAJEURE

Neither party shall be construed to be in default with respect to any obligation hereunder if performance of such obligation is prevented by uncontrollable forces. The term uncontrollable forces is deemed for the purpose of this Contract to mean any cause beyond the control of the party affected, including, but not limited to, flood, earthquake, severe storm, drought, lightning, fire, war, riot, civil disturbance, labor disturbance, sabotage, or restraint by a court order or other regulatory agency, which by exercise of due diligence and foresight such party could not reasonably have been expected to avoid. Any party rendered unable to fulfill any obligation by reason of uncontrollable forces shall exercise due diligence to remove such inability with all reasonable dispatch. Nothing contained herein shall be construed to obligate a party to settle a strike against its will.

84 ENGINEER'S / CONSULTANT'S SITE INSTRUCTION

A site instruction can be given by the Engineer (Consultant) or his representatives delegated to the Contractor for the execution of works, purchase of goods, testing materials, and design issues.

The Engineer may issue to the Contractor (at any time) instructions and additional or modified Drawings which may be necessary for the execution of the Works and the remedying of any defects, all in accordance with the Contract.
The Contractor shall comply with the instructions given by the Engineer or delegated assistant, on any matter related to the Contract. The instructions shall be given by the Engineer in writing.

85 EXISTING UTILITIES

The contractor is responsible for locating all existing utilities. Contractor are supposed to pothole and find where the existing underground utilities are located.

The new waterline should always go over or under the existing waterlines with a minimum 18" vertical clearance for future access and repair. Exact position of waterline will be identified by the Project Engineer at the site.

The sewer line to waterline separation is 10ft horizontal and 2ft vertical. Waterline should always be installed above any sewer line.

86 NOTICES

All notices and correspondence required to be sent to either party hereunder shall be delivered personally or by certified or registered mail and addressed as follows and deemed effective when so mailed (subject to the right to designate a different address by notice similarly given):

IF TO CONTRACTOR: _____

Pago Pago, American Samoa 96799

IF TO ASPA:_____

Executive Director

American Samoa Power Authority
P.O. Box PPB
Pago Pago, American Samoa 96799

MISCELANEOUS

1 ASSIGNMENT

The Contractor shall neither assign nor subcontract any portion of this Agreement without the express written approval of ASPA.

2 AMENDMENTS

This Contract may be amended at any time during the term hereof, provided, however, that no amendments or other variation of this Contract shall be valid unless in writing and signed by the Contractor and a duly authorized representative of ASPA.

3 RELATIONSHIP OF THE PARTIES

The relationship of the parties hereto shall in no event be deemed or construed to be that of employer and employee or of principal and agent, or of any other relationship other than as an independent Contractor providing the services specified in this Contract.

4 ENTIRE AGREEMENT

This Contract and all documents incorporated herein constitute the entire agreement between the parties and supersede any oral or written understandings or agreements.

5 SEVERABILITY

Each part of this Contract is intended to be severable. In the event that any part of this Contract is found by the High Court of American Samoa to be illegal or unenforceable, such provision or provisions shall be severed or modified to the extent necessary to render it enforceable, and as so severed or modified, this Contract shall continue in full force and effect.

6 SECTION HEADINGS, NUMBERS AND LETTERS

The section headings and section numbers and letters in this Contract are for reference purposes only and shall not affect in any way the meaning or interpretation of this Contract.

7 FURTHER ASSURANCES

In addition to the instruments and documents to be made, executed and delivered pursuant to this Agreement, the parties hereto agree to make, execute and deliver or cause to be made, executed and delivered, to the requesting party such other instruments and to take such other actions as the requesting party may reasonably require to carry out the terms of this Contract and the transactions contemplated hereby.

8 EXECUTION IN COUNTERPARTS

This Contract may be executed in any number of counterparts, each of which shall be deemed an original and all of which together shall constitute one and the same agreement.

9 WAIVER

Any waiver at any time by ASPA of its rights with respect to this Contract, or with respect to any other matter arising in connection with this Contract, shall be deemed a waiver of that specific instance only and shall not be deemed a waiver with respect to any other matter arising thereafter in connection with this Contract.

10 AUTHORITY

Each party represents and warrants that it has the necessary corporate and/or legal authority to enter into this Contract and to perform all of its duties and obligations imposed by this Contract. Each party further represents that the individuals executing this Contract on their respective behalf have been duly authorized to do so and that such execution creates a valid, binding and legally enforceable obligation of each party.

11 CONFLICTS

In the event a court of competent jurisdiction finds that a conflict exists between two or more provisions of the Contract Documents, the provisions of the Contract shall first prevail, followed by the Notice to Bidders, Instruction to Bidders, Technical Specifications, Drawings and then Bid Form, in that order.

12 BONDS AND OTHER PERFORMANCE SECURITY

The Contractor shall provide the following performance bond and labor and material payment bond or other performance security: Performance Bond at 100% of the total bid amount and Payment Bond at 100% of the total bid amount.

ATTACHMENT D (PERFORMANCE BOND INSTRUCTIONS)

The Performance Bond – A performance and surety bond must be provided prior to or concurrent with the execution of the written contract. The performance bond shall be in the amount of (the total project cost) _____Dollars ($).

The Performance Bond will be in force until the work is completed following the Notice to Proceed that will be issued no later than _____

The undersigned understands that the American Samoa Power Authority reserves the right to reject any or all proposals or to waive any informality or technicality in any proposal in the interest of the American Samoa Power Authority.

Attached hereto is an affidavit in proof that the undersigned has not entered into any collusion with any person in respect to this proposal or any other proposal or the submitting of proposals for the contract for which this proposal is submitted.

RESPECTFULLY SUBMITTED BY:

_____

(OFFEROR SIGNATURE)

_____

(BY)

_____

(TITLE)

_____

(BUSINESS ADDRESS)ATTACHMENT E (PERFORMANCE BOND)

No. _____

KNOW ALL MEN BY THESE PRESENTS that (here insert full name and address or legal title of Contractor)

_____, as Principal hereafter called the Contractor, and (Bonding Company),

_____, a duly admitted insurer under the laws of the American

Samoa Power Authority, as Surety, hereinafter called Surety are held firmly bound unto the American Samoa Power

Authority as oblige, in the amount of _____ Dollars ($_____), for payment of whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Contractor has by written agreement dated _, entered into a contract with the American

Samoa Power Authority for (describe project and insert project number) _____which contract is by reference made a part hereof, and is hereinafter referred to as the Contractor.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract then the obligation shall be null and void, otherwise it shall remain in full force and effect. The

Surety hereby waives notice of any alternation or extension provided the same be within the scope of the contract.

Whenever Contractor shall be and is declared by the American Samoa Power Authority to be in default under the

Contract, the American Samoa Power Authority having performed territorial obligations thereunder, the Surety may promptly remedy the default or shall promptly:

1. Complete the Contract in accordance with its terms and conditions; or

2. Obtain an offer or offers for completing Contract in accordance with its terms and conditions, and upon determination by the American Samoa Power Authority and the Surety jointly of the lowest responsive, responsible Offeror, arrange for a contract between such Offeror and the American Samoa Power

Authority, and make available as work progresses (even though there should be a default under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract prices; but not exceeding, including other cost and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The terms balance of the contract price, as use in this paragraph shall mean the total amount payable by the American Samoa Power Authority to Contractor under the Contract and any amendments thereto, less the amount properly paid by the American Samoa Power Authority to Contractor. No right of action shall accrue on this bond to or for the use of any person or corporation other than the American Samoa

Power Authority or successors of the American Samoa Power Authority.

Signed and sealed this day of 2010.

_____

(PRINCIPAL) SEAL

_____

(WITNESS)

_____

(TITLE)

_____ _____

(MAJOR OFFICER OF SURETY) (MAJOR OFFICER OF SURETY)

_____ _____

(MAJOR OFFICER OF SURETY) (MAJOR OFFICER OF SURETY)

_____

(RESIDENT GENERAL AGENT)

13. BONDS ACCEPTABLE OTHER PERFORMANCE SECURITY

Tier 1: The contractor may elect 20% retainage for contracts greater than $35,000.00 but less than $1,500,000.00 and apply pre-qualification requirements for construction companies.

Tier 2: The contractor may provide 100% performance and payment bonding by a non-treasury listed company for contracts greater than $1,500,000.00 (surety company must be licensed in American Samoa or United States.

SECTION 00100

SUMMARY OF WORK

PART 1 – GENERAL

1.01 GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

2.02 GENERAL INTENTION

Complete construction of Tramway Tank Rehabilitation Project Phase 2 as stipulated in contract documents and as shown in the contract drawing.

The Work Includes: All Work as described in the General Intention. This Summary of Work shall become a part of the Contract.

The Contractor will be responsible for reading these specifications and he shall become familiar with the drawings. All items mentioned in the specifications and that appear on the drawings, shall be required to be installed as if specifically mentioned in this section.

1.03 CONTRACT

Contract may be awarded to only one Contractor depending on the outcome of the bid and the Contractor's capability to perform the work and to provide a Performance Bond.

1.04 SEQUENCE

Contractor may use any sequence of operations he chooses compatible with completion dates noted in the Specifications, and other limitations required by the Contract Documents.

1.05 COOPERATION, COORDINATION, SUPERVISION, SCHEDULING

General Contractor is responsible for expediting coordination and scheduling all work, and for proper notifications to Owner’s Representative and/or agencies responsible for code compliance

END OF SECTION

SECTION 00110

APPLICABLE STANDARDS

PART 1-GENERAL

1.01 GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.02 DESCRIPTION

Work Included:

Throughout the Contract Documents, reference is made to codes and standards that establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.

Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship that meet or exceed the specifically named code or standard.

It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the ENGINEER, to deliver to the ENGINEER all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard.

Related Work Described Elsewhere:

Specific naming of codes or standards occurs on the Drawings and in other Sections of these Specifications.

1.03 QUALITY ASSURANCE

Familiarity with Pertinent Codes and Standards: In procuring all items used in this Work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this Work meet or exceed the specified requirements.

Rejection of Non-Complying Items: The Engineer reserves the right to reject items incorporated into the Work that fail to meet the specified minimum requirements. The Engineer further reserves the right, and without prejudice to other recourse, the Engineer may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Engineer and the Owner.

END OF SECTION

SECTION 00120

PROJECT MEETINGS

PART 1 – GENERAL

1.01 GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.02 DESCRIPTION

Work Included:

To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Engineer will conduct project meetings throughout the construction period.

Related Work Described Elsewhere:

The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and are not part of project meetings contents.

1.03 QUALITY ASSURANCE

Persons designated by the Contractor to attend and participate in the project meetings shall have all required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.04 SUBMITTALS

Agenda Items: To the maximum extent practicable, advise the Engineer at least 24 hours in advance of project meetings regarding all items to be added to the agenda.

Minutes: The Engineer will compile minutes of each project meeting and will furnish the Contractor.

PART 2- PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 MEETING SCHEDULE

Except as noted below for Preconstruction Meeting contractor will hold project meetings weekly. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.02 MEETING LOCATION

To the maximum extent practicable, meetings will be held at the job site.

3.03 PRE-CONSTRUCTION MEETING

Schedule the Preconstruction Meeting as soon as possible after the Owner has issued Notice to Proceed. Provide attendance by authorized representatives of the Contractor and all major subcontractors. The Engineer will advise other interested parties and request their attendance.

Minimum Agenda: Distribute data on and discuss:

Organizational arrangement of Contractor's forces and personnel and those of subcontractors, materials suppliers and Engineer

Channels and procedures for communications

Construction Schedule, including sequence of critical work

Contract Documents, including distribution of required copies of original Documents and revisions

Processing of Shop Drawings and other data submitted to the Engineer for review

Processing of field decisions and Change Orders

Rules and regulations governing performance of the work

Procedures for safety and first aid, security, quality control, housekeeping, and other related matters

3.04 PROJECT MEETINGS

Attendance:

To the maximum extent practicable, assign the same person to represent the Contractor at project meetings throughout progress of the work. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspects of the Work are involved.

Minimum Agenda:

Review, revise as necessary and approve minutes of previous meeting.

Review progress of the Work since last meeting, including status of submittals for approval.

Identify problems that impede planned progress.

Develop corrective measures and procedures to regain planned schedule.

Complete other current business.

END OF SECTION

SECTION 00130

SUBMITTALS AND SUBSTITUTION

PART 1 – GENERAL

1.01 GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.02 DESCRIPTION

Work Included:

Wherever possible throughout the Contract Documents, the minimum, acceptable quality of workmanship and materials has been defined by manufacturer's name and catalog number, reference to recognized industry and government standards, or description of required attributes and performance.

To ensure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for their review by the ENGINEER.

Make all submittals required by the Contract Documents, revise and resubmit as necessary to establish compliance with the specified requirements.

Related Work Described Elsewhere:

Individual requirements for submittals are described in pertinent other Sections of these Specifications.

1.03 QUALITY ASSURANCE

Coordination of Submittals: Prior to each submittal carefully review and coordinate all aspects of each item being submitted and verify that each item and the submittal for it conforms in all respects with the requirements of the Contract Documents. Affixing the Contractor's signature to each submittal certifies that this coordination has been performed.

Certificates of Compliance:

Certify that all materials used in the Work comply with all specified provisions thereof. Certification shall not be construed as relieving the Contractor from furnishing satisfactory materials if, after tests are performed on selected samples the material is found not to meet specified requirements.

Show on each certification the name and location of the Work, name and address of Contractor, quantity and date or dates of shipment or delivery to which the certificate applies and name of the manufacturing or fabricating company. Certification shall be in the form of letter or company-standard forms containing all required data. An officer of the manufacturing or fabricating company shall sign certificates.

In addition to the above information all laboratory test reports submitted with Certificates of Compliance shall show the date or dates of testing, the specified requirements for which testing was performed and results of the test or test

1.04 SUBMITTALS

Submittals Schedule:

Within 35 days after award of Contract and before any items are submitted for approval submit to the ENGINEER two copies of the schedule.

Certificates of Compliance:

Upon completion of the Work and as a condition of its acceptance submit to the ENGINEER all Certificates of Compliance.

Procedures:

Make submittals in strict accordance with the provisions of this Section.

PART 2 – PRODUCTS

2.01 SUBMITTAL SCHEDULE

General:

Compile a complete and comprehensive schedule of all anticipated submittals during progress of the Work. Include a list of each type of item for which Contractor's drawings, Shop Drawings, Certificates of Compliance, material samples, guarantees or other types of submittals are required. Upon approval by the ENGINEER this schedule will become part of the Contract and the Contractor will be required to adhere to the schedule except when specifically otherwise permitted.

Coordination:

Coordinate the schedule with all necessary Subcontractors and materials suppliers to ensure their understanding of the importance of adhering to the approved schedule and their ability to so adhere.

Revisions:

Revise and update the schedule on a monthly basis as necessary to reflect conditions and sequences. Promptly submit revised schedules to the ENGINEER for review and comment.

2.02 SHOP DRAWINGS AND COORDINATION DRAWINGS

Shop Drawings:

Scale and Measurement:

Make all Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.

Type of Prints Required:

Submit all Shop Drawings in the form of six (6) copies shall be submitted for review, blue line or black line print of each sheet.

Reproduction of Review Shop Drawings:

Printing and distribution of review Shop Drawings for the Engineer's use will be by the ENGINEER. All review comments of the ENGINEER will be shown on the sepia transparency when it is returned to the Contractor. The Contractor shall make and distribute all copies required for his purposes.

2.03 MANUFACTURER'S LITERATURE

General:

Where contents of submitted literature from manufacturers include data not pertinent to the submittal, clearly indicate which portion of the contents is being submitted for review.

Number of Copies Required:

Submit six (6) copies of all required shop drawings, product data, etc...

2.04 SAMPLES

Accuracy of Samples:

Samples shall be of the precise article proposed to be furnished.

Number of Samples Required:

Unless otherwise specified submit samples in the quantity that is required to be returned plus two (2) that will be retained by the ENGINEER.

Reuse of Samples:

In situations specifically so approved by the ENGINEER, the Engineer's retained sample may be used in the construction as one of the installed items.

2.05 COLORS AND PATTERNS

Unless the precise color and pattern is specifically described in the Contract Documents and whenever a choice of color or pattern is available in a specified product, submit accurate color and pattern charts to the ENGINEER or review and selection.

2.06 SUBSTITUTIONS

Approvals Required:

The Contract is based on the standards of quality established in the Contract Documents.

All products proposed for use, including those specified by requirement attributes and performance shall require approval by the ENGINEER before being incorporated into the Work.

Do not substitute materials, equipment, or methods unless the ENGINEER has specifically approved such substitution for this Work.

"Or Equal":

2.6.2.1Where the phrase "or equal" or "equal as approved by the ENGINEER" occurs in the Contract Documents. Do not assume that materials, equipment, or methods will be approved or are equal unless the item has been specifically approved for this Work by the ENGINEER. The decision of the Engineer shall be final.

PART 3 – EXECUTION

3.01 IDENTIFICATION OF SUBMITTALS

Consecutively number all submittals. Accompany each submittal with a letter of transmittal containing all pertinent information required for identification and checking of submittals.

3.02 COORDINATION OF SUBMITTALS

General:

Prior to submittal for approval, use all means necessary to fully coordinate all materials including, but not necessarily limited to:

Determine and verify all interface conditions, catalog numbers and similar data.

Coordinate with other trades as required.

Clearly indicate all deviations from requirements of the Contract Documents.

Grouping of Submittals:

Unless otherwise specified make all submittals in groups containing all associated items to ensure that information is available for checking each item when it is received. Partial submittals may be rejected as not complying with the provisions of the Contract Documents and the Contractor shall be strictly liable for all delays so occasioned.

3.03 TIMING OF SUBMITTALS

General:

Make all submittals far enough in advance of scheduled dates for installation to provide all time required for reviews, for securing necessary approvals, for possible revisions and re-submittals, and for placing orders and securing delivery.

Engineer’s Review Time:

In scheduling, allow at least 10 calendar days for review by the ENGINEER following his receipt of the submittal.

Delays:

Delays caused by tardiness in receipt of submittals will not be an acceptable basis for extension of the Contract completion date.

3.04 ENGINEER/ENGINEER’S REVIEW

General:

Review by the ENGINEER shall not be construed as a complete check, but only that the general method of construction and detailing is satisfactory. Review shall not relieve the Contractor from responsibility for errors that may exist.

Authority to Proceed:

The notations "Reviewed, no exceptions noted" or "Reviewed, exceptions noted" authorize the Contractor to proceed with fabrication, purchase, or both, of the items so noted subject to the revisions, if any, required by the Engineer's review comments.

Revisions:

Make all revisions required by the ENGINEER. If the Contractor considers any required revision to be a change, he shall so notify the ENGINEER provided for under "Changes" in the General Conditions. Show each drawing revision by number, date, and subject in a revision block on the drawing. Make only those revisions directed or approved by the ENGINEER.

Revisions After Approval:

When a submittal has been reviewed by the ENGINEER, re-submittal for substitution of materials or equipment will not be considered unless accompanied by an acceptable explanation as to why the substitution is necessary.

END OF SECTION

SECTION 00140

CONSTRUCTION SCHEDULE

PART 1 – GENERAL

1.01 GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.02 DESCRIPTION

Work Included:

To assure adequate planning and execution of the work so that the work is completed within the number of calendar days allowed in the Contract, and to assist the ENGINEER in appraising the reasonableness of the proposed schedule and in evaluating progress of the work, prepare and maintain the schedules as described in this Section.

"Day" used throughout the Contract, unless otherwise stated, means "calendar day".

1.03 QUALITY ASSURANCE

Qualifications of Scheduling Personnel:

Employ a scheduler who is thoroughly trained and experienced in compiling construction schedule data, in analyzing by use of Critical Path Method or PERT, and in preparation and issue of periodic reports as required below.

Reference Standards: Perform all data preparation, analysis, charting, and updating in accordance with all recommendations contained in the current edition of "CPM In Construction" manual of Associated General Contractors, or in accordance with other standards approved by the ENGINEER.

Reliance upon approved schedule:

The construction schedule as approved by the ENGINEER will be an integral part of the Contract, and will establish interim contract completion dates for the various activities.

Should any activity not be completed within 15 days after the stated scheduled date, the ENGINEER should have the right to order the Contractor to expedite completion of the activity by whatever means the ENGINEER deems appropriate and necessary, without additional compensation to the Contractor.

Should any activity be 30 or more days behind schedule, the ENGINEER shall have the right to perform the activity or have the activity performed by whatever method the ENGINEER deems appropriate.

The Contractor shall reimburse cost incurred by the ENGINEER in connection with expediting construction activity under this Article to the ENGINEER.

It is expressly understood and agreed that failure by the ENGINEER to exercise the option to either order the Contractor to expedite an activity or to expedite the activity by other means shall not be considered precedent setting for any other activities.

1.04 SUBMITTALS

General:

Comply with the provisions of Section 00130 – SUBMITTALS AND SUBSTITUTIONS.

Preliminary Analysis:

Within ten days after receipt of Notice to Proceed, submit one reproducible copy and four prints of a preliminary Construction Schedule, plus four prints of proposed forms for Materials Status Reports, prepared in accordance with Part 3 of this Section.

Periodic Reports:

On the first working day of each month, submit four prints of the Construction Schedule updated as described in Part Three of this Section.

Accompanying each periodic submittal of Construction Schedule submit four prints of the Materials Status Reports updated as described in Part Three of this Section.

PART 2 – PRODUCTS

2.01 CONSTRUCTION ANALYSIS

Diagram:

Graphically show the order and interdependence of all activities necessary to complete the Work, and the sequence in which each activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all Subcontractors whose work is shown on the diagram. Activities shown on the diagram shall include, but are not necessarily limited to:

Project mobilization;

Submittals and approvals of Shop Drawings and Samples;

Procurement of equipment and critical materials;

Fabrication of special material and equipment, and their installation and testing;

Final cleanup;

Final inspection and testing;

All activities by the ENGINEER that affect progress, required dates for completion, or both, for all and for each part of the work

The detail of information shall be such that duration times of activities shall normally range from one to 15 days. The selection and number of activities shall be subject to the Engineer’s approval.

Show on the diagram, as a minimum for each activity, preceding and following event numbers, description of each activity, cost, and activity duration in calendar days. Submit diagram on a sheet 75 cm (30") high by the width required.

Mathematical Analysis:

Furnish a mathematical analysis of the diagram by manual or computer aided means, including a tabulation of each activity. Show the following information as a minimum for each activity:

Preceding and following event number;

Activity description;

Estimated duration of activities;

Earliest start date (by calendar date);

Latest start date (by calendar date);

Earliest finish date (by calendar date);

Latest finish date (by calendar date);

Slack or float (in calendar days);

Monetary value of the activity;

Percentage of activity completed;

Contractor's earnings based on portion of activity completed.

The means used in making the mathematical analysis shall be capable of compiling the total value of completed and partially completed activities, and be capable of accepting modifications approved for time and logic adjustment.

Periodic Reports:

If computer-aided means are used, list the activities in computer printout sorts as follows:

By the preceding event number from lowest to highest, and then in order of the following event number;

By the amount of float, then in order of preceding event numbers, and then in order of succeeding event numbers;

In order of preceding event numbers, and then in order of succeeding event numbers (show the dollar amount and dollars spent to date for each activity);

Other sorts requested by the Engineer, for which the Contractor will be reimbursed in accordance with the General Conditions provisions for "Changes".

2.02 MATERIALS STATUS REPORT

Format:

The Contractor's standard materials status report form will be acceptable if, in the Engineer’s judgment, it provides sufficient pertinent data to determine that materials procurement flow is adequate for all needs of the Work.

Content:

Show at least the following information:

Item description, listed in accordance with Specifications Section number in which the item is called for

Purchase Order number and date of issue

Vendor name

Date shipped, and shipping means utilized

Estimated date of arrival at job site

Actual date of arrival at job site, and receiving report number

Data Processing:

Process the data by manual or computer-aided methods, but to a degree of promptness and accuracy assuring complete display of all pertinent current information at date of each periodic report.

PART 3 – EXECUTION

3.01 PRELIMINARY ANALYSIS

Contents

Show all activities of the Contractor under this Work for the period between receipt of Notice to Proceed and submittal of Construction Schedule.

Show the Contractor's general approach to remainder of the Work.

Show cost of all activities scheduled for performance before submittal and approval of the Construction Schedule.

Submittal

Submittal shall be in accordance with submittal requirement.

3.02 CONSTRUCTION SCHEDULE

As soon as practicable after receipt of Notice to Proceed, complete the construction analysis as required. Meet with the ENGINEER, review contents of proposed Construction Schedule, and make all revisions agreed upon.

3.03 MATERIALS STATUS REPORT

As soon as practicable after receipt of Notice to Proceed, meet with the ENGINEER, review contents of proposed Materials Status Reports, and make all revisions to format agreed upon.

3.04 PERIODIC REPORTS

Construction Schedule Contents:

Report actual progress by updating the mathematical analysis

Note on the summary report, or clearly show on a revised issue of affected portions of the detailed diagram, all revisions causing changes in the detailed program.

Revise the summary report as necessary for clarity.

Show activities or portions of activities completed during the reporting period, and their actual value.

State the percentage of Work actually completed as scheduled as of the report date, and the progress along the critical path in terms of days ahead of or behind the allowable dates.

If the Work is behind schedule, also report progress along other paths with negative slack.

Include a narrative report which shows, but is not necessarily limited to:

A description of the problem areas, current and anticipated;

Delaying factors, and their impact;

An explanation of corrective actions taken or proposed

Show the date of latest revision. Submit in accordance with the provisions of section 00130-Submittal.

Materials Status Report:

On the letter of transmittal, accompanying periodic reports, on an accompanying summary sheet, or by other means acceptable to the ENGINEER, clearly indicate those items the deliveries of which are critically overdue or otherwise hazardous to maintenance of the approved schedule.

Submit in accordance with the provisions of section 00130-Submittal

3.05 REVISIONS

Make only those revisions to approved Construction Schedule and approved Materials Status Reports as are approved in advance by the ENGINEER.

END OF SECTION

SECTION 00150

TEMPORARY FACILITIES AND CONTROL

PART 1 – GENERAL

1.01 GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.02 DESCRIPTION

Work Included:

Temporary facilities and controls required for this Work include, but are not necessarily limited to:

Temporary utilities such as water, electricity and telephone

Field offices and sheds

Sanitary facilities

Fencing of the construction area

Haul roads.

Related Work Described Elsewhere:

Except that all equipment furnished by Subcontractors shall comply with all requirements of pertinent safety regulations, the ladders, planks, hoists, and similar items normally furnished by the individual trades in execution of their own portions of the work are not part of this Section.

Permanent installation and hook-up of the various utility lines are described in pertinent other Sections of these Specifications.

1.03 PRODUCT HANDLING

Use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of the work.

1.04 JOB CONDITIONS

Make all required connections to existing utility systems with minimum disruption to services in the existing utility systems, when disruption of the existing service is required, do not proceed without the ENGINEER’s approval and, when required, provide alternate temporary service.

PART 2 – PRODUCTS

2.01 UTILITIES

General:

All temporary facilities shall be subject to the Engineer’s approval.

Water:

Furnish and install all necessary temporary water lines and water supply and, upon completion of the Work, remove all such temporary facilities.

The Contractor will furnish all water needed for construction, at no cost to the Owner.

Electricity:

Furnish and install all necessary temporary wiring and, upon completion of the work, remove all such temporary facility.

Furnish and install area distribution boxes so located that the individual trades may use 30m (100') maximum length extension cords to obtain adequate power and artificial lighting at all points where required for the work, for inspection and for safety.

The Contractor shall make arrangements for and pay for all temporary electrical power required for construction.

Telephone:

Make all necessary arrangements and pay all costs for operation and installation of telephone service to the Contractor's office at the site.

2.03 CONTRACTOR’S FACILITIES

Field Office:

Provide a field office building and sheds adequate in size and accommodation for all Contractor's Offices, supplies and storage.

Within the Contractor's facilities, provide enclosed space adequate for holding weekly project meetings. Furnish with all required tables, chairs, and utilities.

The entire facility, including furniture, will remain the property of the Contractor and shall be removed from the site after completion of the work.

Sanitary Facilities: Provide temporary sanitary facilities in the quantity required, for use of all personnel. Maintain in a sanitary condition at all times.

2.04 ENCLOSURES

Furnish, install, and maintain for the duration of construction all required scaffolds, tarpaulins, barricades, canopies, warning signs, steps, bridges, platforms, and other temporary construction necessary for proper completion of the work in compliance with all safety and other regulations.

2.05 PROJECT SIGNS

Allow no signs or advertising of any kind on the job site except as specifically approved in advance by the ENGINEER.

2.06 FENCING OF THE CONSTRUCTION AREA

General:

Furnish and install temporary fence around construction areas on the site

Construction:

The temporary fence shall consist of woven wire mesh not less than 1.82 m (72”) in height, complete with metal posts and all required bracing and with truck and pedestrian gates as required.

PART 3 – EXECUTION

3.01 MAINTENANCE AND REMOVAL

Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work. Remove all such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the ENGINEER

END OF SECTION

SECTION 00160

SITE CLEANING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.02 DESCRIPTION

Work Included:

Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.

Related Work Described Elsewhere:

In addition to standards described in this Section, comply with all requirements for cleaning up as described in various other Sections of these Specifications.

1.03 QUALITY ASSURANCE

Conduct daily inspection, and more often if necessary, to verify that requirements of cleanliness are being met.

Codes and Standards:

In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

PART 2 – PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

Provide all required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.02 COMPATIBILITY

Use only the cleaning materials and equipment that are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Engineer.

PART 3 – EXECUTION

3.01 PROGRESS CLEANING

General:

Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.

Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this Work.

At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.

Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the ecology.

Site:

Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.

Weekly, and more often if necessary, inspect all arrangements of materials stored on the

Maintain the site in a neat and orderly condition at all times.

Structures:

Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.

Weekly, and more often if necessary, sweep all interior spaces clean. "Clean", for the purpose of this sub-program, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and hand-held broom.

As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using all equipment and materials required to achieve the required cleanliness.

Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials have been installed. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from all foreign material that, in the opinion of the ENGINEER may be injurious to the finish floor material.

3.02 FINAL CLEANING

Definition:

Except as otherwise specifically provided, "clean" (for the purpose of this Article) shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaning using commercial quality building maintenance equipment and materials.

General:

Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as required.

Site:

Unless otherwise specifically directed by the ENGINEER, broom clean all paved areas on the site and all public paved areas directly adjacent to the site. Completely remove all resultant debris.

Structures:

Exterior: Visually inspect all exterior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the ENGINEER may require light sandblasting or other cleaning at no additional cost to the Owner.

Interior: Visually inspect all interior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Remove all paint dropping, spots, stains, and dirt from finished surfaces. Use only the specified cleaning materials and equipment.

Timing:

Schedule final cleaning as approved by the ENGINEER

END OF SECTION

SECTION 00170

SITE CLEARING

PART 1 - GENERAL

1.01 SECTION INCLUDES

Remove surface debris and topsoil excavation

Clear site of plant life, trees, shrubs and grass, including the root system of trees and shrubs

1.02 MEASUREMENT AND PAYMENT

Basis of Measurement and Payment: Payment for site clearing shall be an incidental cost to the installation of the connections and shall include all work related to clearing site, loading and removing waste materials from site.

1.03 REGULATORY REQUIREMENTS

Conform to applicable American Samoa Code for disposal of debris, burning debris on site and use of herbicides.

Coordinate clearing Work with utility companies and Owner.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PREPARATION

Prepare site as per construction drawings and provide erosion control per PNRS permit requirements.

3.02 PROTECTION

Locate, identify, and protect utilities that remain, from damage.

Protect trees, plant growth, and features designated to remain, as final Landscaping

Protect bench marks and existing structures from damage or displacement.

3.03 CLEARING

Clear areas required for access to site and execution of Work.

Remove trees and shrubs, within marked areas and as indicated.

Remove Stumps and main root system

Clear undergrowth and deadwood, without disturbing subsoil.

Remove debris, rock, and extracted plant life from site.

3.04 TOPSOIL EXCAVATION

Excavate topsoil from areas to be further excavated, or re-graded.

Stockpile in area where directed by engineer and approved by landowner to height not exceeding 8 feet and protect from erosion.

END OF SECTION

SECTION 00180

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.02 DESCRIPTION

Work Included: This Section establishes general requirements pertaining to cutting (including excavating), fitting, and patching of the Work required to:

Make the several parts fit properly.

Uncover Work to provide for installation, inspection or both of ill-timed Work.

Remove and replace Work not conforming to requirements of the Contract Documents.

Remove and replace defective work.

1.03 QUALITY ASSURANCE

Perform all cutting and patching in strict accordance with pertinent requirements of these Specifications and, in the event no such requirements are determined, in conformance with the ENGINEER's written direction.

1.04 SUBMITTALS

Request for the Engineer's Consent:

Prior to cutting which affects structural safety, submit written request to the ENGINEER for permission to proceed with cutting.

Should conditions of the Work, or Schedule, indicate a required change of materials or methods for cutting and patching, so notify the ENGINEER and secure his written permission prior to processing.

PART 2-PRODUCTS

2.01 MATERIALS

For replacement of Work removed, use materials that comply with the pertinent Sections of these Specifications.

2.02 PAYMENT COSTS

The extent of cutting and patching of below slab/grade is shown on the drawings; the cost for such work shall be included in the lump sum price. Contractor performs all other cutting and patching needed to comply with the Contract Documents at no additional cost to the Owner.

PART 3-EXECUTION

3.01 CONDITIONS

Inspection

Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, backfilling, and patching.

After uncovering the Work, inspect conditions affecting installation of new Work.

Discrepancies:

If uncovered conditions are not as anticipated, immediately notify the ENGINEER and secure needed directions.

Do not proceed in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 PREPARATION PRIOR TO CUTTING

Provide all required protection including, but not necessarily limited to, shoring, bracing, and support to maintain structural integrity of the Work

3.03 PERFORMANCE

Perform all required excavation and backfilling as required under pertinent Sections of these Specifications. Perform cutting and demolition by methods that will prevent damage to other portions of the Work and will provide proper surfaces to receive installation of repair and new work. Perform fitting and adjustment of products to provide finished installation complying with the specified tolerances and finishes.

END OF SECTION

SECTION 00190

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

Cast-in-place concrete, floors, shear walls, foundation walls, equipment pads and slabs on grade.

1.02 REFERENCES

ACI 301 - Structural Concrete for Buildings.

ACI 302 - Guide for Concrete Floor and Slab Construction.

ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

ACI 305R - Hot Weather Concreting.

ACI 306R - Cold Weather Concreting.

ACI 308 - Standard Practice for Curing Concrete.

ACI 318 - Building Code Requirements for Reinforced Concrete.

ANSI/ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type).

ANSI/ASTM D1190 - Concrete Joint Sealer, Hot-Poured Elastic Type.

ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

ANSI/ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for

ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.

ASTM C33 - Concrete Aggregates.

ASTM C94 - Ready-Mixed Concrete.

ASTM C150 - Portland Cement.

ASTM C260 - Air Entraining Admixtures for Concrete.

ASTM C330 - Light Weight Aggregates For Structural Concrete.

ASTM C494 - Chemicals Admixtures for Concrete.

ASTM C618 - Fly Ash and Raw or Calcinated Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.

ASTM A775 - Reinforcing Steel Bars

PROJECT RECORD DOCUMENTS

Accurately record actual locations of embedded utilities and components which are concealed from view.

1.03 QUALITY ASSURANCE

Perform Work in accordance with ACI 301.

Maintain one copy of documents on site.

Acquire cement and aggregate from same source for all work.

Conform to ACI 305R when concreting during hot weather.

Conform to ACI 306R when concreting during cold weather.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

Cement: ASTM C150, Portland type.

2.02 ACCESSORIES

Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days.

2.03 JOINT DEVICES AND FILLER MATERIALS

Joint Filler: ASTM D1751, ASTM D994, asphalt impregnated fiberboard, closed cell polyvinyl chloride, molded vinyl foam or pre-molded sponge rubber.

Construction Joint Devices: Integral galvanized steel or extruded plastic.

Expansion and Contraction Joint Devices: ASTM B221 alloy, extruded aluminum; resilient neoprene filler strip with a Shore A hardness of 35 to permit plus or minus 25 percent joint movement with full recovery.

2.04 CONCRETE MIX

Mix and deliver concrete in accordance with ASTM C94 and ACI 304.

Use accelerating admixtures only when approved by Engineer.

Use set retarding admixtures during hot weather only when approved by Engineer.

Add air entraining agent to normal weight concrete mix for work exposed to exterior.

Provide Engineer with tickets indicating mix times, delivery and additives to the mix.

PART 3 - EXECUTION

3.01 EXAMINATION

Verify site conditions and verify requirements for concrete cover over reinforcement.

Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.02 PREPARATION

Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.03 PLACING CONCRETE

Place concrete in accordance with ACI 304, ACI 301 and/or ACI 318.

Notify Engineer minimum 24 hours prior to commencement of operations.

Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

Install vapor barrier under interior slabs on grade. Lap joints minimum 6 inches and seal watertight by sealant applied between overlapping edges and ends or taping edges and ends.

Install joint devices in accordance with manufacturer's instructions.

Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

Place concrete continuously between predetermined expansion, control, and construction joints.

Do not interrupt successive placement; do not permit cold joints to occur.

Screed floors and slabs on grade level, maintaining surface flatness of maximum 1/4 inch in 10 ft.

3.04 SEPARATE FLOOR TOPPINGS

Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.

Place required dividers, edge strips, reinforcing and other items to be cast in.

Apply bonding agent to substrate in accordance with manufacturer's instructions.

Place concrete floor toppings to required lines and levels.

3.05 CONCRETE FINISHING

Finish concrete floor surfaces in accordance with ACI 301.

In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drain at 1/8 inch per foot nominal or as indicated on drawings.

3.06 CURING AND PROTECTION

Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

Cure floor surfaces in accordance with ACI 308.

3.07 FIELD QUALITY CONTROL

Field inspection and testing will be performed. Provide free access to Work and cooperate with appointed firm.

Submit proposed mix design of each class of concrete to Owners Engineer for review prior to commencement of Work.

Tests of cement and aggregates may be performed to ensure conformance with specified requirements.

3.08 PATCHING

Allow Engineer to inspect concrete surfaces immediately upon removal of forms.

Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.

Patch imperfections as directed and in accordance with ACI 301.

3.09 DEFECTIVE CONCRETE

Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

Repair or replacement of defective concrete will be determined by the Engineer and will be on the contractor's expense.

Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

3.10 SCHEDULE - CONCRETE TYPES AND FINISHES

Foundation Walls: 4,000 psi 28 day concrete, form finish with honeycomb filled surface.

Roof: 4000 psi 28 day concrete, form finish with honeycomb filled surface.

END OF SECTION.

SECTION 00200

CONCRETE FORMWORK

PART 1 GENERAL

1.01 GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.02 DESCRIPTION

Work Included:

Provide formwork in accordance with the provisions of this Section for all cast-in-place concrete shown on the Drawings or required by other Sections of these Specifications.

Related Work Described Elsewhere:

Excavating for footings

Design of Formwork:

Design of formwork is the Contractor's responsibility.

Comply with pertinent provisions of the ACI 347

1.03 SUBMITTALS

General:

Comply with pertinent provisions of Section 00130 – SUBMITTALS AND SUBSTITUTIONS.

Manufacturer's Data:

Within 30 calendar days after award of the Contract, submit manufacturers' data and installation instructions for proprietary materials including form coatings, ties and accessories, and manufactured form systems if used.

PART 2 PRODUCTS

2.01 FORM MATERIALS

Forms:

Construct formwork for exposed (painted or unpainted) concrete surfaces with smooth faced undamaged plywood or other panel type materials acceptable to the Engineer, to provide continuous, straight, smooth as-cast surfaces. Furnish in largest practicable sizes to minimize number of joints.

Construct formwork for concrete concealed from view or covered with cement plaster with rough sawn boards of sound grade, as approved by the Engineer, to provide a mechanical bond for subsequent application of plaster.

Provide form material with sufficient thickness to withstand pressure of newly placed concrete without excessive and objectionable bow or deflection.

Form Ties:

Provide factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete surfaces upon removal.

Provide ties so that portion remaining within concrete after removal of exterior parts is at least 3.8 cm (1-1/2") from the outer concrete surface. Provide form ties that will not leave a hole larger than 2.5 cm (1") diameter in the concrete surface.

Form Coatings:

Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces requiring bond or adhesion, nor impede the wetting of surfaces to be cured with water or curing compounds.

2.02 DESIGN OF FORMWORK

General:

Design, erect, support, brace, and maintain formwork so that it will safely support vertical and lateral loads that might be applied, until such loads can be supported by the concrete structure.

Carry vertical and lateral loads to ground by formwork system and in-place construction that has attained adequate strength for that purpose.

Construct formwork so that concrete members and structure are of correct size, shape, alignment, elevation and position.

Support form facing materials by structural members spaced sufficiently close to prevent objectionable deflection.

Fit forms placed in successive units for continuous surfaces to accurate alignment, free from irregularities, and within-allowable tolerances.

Provide formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.

Earth Forms:

Side forms of footings may be omitted and concrete placed directly against excavation only when requested by the Contractor and accepted by the Engineer. When omission of forms is accepted, provide minimum additional concrete 2.5 cm (1") on each side of the minimum design profiles and dimensions shown.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

Examine the substrate and conditions under which work of the Section is to be performed, and correct unsatisfactory conditions that would prevent proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 FORM CONSTRUCTION

General:

Construct forms complying with ACI 347, to the exact sizes, shapes, lines, and dimensions shown and as required to obtain accurate alignment, location, grades, level,

Provide for openings, offsets, linkage, keyways, recesses, moldings, reglets, chamfers, blocking, screeds, bullheads, anchorages, inserts, and other features required. Use selected materials to obtain required finishes.

Forms for openings and construction that accommodates installation by other trades whose materials and products must be fabricated before the opportunity exists to verify the measurements of adjacent construction which affects such installations, shall be accurately sized and located as dimensioned on the Drawings. In the event that deviation from the Drawing dimensions results in problems in the field, the Contractor shall be responsible for resolution of the conditions as approved by the Project Engineer without additional expense to the Owner.

Fabrication:

Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where the slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses and the like to prevent swelling and assure ease of removal.

Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement and for placement of concrete. Brace temporary closures and set tightly to temporary openings on forms in as inconspicuous locations as possible, consistent with design requirements. Form intersecting planes to provide true, clean out corners.

Forms for Exposed Concrete:

Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes. Do not splinter forms by driving ties through improperly prepared intersections.

Provide sharp, clean corners at intersecting planes without visible edges or offsets. Back joints with extra studs or girts to maintain true, square intersections.

Use extra studs, walers, and bracing to prevent objectionable bowing of forms between studs and to avoid bowed appearance in concrete. Do not use narrow strips of form material that will produce bow.

Assemble forms so they may be readily removed without damage to exposed concrete surfaces.

Corner Treatment: Unless shown otherwise, form chamfers with 2 cm x 2 cm (3/4" x 3/4") strips, accurately formed and surfaced to produce uniformly straight lines and tight edge joints on exposed concrete. Extend terminal edges to required limit and miter chamfer strips at changes in direction.

Control Joints: Locate as indicated.

Provision for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Verify size and location of openings, recesses and chases with the trade requiring such items. Accurately place and securely support items to be built into forms.

Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before concrete is placed. Re-tighten forms immediately after concrete placement as required to eliminate mortar leaks.

3.03 FORM COATINGS

Coat form contact surfaces with form-coating compound before reinforcement is placed. Do not allow excess form coating material to accumulate in the forms or to be exposed to surfaces that will be bonded to fresh concrete. Apply in compliance with manufacturer's instruction.

3.04 INSTALLATION OF EMBEDDED ITEMS

General:

Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of the items to be attached thereto.

Edge Forms and Screed Strips for Slabs:

Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in the finished slab surface. Provide and secure units to support types of screeds required.

3.05 REMOVAL OF FORMS

General:

Formwork not supporting concrete, such as sides of beams, walls, columns, and similar parts of the Work, may be removed after cumulatively curing at not less than 10 degree C (50 degrees F) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operation, and provided that curing and protection operations are maintained.

Form Facing Material:

Form facing material may be removed four days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.06 RE-USE OF FORMS

Clean and repair surfaces of forms to be re-used in the Work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. Apply new form coating compound material to concrete contact surfaces as specified for new formwork. When forms are reused for successive concrete placement, thoroughly clean surfaces, remove fins, and tighten forms to close all joints. Align and secure joints to avoid offsets.

END OF SECTION

SECTION 00210

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.02 DESCRIPTION

Work Included:

Provide complete, in place, all steel required for reinforcement of cast-in-place concrete as shown on the Drawings.

Related Work Described Elsewhere:

Steel reinforcement is also required under Section 00190 – CAST IN PLACE CONCRETE.

1.03 QUALITY ASSURANCE

Comply with pertinent provisions of following standards as listed in Section 00300, except as herein modified.

CRSI "Manual of Standard Practice"

ACI 318

1.04 UBMITTALS

General:

Comply with pertinent provisions of Section 00130 – SUBMITTALS AND SUBSTITUTIONS.

Shop Drawings:

Within 20 calendar days after award of the Contract, submit complete Shop Drawings of all material proposed to be furnished and installed under this Section. Show:

Bar schedules, stirrup spacing, diagrams of bent bars, and arrangement and assemblies.

Make Shop Drawings in accordance with ACI 315.

Accompanying the Shop Drawings, submit steel producer's certificates of mill analysis, tensile, and bend tests for reinforcing steel.

1.05 PRODUCT HANDLING

Delivery:

Deliver reinforcement to the job site bundled, tagged, and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on

Storage:

Store reinforcement at the job site in a manner to prevent damage and accumulation of dirt and excessive rust.

PART 2- PRODUCTS

2.01 MATERIALS

Reinforcing Bars:

Comply with ASTM A 615, Grade 60 for all sizes Galvanized.

Steel Wire:

Comply with ASTM A 82.

Welded Wire Fabric:

Comply with ASTM A 185.

Supports for Reinforcement:

Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement in place:

Use wire bar type supports complying with CRSI recommendations, unless otherwise indicated. Do not use wood, brick, and other unacceptable materials.

For slabs on grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with hot-dip galvanized or plastic protected legs.

2.02 FABRICATION

General:

Fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances complying with CRSI Manual. In case of fabricating errors, do not re-bend or straighten reinforcement in a manner that will injure or weaken the material.

Unacceptable Materials:

Reinforcement with any of the following defects will not be permitted in the Work:

Bar lengths, depths and bends exceeding specified fabrication tolerances.

Bends or kinks not indicated on Drawings or final Shop Drawings.

Bars with reduced cross-section due to excessive rusting or other causes

PART 3 EXECUTION

3.01 INSPECTION

Examine the substrate, formwork and the conditions under which concrete reinforcement is to be placed, and correct conditions that would prevent proper and timely completion of the work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

General:

Comply with the specified standards for details and methods of reinforcement, placement and support, and as herein specified.

Clean reinforcement to remove loose rust and mill scale, earth, and other materials that reduce or destroy bond with concrete.

Position, support and secure reinforcement against displacement by formwork, construction or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers as required.

Place reinforcement to obtain the minimum coverage for concrete protection. Arrange, space and securely tie bars and bar supports together with 16-gage wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that twisted ends are directed away from exposed concrete surfaces.

Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh.

Provide sufficient numbers of supports and of strength sufficient to carry reinforcement. Do not place reinforcing bars more than 5 cm (2") beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

Splices:

Provide standard reinforcement splices by lapping ends, placing bars in contact, and tightly tying wire.

END OF SECTION

SECTION 00220

FUSIBLE POLYVINYL CHLORIDE (PVC) WATER PIPE (NOT IN USE)

SECTION 00230

CHAIN LINK FENCING

1. GENERAL

Unless stated otherwise, all materials for chain link fencing and gates above and below ground shall be PVC coated galvanized as specified in the current ASTM F 668.

2. POST

All posts shall be of sufficient length to provide a 36-inch minimum setting in concrete footings and at a depth as specified on the plans. Posts shall be set at a maximum spacing of 10' o.c. Posts shall be in proper alignment so that there is a minimum of 4” on all sides of the post. No material shall be installed on the post nor shall the post be disturbed in any manner within 7 days after the individual post footing is completed. Should rock be encountered at a depth less than the planned footing depth a hole 2” larger than greatest dimension of the post shall be drilled to a depth of 12”. No extra compensation shall be made for rock excavation.

(1) All posts. PVC coated Galvanized steel, 35 percent minimum carbon content, 60,000 pounds per square inch minimum tensile strength (Schedule 40).

(2) Line Posts. 2-3/8 inch O.D. pipe weighing 3.65 pounds per linear foot or 2 inch x 2-1/4 inch H section weighing 4.10 pounds per linear foot unless otherwise specified on drawings.

(3) End, Corner and Pull Posts. 2-7/8 inch O.D. pipe weighing 5.79 pounds per linear foot unless otherwise specified on drawings.

(4) Gate posts. For single gate or one leaf of double gates: (aa) Up to 6 feet wide. 3 inch O.D. pipe weight 5.79 pounds per linear foot unless otherwise specified on drawings. (ab) 6 feet to 15 feet wide. 4 O.D. pipe weighing 9.11 pound per linear foot.

(5) Post Tops. Tubular post tops designed to prevent moisture from entering posts and to support top rail.

3. TOP RAILS

(1) 1-1/2 inch I.D. PVC coated galvanized steel pipe weighing 2.27 pounds per linear foot. (2) Provided with PVC coated galvanized, outside sleeve, self-centering 7- inch long couplings approximately every 20 feet.

4. HORIZONTAL BRACES

(1) Braces shall be 1-1/2 inch I.D. PVC coated galvanized steel pipe weighing 2.27 pounds per linear foot with plain ends.

5. DIAGONAL BRACES

(1) Diagonal braces shall be 3/8 inch diameter PVC coated galvanized steel rods or as specified on drawing. (2) Diagonal braces shall be provided with heavy galvanized iron turnbuckles to adjust the tension.

6. FENCE FABRIC

(1) Wire. 9 gauge PVC coated galvanized steel wire, of medium high carbon quality, minimum tensile strength of 70,000 pounds per square inch, interwoven into 2 inch diamond mesh. (2) Fabric. 72 inches wide, selvage shall be knuckled at bottom and twisted and barbed at top.

7. BARBED WIRE

PVC coated barbed wire shall be 10 gauge with 10 gauge barbs. All barbs shall be 4 points and spacing of barbs shall be 4 to 6 inches.

8. FABRIC CONNECTIONS AND INSTALLATION

(1) Terminal post shall be fastened by 3/16 inch x 3/4 inch stainless steel stretcher bars with 11 gauge stainless steel or aluminum bands unless otherwise specified on drawings.

(2) All line posts shall be fastened with 9 gage stainless steel or aluminum wire clips unless otherwise specified on drawings.

(3) All top rails shall be fastened with a 9 gage stainless steel or aluminum tie wires.

(4) The bottom edge of the fabric shall be fastened by 1/8 inch PVC coated galvanized tension bars with 11 gage stainless steel or aluminum bands unless otherwise specified on drawings.

(5) The fence shall generally follow the contour of the ground, with the bottom of the fence no more than 2” from ground surface. At locations of small natural swales and where it is not practical to have the fence conform to the general contour of ground surface, longer post may be used and multiple strands of barbed wire stretched there on to span the opening below fence. Vertical clearance between strands of barbed wire shall be 4” or less.

9. CONCRETE

Concrete shall be of a commercial grade with a min 28-day compression strength of 2500psi. All concrete shall be placed against solid, undisturbed or re-compacted fill materials. All aggregates shall comply with latest ACI requirements. Cement shall be Type II Portland. Concrete Mix Design (Proportion) shall be submitted to ASPA for approval prior to any concrete placement.

END OF SECTION

SECTION 00240

EXCAVATION, TRENCHING AND BACKFILL FOR PIPELINES

PART 1 – GENERAL

1.01 SUMMARY

This section includes excavation, trenching and backfill necessary for the construction of the facilities as indicated on the plans including, but not limited to: water mains and service lines, sewer mains and service lines, valves and concrete manholes and related appurtenances.

1.02 MEASUREMENT AND PAYMENT

Measurement:

Linear feet of pipe installed measured horizontally over the centerline of the pipe.

If stationing is established on the job, stationing shall be used to determine the payment quantities.

Basis for Payment:

Payment shall be full compensation for all temporary controls and facilities; excavation; rock excavation; erosion and sediment control; trenching; pipe; pipe fittings; pipe installation; joint thrust restraints; casing; bedding;, including imported bedding; slurry; compaction; compaction testing; grading; hydrostatic testing; disinfection; site restoration (excluding rock walls, fences, roads and sidewalks0; and provision of record drawings (as-builts); and site cleanup.

1.03 REFERENCES

ASTM D698 – Test Methods for Moisture Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5 lb. Rammer and 12-in. Drop [Standard Proctor Test].

ASTM D1556 – Test Method for Density of Soil in Place by the Sand-Cone Method

ASTM D2216 – Test Method for Laboratory Determination of Water Content of Soil, Rock and Soil-Aggregate Mixtures

ASTM D2487 – Classification of Soils for Engineering Purposes [Unified Soil Classification System].

ASTM D2774 – Standard Recommended Practice for Underground Installation of Thermoplastic Pressure Piping

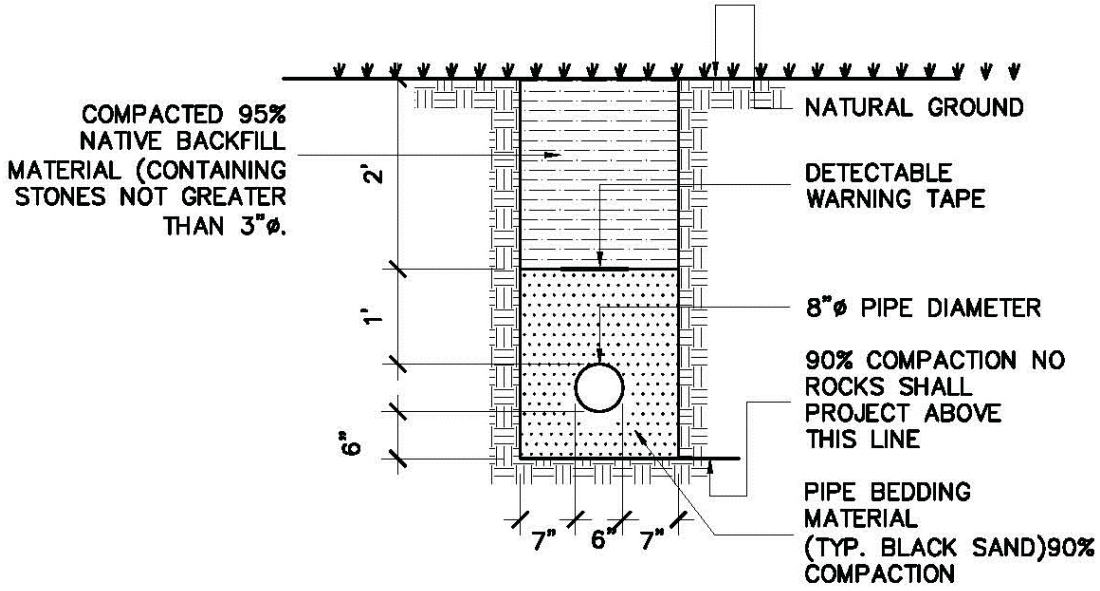
ASTM D2922 – Test Method for Density of Soil and Soil Aggregate and Rock in Place by Nuclear Methods (Shallow Depth)

ASTM D3017 – Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

OSHA 1926 – Occupational Safety and Health Standards for the Construction Industry

1.04 DEFINITIONS

Bedding, Haunching and Initial Backfill zones as defined herein and on the standard thermoplastic pipe trench detailed drawing below.



Native, and Import and Select/Engineered Material Definitions:

Native Material: Soils excavated from the trench in the immediate vicinity of current pipe installation activities.

Import Material: Soils transported from a soil pit stockpile at a location other than the location where trench excavation is taking place.

Select/Engineered Fill: Soil specified in the plans or specifications or by the Project Engineer to meet permit conditions or selected applications.

Soil Materials as summarized in the table below and further defined in ASTM D2487:

USCS Group	Description
GW	Well-Graded Gravel, with less than 5% fines
GP	Poorly-Graded Gravel, with less than 5% fines
SW	Well-Graded Sands, with less than 5% fines
SP	Poorly-Graded Sands, with less than `5% fines
GW-GM or GW-GC	Well-Graded Gravel, with 5-12% fines
GP-GM or GP-GC	Poorly-Graded Gravel, with 5-12% fines
SW-SM or SW-SC	Well Graded Sands with 5-12% fines
SP-SM or SP-SC	Poorly Graded Sands with 5-12% fines

1.05 SUBMITTALS

Submit the result of ASTM 698 standard proctors, including proctor curve, for each soil type encountered and used on the job.

Submit all compaction test results in writing within 5 days of being performed.

Submit gradation curves for imported fill for project engineer review and approval prior to placement.

1.06 QUALITY ASSURANCE

Compaction Testing Qualifications: Tests must be performed by a firm or professional regularly engaged in soil testing for engineering purposes. The individual on site shall be certified to operate nuclear density equipment.

Locations: Provide compaction test results at locations as designated by the Project Engineer and/or American Samoa Department of Public Works.

Frequency:

Excavation, Trenching and Backfilling in an Established, Traveled Roadway: once per 100-feet along the pipeline (minimum).

Excavation, Trenching and Backfilling outside of an Established, Traveled Roadway: once per 300-feet along the pipeline (minimum).

At each location, provide enough tests to demonstrate compliance with the compaction requirements for both the pipe embedment zone and the final backfill zone.

If testing reveals inadequate compaction, retest at that location after remedying the non-compliance with the specifications.

PART 2 – PRODUCTS

2.01 BEDDING, HAUNCHING AND INITIAL BACKFILL MATERIAL

Imported Bedding, Haunching and Initial Backfill Materials: Use one of the following materials.

Black sand or 1/4" minus crushed rock.

Native bedding, native haunching and native initial backfill material:

Use in accordance with the restrictions of Part 3 – Execution.

Free from particles greater than 1-inch in dimension.

2.02 FINAL BACKFILL MATERIAL

General:

Free from soil chunks larger than 4-inches in dimension.

Free from stones or rocks larger than 4-inches in dimension.

Free from organic materials.

Free from frost chunks.

Free of Toxic Waste or Hazardous Chemicals per American Samoa Environmental Protection Agency Requirements. Certified if possible.

Imported Final Backfill for Wet Conditions:

Types GW, GP, SW, SP (coarse grained soils with less than 5% fines) or GW-GC/GM, GP-GC/GM, SW-SC/SM, SP-SC/SM (coarse grained soils with 5-12% fines).

Otherwise meeting the general requirements of Article 2.02 Paragraph A.

2.03 SLURRY MIX

General: Conform to American Samoa Department of Public Works Standard Specification for Construction of Local Streets and Roads as applicable.

PART 3 – EXECUTION

3.01 GENERAL

Conform to applicable safety laws, including, but not limited to, OSHA 29 CFR Part 1926.

Obtain all permits from the appropriate road agencies for construction within road right of way.

Repair damage resulting from settlement, slides, cave-ins, water pressure, and other causes.

Provide traffic control and other temporary provisions in accordance with American Samoa Department of Public Works, Department of Public Safety, and PNRS Encroachment Permit Conditions.

3.02 EXCAVATION

Remove brush, trees and stumps from excavation and site.

Strip and stockpile existing topsoil.

Maintain surface drainage away from trenching or excavation.

If existing soil cannot provide uniform and stable bearing support along the length of the pipe, or if the existing soil contains stones greater than 1-inch in dimension, then over-excavate 6-inches below bottom of pipe.

If trench is more than 5’ in depth, the contractor must conform to OSHA guidelines on Trench Safety and Shoring. In addition the contractor must conform to all other State and County requirements for Trench Safety and Shoring.

Contractor will be responsible for disposal of excavated materials during excavation. Contractor must identify, with approval from the Project Engineer or the American Samoa Environmental Protection Agency, the construction disposal site before construction can begin.

3.03 TRENCHING

Total Bottom Width: As indicated on plans.

Depth: Provide minimum cover as specified, or depths shown on plans.

Top Width: As needed to meet safety requirements, but minimize the width where possible.

Trench Walls: Keep trench walls vertical in the pipe embedment zone.

Length of Open Trench:

Unless authorized by the Project Engineer in writing, the length of trench excavation in advance of pipe being laid shall not exceed 200-feet during active construction.

All trenches must be backfilled during non-work hours, or alternately, up to 20-feet of trench can be left open during non-work hours if the trench is completely barricaded and fenced.

If open trenches in excess of this specification result in the wetting of moisture-sensitive stockpiled materials, such that the moisture content makes it impossible to meet compaction requirements, the contractor shall provide imported material that complies with these specifications and haul away the wet materials at no expense to the project or the Owner.

3.04 BEDDING

General:

Where over excavation is necessary, install a minimum of 6-inches of imported bedding.

Level and form the bottom of the trench to provide uniform bearing support along the length of the pipe.

Compaction of Imported Bedding: Meet the following density requirements based on standard proctor (ASTM D698):

Location	Percent of Max. Dry Density Required
Areas of Recent Fill or Embankment	95%
Areas Traveled By Vehicular Traffic, Rights-of-Way	90%
Unimproved Surfaces or Fields	80%

3.05 HAUNCHING AND INITIAL BACKFILL

General

Provide complete and uniform bearing and support for the pipe, including allowance for bell holes.

Work material under the pipe haunches and around the pipe to ensure full pipe support.

Place material in lifts no greater than 6-inches thickness in loose measure.

Install initial backfill to a depth of 6-inches over the crown of the pipe.

Material Usage:

Rigid Pipe (Ductile Iron):

Dry Trench and Site Conditions: Use native material free from particles greater than 1-inch in dimension.

Wet Trench Conditions: Imported Material.

Plastic Pipe: Imported Material

If deemed necessary by the Project Engineer, and as required by road owner use imported material for PVC and Polyethylene pipe in accordance with ASTM D 2774 and/or road owner requirements.

Pipe Diameter	Maximum Particle Size
4 inch and under	½ inch
6-8 inch	¾ inch
10-16 inch	1 inch
16 inch and larger	1-1/2 inch

Compaction of haunching and Initial Backfill:

Compact hunching material and initial backfill using walk-behind vibratory plate compactor or manual hand-tamping tools

Ensure no contact between compacting equipment and the pipe.

Prohibited Compaction Equipment for haunching and Initial Backfill:

Hoe-pack

Hydro-hammer

Rammer-tamper

Vibratory rollers

Prevent movement of the pipe during placement or compaction of material.

Meet the following density requirements based on standard proctor (ASTM D698):

Location	Percent of Max. Dry Density Required
Areas of Recent Fill or Embankment	95%
Areas Traveled By Vehicular Traffic, Rights-of-Way	90%
Unimproved Surfaces or Fields	80%

3.06 FINAL BACKFILL

General:

If moisture content of the native soil results in the inability to meet compaction requirements (due to fines), use imported material that meets Article 2.02 B.

Waste or haul away material not meeting the requirements at contractor's expense.

Conform to DPW Road Restoration for backfill requirements under roadways.

Repair any trenches improperly backfilled or where settlement occurs, then refill and compact.

Compaction:

Install 2-feet of total fill over the pipe crown before subjecting the trench to hydro-hammers, hoe-packs, or vehicular traffic.

Backfill in lifts to meet compaction requirements throughout the full depth of backfilled trench.

Compact to the following requirements (Densities as a percent of Standard Proctor):

Location	Maximum Lift	Percent of Max. Dry Density Required
Under Roadways or Surfaces Traveled by Vehicular Traffic	12-inches	95%
Areas of Recent Fill or Embankment	12-inches	90%
Rights-of-Way	12-inches	90%
Unimproved Surfaces or Fields	24-inches	80%

Use smaller lifts if necessary to meet the in-place density requirements.

3.07 REMOVAL OF NUISANCE WATER

Control site drainage, springs and runoff, and prevent water from adversely affecting trenching locations.

Remove nuisance water entering the trenches. Water that can be removed through the use of sump or trash pumps will not be considered dewatering.

Keep trenches free from standing water until the facilities are in place, the end plugged against the entrance of water, and backfill has been placed and compacted.

3.08 LOCATE EXISTING UTILITIES

Field locates all existing underground utilities.

Contact ASPA Water Division and Wastewater Division 48-hours in advance of work in areas needing utility location service.

3.09 UTILITY CONFLICTS

Protect existing utilities from damage during excavation and backfilling operations.

Provide temporary support for existing water, gas, telephone, power, or other utility services that cross the trench until backfilling of trench is complete.

Compact backfill to 95% of maximum density under disturbed utilities.

Coordinate the repair of existing utilities, regardless of whether they were properly located.

Damage to existing utilities properly located through “Utility Locate” programs will be the responsibility of the Contractor to repair, at no cost to the American Samoa Power Authority.

Damage to existing utilities improperly located by “Utility Locate” programs shall be at the expense of the “Utility Locate” service or the owner of the damaged utilities.

Fair compensation will be negotiated for repairs to Village water and sewer utilities that were improperly located. However, if the Contractor neglects to request a Village utility locate in accordance with the Contract requirements, no compensation will be made to the Contractor.

Water and sewer parallel and perpendicular crossings:

Maintain a 10-foot horizontal separation (O.D. to O.D.) for parallel mains.

Upon approval by the Engineer, water and sewer mains may be installed in parallel as close as 5-feet, provided all of the following conditions:

Vertical separation is 18 inches (O.D. to O.D.)

Water main is above the sewer main.

Sewer pipe is constructed to withstand 150 psi static pressure without leaking.

Maintain a minimum 18-inch vertical separation (O.D. to O.D.) for perpendicularly crossing mains.

Place water pipe over sewer pipe.

Lay pipe with joints equidistant from the point of crossing.

If it is impossible to meet any of the above separation distances and deviations, and specific provisions are not indicated on the plans, bring the matter to the attention of the Project Engineer for resolution.

END OF SECTION

SECTION 00250

WATER DISTRIBUTION MAINS MOLECULARLY ORIENTED POLYVINLY CHLORIDE (PVC-O) PIPE

PART 1 - GENERAL

1.01 SCOPE OF WORK

This section specifies molecularly oriented polyvinyl chloride (PVCO) pressure pipe, including standards for dimensionality, testing, quality, practice, safe handling and storage.

This section includes gate valves, hydrants, preparation, bedding, installation, and disinfection.

1.02 PIPE DESCRIPTION

Pipe supplier shall furnish PVCO pipe as manufactured by IPEX Inc. - BIONAX® PVCO conforming to all standards and procedures, and meeting all testing and material properties as described in this specification.

PART 2 - QUALITY ASSURANCE

2.01 REFERENCES

AWWA C909-09	Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe 4" through 24" (100 mm through 600 mm) for Water, Wasterwater and Reclaimed Water
ASTM F1483	Standard Specification for Oriented Poly (Vinyl Chloride) (PVCO) Pressure Pipe.
ASTM D1784	Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
ASTM D3139	Standard Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.
ASTM F477	Standard Specification for Elastomeric Seals
NSF-14	Plastics Piping System Components and Related Materials
NSF-61	Drinking Water System Components--Health

ANSI/AWWA C104/A21.4 – Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water

AWWA C105	Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.

ANSI/AWWA C110/A21.10 – Ductile Iron and Gray Iron Fittings, 3 Inch Through 48 Inch, for Water and Other Liquids

ANSI/AWWA C111/A21.11 – Rubber-Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings

ANSI/AWWA C150/A21.50 – Thickness Design of Ductile Iron Pipe

ANSI/AWWA C151/A21.51 – Ductile Iron Pipe, Centrifugally Cast, for Water or Other Liquids

ANSI/AWWA C153/A21.53 – Ductile Iron Compact Fittings, 3 Inch through 16 Inch, for Water and Other Liquids

ANSI/AWWA C502 – Dry Barrel Fire Hydrants

AWWA C503 – Wet-Barrel Fire Hydrants

AWWA C504 – Rubber-Sealed Butterfly Valves

ANSI/AWWA C509 – Resilient Seat Gate Valves for Water and Sewerage Systems

ANSI/AWWA C515 – Reduced Wall, Resilient Seated Gate Valve for Water Supply Service

ANSI/AWWA C600 – Installation of Ductile Iron Water Mains and Their Appurtenances

ANSI/AWWA C605 – Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water

ANSI/AWWA C651– Disinfecting Water Mains

ANSI/AWWA C900 – Polyvinyl Chloride (PVC) Pressure Pipe, 4 Inch through 12 Inch, for Water Distribution

AWWA C901 – Polyethylene (PE) Pressure Pipe, Tubing, and Fittings, ¾ inch through 3 inch, for Water.

ASTM D 1785 – Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

ASTM D 2241 – Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR).

ASTM D 2466 – Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

ASTM D 2855 – Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

ASTM D 2239 – Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.

ASTM D 3139 – Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

ASTM F 477 – Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

Standard Methods for Examination of Water and Wastewater

2.02 MANUFACTURER REQUIREMENTS

All piping shall be made from PVC compound conforming to cell classification 12454 per ASTM D1784.

Recommended Manufacturer: IPEX Inc. - BIONAX® PVCO, or approved equal.

2.03 WARRANTY

A one-year warranty for the pipe shall be included from the Contractor, and shall cover the cost of replacement pipe and freight to project site, should the pipe have any defects in material or workmanship.

Unless otherwise specified, the warranty periods shall begin after the Certificate of Acceptance is issued for the contract.

2.04 PRE-CONSTRUCTION SUBMITTALS

The following product data is required from the pipe supplier and/or fusion provider:

Name of pipe manufacturer

Pipe diameter

Dimension Ratio (DR 14 or as per plans)

Pressure Class per applicable standards

Color

Confirmation/ Recommended minimum bending radius and 20 feet length pull offset distance.

Confirmation/ Recommended maximum safe pull force

Fusion technician qualification indicating conformance with this specification

2.05 SUBMITTALS

Water Main and Fittings

Special Anchoring Retainer Glands

Gate Valves and Boxes

Fire Hydrants and Flush Hydrants

Warning Tape

Tracing wire, Box and Splice Materials

Method of Disinfection

Water Testing Lab

Method of Connection to Existing Distribution System

Method of Pressure Testing

Pressure Test Certification Forms

2.06 DEFINITIONS

Fully Restrained: Pipe installed with or including:

Certalok C900 joined pipe (or equal)

Pipe with Flanged connections

Pipe with mechanical joints

2.07 QUALITY ASSURANCE

Water testing shall be done by the AS-EPA certified laboratory.

Pipe: Perform work in accordance with manufacturer's recommended procedures.

Valves: Mark manufacturer's name and pressure rating on valve body.

Pressure testing shall be done in accordance with the requirements

2.08 DELIVERY, STORAGE, AND HANDLING

Deliver, store, and protect products to site.

Deliver and store valves in shipping containers with labeling in place.

2.09 ACCEPTANCE

Work covered by this section will not be accepted until the backfilling and testing connected with the work has been completed satisfactorily.

Any section of water main that is found defective in material, alignment, or joints before acceptance shall be corrected to the satisfaction of the Project Engineer.

Test in the presence of the ASPA representative.

Repair and retest any joint with leakage until no leakage is visible at no cost to the owner.

PART 3 – PRODUCTS

3.01 MOLECULARLY ORIENTED POLYVINYL CHLORIDE (PVCO) PRESSURE PIPE

Manufacturers: IPEX Inc. - BIONAX® PVCO, or approved equal.

3.02 PVC PIPE:

AWWA C900, elastomeric-gasket couplings, Class 100, 150, or 200 as shown on the drawings or bid schedule.

3.03 MECHANICAL FITTINGS:

AWWA C111, rubber-gasket joints, Ductile-Iron Joints: ASTM D3139 compression gasket ring.

3.04 TRACE WIRE:

Magnetic detectable conductor, plastic covering, imprinted with "Water Line" in large letters.

3.05 DUCTILE IRON PIPE:

AWWA C151, pressure class 350, centrifugally cast in metal molds or sand-lined molds, or C104, cement-mortar lining, as shown on the drawings or bid schedule.

3.06 FITTINGS:

Ductile iron, standard thickness.

JOINTS: AWWA C111, RUBBER-GASKET JOINTS WITH RODS.

3.07 JACKETS:

AWWA C105 polyethylene encasement, double layer, half lapped, ½-inch polyethylene tape.

3.08 JOINT THRUST RESTRAINT:

CONCRETE THRUST BLOCKS:

One part Portland cement, 2 ½ part of fine aggregate, 3 ½ parts coarse aggregate and just enough water for a workable consistency.

#4 Epoxy coated rebars.

SPATIAL ANCHORING RETAINER GLANDS FOR MECHANICAL JOINTS:

For C909 PVCO: Equal to EBAA Series 19MJOO

ROMAC Industries: ROMA GRIP for

BELL RESTRAINT HARNESS SERIES 1600 FOR C900 PVCO PIPE:

Manufactured by: EBAA Iron Inc., or approved equal

The restraint shall be manufactured of Ductile Iron conforming to ASTM A536.

The Restraints shall be coated with MEGA-BOND (visit www.ebaa.com).

A split ring shall be used behind the pipe bell and a split serrated ring shall be used to grip the pipe.

3.09 HARDWARES:

Sufficient number of bolts shall be used to connect the bell ring and the gripping ring. The combination shall have a minimum pressure ratings as shown on the table below:

		A	B	C	D	
Nominal Pipe Size	Series Number	Pipe O.D.	Maximum Bell O.D. Cleared	Max. Restraint O.D. (Casing Clearance)	Overall Length	Thrust Bolt (Number - Size)
4	1604	4.80	6.75	9.25	13	2 - ¾ x 13
6	1606	6.90	8.75	11.25	18	2 - ¾ x 18
8	1608	9.05	12.25	14.75	18	2 - ¾ x 18
10	1610	11.10	14.20	16.85	22	4 - ¾ x 22
12	1612	13.20	16.90	19.45	22	4 - ¾ x 22
NOTE: Dimensions are in inches and are subject to change without notice.						

3.10 INSTALLATION INSTRUCTION:

Assemble the push-on joints as per the pipe manufacturer's instructions.

Install both halves of the non- serrated bell ring around the pipe behind the bell. Install the side bolts and tighten each to 60 ft-lbs (110 ft-lbs on 8, 10 and 12 inches diameters).

Slide the bell ring toward the bell so it fits snugly behind the bell.

Remove the side bolts from the serrated restraint ring. Use the tie bolts to determine the proper location of the restraint ring on the spigot Allow enough room on the tie bolt to fully engage the buts.

Install both half of the restraint ring at the proper location, tapping each half into place. Make sure that the complete ID is touching the pipe before installing the side bolts evenly to 60 ft-lbs (110 ft-lbs on 8, 10 and 12 inches diameters).

Place nuts on the tie bolts and tighten until they are snug. Allow enough room on the tie bolt to fully engage the nut with several threads showing. Do not tighten these bolts to force the spigot into the bell of the joint.

3.11 WATER PIPE

FITTINGS: AWWA C111, rubber-gasket joints, Ductile-Iron Joints: ASTM D3139 compression gasket ring.

TRACE WIRE: Magnetic detectable conductor, plastic covering, imprinted with “Water Line” in large letters.

FITTINGS: ASTM D2466, PVC.

JOINTS: ASTM D2855, solvent weld. PVC

TRACE WIRE: Magnetic detectable conductor, plastic covering, imprinted with “Water Line” in large letters.

DUCTILE IRON PIPE: AWWA C151, pressure class 350, centrifugally cast in metal molds or sand-lined molds, or C104, cement-mortar lining, as shown on the drawings or bid schedule.

FITTINGS: Ductile iron, standard thickness.

JOINTS: AWWA C111, rubber-gasket joints with rods.

JACKETS: AWWA C105 polyethylene encasement, double layer, half lapped, ½-inch polyethylene tape.

3.12 GATE VALVES

Manufacturers: American Darling, Mueller, Clow, or Waterous, or equal. Meet or exceed either AWWA C509 or C515, resilient seated gate valves 2 inch through 12 inch NPS, ductile iron body, trim, non-rising stem with square nut, single wedge, mechanical joint, flanged, or slip-on ends as specified in drawings, control rod, and extension box. Furnish one valve key per contract or delivery order as applicable.

3.13 BUTTERFLY VALVES

AWWA C504, rubber seated, iron body, bronze disc, resilient replaceable seat, water or lug ends, ten position lever handle.

Valve Type: Float operated, with operating pressures up to 1200 kPa, equal to APCA Air Release model 143C.

Valve Box: Concrete water meter box equal to Christy B-9 or San Diego.

3.14 COMBINATION AIR/VACUUM RELIEF VALVE

APCO, Combination Air Valve, 100 kPa, 150 psi, C.I., Model 140C single body, double orifice, cast iron.

3.15 GATE VALVE BOX

Manufacturer: Tyler Pipe or equal.

Two piece slip style valve box

5 ¼-inch nominal diameter

Length: Sufficient for depth of bury indicated on plans

Cover: Locking with pentagon nut and clearly marked as “water”

Acceptable Products: Equal to the following

Tyler Pipe 6855 valve box and lid

Rich 920 or 925 valve box and lid

Cast iron and of the sliding type, sized for use with the appropriate valve. Box shall extend from the body of the valve to the finished grade.

3.16 FIRE HYDRANT

Conform to AWWA C502, dry-barrel or C503 wet-barrel, as specified in drawings.

Bury length is to the nearest 6-inches from the bottom of the connecting pipe to the ground line of the hydrant.

Use two hose (2½ inch) and one pumper outlet (4 1/2 inch) nozzles with threads conforming to National Fire Protection Association (NFPA) 1963 for National Standard Fire Hose Coupling Screw Threads

The size of the hydrant is designated by the nominal diameter of the main valve opening. In no case shall the diameter of the main valve opening be less than 4 inches.

Inlet connection is 6 inch flanged or hub connection.

The direction of rotation of the operating nut to open the hydrant is left (counterclockwise).

Paint the exterior of the hydrant traffic or safety red.

The outlet nozzle cap and chain is bronze.

Equipped with break off Flange and check valve (Model/LBI 400A)

Furnish two hydrant wrenches per contract or delivery order as applicable.

Furnish two traffic safety flange repair kits including all couplings, flanges, gaskets and connections necessary to replace a broken safety flange.

3.17 FLUSH HYDRANT

Manufacturer: James Jones Company, Model J342, J344HP, or equal.

Conform to AWWA C503, wet-barrel.

Hydrant of bronze material.

Inlet connection is 2 inch or 4 inch flanged or hub connection.

Use one hose (2 1/2 inch) nozzle with threads conforming to National Fire Protection Association (NFPA) 1963 for National Standard Fire Hose Coupling Screw Threads.

Bury length is to the nearest 6 inches from the bottom of the connecting pipe to the ground line of the hydrant.

The direction of the rotation of the operating nut to open the hydrant is left (counterclockwise).

Paint the exterior of the hydrant traffic or safety red.

The outlet nozzle cap and chain is bronze.

Furnish two hydrant wrenches per job-site.

Galvanized Pipe Schedule 40 ASTM A120, Scotch Rap 50 per drawing.

Use Teflon compound on all joints.

3.18 BLOW-OFF HYDRANT

Manufacturer: Kupferle foundry Company. Substitutions will be permitted

3.19 WARNING TAPE

Supply detectable warning tape that is a minimum of 2 inches wide, blue or striped blue, and have a printing that warns of a water line below.

3.20 PIPELINE MARKER POSTS

Equal to Carsonite composite utility marker CUM-375, blue color.

3.21 PRESSURE REDUCING VALVE

Manufacturer: CLA-VAL. Substitutions will be permitted.

3.22 AIR RELEASE VALVE ASSEMBLIES

Valve Material: Cast iron. Valve Type: Float operated, equal to APCO Air Release model 143C. Valve Box: Concrete water meter box equal to Christy B-9 or San Diego 37b.

3.23 COMBINATION AIR VALVE

APCO, Combination Air Valve, 150 psi, C.I., Model 143C, single-body, double orifice, cast iron.

3.24 STEEL PIPE ENCASEMENT

ASTM A53, schedule 40 black steel pipe.

3.26 TRACER WIRE AND BOX

Wire: Provide #10 AWG jacketed solid copper wire, type THHN/THWN. Box: Provide 4 inch Schedule 40 PVC pipe and a 4-inch PVC threaded watertight plug as a box for terminations or junctions of tracer wire. Splice Kit: Use underground waterproof splice materials.

3.27 ACCESSORIES

Thrust Blocks: Refer to Cast-In-Place Concrete

Marker Post

Manufacturers: Carsonite, Greenline

Flexible fiberglass, dual-sided.

Blue decal label on both sides as specified in drawing.

Protection Post

Black iron, 3 inch diameter, 6 feet long, buried 3 feet.

Cover each post at the top with 2 coats of yellow reflectorized paint or tape for a band 3 inches wide.

Metallic Tracer Tape, magnetic detectable conductor, copper tracer wire, plastic covering, imprinted with "Water Line" in large letters.

PART 4 - EXECUTION

4.01 DELIVERY AND OFF-LOADING

All pipe shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the owner or engineer.

All pipe shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the owner or engineer.

Each pipe shipment should be inspected prior to unloading to see if the load has shifted or otherwise been damaged. Notify owner or engineer immediately if more than immaterial damage is found. Each pipe shipment should be checked for quantity and proper pipe size, color, and type.

Pipe should be loaded, off-loaded, and otherwise handled in accordance with AWWA M23, and all of the pipe supplier's guidelines shall be followed

Off-loading devices such as chains, wire rope, chokers, or other pipe handling implements that may scratch, nick, cut, or gouge the pipe are strictly prohibited.

During removal and handling, be sure that the pipe does not strike anything. Significant impact could cause damage, particularly during cold weather.

If appropriate unloading equipment is not available, pipe may be unloaded by removing individual pieces. Care should be taken to insure that pipe is not dropped or damaged. Pipe should be carefully lowered, not dropped, from trucks.

4.02 HANDLING AND STORAGE

Any length of pipe showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. Damaged areas, or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by the owner or engineer.

Any length of pipe showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. Damaged areas, or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by the owner or engineer.

Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the owner or engineer.

Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter.

Pipe shall be handled and supported with the use of woven fiber pipe slings or approved equal. Care shall be exercised when handling the pipe to not cut, gouge, scratch or otherwise abrade the piping in any way.

If pipe is to be stored for periods of 1 year or longer, the pipe should be shaded or otherwise shielded from direct sunlight. Covering of the pipe which allows for temperature build-up is strictly prohibited. Pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excess heat accumulation.

4.03 PREPARATION PRIOR TO MAKING INTER-CONNECTIONS

Approximate locations for existing piping systems are shown in the construction documents. Prior to making connections into existing piping systems, the contractor shall:

Field verify location, size, piping material, and piping system of the existing pipe.

Obtain all required fittings, which may include saddles, sleeve type couplings, flanges, tees, or others as shown in the construction documents.

Have installed all temporary pumps and/or pipes in accordance with established connection plans.

Unless otherwise approved, new piping systems shall be completely assembled and successfully tested prior to making connections into existing pipe systems.

4.04 PIPE SYSTEM CONNECTION

Pipe connections shall be installed per applicable standards and regulations, as well as per the connection manufacturer’s guidelines and as indicated in the construction documents. Pipe connections to structures shall be installed per applicable standards and regulations, as well as per the connection manufacturer’s guidelines.

4.05 CURVATURE OF THE PIPELINE:

There are three common methods used to achieve changes in direction with PVC-O Pressure Pipe. They are: using PVC Fittings, deflecting the joint, and bending the pipe barrel.

4.06 USING PVC FITTINGS:

Pipeline Curvatures can be achieved by using PVC Fittings. Standard elbows for molded fittings include 22 1/2, 45 and 90 degrees. The cut lengths and radii are as follows:

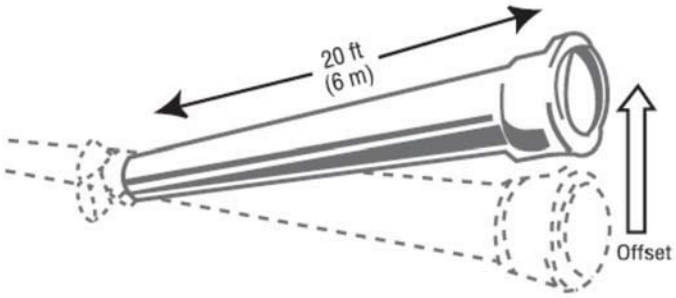
Size		Cut Length		Radius	
in	mm	in	mm	ft	m
6	150	36	910	22	6.7
8	200	36	910	21	6.3
10	250	42	1070	26	7.9
12	300	48	1220	30	9.2
14	350	60	1520	40	12.2
16	400	72	1830	48	14.6
18	450	74	1870	49	14.8
20	500	82	2080	54	16.5
24	600	98	2480	67	20.3

4.07 DEFLECTING THE JOINT:

The procedure for offsetting pipe gasketed joint is shown below. Warning: “DO NOT COMBINE THIS METHOD WITH BENDING THE PIPE BARREL”.

Make a concentric assembly, but push the spigot into the bell only to a point about ½ inch (13 mm) short of the reference line (the first reference line if there are two). This incomplete assembly permits more movement of the end of the pipe at the bottom of the bell.

Without delay, shift the loose bell end of the assembled length by not more than the following recommended maximum offsets. Use only manual effort.



MAXIMUM RECOMMENDED OFFSETS, TO ACHIEVE MINIMUM CURVE RADUIS BY DEFLECTING A STRAIGHT LENGTH OF PIPE AT THE JOINT.

Bell-by-Bell fittings such as tees and couplings offer a total of 2° deflection per fitting.

Pipe Size		Max Offset		Angle at One Bell	Resulting Radius of Curvature Using 20ft (6m) Lengths	
in	mm	in	mm			
4	100	12½	320	3°	382 ft	116 m
6	150	12½	320	3°	382 ft	116 m
8	200	12½	320	3°	382 ft	116 m
10	250	12½	320	3°	382 ft	116 m
12	300	10½	270	2.5°	458 ft	140 m
14 - 24	350 - 600	6¼	160	1.5°	764 ft	233 m
30 - 48	750 - 1200	4	100	1.0°	1146 ft	349 m
At Molded PVC Fittings (all sizes)		4	100	1.0°**	1146 ft	349 m

4.08 BENDING THE PIPE BARREL:

Smaller diameters of PVC-O Pressure pipes can be laid to the line of the curved trench by bending the pipe barrel into curved shape. The procedure is as follows:

Make a concentric assembly in the usual way. Keep the spigot in straight alignment with the bell.

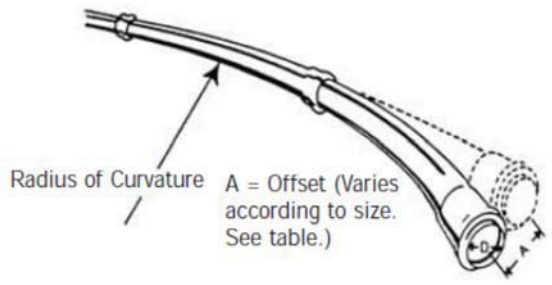
Place compacted backfill around the assembled joint to restrict its movement while the curvature is being made.

Place compacted backfill at the inside of the curve, at the midpoint of the pipe length, to form a fulcrum.

Using only manual effort, move the leading bell of the pipe length to be curved by no more than the offset distance shown in the following table below.

Tapping bent PVCO pipe is permitted BUT it is recommended to tap on straight or not bended pipe.

NOTE: Bent Pipes should be clearly marked along their length to avoid the possibility that they will be tapped in the future.



MAXIMUM RECOMMENDED OFFSETS, TO ACHIEVE MINIMUM RADII OF CURVATURE BY BENDING THE BARREL OF 20 ft (6 m) LENGTHS.

TAPPING FOR POTABLE AND NON-POTABLE WATER APPLICATIONS

CIOD Pipe – Blue Brute™ & Bionax® C909 Pipe

Pipe Size D		Max Offset		Resulting Angle of Deflection	Resulting Radius of Curvature	
in	mm	in	mm		ft	m
4	100	24	600	5.7°	100	30
6	150	17	430	4.0°	144	44
8	200	13	300	3.0°	188	58
10	250	10	254	2.5°	232	71
12	300	8.7	221	2.1°	275	84

NOTE: Minimum radius is approximately 250 times nominal OD

IPS OD Pipe – Cycle Tough™ F1483 Pipe

Pipe Size D		Max Offset A		Resulting Angle of Deflection	Resulting Radius of Curvature	
in	mm	in	mm		ft	m
4	100	32	813	7.6°	75	23
6	150	22	560	5.2°	111	34
8	200	17	430	4.0°	144	44
10	250	13	330	3.2°	179	55
12	300	11	280	2.7°	213	65

NOTE: Minimum radius is approximately 200 times nominal OD

** SDR and DR both refer to the outside diameter of the pipe divided by pipe thickness:* O.D.

Tapping shall be performed using standard tapping saddles designed for use on PVC piping in accordance with AWWA C605. Tapping shall be performed only with use of tap saddles or sleeves. NO DIRECT TAPPING WILL BE PERMITTED. Tapping shall be performed in accordance with the applicable sections for saddle tapping as per "Uni-Pub-8: Tapping Guide for PVC Pressure Pipe by Uni-Bell PVC Pipe Association".

All connections requiring a larger diameter than that recommended by the pipe supplier, shall be made with a pipe connection as specified and indicated on the drawings.

Equipment used for tapping shall be made specifically for tapping PVC pipe:

Tapping bits shall be slotted "shell" style cutters, specifically made for PVC pipe. 'Hole saws' made for cutting wood, steel, ductile iron, or other materials are strictly prohibited.

Taps may be performed while the pipeline is filled with water and under pressure ('wet' tap,) or when the pipeline is not filled with water and not under pressure ('dry' tap).

4.09 EXAMINATION

Verify existing water main size and location.

4.10 DELIVERY, STORAGE AND HANDLING

Ensure that pipe is free from defects and damage at time of delivery and prior to installation in the trench.

Remove all defective pipes from the site within 24-hours of discovery.

Handle pipe with padding between metal machinery and pipe.

Keep dirt and foreign matter away from the pipe interiors and sealing surfaces.

Lower pipe carefully into the trench without dropping, rolling or dumping.

4.11 PREPARATION

Cut pipe ends square, ream pipe and tube ends to full pipe diameter, and remove burrs.

Remove scale and dirt on inside and outside before assembly.

Prepare pipe connections to equipment with flanges or unions.

4.12 BEDDING

Excavate pipe trench in accordance with Section 00250 (Excavating, Trenching and Backfilling). Hand trim excavation for accurate placement of pipe to elevations indicated.

Backfill around sides and to top of pipe with bedding material and tamp in place.

Maintain optimum moisture content of bedding material to attain required compaction density.

4.13 INSTALLATION - WATER MAIN

Maintain separation distances of water main from sewer pipe as per American Samoa Environmental Protection Agency specifications.

Route pipe in straight line.

Install pipe to allow for expansion and contraction without stressing pipe or joints.

Install water mains and appurtenances in the locations and of the sizes and materials shown on the drawings and bid schedule.

Ensure that ends of pipe in the trench are plugged during all work interruptions and all other times necessary to prevent soil, rodents and trench water from entering the pipeline or contaminating the joints.

Promptly remove all debris that enters the pipeline and swab the area with a 1% hypochlorite solution.

Install pipe with a minimum cover depth of 36-inches measured from finished grade to top of pipe.

Install thrust restraint on all fittings and appurtenances. Contractor’s option of the following unless specifically noted on the plans:

Concrete Thrust Blocks:

Pour thrust blocks against the fitting and undisturbed earth.

Place concrete thrust blocks so that the pipe and joints will be accessible for repair.

Install rebar around the fitting and embed rebar inconcrete thrust block as shown on detail drawings.

Use full 20-foot sections of pipe out of fittings or valves, otherwise use restrained joints within 20-feet of fitting or valve.

Special Anchoring Retainer Glands:

Install in accordance with manufacturer's recommendations.

Project Engineer may specify that an additional; restraint be used for pipe sections near critical fittings.

Joint Restraint Rodding ("shackle rods")

Rod from hydrant tees to ears on the hydrant base elbow.

Rod from fitting to fitting.

Install tie bolts to connect tie rods, if required.

Install duct lugs where required to increase the width of the rodding.

Paint rods and hardware with two coats of bituminous coating.

Install fully restrained push-on joints where specifically noted on the plans or if the mains are explicitly called out as "fully restrained" in the bid schedule.

Horizontal Pipe Deflection:

PVC:

AWWA C900 Water Main may be deflected in accordance with AWWA C605, for sizes 4-inch through 10-inch.

Normal Size	Minimum Bending Radius	Offset per 20' Length
4 in.	100 ft.	23 in.
6 in.	144 ft.	16 in.
8 in.	189 ft.	12 in.
10 in.	231 ft.	10 in.

Deflection will not be permitted at the joint and must be via a continuous arc of constant radius.

Ductile Iron

Ductile iron push-on joints mains may be deflected in accordance with the manufacturer's recommendations and AWWA C600.

Deflection will occur at the push-on joint.

Normal Size	Max Deflection	Offset per 20' Length
3 in. through 12 in.	5˚	21 in.
14 in. and larger	3˚	12 in.

Install access fittings per Section Disinfection of Water Main System.

Form and place concrete for thrust restraints at each elbow or direction change of pipe main.

Install Metallic Tracer Tape buried continuously at 12 inches below finish grade.

Backfill per Section Excavating, Trenching and Backfilling.

Install marker post at all bends, gate valves…etc. as shown on details.

Provide accurate As-built Drawings and Reference Points to accurate locations with a minimum of 2 points for minor and 3 points for major appurtenances.

4.14 VALVE, VALVE BOX AND MARKER INSTALLATION

Install valves at location indicated on the plans.

Support gate valves on a pre-cast block during assembly, and thrust block and rebar or fully restrain the valve.

Set valves on solid bearing.

Install thrust blocking and rebar as shown in the drawings.

Center and plumb valve box over valve. Set box cover as specified in drawings.

Set valve Marker Post Installation:

Flush with finish grade elevation.

Flush with the surfaced street.

2-inches below the level of an unimproved street.

3.07 VALVE MARKER POST INSTALLATION:

Set post with 18-inches of post above grade with “V” pointing toward gate valve.

Paint the marker post “safety blue”.

Stencil the size of the valve and the distance to the valve on the post with 2-inch tall black lettering.

Install every 300 feet or as directed by the Engineer.

Install concrete collar around gate valve lid.

4.15 FIRE HYDRANT INSTALLATION

Set hydrants plumb. Locate pumper nozzle perpendicular to and facing roadway.

Set hydrants to grade with nozzles at least 20 inches above ground.

Connect auxiliary gate valve to tee and hydrant to gate valve using a 3-foot section of 6-inch water main pipe on each unless otherwise indicated on the plans.

Fully restrain joints between tee and auxiliary gate valve, and between auxiliary gate valve and hydrant.

Set hydrant on precast concrete block.

Set hydrant with the traffic flange at an elevation of 1 to 3 inches above finished grade.

Place gravel, a minimum of 18 cubic feet per hydrant, from 18 inches below to 6 inches above the weep hole opening.

Paint hydrants in accordance with local code, or as specified by the engineer.

4.16 FLUSH HYDRANT INSTALLATION

Set hydrants on solid bearing.

Install hydrants plumb with the pumper nozzle as indicated in the plans. Where grade is established, set the hydrant to an elevation with the nozzles approximately 3 feet above the ground or sidewalk level. Where grades are not established, set the hydrant to the elevation established by the Project Engineer.

Provide each hydrant with protection posts as specified in drawings.

4.17 WARNING TAPE INSTALATION

Install warning tape in water main trench 1-foot below finish grade, centered over the pipeline.

4.18 PIPELINE MARKER POST INSTALLATION

If the pipeline is not in a roadway or sidewalk and is in an unimproved area, install Carsonite marker posts at 500-foot intervals along the pipeline, centered over the pipe.

If the pipeline is under a traveled roadway, install the marker posts offset from the pipe at a consistent distance.

Allow 36-inches of the post to be exposed above grade.

Stencil the water main information, including offset distance, diameter of pipe, and pipe material neatly on the post.

4.19 PRESSURE AND LEAKAGE TESTING

Whenever practical, before backfill is placed or joint covered, test pipe for leaks.

Furnish necessary material, equipment, labor for testing including, but not limited to: water, pump, water storage vessel, piping, two water pressure gauges, valve hydrant, graduated container and corporation stops.

Water pressure gauges shall be liquid filled with 5 psi or less increments.

Pump shall be of a design that limits introduction of air. Defective equipment shall be replaced.

Test mains and have equipment fully prepared prior to calling the Project Engineer or his representative on site to witness the passing of a test. Notify Project Engineer 48 hours prior to pressure testing of any section.

Test Duration: 2 hours minimum

Maximum length of test section: 1,000-feet. Longer length may be tested, but the allowable leakage shall be limited to the 1,000-foot length.

Maximum allowable pressure differential: A pressure differential no greater than 25 psi above the test pressure will be allowed due to elevation changes unless approved by the Engineer.

TESTING PROCEDURE:

Fill test section with potable water at a velocity below 1ft/s.

Expel all air from the test section.

Install corporation stops at high points if necessary to facilitate removal, and cap off after successful completion of the test

Verify that all fire hydrant lead valves and main valves within the test section are open.

Pressurized the main to 150 psi or to the pressure class or rating of the pipe as measured at the lowest elevation along the test section, whichever is less.

If pressure drops more than 5 psi during the test, immediately re-pressurize the line to the original test pressure and continue test, and record amount of water required to re-pressurize the line. Two water pressure gauges are required to verify pressurization.

At the end of the test, re-pressurize the line to the original test pressure, and record amount of water required to re-pressurize the line.

Method of Water Measurement: Supply a means of accurate water measurement that is compatible with the pressurizing equipment (e.g. pump and hoses), such as a water meter or a water container with graduations.

Add total amount of water required to re-pressurize the line during and at the end of the test and compare with the allowable leakage as calculated below.

Allowable Leakage Determination

$L = (N*D*P^{1/2})/7400$

Allowable Leakage (gph)

N = Total Length Tested Divided by the Standard Pipe Length

D = Nominal Diameter of Pipe (inches)

P = Test Pressure (psi)

Example Allowable Leakage Chart Using Formula Above

PVC and DI Pipe with 20-foot sections

Allowable Leakage/ 1000 feet (gph)				
Pipe Diameter, D	P = 100 psi	P = 150 psi	P = 200 psi	P = 250 psi
4 inch	0.27	0.33	0.38	0.43
6 inch	0.41	0.50	0.57	0.64
8 inch	0.54	0.66	0.76	0.85
10 inch	0.68	0.83	0.96	1.07
12 inch	0.81	0.99	1.15	1.28

Repair, at no cost to owner, any section of the line that fails this test.

Repair any visible leakage, regardless of the result of the leakage test.

Retest all repaired sections of line, at no cost to the owner, until pressure test is successfully completed.

Complete pressure test certification forms and submit to Project Engineer within five (5) days of pressure test.

4.20 FLUSHING WATER MAINS

Flush with potable water to provide 3 volumetric exchanges in the pipeline at a minimum velocity of 3 feet per second.

“Pig” line after flushing if sediment or debris is still visible in the discharge.

4.21 DISINFECTION OF WATER MAINS

Disinfect in accordance with one of the methods outlined in Section 5 of AWWA C651

CONTINUOUS FEED METHOD:

Feed a chlorine solution into water entering the main such that the water will have a 25-mg/L free chlorine concentration.

Continue feeding until the entire pipeline to be disinfected is filled with the chlorinated water.

At the end of 24-hours, there must be at least 10-mg/L free chlorine residual as evidenced by residual tests taken at approximately 1200 feet intervals along the main.

SLUG METHOD:

Feed a chlorine solution into water entering the main such that the water will have a 100-mg/L free chlorine concentration.

Apply the solution continuously and sufficiently to ensure that a column of water with 100mg/L free chlorine residual is formed in the pipe.

Ensure that all parts of the main and its appurtenances are exposed to the column for at least 3-hours.

Check the residual of the column at 1200 feet intervals along the main. If it drops below 50mg/L, inject additional chlorine solution into the entire column such that its residual is raised to 100 mg/L.

For test methods 2 and 3 in Article 3.12 Paragraph A, ensure that the chlorine solution is introduced within 10-feet of the end of the section being disinfected and for all cases is being withdrawn or wasted from the most extreme point relative to the point of water introduction. If branches exist, ensure that the chlorinated solution reaches all portions of the branches.

After disinfection, flush chlorinated water from the pipe in an environmentally safe manner. In no case shall direct disposal to a surface water be permitted.

Check the chlorine residual at time of disposal.

If disposal is to the ground surface or ditch, neutralize the chlorine residual if the free residual is above 1 mg/L.

Use the following neutralization chemical schedule:

- Sulfur dioxide at 0.8 lb/100,000 gals/mg/L of free chlorine
- Sodium Bisulfite at 1.2 lb/100,000 gals/mg/L of free chlorine
- Sodium Sulfite at 1.4 lb/100,000 gals/mg/L of free chlorine
- Sodium Thiosulfate at 1.2 lb/100,000 gals/mg/L of free chlorine
- Continue flushing until the residual reaches distribution system levels.

After disinfecting and flushing but before the water main is placed in service, collect and test water samples for bacteriological quality.

Sample in accordance with the Standard Methods for Examination of Water and Wastewater.

Take two consecutive batches of tests, 24 hours apart.

Collect samples from each pipe end and at approximately 1200 feet intervals along each main.

Deliver samples to a state certified testing lab and provide Project Engineer with results within 24 hours of laboratory results.

Regardless of the chosen testing method, if initial disinfection fails to produce satisfactory bacteriological results, re-chlorinate the mains and branch lines, flush and take new samples until satisfactory results are obtained.

Do not place main in service until the Project Engineer has received safe bacteriological results.

4.22 TRACING WIRE INSTALLATION

Install with all PVC, Ductile Iron, and HDPE Pipe.

Provide a minimum of three attachments to the pipe per pipe length with duct tape or install in the initial backfill layer 6-inches above and along the pipe centerline.

Avoid underground splices, but where necessary, make splices with an underground, waterproof splice kit.

Provide riser boxes at maximum intervals of 1000 feet or at fire hydrant locations.

Install an independent tracing wire line between each tracing wire box in each direction of pipe.

Bring tracing wire a minimum of 18 inches above ground surface directly behind each hydrant using box construction specified.

Install box to elevation that will not interfere with operation and maintenance of the hydrant.

4.23 CONNECTION TO EXISTING WATER MAINS

Make the necessary arrangements with ASPA a minimum of three (3) working days prior to any connections to any water mains.

Do not start work until all the materials, equipment, and labor have been assembled on the site. When work is started on a connection, proceed continuously without interruption, and as rapidly as possible until completed.

If the connection to the existing system involves turning off the water, notify affected customers 24 hours in advance. No shutoff of mains will be permitted overnight, over weekends, or on Federal and holidays. Water shut-off is limited to 4 hours maximum.

Make connections to existing water mains in a neat, workmanlike manner to suit actual conditions encountered at the existing main. Adhere to manufacturer's recommendation to avoid damage to pipe coating when wet or dry tapping. Leave a smooth end at right angles to the axis of the pipe.

Prevent the existing main from being contaminated when making the connection. Take all action necessary to prevent trench water, mud or other contaminants from entering the connection line or main at any time.

Spray or swab all connection components with a 1% hypochlorite solution prior to installation.

Visually inspect any joint not pressure tested for leakage.

Test under system pressure prior to backfilling.

4.24 UNIT PRICE - MEASUREMENT AND PAYMENT

PVC Water Main:

Paid by the linear foot, measured to the nearest foot. Includes trench excavation, placement of bedding material (quantity of imported bedding material required, if any, will be paid separately under its own Line Item), hand trimming, pipe, fittings, thrust blocks, water main metallic tracer tape, marker posts, hydrostatic testing, disinfection, backfilling, as-builts, site cleanup, bacteriological sampling and testing, and all appurtenances not otherwise specified in the bid schedule.

Ductile Iron Water Main:

Paid by the linear foot, measured to the nearest foot. Includes trench excavation, placement of imported bedding material (quantity of imported bedding material required, if any, will be paid separately under its own Line Item), hand trimming, pipe, fittings, thrust blocks, jacket, water main metallic tracer tape, marker posts, hydrostatic testing, disinfection, backfilling, as-builts, site cleanup, bacteriological sampling and testing, copper wire conductor on top of pipe, and all appurtenances not otherwise specified in bid schedule.

Fire Hydrant Assembly:

Paid by the unit, measured to the whole unit. Includes excavation, angle fire hydrant valve, gate valve and box, hydrant wrench, gate valve key, thrust blocks, connection to water main, gravel, concrete, backfilling, protection post, as-builts, site cleanup, and other appurtenances necessary to make a workable installation.

Flush Hydrant Assembly:

Paid by the unit, measured to the whole unit. Includes excavation, angle flush hydrant valve, galvanized pipe, gate valve and box, hydrant wrench, gate valve key, thrust blocks, connection to water main, gravel, concrete, backfilling, protection posts, as-builts, site cleanup, and other appurtenances necessary to make a workable installation.

Gate Valve and Box:

Paid by the unit, measured to the whole unit. Includes excavation, gate valve, gate valve key, box, thrust blocks, protection posts, backfilling, as-builts, site cleanup, and other appurtenances as necessary.

Pressure Reducing Valve (PRV):

Paid by the unit, measured to the whole unit. Includes excavation, pipe, vault, two gate valves (one upstream, one downstream from PRV), gate valve key, boxes, thrust blocks, fittings, protection posts, backfilling, as-builts, site cleanup, and other appurtenances as necessary.

Air Release Combination Valve:

Paid by the unit, measured to the whole unit. Includes excavation, pipe, vault, air release combination valve, fittings, marker posts, double strap saddle, corporation stop, and connection to the water main, backfilling, as-builts, site cleanup, and other appurtenances as necessary.

Connection to Existing Water Main:

Paid by the unit, measured to the whole unit. For the purposes of this contract, a water main is defined as larger than 2 inches in diameter. Includes excavation, removal and disposal of existing water main and fittings, locating existing valves, draining existing water mains, coordinating shut-down with local utility authority, fittings, disinfection, backfilling, as-builts, site cleanup and other appurtenances as necessary.

Steel Pipe Encasement:

Paid by the linear foot, measured to the nearest foot. Includes trench excavation, placement of imported bedding material (quantity of imported bedding material required, if any, will be paid separately under its own Line Item), hand trimming, encasement pipe, fittings, thrust blocks, marker posts, backfilling, as-builts, site cleanup, and all appurtenances not otherwise specified in bid schedule.

SECTION 00260

VALVES, FITTINGS AND APPURTENANCES

PART 1 - GENERAL

1.01 SCOPE OF WORK

Work required under this section consists of furnishing and installing valves, gates and appurtenances of the following types:

Gate valves
Check valves
Altitude valves
Pressure reducing valves
Air release and vacuum valves
Hose valves
Service saddles
Corporation stops
Curb stops
Valve boxes
Pressure gauges
Water metersFire hydrants
Pipe Hangers and Saddles

1.02 SUBMITTAL REQUIREMENTS

The Contractor shall submit shop drawings, manufacturer's literature, samples, certificates and guarantees.

1.03 OPERATING AND MAINTENANCE INSTRUCTIONS

The Contractor shall furnish operating and maintenance instructions and parts lists.

PART 2- MATERIALS

2.01 GENERAL

All valves 2-l/2" and smaller in diameter shall be provided with screwed ends. All valves larger than 2-1/2" in diameter shall have flanged or bell ends unless otherwise indicated on the Drawings or in these Specifications. Flanges shall be dimensioned, faced and drilled in accordance with ANSI B16.1 for class 125 unless stated otherwise on the Drawings or the Specifications. All necessary caulking materials, gaskets, bolts, and nuts shall be provided.

Valves shall be carefully installed in their respective positions, accessible for operation and repair, and free from all distortion and strain, with joints made as specified, and shall be left in satisfactory operating condition. The valves or gates shall be connected to floor stands where required. All stem guides shall be accurately aligned.

All valves, fittings, hydraulic and electric operators, and all other materials shall be protected from damage and corrosion before installation and until completion of work. After installation, all valves except bronze valves and those underground shall be painted in accordance with the painting requirements and color code for the pipelines of which they are a part. Bright or rubbing surfaces shall not, however, be painted, but shall be protected with an approved lubricant.

Valves and gates shall be supplied with suitable operating keys, levers, extension rods, floor boxes, hand wheels or chain operators as indicated on the Drawings or in these Specifications.

2.02 GATE VALVES

All double disc gate valves shall have their stems in a vertical position or be designed for proper operation in the positions shown on the Drawings and shall have the same clear internal diameter as the pipe on which they are placed.

All gate valves 2-1/2 inches in diameter and smaller shall be all brass or bronze, except the hand-wheel, which shall be of die cast aluminum. Valves shall be of the double disc type with rising stems and shall be rated for 200 psi non-shock cold water. Valves shall be Kennedy 251, Stockham Figure B106, or approved equal. Gate valves 3 inches in diameter or larger shall be iron-body, resilient seated, non-rising stem type and shall conform to AWWA C509. Valves shall have mechanical joint ends and gaskets conforming to AWWA C111 or flanged joint ends. Buried valves shall have a 2-inch operating unit and OPEN LEFT. An operating hand-wheel shall be provided with each flanged gate valve installed above ground. A permanently attached extension rod with operating nut shall be installed on all valves deeper than 4 feet below finished grade to ring the nut to within 1 foot of the surface. Valves shall be Dresser, Mueller, Clow or equivalent. All cast iron body gate valves shall be asphalt coated to prevent corrosion. All ductile iron body gate valves shall be fully epoxy coated both on the interior as well as the exterior for maximum corrosion protection.

2.03 CHECK VALVES

Check valves shall be wafer style, spring loaded, and center stem guided type for bolting between adjacent flat face flanges. Bodies shall be semi-steel, plugs and seats shall be bronze, and springs shall be stainless steel. Flow area through the body shall be equal or more than the cross-section of the equivalent pipe size. Check valves shall be APCO Series 3000 or equal.

2.04 ALTITUDE VALVES

Altitude valves shall be of the hydraulically operated, pilot controlled, single seated, diaphragm type, globe valves (with resilient disc) and shall control the high water level in tanks and reservoirs without the need for floats or other devices. It shall be a non-throttling type valve and remain fully open until the “shut-off” point in the tank or reservoir is reached. The valve shall be designed as a two-way or one-way as shown in the drawings.

General Valve Description. The main valve shall be a single diaphragm actuated, globe pattern. The valve shall consist of three major components: the body, with seat installed; the cover with bearings installed and the diaphragm assembly.

The shall contain a resilient, synthetic rubber disc, having a rectangular cross-section contained on three and one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. No O-ring type discs, circular, square or quad type shall be permitted as the seating surface. The disc guide shall be of the contoured type to permit smooth transition of flow and shall hold the disc firmly in place. The disc retainer shall be of a sturdy one-piece design capable of withstanding opening and closing shocks. It must have a straight edge sides and a radius at the top edge to prevent excessive diaphragm wear as the diaphragm flexes across this surface.

The diaphragm assemble containing a non-magnetic 303 stainless steel stem shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. The seat shall be solid, one-piece design and shall have a minimum of a five degree taper on the seating surface for a positive, drip-tight shut off. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from the line pressure.

Pilot Valve Description. The altitude valve pilot control shall be of a diaphragm-actuated, three-way type that operates on the differential force between the height of the water in the tank or reservoir and an adjustable spring-load. The spring-load shall be an arrangement of smaller springs on a plate within the control. At least five different adjustment ranges shall be available with this configuration. When actuated the pilot control shall vent the cover of the main valve to atmosphere through the internal working of the pilot control to open the valve wide. When the desired level in the tank or reservoir is reached, the static height of the tank shall head through a sensing line connected directly to the tank or reservoir. When the control shifts at high water level supply pressure shall be directed into the valve cover through the internal workings of the pilot control to close the valve. The pilot control senses the tank or reservoir head by means of a sensing line connected between the pilot control and the tank or reservoir. A full range of spring settings shall be available in ranges of up to 200 feet.

Type of End Connections. All altitude valves shall have 250# flanged ends in accordance with ANSI B16.1 Standard.

Material. Cast iron used to manufacture the valve body and cover shall meet or exceed the requirements of ASTM A-536 and ANSI B16.42. The bronze used in the manufacture of the valve seat shall meet or exceed the requirements of ASTM B62 and ANSI B16.24. The stainless steel used to manufacture the valve steam shall be type 304 meeting or exceeding the requirements of ANSI B16.5. The disc shall be made of Buna-N™ rubber. Exterior and interior coating shall be FDA approved epoxy applied in accordance with AWWA C550-90. Manufacturer. The valve shall be manufactured by Cla-Val Co. or approved equal.

2.05 PRESSURE REDUCING VALVES

Pressure reducing valves shall be hydraulically operated, pilot-controlled, diaphragm type. Valves shall be modulating, hydrostatic pressure pilot controlled, and globe pattern as indicated on the Drawings. Pressure reducers shall be Clayton 90G-01AB, Class 250 or equal.

2.06 AIR RELIEF VALVES

Air Relief valve must be corrosion resistant. Must be top quality thermoplastics and elastomers that could resist chemical attack to protect system purity. Air relief valve must no metal components

Air Relief / Air Vacuum Valve must be PLAST-O-MATIC Model ARV100EPT-PV "or" ASPA approved equal

2.07 HOSE VALVES

Hose valves 3/4-inch in size shall be rough brass or bronze with composition disc and hand-wheel. Valves shall be Crane No. 58, Kennedy or other equivalent.

Hose valves one (1) inch in size and larger shall be wedge disc, 200 psi cold water class with full diameter seat openings. Valves shall be Crane No. 451, Lunkenheimer or other equivalent. Free-standing yard type hose valves shall be 1-inch size, 40-inch high non-freeze post hydrants; J.R. Smith No. 5913, Murdock M-100, Zurn or other equivalent.

2.08 SERVICE SADDLES

On pipe with nominal pipe size 6-inches and smaller, service saddles shall be ductile iron, double strap construction. Saddles shall be Rockwell Type 311, Mueller or other equivalent for Mueller thread.

On pipe with nominal pipe size 8-inches and larger, service saddles shall be ductile iron, double strap construction. Saddles shall be Rockwell Type 313, Mueller, Dresser or other equivalent.

2.09 CORPORATION STOPS

Corporation stops shall be compatible with the type and class of service piping and service saddle used for the connection. For plastic service piping, a stainless steel insert shall be provided with each corporation stop. Corporation stops shall be Mueller, Hayes, Crane or equivalent product with "Mueller Threads".

2.10 CURB STOPS

Curb stops and meter stops shall be compatible with the type and class of service piping used. Curb stops shall be Mueller H-10201 or H-15207, Hayes or other equivalent.

2.11 VALVE BOXES

Valve boxes shall be furnished and installed on all buried valves in the locations shown on the Drawings. Valve boxes shall be concrete traffic-type boxes with cast iron lid on ring seat. The cover shall be marked "WATER". Concrete extension pieces shall be provided with each box as required. Cast iron or PVC pipe extensions may be used for deep bury conditions for valve boxes. Gate Valve boxes shall be 12 inches long. Diameter shall be 10-3/8" minimum with 9" throat diameter. Valve boxes shall be Christ, Model GS, Brook Model 3RT, or equivalent.

2.12 PRESSURE GAUGES

All pressure gauges shall be 3-1/2" minimum dial with black enamel finish with chrome-plated ring. Accuracy shall be 1/2 of 1 percent of scale range. Range shall be 0-100 psi. The movement shall be constructed of stainless steel and Monel, rustproof and corrosion resistant and equipped with recalibration mechanism. Mounting shall be as indicated on the Drawings. Gauges shall be furnished with suitable mounting brackets when flush or wall mounted. All gauge mounting locations shall have 1/4", female connection, tee handle shut-off cocks installed between gauge and gauge tap. Gauges shall be Marsh Type 10-ounce "Mastergauge," Marshalltown Figure 23, Ashcroft Duraguage 1279, or equal.

2.13 FIRE HYDRANTS

Wet Barrel Hydrants: Hydrants shall be wet barrel, Clow "Ranger" Model 960 or equal and comply with AWWA C503. Hydrants shall have two 2-1/2 inch hose connections and one 4-1/2 inch pumper connection. The end of the 6-inch bury elbow either mechanical joint or flanged as shown on the Drawings. Bury section lengths shall be as shown on the Drawings.

Exterior parts of the hydrant shall be covered with two coats of red paint matching existing hydrants. All hydrant parts shall be distinctly marked with its name, part number, length, size, and marker's name. The markings shall be on cloth tags securely fastened to the parts with wire or shall be painted on the parts by such other means as will ensure positive identification of the parts on delivery.

Hydrant Guard Post: Four-inch diameter steel pipe shall be used to fabricate hydrant guards. Refer to Standard Drawings for construction details. Hydrant guards shall painted with one coat of suitable primer and two (2) coats of optic yellow enamel paint. Place the hydrant guard posts so the hydrant is located in the center of the guard.

Remove Existing Hydrants: Hydrants that are to be taken out of service as a result of new construction shall be pressure washed inside and out and delivered to the ASPA storage yard.

2.14 PIPE HANGERS AND SADDLES

Pipe hangers shall be designed to support cast iron pipe. They shall be adjustable clevis type fabricated from carbon steel. Hangers shall be Grinnell Figure 590 or equal, and they shall be suspended by 3/8-inch threaded rod from ceiling flanges, Grinnell Fig. 128 R or equal.

Pipe saddle supports shall be designed to support cast iron pipe. They shall be adjustable with cast iron saddle, locknut nipple, and reducer to fit 3-inch pipe stanchion and allow vertical adjustment of approximately 4-1/2 inches. The stanchion shall be fitted with a companion flange for bolting to concrete piers. Pipe saddle supports shall be Grinnell Figure 264 or equal.

2.15 METER BOXES

Meter boxes shall be constructed of HDPE. Boxes shall be as manufactured by Carson Industries, La Verne, California, or approved equal. Box shall be Part Number 1419B-1. Cover shall be non-hinged type capable of locking, Part Number 1419-3B.

All fittings for installation of the meter shall be provided and installed at the box. Meters shall be provided and installed by the owner. Specific meters to be provided shall be selected following start of construction, but before meter boxes are to be installed.

2.16 WATER METERS

Meters must be SENSUS OMNI T2 or approve equal: The meter must meets or exceeds the most recent revision of AWWA Standard C701 class II standards. Each meter is performance tested to ensure compliance. Meters must be NSF/ ANSI Standard 61, Annex F and G approved.

PERFORMANCE: The meter must assure enhanced accuracy ranges, an overall greater accuracy, and a longer service life. The meter must no restrictions as to sustained flow rates within its continuous operating range. The meter must have floating ball measurement technology allows for flows up to its rated maximum capacity without affecting undue wear or accuracy degradation when installed in any orientation.

CONSTRUCTION: The meter must consists of two basic assemblies; the main case and the measuring chamber. The measuring chamber assembly must include the floating ball impeller with a coated titanium shaft, hybrid axial bearings, integral flow straightener and all electronic programmable register with protective bonnet. The main case must be made from industry proven Ductile Iron with an approved NSF epoxy coating.

ELECTRONIC REGISTER: The meter electronic register must consist of a hermetically sealed register with an electronic pickup containing no mechanical gearing. The large character LCD displays AMR (automated meter reading), Totalization and a Resettable Test Totalizer. Meter register features must have AMR resolution units that are fully programmable, Pulse output frequency that are fully programmable, Integral customer data logging capability, Integral resettable accuracy testing feature compatible with the UniPro Testing Assistant Program, Large, easy-to-read LCD also displays both forward and reverse flow directions and all with a 10-year battery life guarantee.

MAGNETIC DRIVE: Meter registration is achieved by utilizing a fully magnetic pickup system. This is accomplished by the magnetic actions of the embedded rotor magnets and the ultra-sensitive register pickup probe. The only moving component in water is the “floating ball” impeller.

MEASURING ELEMENT: The revolutionary thermoplastic, hydro dynamically balanced impeller floats between the bearings. The Floating Ball Technology (FBT) allows the measuring element to operate virtually without friction or wear, thus creating the extended upper and lower flow ranges capable on only the OMNI T2 meter.

STRAINER The OMNI T2 with the “V” shaped integral strainer using a stainless steel screen along with Floating Ball Technology (FBT) create a design that gives far improved accuracy even in those once thought questionable settings. A removable strainer cover permits easy access to the screen for routine maintenance.

MAINTENANCE: The meter must be designed for easy maintenance. Should any maintenance be required, the measuring chamber and / or strainer cover can be removed independently. Parts and or a replacement measuring chamber may be utilized in the event repairs are needed. Replacement Measuring Chambers Exchange are available for the OMNI T2 meters and may also be utilized for retrofitting to competitive meters to achieve increased accuracy and extended service life.

AMR / AMI SYSTEMS:

Meters and encoders are compatible with current Sensus AMR/AMI systems.

PART 3 - PERFORMANCE

3.01 INSTALLATION OF VALVES, GATES, AND METERS

Valves, gates, and meters shall be carefully installed in their respective positions, free from all distortion and strain, with joints made as specified, and shall be left in satisfactory operating condition. Valves and gates shall be connected to floor stands where required. All stem guides shall be accurately aligned. Before installation, all valves and appurtenances shall be thoroughly cleaned of all foreign material, and shall be inspected for proper operation, both opening and closing and to verify that the valves seat properly. Valves shall be installed so that the stems are vertical, unless otherwise approved by the Engineer. All valves shall be tested in place so far as practicable under the conditions specified and any defects revealed in valves or connections tested shall be corrected. Valves, gates, and meters shall be protected both before and after erection, from rust or other damage. After installation, all items except bronze valves and those underground shall be painted in accordance with the painting requirements and color code of the pipe lines of which they are a part. Bright or rubbing surfaces shall not be painted, but shall be protected with a suitable lubricant.

3.02 INSTALLATION OF VALVE BOXES

Valve boxes shall be centered and set plumb over the wrench nuts of the valves and shall not transmit shock or stress to the valves. Valve box covers shall be set flush with the surface of the finished pavement or such other level as may be approved by the Engineer. For valves not located in pavement, a steel marker post 3'-0" above grade and painted yellow shall be furnished and installed at the property line opposite the valve. Backfill shall be placed around the valve boxes and thoroughly compacted to a density equal to that of the undisturbed ground and in such a manner that will not damage or displace the valve box from proper alignment or grade. Misaligned valve boxes shall be excavated, plumbed, and backfilled at the Contractor's expense.

3.03 INSTALLATION OF TAPPING SLEEVES AND SERVICE SADDLES

Service saddles shall be installed in accordance with the manufacturer's recommendations and shall be of the proper type for the pipe material.

3.04 INSTALLATION OF PRESSURE GAUGES

Pressure gauges shall be installed in the vertical position unless otherwise indicated on the Drawings. Gauges shall be installed with suitable mounting brackets when flush or wall mounted. All gauge mounting locations shall have 1/4", female connection, tee handle shut-off cocks installed between gauge and gauge tap. All installed gauges shall be tested for proper operation and protected from corrosion and damage prior to and after installation until placed in operation.

3.05 INSTALLATION OF FIRE HYDRANTS

Hydrants and Appurtenances: Hydrants shall be installed at the locations shown on drawings and in accordance with the drawing details. Hydrants shall be installed with the barrel vertical. After the hydrant has been checked for alignment and grade, the barrel shall be wedged tightly against the side of the trench to prevent any lateral movement. The wedges may be removed after the concrete anchor block, poured at the bottom elbow, has set. The concrete anchor block shall be poured to at least 12 inches above the invert of the bottom elbow and shall not be disturbed for a minimum of three days or as directed by the Engineer.

Prior to final inspection, fire hydrants and parts above the finish ground surface shall be cleaned of all oil, grease, dirt, or other foreign material and given one coat of red lead and two coats of finish paint as specified in Section 10. Only standard tools shall be used in operating fire hydrants.

Hydrant Guard Posts: Hydrants guard posts shall be fabricated in from steel pipe and the assembly shall be welded in a neat and workmanlike manner and shall be cleaned, primed and painted. Drawings of the hydrant guard posts are provided in the drawings.

END OF SECTION

SECTION 00270

GALVANIZED GABION (TERRA AQUA "OR APPROVED EQUAL)

1 SCOPE:

This specification data sheet covers the use of galvanized steel double twisted woven wire mesh gabion baskets filled with stone and used for various applications including but not limited to retaining walls, mechanically stabilized soil retaining structures, stream bank protection, slope paving, outfall structures, weirs, drop structures, etc…

2 DEFINITION:

a) Gabions are defined as double twisted woven wire mesh box shaped baskets, of various sizes and dimensions.

b) The selvedges of the gabion baskets are the thicker perimeter and edge wires to which the wire mesh is secured as to withstand sudden or gradual stress from any direction.

c) Reinforcing wires are the thicker wires incorporated into the netting during fabrication.

d) The internal diaphragms are the internal wire mesh partitions which divide the gabions into cells.

e) Lacing or tie wire is used to assemble and join the gabion units.

f) Connecting wires are the internal wire used to prevent the gabions from bulging.

g) Alternative wire fasteners are ASTM approved wire fasteners used in lieu of lacing wire.

3 FABRICATION:

Double Twisted Hexagonal steel wire mesh Galvanized Gabions. Gabions shall be fabricated in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into rectangular baskets of the sizes specified and shown in the drawings. Gabions shall be of single unit construction: the base, lid, ends, and sides shall be either woven into a single unit or edge of these members connected to the base section of the gabion in such a manner that strength an flexibility at the connecting point does not compromise the engineered structural design of the gabion. Where the length of the gabion exceeds on an one half its horizontal width, the gabion shall be divided by diaphragms of the same mesh and gauge as the body of the gabion, into cells whose length does not exceed the horizontal width. The gabion shall be furnished with the necessary diaphragms secured in proper position on the base in such a manner that no additional tying is required at this juncture.

4 MESH FORMATION:

The double twisted hexagonal wire mesh shall have deformability sufficient to permit minimum of mesh elongation equivalent to 10% of the unstretched length of the mesh test section without reducing the gauge or the tensile strength of the individual wire strands to values less than those for similar wire, one gauge smaller in diameter.

5 NON-RAVELING:

The double twisted hexagonal wire mesh is to be fabricated in such a manner as to be non raveling. This is defined as the ability to resist pulling apart at any of the twists or connections forming the mesh when a single wire strand in a section of mesh is cut or broken.

6 GABION FILL:

The stone fill material used for filling the gabion units shall be clean, hard stone with pieces ranging from 4 – 8 inches on the greatest dimensions. Stone filling shall not exceed 24 inch vertical drop above the gabion basket. All effort shall be made to ensure that the stone fill material utilized in the design of the structure match the stone fill used in constructing the gabion structure.

7 ASSEMBLING AND PLACING:

a) Each gabion unit shall be assembled by tying or fastening all connecting seams. The binding wire shall be tightly looped around every other mesh opening along the seams in such a manner that single and double loops are alternated. An alternative wire fasteners may be used in lieu of lacing wire. The alternative wire fasteners shall be applied at approximately 4” – 6” intervals on all vertical and horizontal seams. No less than 3 fasteners per one foot on any given seam.

b) A line of empty gabions, shall be placed into position according to the contract drawings. Binding wire or alternative wire fasteners shall be used to secure each unit to the adjoining one along the vertical reinforced edges and the top selvedges. An approved corner closure tool shall be used to adjoin adjacent gabions to insure a tight, neat seam and minimize gabion wired or fastened to the latter at front and back. The lid shall be secured with an approved closure tool to insure proper closure without excessive mesh deformation.

c) To achieve optimum alignment and finish for retaining walls, a minimum amount of stretching may be required.

d) Connecting wire shall be inserted during the filling operation as follows: The connecting wires shall be installed according to manufacturer’s instructions every 1’ vertical lift of the gabion unit.

8 TOLERANCES:

All gabion dimensions shall be within a tolerance limit of plus or minus 5% of the manufacturers stated dimensions.

9. MINIMUM STRENGTH REQUIREMENTS OF TERRA AQUA DOUBLE TWISTED MESH GABIONS

Test Description	Galvanized
Tensile strength of wire mesh parallel to twist	3500 lbs/ft
Tensile strength of wire mesh perpendicular to twist	1800 lbs/ft
Connection to selvedges	1400 lbs/ft
Panel to Panel	1400 lbs/ft
Punch strength of mesh	6000 lbs/ft

10 MATERIAL DATA:

-Diameter of mesh wire: 0.120 inches

-Diameter of selvedge wire: 0.153 inches

-Diameter of lacing wire: 0.091 inches

-Coating of wire: finish 5 class 3 zinc coating- ASTM A-641 tested in accordance with ASTM A370-92.

-Tensile of wire: soft temper in accordance with ASTM A641-92

-Weight of zinc coating of wire: shall be determined by ASTM A-90 -wire diameter of 0.120 inches shall have a weight of zinc coating of: 0.85 oz/sf

-Wire diameter of 0.153 inches shall have a weight of zinc coating of: 0.90 oz/sf

-Wire diameter of 0.091 inches shall have a weight of zinc coating of: 0.80 oz/sf

-Grade of zinc coating of wire: high grade or special high grade in accordance with ASTM B-6, Table 1

-Uniformity of coating: shall be determined by ASTM A-239

-Elongation: not less than 12% in accordance with ASTM A370-92.

All of the above wire diameters are subject to a tolerance limit of 0.004 in accordance with ASTM A-641.

All Terra Aqua Gabion “or approved equal” material shall be manufactured according to ASTM A975-97 guidelines for Double Twisted Hexagonal Mesh Gabions.

11 ROCK FOR GABION WALL

Rock for filling gabions, which are greater than or equal to 18 inches in height, shall vary in size and shall conform to the following:

Screen Size (inches)	Percentage Passing
12	100
4	0-5

Rock for filling gabions, which are equal to 12 inches in height, shall vary in size and shall conform to the following:

Screen Size (inches	Percentage Passing
8	100
4	0-5

The minimum unit weight of a rock-filled gabion shall be 110 pounds per cubic foot. Verification of the 110 pounds per cubic foot shall be performed when ordered by the Engineer. Verification shall be performed on the smallest standard gabion size to be used on the project. The rock supplied for the project shall be used for verification. Filling shall be done using the same method intended for actual construction. The weight of a rock-filled gabion shall be determined using available certified scales. The volume for calculating the unit weight shall be determined on the theoretical volume of the standard gabion which is rock-filled and weighed

END OF SECTIO

SECTION 00280

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section covers Quality Assurance and Control requirements for this contract.

B. Contractor is responsible for controlling the quality of work, including work of its subcontractors, and suppliers and for assuring the quality specified in the Technical Specifications is achieved.

1.02 SUMMARY:

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and control procedures that facilitate compliance with the Contract Document requirements.

3. Requirements for Contractor to provide quality-assurance and control services required by Engineer, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Requirements:

1. Division 01 Section "Allowances" for testing and inspecting allowances.

2. Divisions 02 through 16 Sections for specific test and inspection requirements.

1.03 REFERENCES:

A. American Society for Testing and Materials (ASTM):

1. E329: Standard Specification for Agencies Engaged in Construction Inspection and/or Testing

1.04 DEFINITIONS:

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer or Construction Manager.

C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

D. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

E. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

F. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency. G.. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

H. Experienced: When used with an entity or individual, “experienced” means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.05 CONFLICTING REQUIREMENTS:

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to CM for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to CM for a decision before proceeding.

1.06 SUBMITTALS:

A. Shop Drawings:

1. Indicate manufacturer and model number of individual components.

2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

B. Contractor’s Quality Control Plan: For quality-assurance and quality-control activities and responsibilities.

C. Qualification Data: For Contractor's quality-control personnel.

D. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Engineer.

2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Engineer.

E. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

F. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.

2. Entity responsible for performing tests and inspections.

3. Description of test and inspection.

4. Identification of applicable standards.

5. Identification of test and inspection methods.

6. Number of tests and inspections required.

7. Time schedule or time span for tests and inspections.

8. Requirements for obtaining samples.

9. Unique characteristics of each quality-control service.

1.07 CONTRACTOR'S QUALITY-CONTROL PLAN:

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to CM. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor elected tests and inspections.

2. Special inspections required by authorities having jurisdiction and indicated on the “Statement of Special Inspections.”

3. Owner-performed tests and inspections indicated in the Contract Documents.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and accepted mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of accepted and rejected results. Include work CM has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.08 REPORTS AND DOCUMENTS:

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.

2. Project title and number.

3. Name, address, and telephone number of testing agency.

4. Dates and locations of samples and tests or inspections.

5. Names of individuals making tests and inspections.

6. Description of the Work and test and inspection method.

7. Identification of product and Specification Section.

8. Complete test or inspection data. ‘

9. Test and inspection results and an interpretation of test results.

10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.

11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.

12. Name and signature of laboratory inspector. 13. Recommendations on retesting and reinspecting.

B. Manufacturer’s Technical Representative’s Field Reports: Prepare written information documenting manufacturer’s technical representative’s tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.

2. Statement on condition of substrates and their acceptability for installation of product.

3. Statement that products at Project site comply with requirements.

4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.

5. Results of operational and other tests and a statement of whether observed performance complies with requirements.

6. Statement whether conditions, products, and installation will affect warranty.

7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.

2. Statement that equipment complies with requirements.

3. Results of operational and other tests and a statement of whether observed performance complies with requirements.

4. Statement whether conditions, products, and installation will affect warranty.

5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.09 QUALITY ASSURANCE:

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.

b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

c. When testing is complete, remove test specimens, assemblies; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Engineer through Construction Manager, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

J. Codes and Standards: Refer to General Conditions

K. Copies of applicable referenced standards are not included in the Contract Documents. Where copies of standards are needed by the Contractor for superintendence and quality control of the work, the Contractor shall obtain a copy or copies directly from the publication source and maintain at the jobsite, available to the Contractor's personnel, subcontractors, and CM.

L. Quality of Materials: Unless otherwise specified, all materials and equipment furnished for permanent installation in the Work shall conform to applicable standards and specifications and shall be new, unused, and free from defects and imperfections, when installed or otherwise incorporated in the Work. The Contractor shall not use material and equipment for any purpose other than that intended or specified unless the CM authorizes such use.

M. Where so specified, products or workmanship shall also conform to the additional performance requirements included within the Contract Documents to establish a higher or more stringent standard or quality than that required by the referenced standard.

1.10 OFFSITE INSPECTION:

A. When the specifications require inspection of materials or equipment during the production, manufacturing, or fabricating process, or before shipment, such services shall be performed by the Owner's independent testing laboratory, or inspection organization acceptable to Engineer in conjunction with or by the CM.

B. The Contractor shall give appropriate written notice to the CM not less than 30 days before offsite inspection services are required, and shall provide for the producer, manufacturer, or fabricator to furnish safe access and proper facilities and to cooperate with inspecting personnel in the performance of their duties.

1.11 MATERIALS AND EQUIPMENT:

A. The Contractor shall maintain control over procurement sources to ensure that materials and equipment conform to specified requirements in the Contract Documents.

B. The Contractor shall comply with manufacturer's printed instructions regarding all facets of materials and/or equipment movement, storage, installation, testing, startup, and operation. Should circumstances occur where the contract documents are more stringent than the manufacturer's printed instructions, the Contractor shall comply with the specifications. In cases where the manufacturer's printed instructions are more stringent than the contract documents, the Contractor shall advise the CM of the disparity and conform to the manufacturer's printed instructions. In either case, the Contractor is to apply the more stringent specification or recommendation, unless accepted otherwise by the CM.

1.12 QUALITY CONTROL:

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.

2. The Contractor shall furnish a construction schedule and a minimum of 48 hour notice of readiness for testing and inspection of the work. The CM shall determine the exact time and location of field sampling and testing, and may require such additional sampling and testing to determine that materials and equipment conform with data previously furnished by Contractor and with the Contract Documents.

3. The Contractor shall schedule the work to permit adequate time for testing and re testing should test results not conform to the contract documents. Lack of testing or inspection which is attributable to insufficient notice by the Contractor or failure of the Contractor to cooperate, will be cause for rejection of the work.

4. The Contractor shall deliver materials in sufficient quantities to the Owner's testing agency as may be required. Laboratory testing shall be performed within a reasonable time, consistent with the specified standards.

5. The Contractor shall furnish material samples and cooperate in the field sampling and testing activities, interrupting the work when necessary. The Contractor shall furnish personnel, facilities and access to assist in the sampling and testing activities.

6. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.

7. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

2. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

3. Comply with manufacturers' instructions, including each step in sequence.

4. When manufacturers' instructions conflict with Contract Documents, request clarification from CM before proceeding.

5. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

6. Perform Work by persons qualified to produce required and specified quality

7. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.

8. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

9. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

10. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.

11. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

12. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

13. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Tolerances:

1. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

2. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from CM before proceeding.

3. Adjust products to appropriate dimensions; position before securing products in place.

D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

E. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

F. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

G. Testing Agency Responsibilities: Cooperate with Engineer, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Engineer, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.

3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.

6. Do not perform any duties of Contractor.

H. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.

2. Incidental labor and facilities necessary to facilitate tests and inspections.

3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.

4. Facilities for storage and field curing of test samples.

5. Delivery of samples to testing agencies.

6. Preliminary design mix proposed for use for material mixes that require control by testing agency.

7. Security and protection for samples and for testing and inspecting equipment at Project site.

I. Coordination: Coordinate sequence of activities to accommodate required quality assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

J. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Engineer, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2- PRODUCTS -NOT USED

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify utility services are available, of correct characteristics, and in correct locations.

3.02 PREPARATION:

Clean substrate surfaces prior to applying next material or substance.

Seal cracks or openings of substrate prior to applying next material or substance.

Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.03 QUALITY CONTROL:

A. Quality control is the responsibility of the Contractor, and the Contractor shall maintain control over construction and installation processes to assure compliance with specified requirements.

B. Certifications for personnel, procedures, and equipment associated with special processes (e.g., welding, cable splicing, instrument calibration, surveying) shall be maintained in the Contractor's field office, available for inspection by the CM. Copies shall be made available to the CM upon request.

C. Means and methods of construction and installation processes are the responsibility of the Contractor, and at no time is it the intent of the CM to supersede or void that responsibility.

3.04 TEST AND INSPECTION LOG:

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.

2. Description of the Work tested or inspected.

3. Date test or inspection results were transmitted to CM.

4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineers and Construction Manager's reference during normal working hours.

3.05 REPAIR AND PROTECTION:

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 00290

GEOTECHNICAL INVESTIGATION

PART 1 - GENERAL

1.01 SCOPE OF WORK

The objective of the geotechnical investigation is to provide a comprehensive geotechnical site analysis for usage as the basis of a foundation design for the proposed 200,000 gallon bolted-steel water storage tank (WST) as shown in the drawings.

Furnish all labor, materials, tools, equipment, and supervision for conducting an adequate sub-surface soils investigation at the tank site as shown in the plans.

Deliver to the ASPA a geotechnical report containing all pertinent information required for the design of the foundation of a 200,000 gallon (approximate) bolted steel

WST which will be anchored to the foundation. The report shall contain, but not be limited to, the requirements of AWWA D103 latest edition.

The information in the report shall be established, certified and stamped by a qualified U.S. P.E. Geotechnical Engineer.

1.02 QUALIFICATIONS OF THE GEOTECHNICAL FIRM/ENGINEER

The Geotechnical Firm/Engineer shall have a minimum of five (5) years of qualified experience in the preparation of geotechnical reports for the design of WST foundations or for similarly applicable structures.

With the bid, and as a minimum, the bidder shall submit the following:

- Proposed scope of work
- List of previous projects undertaken.
- List of pertinent equipment/tools owned/leased to be used in the project.
- Resume of staff to be utilized for the project.
- List of certifications and professional credentials.

1.03 MINIMUM DATA TO BE INCLUDED IN THE REPORT

Soil bearing capacity for entire proposed area footprint of WST based on a minimum of four (4).

Presence of any substance in addition to SO4 which may be detrimental to the long term strength of concrete or the steel reinforcing bars.

Minimum depth of foundation.

SECTION 00300

AS-BUILTS

PART 1 - GENERAL

1.01 Work required under this section consists of surveying and preparing as-builts in AutoCAD to be approved by ASPA.

1.02 Prior to completion of the final inspection, the Contractor shall provide to ASPA an electronic file and certified copies of as-built surveys with all required revisions included as the final as-built survey.

1.03 All changes requested by ASPA must be made to the electronic file, as well as the printed, signed and sealed copies. Neglecting to provide the required information will delay the final inspection.

1.04 All measurements are to be made by the Surveyor or Engineer who will be certifying the project as constructed.

1.05 The Contractor is responsible for coordinating with the Surveyor or Engineer during construction and shall provide access to all utilities prior to being buried; allowing accurate horizontal and vertical measurements to be acquired by the Surveyor or Engineer. In the event of any discrepancies identified by ASPA and at no cost to ASPA, the Contractor shall verify the location and measurements of any buried utilities.

1.06 Any and all utility information must be collected, regardless of “typical” alignments (including existing obstructing, conflicting, or crossing utility infrastructure). Refer to the information provided in the contract documents (construction plans, specifications, etc.).

1.07 The Surveyor or Engineer must provide ASPA with a certificate of its professional liability coverage.

PART 2 - CONFIGURATION STANDARDS

All electronic as-built utility information in the as-built survey must reference the State Plane Coordinate System 1962, D_1983_HARN_UTM_Zone_2SNAD (horizontal) and NAVD88 or ASVD02 (vertical); the units must be in feet, and be properly projected into its correct spatial location prior to submitting to ASPA. ASPA will not re-project or manipulate as-built surveys in an attempt to correct improperly spatially referenced as-built surveys. It’s the certifying Surveyor or Engineer’s responsibility to ensure all submitted information adheres to the specifications.

All new and existing utilities (water, sewer, reclaimed, electrical, communications, etc…) and drainage located within project site impacted by construction shall be located relative to property lines and/or right-of-way lines, using the specifications identified in this document.

Blocks inserted into a drawing shall be on the correct layer, identifying those features (including

All text (DTEXT and MTEXT) must be masked; CUT/BROKEN LINES BEHIND TEXT WILL NOT BE ACCEPTED. Detail(s) also must be masked. The dimensions will be created with masked text using a standard dimension

All dimensioning, text and multileader lines must be drawn using ASPA's provided template (each template has been preconfigured).

Set the 'Dimension Association' to 2 (exploded dimensions will not be accepted).

Use Arial font in template and name them as follows: ASPA Annotative Text, ASPA Standard Dimension and ASPA Annotative Leader.

All corresponding line types must be used.

Text identifying information about features shall be properly aligned. Text shall be visible on the drawing using the template font style provided and with the base set to the upper left-hand corner of the text which is clear of the linear or block features. For legibility, it may require that the label be moved and accompanied by a leader arrow. The labels shall be placed onto a separate layer and not to be placed on the feature layer itself. Labels must be properly rotated for easy legibility (horizontal alignment).

Features shall be placed on their appropriate layers and assigned colors by layer for consistency. Features shown in the AutoCAD files shall be in model space and be contained in the AutoCAD files as opposed to being linked through externally referenced files (binded layers MUST reflect the correct layers).

The AutoCAD file shall be reviewed for duplicate objects. Polylines shall be continuous from structure to structure. End points of polylines must be snapped to the end points of connecting polylines, with a structure node being represented

The following list of section should be referenced when creating AutoCAD as-built surveys.

Clean all unnecessary layers and blocks before submitting final as- built plans to ASPA

Use only ASPA approved layers

Properly place features on the correct AutoCAD layers

Do not break lines or trim behind text boxes; utilize the text masking feature (also applies to detail blow ups)

Use reasonably scaled templates and blocks for all drawings

Add continuations / match lines on all related as-builts

Do not explode blocks, even if object is owned by others

Snap all designated blocks at the base point of the object i)Properly connect all lines, blocks, etc.

Create detail blow-ups to show information in close proximity (to maintain legibility)

Layer naming conventions shall follow the NCS (National CAD Standards) guidelines. For more information on NCS, visit their website at nationalcadstandard.org

Each feature (e.g., hydrant, valves, mains, etc.) shall have IDs assigned by the Surveyor or Engineer completing the as-built, which reference a worksheet table. The worksheet table will contain an inventory of items installed. The entire table must be complete and refer to a corresponding feature on the as-built

PART 3 - COSTS

The as-built surveys shall be prepared at the Contractor's, expense.

The applicant's Contractor shall be responsible for paying in advance to ASPA, the cost for reviewing the final as-built surveys for each extension of the ASPA's utility system. The cost is based on the ASPA's initial estimate of the time needed to review the final as-built surveys.

Extra time required to review the as-built surveys, due to failure of meeting the as-built specifications or for other inadequate or inaccurate information required of Contractor's Surveyor or Contractor to complete ASPA's as-built drawings or by any combination of such factors shall be charged to and paid by the Contractor as an additional cost of completing ASPA's final CAD as-built plans, based on a rate of $50.00 per hour, plus plotting cost for any extra proof sets.

PART 4 - SUBMISSION OF AS-BUILTS

As-built surveys shall be submitted using ASPA's AutoCAD template settings; with the Contractor, Surveyor or Engineer's title block. Sheets shall be no larger than 24"x36" and accompanied by all necessary electronic files delivered on CD/DVD or by e-mail.

Scale shall range between 1"=10' to 1" = 60', unless approved by ASPA.

Each sheet must be labeled "AS-BUILT" in one-inch high bold letters in the bottom right hand corner and include the following items:

a) Station numbers and with offsets
b) Dimension measurements
c) Lot numbers
d) Street names
e) Scale
f) Location, elevation and datum of the benchmark used
g) Easements as shown on approved plans
h) Certification block (see 3 below)

Once ASPA has completed its proposed final review of the CAD as-built plans for such extension, a proof set of the proposed plans will be provided to the Contractor for proof reading and verification of the accuracy of ASPA's proposed final CAD as-built drawings, based on the information provided to ASPA by the Contractor or Surveyor.

When ASPA's proposed final CAD as-built drawing have been verified as accurate by the Contractor and ASPA, then a final set of "official" as-built drawing will be plotted by the

Each as-built survey sheet is required to have a certification block and bear the name, address, phone number and signature of the Contractor, and Surveyor or Engineer. The Surveyor will certify the horizontal and vertical dimensions and elevations of the project's as-built conditions.

The Contractors Engineer shall certify the project has been constructed in substantial conformance with the permitted construction plans and specifications and certify that the materials and quantities used were accurate and are in accordance with ASPA's approved plans and specifications. The signature(s) certify the as-built survey and information provided is

Submit a signed sealed written report in a format acceptable to ASPA by the Surveyor or Engineer which identifies each pipe and appurtenances and outline the attributes of each material.

PART 5 - ASSET TABLE WORKSHEET

The following list of information shall be collected and turned in as an electronic Microsoft Excel file on CD/DVD, or sent by e-mail.

Fittings	**Locate Wire**	**ARV**
Feature ID	Feature ID	Feature ID
Plan Sheet Number	Plan Sheet Number	Plan Sheet Number
Easting (X)	Easting (X)	Easting (X)
Northing (Y)	Northing (Y)	Northing (Y)
Main Type	Main Type	Main Type
Fitting Type		Fitting Type
Fitting Size		Fitting Size
Material Type		Material Type
Year of Installation		Year of Installation
Type of Joint Fitting		Type of ARV

LAYER NAME FORMAT

Discipline Designator Values:

Discipline identifier (value), which is added to the layer name

(e.g., CU- WATR-DOMC-PIPE-XXXX XXXX XXXX XXXX XX-ST) the value must be four characters in length (see table below).

Designator	Description
C	Civil
CU	Civil Utilities
V	Survey / Mapping
VU	Survey / Mapping Utilities

LAYER

AutoCAD drawing layer name, which follow the National CAD Standards (e.g., CU-WATR-DOMC-PIPE-XXXX XXXX XXXX XXXX XX-ST) the value must be four characters in length (see table below).

Name	Color	Linetype	Description
C-ANNO-MATL	White	PHANTOM2	Match line annotation
C-ANNO-NOTE	Yellow	Continuous	Note annotation
C-ANNO-TTLB	White	Continuous	Title block annotation
C-BLDG-ANNO	White	Continuous	Building annotation
C-BLDG-STRC	15	Continuous	Building structure
C-ESMT-ANNO	White	Continuous	Easement annotation
C-ESMT-LINE	White	HIDDEN	Easement line
C-POND-ANNO	15	Continuous	Pond annotation
C-POND-LINE	15	HIDDEN	Pond line
C-PROP-ANNO	White	Continuous	Property annotation
C-PROP-LINE	53	DASHDOT2	Property line
C-ROAD-CNTR	10	CENTER2	Roadway center line
C-ROAD-CURB	251	Continuous	Roadway curb / edge
C-ROAD-RWAY	White	PHANTOM2	Roadway right-of-way
C-ROAD-SWLK	251	Continuous	Roadway sidewalk
C-STRM-ANNO	15	Continuous	Storm annotation
C-STRM-LINE	15	Continuous	Storm line
CU-ELEC-ANNO	Yellow	Continuous	Electrical annotation
CU-ELEC-JUNC	14	Continuous	Electrical junction
CU-ELEC-LINE	14	HIDDEN	Electrical line

CU-SSWR-FORC-ANNO	41	Continuous	Sewer forced annotation
CU-SSWR-FORC-DETL	41	Continuous	Sewer forced detail
CU-SSWR-FORC-INFS	30	Continuous	Sewer forced infrastructure
CU-SSWR-FORC-PIPE-XXXX XXXX XXXX XXXX XX-ST	30	Continuous	Sewer forced pipe
CU-SSWR-FORC-SRVC	34	Continuous	Sewer forced service
CU-SSWR-GRAV-ANNO	81	Continuous	Sewer gravity annotation
CU-SSWR-GRAV-DETL	81	Continuous	Sewer gravity detail
CU-SSWR-GRAV-INFS	GREEN	Continuous	Sewer gravity infrastructure
CU-SSWR-GRAV-PIPE-XXXX XXXX XXXX XXXX XX-ST	GREEN	Continuous	Sewer gravity pipe
CU-SSWR-GRAV-SRVC	106	Continuous	Sewer gravity service
CU-SSWR-STRC-LIFT	Yellow	Continuous	Sewer Lift Station structure
CU-WATR-DOMC-ANNO	143	Continuous	Water domestic annotation
CU-WATR-DOMC-DETL	143	Continuous	Water domestic detail
CU-WATR-DOMC-INFS	Cyan	Continuous	Water domestic infrastructure
CU-WATR-DOMC-PIPE-XXXX XXXX XXXX XXXX XX-ST	Cyan	Continuous	Water domestic pipe
CU-WATR-DOMC-SRVC	154	Continuous	Water domestic service
CU-WATR-RECL-ANNO	191	Continuous	Water reclaimed annotation
CU-WATR-RECL-DETL	191	Continuous	Water reclaimed detail
CU-WATR-RECL-INFS	190	Continuous	Water reclaimed infrastructure
CU-WATR-RECL-PIPE-XXXX XXXX XXXX XXXX XX-ST	190	Continuous	Water reclaimed pipe
CU-WATR-RECL-SRVC	185	Continuous	Water reclaimed service

**Layers not included in list shall be added following the NCS guidelines. ASPA shall be provided a list of any new layers added.*

SIZE VALUES:

Size identifier (value), which is added to the layer name (e.g., CU-WATR- DOMC-PIPE-XXXX XXXX XXXX XXXX XX-ST) the value must be four characters in length (see table below).

Size* Description	Size* Description
0.251/4"	6.006"
0.501/2"	8.008"
0.753/4"	10.010"
1.251-1/4"	12.012"
1.501-1/2"	14.014"
1.751-3/4"	16.016"
2.002"	18.018"
2.252-1/4"	20.020"
2.502-1/2"	24.024"
3.003"	30.030"
4.004"	36.036"

**Values not included in list shall be added and abbreviated with four (4) characters. ASPA shall be provided a list of any new values added.*

MATERIAL VALUES:

Material identifier (value), which is added to the layer name (e.g., CU- WATR-DOMC-PIPE-XXXX XXXX XXXX XXXX XX-ST) the value must be four characters in length (see table below).

Identifier*	Description
CIRN	Cast Iron
DIRN	Ductile Iron
FPVC	Fusible Polyvinyl Chloride
HDPE	High-Density Polyethylene
PVC~	Polyvinyl Chloride
SSTL	Stainless Steel
STEL	Steel

**Values not included in list shall be added and abbreviated with four (4) characters. ASPA shall be provided a list of any new values added.*

CLASS VALUES:

Class identifier (value), which is added to the layer name (e.g., CU- WATR-DOMC-PIPE-XXXX XXXX XXXX XXXX XX-ST) the value must be four characters in length (see table below).

Designator*	Description
0000	Not Applicable
0051	Class 51
0150	Class 150
0300	Class 300
0900	Class 900
0905	Class 905

**Values not included in list shall be added and abbreviated with four (4) characters. ASPA shall be provided a list of any new values added.*

Rating Values:

Identifier*	Description
DR09	Dimension Ratio (DR) is 9
DR11	Dimension Ratio (DR) is 11
DR18	Dimension Ratio (DR) is 18
DR21	Dimension Ratio (DR) is 21
DR25	Dimension Ratio (DR) is 25
DR26	Dimension Ratio (DR) is 26
DR35	Dimension Ratio (DR) is 35
SC40	Schedule 40
SC80	Schedule 80

Rating identifier (value), which is added to the layer name (e.g., CU- WATR-DOMC-PIPE-XXXX XXXX XXXX XXXX XX-ST) the value must be four characters in length (see table below).

**Values not included in list shall be added and abbreviated with four (4) characters. ASPA shall be provided a list of any new values added.*

CONSTRUCTION VALUES:

Construction identifier (value), which is added to the layer name (e.g., CU-WATR-DOMC-PIPE-XXXX XXXX XXXX XXXX XX-ST) the value must be four characters in length (see table below).

Identifier*	Description
DD	Directional Drill
JB	Jack and Bore
OC	Open-cut
PB	Pipe Burst
PP	Pipe Push

**Values not included in list shall be added and abbreviated with two (2) characters. ASPA shall be provided a list of any new values added*

STATUS FIELD CODES:

Status identifier (code), which is added to the end of the layer name (e.g., CU-WATR-DOMC-PIPE-XXXX XXXX XXXX XXXX XX-ST)

Code	**Description**
A	Abandoned
D	Existing to demolish
E	Existing to remain
F	Future work
M	Items to be moved
N	New work
O	Owned by others

EXAMPLES:

Layer Name
CU-SSWR-GRAV-PIPE-4.00 PVC~ 0000 DR26 OC
CU-SSWR-FORC-PIPE-4.00 PVC~ 0900 DR18 OC
CU-SSWR-FORC-PIPE-8.00 DIRN 0051 DR18 OC
CU-WATR-DOMC-PIPE-2.00 PVC~ 0000 SC80 OC
CU-WATR-DOMC-PIPE-36.0 PVC~ 0900 DR21 OC
CU-WATR-RECL-PIPE-4.00 PVC~ 0900 DR21 OC

ACRONYMS LIST

The following lists of acronyms are referenced throughout this as-built specification.

Acronym	Description
CAD	Computer Aided Drafting; refers to
ASPA	American Samoa Power Authority
QA/QC	Quality Assurance / Quality Control
Engineer	US Licensed Engineer
Surveyor	US Licensed Surveyor
Contractor	American Samoa Licensed Contractor

END OF SECTION

SECTION 00310

PROJECT IDENTIFICATION

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

A. AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)

1. AWPA C1 (2003) All Timber Products - Preservative

Treatment by Pressure Processes

2. AWPA C2 (2003) Lumber, Timber, Bridge Ties and Mine

Ties- Preservative Treatment by Pressure

Processes

1.02 SUBMITTALS

ASPA approval is required for submittals. The following shall be submitted in accordance with

Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Preliminary drawing indicating layout and text content and material

1.03 QUALITY ASSURANCE

1.3.1 Preliminary Sign Drawing

Provide a preliminary project sign drawing in accordance with the following package number being worked on as part of the East Side Villages Wastewater Collection System project as required in paragraph entitled "Submittals". The following submittal data is required to properly identify the appropriate sign content for approval by the APE.

1.04 PROJECT SIGN

Prior to initiating any work on site, provide two project identification sign at the location designated by the APE. Construct the sign in accordance with APE approved project sign.

Maintain sign throughout the life of the project. Upon completion of the project, remove the sign from the site. Provide color rendering of the project. Reproduce the rendering on the signboard or enclose a copy of the rendering under a water-proof, transparent cover, and caulk for weather protection.

1.05 PROJECT IDENTIFICATION SIGNBOARD

Provide preliminary drawing indicating layout and text content. The signboard shall be provided at a conspicuous location on the job site where directed by the APE.

a. The field of the sign shall consist of a 4 by 8 foot sheet of grade B-B medium density overlaid exterior plywood. The contractor may use alternate sign materials, such as plastic banners or digital graphic signs.

b. Lumber shall be Southern pine, or approved equal, pressure-preservative treated in accordance with AWPA C1 and AWPA C2. Nails shall be aluminum or galvanized steel.

c. The entire signboard and supports shall be given one coat of exterior alkyd primer and two coats of exterior alkyd enamel paint. Supports shall be able to withstand the design wind loading at the site, a maximum wind speed of 160 mph. The lettering and sign work shall be performed by a skilled sign painter using paint known in the trade as bulletin colors. The colors, lettering sizes, and lettering styles shall be as directed by APE. Where preservative treated lumber is required, utilize only cured pressure-treated wood which has had the chemicals leached from the surface of the wood prior to painting.

1.06 CONSTRUCTION PROJECT SIGN

Furnish the construction project sign package, maintain the sign during construction, and remove the signs from the job site upon completion of the project. The construction project sign package shall be for project identification.

END OF SECTION