

**CONTRACT DOCUMENTS AND
TECHNICAL SPECIFICATIONS**

**AUGUSTA MILL PLACE
WATER PROJECT - PHASE A**

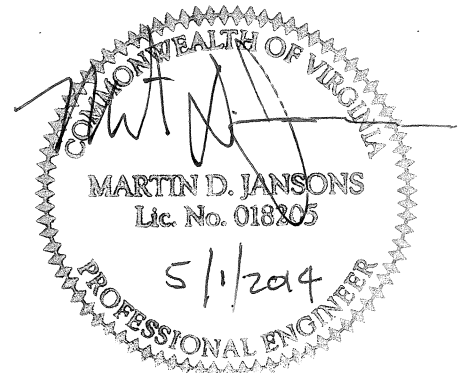
May 1, 2014

Prepared for
Augusta County Service Authority

BOARD OF DIRECTORS

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SECTION 00130 ADVERTISEMENT FOR BIDS -ITB #1725

Owner:

Augusta County Service Authority
18 Government Center Lane
P.O. Box 859
Verona, Virginia 24482

Separate sealed Bids will be received for construction of Augusta Mill Place Water Project - Phase A, generally consisting of an elevated water storage tank, control valves, and appurtenances, to be located southeast of Mill Place Parkway near Verona, Virginia.

Bids will be received at the office of:

William Monroe, PE
Augusta County Service Authority
P.O. Box 859
18 Government Center Lane
Verona, Virginia 24482

until **2:00 PM** local prevailing time June 3, 2014, and then publicly opened and read aloud at said office.

The Contract Documents may be examined at the following locations:

Peed & Bortz, LLC, Civil & Environmental Engineers, 20 Midway Plaza Drive, Ste. 100 Christiansburg, VA 24073 (540-394-3214)
Augusta County Service Authority, 18 Government Center Lane, Verona, Virginia 24482 (540-245-5670)

Copies of the Contract Documents may be obtained at the office of Peed & Bortz, LLC upon payment of \$200 for each set. One-half of the deposit will be refunded to each document holder of record who returns a complete set of Bidding Documents in good condition within 10 days after opening of Bids.

On line examination of the Contract Documents will be available at <http://acsawater.com/mptank>. Documents obtained on line **may not** be used for bidding. Please contact ACSA at (540-245-5670) with questions concerning on line access.

A **Non-Mandatory** Pre-Bid Conference shall be held at **10:00 AM, May 20, 2014**, at the western terminus of Mill Place Parkway, Verona, Virginia (**near tank site**).

Withdrawal of Bids due to error shall be in accordance with Virginia Code Section 2.2-4330.B.1.

Contract award will be based on an evaluated bid analysis. Evaluations will consider capital cost and maintenance costs over a 60 year life cycle. ACSA reserves the right to award the contract based on the evaluation criteria, not on the low bid. ACSA will be the sole and only judge in this evaluation. Maintenance analysis will be performed by establishing the present value of future tank coating requirements based on industry standard repaint cycles and costs.

Should the apparent low Bid exceed available funds, the Owner reserves the right to negotiate with the apparent low Bidder to obtain a contract price within available funds.

Bidders shall comply with Virginia Code Section 54.1-1112 regarding information required with Bid. Envelopes containing Bids shall be clearly marked with the Bidder's Virginia contractor license number.

Augusta County Service Authority encourages participation and bid submission from any Disadvantage Business Enterprises (DBE), Minority or Women Business Enterprise (MBE or WBE) capable and otherwise qualified to perform work defined by this construction contract.

William Monroe, PE
Director of Engineering

Date: May 1, 2014

SECTION 00200 - INSTRUCTIONS TO BIDDERS**ARTICLE 1 - DEFINED TERMS**

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

- A. *Issuing Office*--The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered - Peed & Bortz, LLC, 20 Midway Plaza Ste. 100, Christiansburg, VA 24073.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation to Bid may be obtained from the Issuing Office. One-half the deposit will be refunded to each document holder of record who returns a complete set of Bidding Documents in good condition within 10 days after opening of Bids.

2.02 Complete original sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents. Documents obtained on line shall not be used for bidding.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, included with Bid, Bidder shall submit written evidence such as financial data, present commitments, documentation of prior experience, for both Bidder and proposed subcontractors, on comparable projects, and such other data as may be called for. Bidders shall utilize Contractor's Qualification Statement Section 00450 for this purpose.

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 *Subsurface and Physical Conditions*

- A. The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents.
2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Bidding Documents.

- B. Copies of reports and drawings referenced in Paragraph 4.01 may be reviewed during normal business hours at the offices of Peed & Bortz, LLC, 20 Midway Plaza Drive Suite 100, Christiansburg, VA 24073. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions has been identified and established in Paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions or information contained in such reports or shown or indicated in such drawings.

4.02 *Underground Facilities*

- A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 *Hazardous Environmental Condition*

- A. The Supplementary Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that Engineer has used in preparing the Bidding Documents.
- B. Copies of reports and drawings referenced in Paragraph 4.03 may be reviewed during normal business hours at the offices of Peed & Bortz, LLC, 20 Midway Plaza Drive Suite 100, Christiansburg, VA 24073. Those reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established in Paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any “technical data” or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

4.06 Reference is made to Article 7 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other work.

4.07 It is the responsibility of each Bidder before submitting a Bid to:

- A. examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;
- B. visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
- C. become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;

- D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions at the Site which have been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions;
 - D. obtain and carefully study (or accept consequences of not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;
 - E. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;
 - F. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;
 - G. correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;
 - H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and
 - I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.
- 4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 - PRE-BID CONFERENCE

- 5.01 A Pre-Bid Conference will be held at the time and place shown in the Advertisement for Bids. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6 - SITE AND OTHER AREAS

- 6.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 7 - INTERPRETATIONS AND ADDENDA

- 7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 8 - BID SECURITY

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of five (5%) percent of Bidder's maximum Bid price and in the form of a certified check or bank money order or a Bid bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.
- 8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.
- 8.03 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 9 - CONTRACT TIMES

- 9.01 The number of days within which, or the dates by which, the Work is to be (a) Substantially completed and (b) ready for final payment are set forth in the Agreement.

ARTICLE 10 - LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.

ARTICLE 12 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.

12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 13 - PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from the Engineer.

13.02 All blanks on the Bid Form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each Bid item, listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered.

13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and

- attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.
- 13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.
- 13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.
- 13.06 A Bid by an individual shall show the Bidder's name and official address.
- 13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.
- 13.08 All names shall be typed or printed in ink below the signatures.
- 13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.10 The address and telephone number for communications regarding the Bid shall be shown.
- 13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 - BASIS OF BID; COMPARISON OF BIDS

- 14.01 Bidders shall submit a Bid based on a lump sum price basis as set forth in the Bid Form.

ARTICLE 15 - SUBMITTAL OF BID

- 15.01 A Bid shall be submitted in accordance with and no later than the date and time prescribed and at the place indicated in the Advertisement or Invitation to Bid, and shall be enclosed in an opaque sealed envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed as indicated in the Advertisement or Invitation to Bid.

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

- 16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed, and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

- 16.02 The procedure for withdrawal of bids shall be in accordance to Section 2.2-4330 B(1) of the Code of Virginia.
- 16.03 If within 48 hours after Bids are opened, any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 - OPENING OF BIDS

- 17.01 Bids will be opened at the time and place indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

- 18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

- 19.01 Contract award will be based on an evaluated bid analysis. Evaluations will consider capital cost and maintenance costs over a 60 year life cycle. The Owner reserves the right to award the contract based on the evaluation criteria, not on the low bid. The Owner will be the sole and only judge in this evaluation. Maintenance analysis will be performed by establishing the present value of future tank coating requirements based on industry standard repaint cycles and costs.
- 19.02 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.
- 19.03 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.
- 19.04 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- 19.05 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

- 19.06 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.
- 19.07 If the Contract is to be awarded, Owner will award the Contract to the responsible Bidder whose Bid, conforming with all the material terms and conditions of the Advertisement for Bids, is lowest, price and other factors considered.

ARTICLE 20 - CONTRACT SECURITY AND INSURANCE

- 20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds and insurance certificates.

ARTICLE 21 - SIGNING OF AGREEMENT

- 21.01 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

ARTICLE 22 - N/A

ARTICLE 23 - N/A

ARTICLE 24 - N/A

Bid Form

Project Identification: Augusta Mill Place Water Project - Phase A

Contract Identification and Number: 14-10

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ARTICLE 1 - BID RECIPIENT

1.01 This Bid Is Submitted To:

Augusta County Service Authority
 Attn: William Monroe, PE
 P.O. Box 859
 18 Government Center Lane
 Verona, Virginia 24482

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in the Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER'S ACKNOWLEDGMENTS

2.01 Bidder accepts all of the terms and conditions of the Advertisement and Instructions to Bidders, including without limitations those dealing with the dispositions of Bid security. The Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 - BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

Addendum No. Addendum Date

_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all Federal, State, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in SC-4.02, and (2) reports and drawings of a Hazard Environmental Condition, if any, which has been identified in SC-4.06.

E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by the Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of the Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

K. Bidder will submit written evidence of its authority to do business in the State where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4 - FURTHER REPRESENTATIONS

4.01 Bidder further represents that:

A. This Bid is genuine and not made in the interest of or on the behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

ARTICLE 5 - BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

BASE BID

TOTAL LUMP SUM PRICE BASE BID - 500,000 GALLON COMPOSITE ELEVATED TANK

_____ \$ _____
(USE WORDS)

ALTERNATE BID NO. ONE

TOTAL LUMP SUM PRICE ALTERNATE BID - 500,000 GALLON SPHEROID ELEVATED TANK

_____ \$ _____
(USE WORDS)

ALTERNATE BID NO. TWO

TOTAL LUMP SUM PRICE ALTERNATE BID - 1,000,000 GALLON COMPOSITE ELEVATED TANK

_____ \$ _____
(USE WORDS)

ALTERNATE BID NO. THREE

TOTAL LUMP SUM PRICE ALTERNATE BID - 1,000,000 GALLON SPHEROID ELEVATED TANK

_____ \$ _____
(USE WORDS)

ADDITIVE BID

TOTAL LUMP SUM PRICE ADDITIVE BID - ALL SITE WORK INCLUDING ACCESS ROAD, DRAINAGE, AND EROSION & SEDIMENT CONTROL PROVISIONS

_____ \$ _____
(USE WORDS)

ARTICLE 6 - TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with paragraph 14.07.B of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the work within the Contract Times.

ARTICLE 7 - ATTACHMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of the Bid:

A. Required Bid security in the form of a Bid Bond (EJCDC No. C-430) or Certified Check (circle type of security provided);

B. Contractor Qualification Statement (Sec. 00450)

ARTICLE 8 - DEFINED TERMS

8.01 The terms used in this Bid with the initial capital letters have the meanings indicated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 - BID SUBMITTAL

9.01 This Bid submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

(SEAL)

By: _____

(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____

(SEAL)

By: _____

(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____

(SEAL)

State of Incorporation: _____

Type (General Business, Profession, Service, Limited Liability): _____

By: _____

(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Attest _____

(Signature of Corporate Secretary)

Date of Qualification to do business in Virginia is ___/___/_____

A Joint Venture

Name of Joint Venture: _____

First Joint Venture Name: _____

(SEAL)

By: _____

(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venture Name: _____

(SEAL)

By: _____

(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is party to the venture should be in the manner indicated above.)

Bidder's Business address:

Business Phone No. (____) _____

Business FAX No. (____) _____

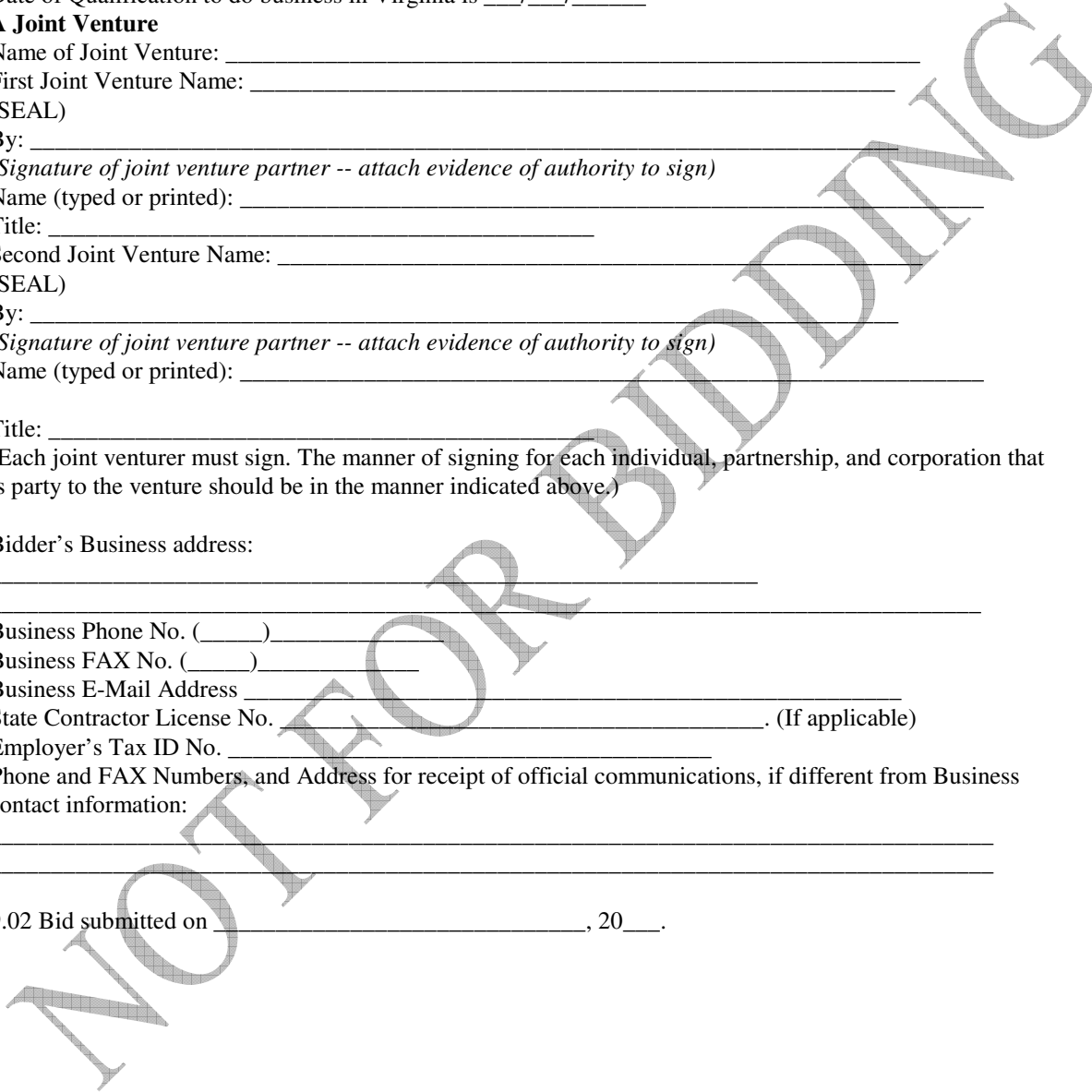
Business E-Mail Address _____

State Contractor License No. _____ (If applicable)

Employer's Tax ID No. _____

Phone and FAX Numbers, and Address for receipt of official communications, if different from Business contact information:

9.02 Bid submitted on _____, 20__.



BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

**Augusta County Service Authority
P.O. Box 859
18 Government Center Lane
Verona, Virginia 24482**

BID
Bid Due Date:

Project (Brief Description Including Location):

Elevated water storage tank, control valving, and appurtenances. Verona, VA

BOND

Bond Number:

Date (Not later than Bid due date):

Penal sum

(Words)

(Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

SURETY

(Seal
)

(Seal)

Bidder's Name and Corporate Seal

Surety's Name and Corporate Seal

By: _____
Signature and Title

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title

Attest: _____
Signature and Title

Note: Above addresses are to be used for giving required notice.

PENAL SUM FORM

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
 - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2. All Bids are rejected by Owner, or
 - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

6. List the contracts upon which you are currently working. Include owner, location, approximate cost, and estimated date of completion.

7. Bank references and credit available.

8. Insurance coverage and amount.
 - a. Liability – Property
 - b. Liability – Personal Injury
 - c. Vehicle and Equipment
 - d. Other – Identify

9. Bonding reference – List surety and highest coverage.

10. Subcontractors utilized – List name, address, specialty and years experience.
 - a.

 - b.

 - c.

11. Provide a general description of the experience of the company and its key personnel.

12. Number of current full-time employees:

Number of employees at highest level in past twelve months:

13. Are you on any list of debarred contractors maintained by the U.S. Department of Labor, the U.S. Department of Housing and Urban Development or the Virginia Department of Highways?

Yes

No

14. List all contracts that have resulted in arbitration, litigation, or legal settlement of claims within the past two years.

The undersigned hereby authorizes and requests any person, firm or Corporation to furnish any information requested by _____ in verification of the recitals comprising this statement of contractor's qualifications:

Contractor: _____

By: _____

Title: _____

Date: _____

STATE OF _____

COUNTY OF _____

_____ being duly sworn deposes says that he is _____ of _____ and that the answers to the foregoing questions and all statements therein contained are true and correct.

SUBSCRIBED AND SWORN TO BEFORE ME THIS _____ DAY OF _____, 2 _____

NOTARY PUBLIC _____

MY COMMISSION EXPIRES _____, 2 _____

Notice of Award

Dated _____

Project: Augusta Mill Place Water Project - Phase A	Owner: Augusta County Service Authority	Owner's Contract No.: N/A
Contract:		Engineer's Project No.: 14-10

Bidder:

Bidder's Address: (send Certified Mail, Return Receipt Requested)

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for _____

(Indicate total Work, alternates or sections or Work awarded.)

The Contract Price of your Contract is \$ _____ Dollars (\$_____).

(Insert appropriate data if Unit Prices are used. Change language for Cost-Plus contracts.)

_____ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

_____ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

1. Deliver to the Owner [five (5)] fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), [and] General Conditions (Paragraph 5.01) [and Supplementary Conditions (Paragraph SC-5.01).]
3. Other conditions precedent:

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

Owner

By: _____
Authorized Signature

Title

Copy to Engineer

**EJCDC
SUGGESTED FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR FOR
CONSTRUCTION CONTRACT (STIPULATED PRICE)
FUNDING AGENCY EDITION**

THIS AGREEMENT is by and between Augusta County Service Authority (Owner)

and _____ (Contractor).

Owner and Contractor, in consideration of the mutual covenants set forth herein, agree as follows:

ARTICLE 1 - WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Elevated water storage tank, control valving, and appurtenances. Verona, VA

ARTICLE 2 - THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Augusta Mill Place Water Project - Phase A

ARTICLE 3 - ENGINEER

3.01 The Project has been designed by

Peed & Bortz, LLC
20 Midway Plaza #100
Christiansburg, VA 24073

(Engineer), who is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIMES

4.01 Time of the Essence

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Days to Achieve Substantial Completion and Final Payment

A. The Work will be substantially completed within 480 days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 510 days after the date when the Contract Times commence to run.

4.03 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner \$500 for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner \$1,000 for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 - CONTRACT PRICE

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

BASE BID

TOTAL LUMP SUM PRICE BASE BID - 500,000 GALLON COMPOSITE ELEVATED TANK

_____ \$ _____
(USE WORDS)

ALTERNATE BID NO. ONE

TOTAL LUMP SUM PRICE ALTERNATE BID - 500,000 GALLON SPHEROID ELEVATED TANK

_____ \$ _____
(USE WORDS)

ALTERNATE BID NO. TWO

TOTAL LUMP SUM PRICE ALTERNATE BID - 1,000,000 GALLON COMPOSITE ELEVATED TANK

_____ \$ _____
(USE WORDS)

ALTERNATE BID NO. THREE

TOTAL LUMP SUM PRICE ALTERNATE BID - 1,000,000 GALLON SPHEROID ELEVATED TANK

_____ \$ _____
(USE WORDS)

ADDITIVE BID

TOTAL LUMP SUM PRICE ADDITIVE BID - ALL SITE WORK INCLUDING ACCESS ROAD, DRAINAGE, AND EROSION & SEDIMENT CONTROL PROVISIONS

_____ \$ _____
(USE WORDS)

ARTICLE 6 - PAYMENT PROCEDURES**6.01 Submittal and Processing of Payments**

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 Progress Payments; Retainage

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the **20th** day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:

- a. 95 percent of Work completed (with the balance being retainage); and
- b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions.

6.03 Final Payment

A. Upon receipt of the final Application for Payment accompanied by Engineer's recommendation of payment in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay Contractor as provided in Paragraph 14.07 of the General Conditions the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages.

ARTICLE 7 - INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the maximum legal rate.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

E. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

F. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

G. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 - CONTRACT DOCUMENTS

9.01 Contents

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to _____, inclusive).
2. Performance bond (pages _____ to _____, inclusive).
3. Payment bond (pages _____ to _____, inclusive).
4. General Conditions (pages _____ to _____, inclusive).
5. Supplementary Conditions (pages _____ to _____, inclusive).
6. Specifications as listed in the table of contents of the Project Manual.
7. Drawings consisting of _____ sheets with each sheet bearing the following general title: _____.
8. Addenda (numbers _____ to _____, inclusive).
9. Exhibits to this Agreement (enumerated as follows):
 - a. Notice to Proceed (pages _____ to _____, inclusive).
 - b. Contractor's Bid (pages _____ to _____, inclusive).
 - c. Documentation submitted by Contractor prior to Notice of Award (pages _____ to _____, inclusive).
10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed (pages _____ to _____, inclusive).
 - b. Work Change Directives.
 - c. Change Order(s).

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 - MISCELLANEOUS

10.01 Terms

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 Severability

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in four copies. One counterpart each has been delivered to Owner, Contractor, Engineer, and Agency. All portions of the Contract Documents have been signed, initialed, or identified by Owner and Contractor or identified by Engineer on their behalf.

This Agreement will be effective _____, _____ (which is the Effective Date of the Agreement). ~~This Agreement shall not be effective unless and until Agency's designated representative concurs.~~

OWNER:

CONTRACTOR:

Augusta County Service Authority _____

By: _____

By: _____

Title: _____

Title: _____

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest: _____

Attest: _____

Title: _____

Title: _____

Designated Representatives:

Designated Representatives:

Name: _____

Name: _____

Title: _____

Title: _____

Address for giving notices:

Address for giving notices:

Phone: _____ FAX: _____

Phone: _____ FAX: _____

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Owner-Contractor Agreement.)

License No.: _____ (Where applicable)

Agent for service or process: _____

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

Agency Concurrence (AGENCY CONCURRENCE NOT APPLICABLE):

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

Agency: N/A _____

By: N/A _____

Date: _____

Title: _____

Notice to Proceed

Dated _____

Project: Augusta Mill Place Water Project - Phase A	Owner: Augusta County Service Authority	Owner's Contract No.:
Contract:		Engineer's Project No.: 14-10
Contractor:		

Contractor's Address: [send Certified Mail, Return Receipt Requested]

You are notified that the Contract Times under the above contract will commence to run on _____. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is _____, and the date of readiness for final payment is _____ [(or) the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must:

OWNER

AUTHORIZED SIGNATURE

TITLE

DATE

Copy to Engineer

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

Augusta County Service Authority
P.O. Box 859
18 Government Center Lane
Verona, Virginia 24482

CONTRACT

Date:

Amount:

Description (Name and Location): Elevated water storage tank, control valving, and appurtenances. Verona, VA

BOND

Bond Number:

Date (Not earlier than Contract Date):

Amount:

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Company:

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By: _____

Signature and Title

(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____

Signature and Title

CONTRACTOR AS PRINCIPAL

Company:

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By: _____

Signature and Title

(Attach Power of Attorney)

Attest: _____

Signature and Title:

EJCDC No. C-610 (2002 Edition)

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.

3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:

3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and

3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and

3.3. Owner has agreed to pay the Balance of the Contract Price to:

1. Surety in accordance with the terms of the Contract;
2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.

4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:

4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or

4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
2. Deny liability in whole or in part and notify Owner citing reasons therefor.

5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1. Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3. Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker
Owner's Representative (engineer or other party)

PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):
Augusta County Service Authority
P.O. Box 859
18 Government Center Lane
Verona, Virginia 24482

CONTRACT

Date:
Amount:
Description (Name and Location): Elevated water storage tank, control valving, and appurtenances. Verona, VA

BOND

Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

Company:

Signature: _____ (Seal)
Name and Title:

Surety's Name and Corporate Seal (Seal)

By: _____
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL

SURETY

Company:

Signature: _____ (Seal)
Name and Title:

Surety's Name and Corporate Seal (Seal)

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

EJCDC No. C-615 (2002 Edition)

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.
2. With respect to Owner, this obligation shall be null and void if Contractor:
 - 2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and
 - 2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.
4. Surety shall have no obligation to Claimants under this Bond until:
 - 4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
 - 4.2. Claimants who do not have a direct contract with Contractor:
 1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
 2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
 3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.
5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.
6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:
 - 6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
 - 6.2. Pay or arrange for payment of any undisputed amounts.
7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.
8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.
9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.
11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.
13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.
14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.
15. DEFINITIONS
 - 15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
 - 15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
 - 15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone

Surety Agency or Broker:

Owner's Representative (engineer or other party):

Partial Payment Estimate				Contract: Augusta Mill Place Water Project - Phase A	Partial Payment Estimate No.	Contractor:
Virginia RUS Bulletin 1780-3 (00620-1)				Period of Estimate	Page _____ of _____	Owner: Augusta County Service Authority
Weather Related Time Delays						
No. of Days Lost	Date of Days Lost					
Change Order Summary				Estimate		
Number	FmHA Approval Date	Amount Approved (2)	Amount Installed to Date (5)	1. Original Contract _____		
				2. Change Orders Approved by Rural Development _____		
				3. Revised Contract (1 + 2) _____		
				4. Work Completed to Date _____		
				5. Change Orders Completed to Date _____		
				6. Stored Materials _____		
				7. Subtotal (4 + 5 + 6) _____		
				8. Retainage _____		
				9. Previous Payments _____		
				10. Amount Due _____		
Total						
CONTRACTOR'S CERTIFICATION The undersigned Contractor certifies that to the best of their knowledge, information and belief, the work covered by this payment estimate has been completed in accordance with the contract documents, that all amounts have been paid by the contractor for which previous payment estimates were issued, and payments received from the owner and that current payment shown herein is now due.		CERTIFICATION OF FIELD REPRESENTATIVE I have checked this estimate against the Contractor's Schedule of Amounts of Contract Payments, the notes and reports of my inspection of the project and the periodic reports submitted by the engineer. It is my opinion that the statement of work performed and/or materials supplied is accurate, that the contractor is observing the requirements of the contract, and that the contractor should be paid the amount requested.		CERTIFICATION OF ENGINEER I hereby certify that to the best of my knowledge and belief, the quantities shown in this estimate are correct and have not been shown in previous estimates and the work has been performed in accordance with the contract documents.		APPROVED BY OWNER <u>Augusta County Service Authority</u> Owner _____ By _____ Date
_____ Contractor		_____ Field Representative		Peed & Bortz, LLC Name of Architectural/Engineering Firm _____ By		ACCEPTED BY Rural Development: The review and acceptance of this estimate by Rural Development does not attest to the correctness of the quantities shown or that the work has been performed in accordance with the contract documents.
_____ By		_____ Date		_____ Title		By <u>N/A</u> _____ Date
_____ Date		_____ Date		_____ Date		_____ Date

PRICE BREAKDOWN

Item	Description	CONTRACT			THIS PERIOD		TOTAL TO DATE		% Complete
		Quantity*	Unit Price*	Amount	Quantity*	Amount	Quantity*	Amount	
	TOTALS								

* Column not used for lump sum price breakdown

Limit entries to quantities and amounts under original contract

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the Controlling Law.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT FUNDING AGENCY EDITION

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

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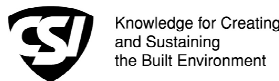
This document has been approved and endorsed by

The Associated General Contractors of America



and the

Construction Specification Institute



These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Funding Agency Edition No. C-521 (2002 Edition). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC Construction Documents, General and Instructions (No. C-001, 2002 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. C-800, 2002 Edition).

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GENERAL CONDITIONS

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda* – Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agency* – The Federal or state agency named as such in the Agreement.
 3. *Agreement* – The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 4. *Application for Payment* – The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 5. *Asbestos* – Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 6. *Bid* – The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 7. *Bidder* – The individual or entity who submits a Bid directly to Owner.
 8. *Bidding Documents* – The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 9. *Bidding Requirements* – The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.
 10. *Change Order* – A document recommended by Engineer which is signed by Contractor and Owner and Agency and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 11. *Claim* – A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 12. *Contract* – The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
 13. *Contract Documents* – Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

14. *Contract Price* – The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
15. *Contract Times* – The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
16. *Contractor* – The individual or entity with whom Owner has entered into the Agreement.
17. *Cost of the Work* – See Paragraph 11.01.A for definition.
18. *Drawings* – That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
19. *Effective Date of the Agreement* – The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
20. *Engineer* – The individual or entity named as such in the Agreement.
21. *Field Order* – A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
22. *General Requirements* – Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.
23. *Hazardous Environmental Condition* – The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.
24. *Hazardous Waste* – The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
25. *Laws and Regulations; Laws or Regulations* – Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens* – Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
27. *Milestone* – A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.
28. *Notice of Award* – The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
29. *Notice to Proceed* – A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
30. *Owner* – The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

31. *PCBs* – Polychlorinated biphenyls.
32. *Petroleum* – Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
33. *Progress Schedule* – A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor’s plan to accomplish the Work within the Contract Times.
34. *Project* – The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
35. *Project Manual* – The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
36. *Radioactive Material* – Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
37. *Related Entity* – An officer, director, partner, employee, agent, consultant, or subcontractor.
38. *Resident Project Representative* – The authorized representative of Engineer who may be assigned to the Site or any part thereof.
39. *Samples* – Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
40. *Schedule of Submittals* – A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
41. *Schedule of Values* – A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
42. *Shop Drawings* – All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
43. *Site* – Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
44. *Specifications* – That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
45. *Subcontractor* – An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
46. *Substantial Completion* – The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for

which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.

47. *Successful Bidder* – The Bidder submitting a responsive Bid to whom Owner makes an award.
48. *Supplementary Conditions* – That part of the Contract Documents which amends or supplements these General Conditions.
49. *Supplier* – A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.
50. *Underground Facilities* – All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
51. *Unit Price Work* – Work to be paid for on the basis of unit prices.
52. *Work* – The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
53. *Work Change Directive* – A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and Agency upon recommendation of the Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

- A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.
- B. *Intent of Certain Terms or Adjectives*
 1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.
- C. *Day*
 1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents, or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.

- F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement.

2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
1. a preliminary Progress Schedule;
 2. a preliminary Schedule of Submittals; and
 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, Agency, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*A. *Standards, Specifications, Codes, Laws, and Regulations*

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*A. *Reporting Discrepancies*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
 1. A Field Order;
 2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3) or
 3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or
 2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.
- B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

- A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
 - 1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and
 - 2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

- A. *Notice:* If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any “technical data” on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
2. is of such a nature as to require a change in the Contract Documents; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

- B. *Engineer’s Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner’s obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer’s findings and conclusions.

C. *Possible Price and Times Adjustments*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor’s making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

- A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and
 2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data,
 - b. locating all Underground Facilities shown or indicated in the Contract Documents,
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.
- B. *Not Shown or Indicated*
1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
 2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the “technical data” contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such “technical data” is identified in the Supplementary Conditions. Except for such reliance on such “technical data,” Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:
1. the completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.
- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner’s own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not

limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06. H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 Performance, Payment, and Other Bonds

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 Licensed Sureties and Insurers

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

5.04 *Contractor's Liability Insurance*

- A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 - 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 - 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
 - 1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
 - 2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
 - 3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.
 - a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (Contractor shall be responsible for any deductible or self-insured retention.). This insurance shall:
 1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;
 2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.
- B. Contractor shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Contractor as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:
 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Contractor and made payable to Contractor as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Contractor shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof.
- B. Contractor as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Contractor's exercise of this power. If such objection be made, Contractor as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Contractor as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Contractor as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or

equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *“Or-Equal” Items:* If in Engineer’s sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an “or-equal” item, in which case review and approval of the proposed item may, in Engineer’s sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) it has a proven record of performance and availability of responsive service; and
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times, and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
2. Substitute Items
 - a. If in Engineer’s sole discretion an item of material or equipment proposed by Contractor does not qualify as an “or-equal” item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
 - b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
 - c. The procedure requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.
 - d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) will perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:

- a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;
 - b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
 - c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
- 3) will identify:
- a) all variations of the proposed substitute item from that specified , and
 - b) available engineering, sales, maintenance, repair, and replacement services;
- 4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.
- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor
 2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or

Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

- B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

- 1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
 3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work, Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
1. all persons on the Site or who may be affected by the Work;
 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

- C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings*

- a. Submit number of copies specified in the General Requirements.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples*

- a. Submit number of Samples specified in the Specifications.

- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Submittal Procedures*
 1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:
 - a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;
 - c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and
 - d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.
 2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
 3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.
- D. *Engineer's Review*
 1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.
- E. *Resubmittal Procedures*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 1. observations by Engineer;
 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. use or occupancy of the Work or any part thereof by Owner;
 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 6. any inspection, test, or approval by others; or
 7. any correction of defective Work by Owner.

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act

or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

- B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and
 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

ARTICLE 8 – OWNER’S RESPONSIBILITIES8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner’s duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner’s identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 *Insurance*

- A. Owner’s responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

- A. Owner’s responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner’s Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor’s failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner’s responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

- A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall

create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 Authorized Changes in the Work

- A. Without invalidating the Contract and without notice to any surety, Owner may, subject to written approval by Agency at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 Unauthorized Changes in the Work

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 Execution of Change Orders

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
 - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).
- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
 1. deny the Claim in whole or in part,
 2. approve the Claim, or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
 3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
 4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
 5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs

shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
 - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
 - g. The cost of utilities, fuel, and sanitary facilities at the Site.
 - h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressages, and similar petty cash items in connection with the Work.
 - i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.
- B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:
1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.
- C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. Cash Allowances
1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance*
1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
1. the Bid price of a particular item of Unit Price Work amounts to more than 5 percent of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement; and
 2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
 1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. Contractor's Fee: The Contractor's fee for overhead and profit shall be determined as follows:
 1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.B.
 - 1. delays caused by or within the control of Contractor; or
- D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at

reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
1. repair such defective land or areas; or
 2. correct such defective Work; or
 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

- b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. the Contractor's performance or furnishing of the Work is inconsistent with funding Agency requirements;
 - d. there are other items entitling Owner to a set-off against the amount recommended; or
 - e. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.
 3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Agency, Contractor, and Engineer shall make a prefinal inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.
 - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
 - 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner, Agency, and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment*

- 1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
- 2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;
 - b. consent of the surety, if any, to final payment;

- c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. Engineer's Review of Application and Acceptance

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims. The remaining balance of any sum included in the final Application for Payment but held by OWNER for Work not fully completed and accepted will become due when the Work is fully completed and accepted.

14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract

Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
 1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),
 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 - 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 - 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION16.01 *Methods and Procedures*

- A. Owner and Contractor may mutually request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
 - 1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or
 - 2. agrees with the other party to submit the Claim to another dispute resolution process, or
 - 3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS17.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - 1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or
 - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

ARTICLE 18 – FEDERAL REQUIREMENTS (THIS ARTICLE NOT APPLICABLE)

18.01 *Agency Not a Party*

- A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

18.02 *Contract Approval*

- A. Owner and Contractor will furnish Owner's attorney such evidence as required so that Owner's attorney can complete and execute the following "Certificate of Owner's Attorney" (Exhibit GC-A) before Owner submits the executed Contract Documents to Agency for approval.
- B. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

18.03 *Conflict of Interest*

- A. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer.
- B. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

18.04 *Gratuities*

- A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.
- B. In the event this Contract is terminated as provided in paragraph 18.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in

addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

18.05 *Audit and Access to Records*

- A. For all negotiated contracts and negotiated modifications (except those of \$10,000 or less), Owner, Agency, the Comptroller General, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor, which are pertinent to the Contract, for the purpose of making audits, examinations, excerpts and transcriptions. Contractor shall maintain all required records for three years after final payment is made and all other pending matters are closed.

18.06 *Small, Minority and Women's Businesses*

- A. If Contractor intends to let any subcontracts for a portion of the work, Contractor shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of: (1) including qualified small, minority and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority, and women's businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) Contractor is encouraged to procure goods and services from labor surplus area firms.

18.07 *Anti-Kickback*

- A. Contractor shall comply with the Copeland Anti-Kickback Act (18 USC 874 and 40 USC 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

18.08 *Clean Air and Pollution Control Acts*

- A. If this Contract exceeds \$100,000, Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 USC 7401 *et seq.*) and the Federal Water Pollution Control Act as amended (33 USC 1251 *et seq.*). Contractor will report violations to the Agency and the Regional Office of the EPA.

18.09 *State Energy Policy*

- A. Contractor shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in any applicable State Energy Conservation Plan, shall be utilized.

18.10 *Equal Opportunity Requirements*

- A. If this Contract exceeds \$10,000, Contractor shall comply with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

- B. Contractor's compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the Contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the Contract, and in each trade, and Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting Contractor's goals shall be a violation of the Contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.
- C. Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the Contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

18.11 *Restrictions on Lobbying*

- A. Contractor and each subcontractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable Agency regulations. This Law applies to the recipients of contracts and subcontracts that exceed \$100,000 at any tier under a Federal loan that exceeds \$150,000 or a Federal grant that exceeds \$100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific Federal loan or grant that is a funding source for this Contract. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 USC 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Certifications and disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.

18.12 *Environmental Requirements*

- A. When constructing a project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental constraints:
 - 1. Wetlands – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.
 - 2. Floodplains – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100 year floodplain areas delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, i.e., alluvial soils on NRCS Soil Survey Maps.
 - 3. Historic Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Officer (SHPO).
 - 4. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall

be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

EXHIBIT GC-A

Certificate of Owner's Attorney

I, the undersigned, _____, the duly authorized and acting legal representative of _____, do hereby certify as follows:

I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

Date: _____

SECTION 00800 – SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract Funding Agency Edition (No. C-521, 2002 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings indicated below, which are applicable to both the singular and plural thereof.

PART I – REVISIONS TO SECTION 00710 “GENERAL CONDITIONS”

SC-1.01.A.20. Add the following language to the end of paragraph 1.01.A.21:

The Engineer’s Consultants on this project are as follows:

Geotechnics, Inc., 686 Lee Highway South, Roanoke, VA 24019

SC-2.03.A. Delete Paragraph 2.03.A in its entirety and insert the following in its place:

- A. The Contract Times will commence to run on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of Agreement.

SC-4.02. Add the following new paragraph(s) immediately after Paragraph 4.02.B:

- C. In the preparation of Drawings and Specifications, the Engineer or Engineer’s Consultants relied upon the following reports of exploration and tests of subsurface conditions at the Site:

Subsurface Investigation, Mill Place Elevated Water Storage Tank, Augusta County, VA
Prepared by Geotechnics, Inc. 28 December 2013

SC-4.06. Add the following new paragraph(s) immediately after Paragraph 4.06 A:

1. In the preparation of Drawings and Specifications, Engineer or Engineer’s Consultants relied upon the following environmental reports for the Project: (None)

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.B:

- C. Failure of Owner to demand such certificates or other evidence of full compliance with these insurance requirements or failure of Owner to identify a deficiency from evidence provided shall not be construed as a waiver of Contractor’s obligation to maintain such insurance.
- D. By requiring such insurance and insurance limits herein, Owner does not represent that coverage and limits will necessarily be adequate to protect the Contractor, and such coverage and limits shall not be deemed as a limitation on Contractor’s liability under the indemnities granted to Owner in the Contract Documents.

SC-5.04. Add the following new paragraph immediately after paragraph 5.04.B:

- C. The limits of liability for the insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 5.04.A.1 and A.2 of the General Conditions:
 - a. State: Statutory
 - b. Applicable Federal Statutory
 - c. Employer's Liability:

\$ 500,000	Each Accident Limit
\$ 500,000	Disease Policy Limit
\$ 500,000	Disease Each Employee

2. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall:
 - * be an occurrence coverage form equivalent to ISO's CG 00 01 10 01
 - * include coverage for liability arising from premises-operations, independent contractors, products-completed operations, personal and advertising injury and liability assumed under this contract
 - * include no endorsements or modifications arising from pollution, explosion, collapse, underground property damage or work performed by subcontractors
 - * include a waiver of subrogation
 - * name Owner and Engineer as an additional insured on a primary basis for ongoing and completed work using CG 20 10 11 85 (or substituting forms that provide equivalent coverages)
 - *eliminate the exclusion with respect to property under the care, custody and control of Contractor:
 - a. General Aggregate \$2,000,000
 - b. Products – Completed Operations Aggregate \$1,000,000
 - c. Personal and Advertising – Injury \$1,000,000
 - d. Each Occurrence - (Bodily Injury and Property Damage) \$1,000,000
 - e. Property Damage liability insurance will provide Explosion, Collapse, and Under-ground coverages where applicable.

3. Excess or Umbrella Liability

1) Aggregate	\$5,000,000
2) Each Occurrence	\$5,000,000

4. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:
 - a. Bodily Injury:

1) Each person	\$1,000,000
2) Each Accident	\$1,000,000

AND
 - b. Property Damage:

1) Each Accident	\$1,000,000
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OR
 - c. Combined Single Limit of \$1,000,000

5. The OWNER and ENGINEER shall be named in the policy as additional insured.

6. The Contractual Liability coverage required by paragraph 5.04.B.4 of the General Conditions shall be provided by the CONTRACTOR as part of the CONTRACTOR's General Liability Coverage.

SC-6.06 Add a new paragraph immediately after Paragraph 6.06.G:

- H. The Contractor shall not award work valued at more than fifty (50%) percent of the Contract Price to Sub-contractor(s), without prior written approval of the Owner.

SC-6.08 Delete Paragraph 6.08 in its entirety and insert the following in its place:

- A. Contractor shall obtain and pay for the following construction permits and licenses:
- Building Permit (fee waived)

Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

SC-6.17 Add the following new paragraphs immediately after Paragraph 6.17.E:

F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples or other items requiring approval and Contractor shall reimburse Owner for Engineer's charges for such time.

G. In the event that Contractor requests a substitution for a previously approved item, Contractor shall reimburse Owner for Engineer's charges for such time unless the need for such substitution is beyond the control of Contractor.

SC-7 Other work at site - The Augusta County Service Authority will be constructing connecting piping and possibly site work including tank access road. Additional connecting piping will be constructed by others.

SC-7.04 Add the following new paragraph immediately after paragraph GC-7.03:

SC-7.04 Claims between Contractors

A. Should Contractor cause damage to the work or property of any other contractor at the Site, or should any claim arising out of Contractor's performance of the Work at the Site be made by any other contractor against Contractor, Owner, Engineer, or the construction coordinator, Contractor shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law.

B. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner, Engineer, the construction coordinator and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages (including, but not limited to, fees and charges of engineers, architects, attorneys, and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any other contractor against Owner, Engineer, Engineer's Consultants, or the construction coordinator to the extent said claim is based on or arises out of Contractor's performance of the Work. Should another contractor cause damage to the Work or property of Contractor or should the performance of work by any other contractor at the Site give rise to any other Claim, Contractor shall not institute any action, legal or equitable, against Owner, Engineer, or the construction coordinator or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose li-

ability on or to recover damages from Owner, Engineer, or the construction coordinator on account of any such damage or Claim.

C. If Contractor is delayed at any time in performing or furnishing Work by any act or neglect of another contractor, and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim for an extension of times in accordance with Article 12. An extension of the Contract Times shall be Contractor's exclusive remedy with respect to Owner, Engineer, and construction coordinator for any delay, disruption, interference, or hindrance caused by any other contractor. This paragraph does not prevent recovery from Owner, Engineer, or construction coordinator for activities that are their respective responsibilities.

SC-9.03.A. Add the following language at the end of paragraph 9.03:

If applicable, the duties, responsibilities, and limitations of authority of the Resident Project Representative will be as stated in Exhibit D of the OWNER-ENGINEER Agreement, E-510, 2002 Edition, as amended and executed for this specific project. The Owner may provide the Resident Project Representative.

SC-11.01.A.5.c, Delete Paragraph 11.01.A.5.c in its entirety and insert the following in its place:

c. Construction Equipment and Machinery:

1. Rentals of all construction equipment and machinery, and the parts thereof in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

2. Costs for equipment and machinery owned by Contractor will be paid at a rate shown for such equipment in "The AED Green Book". An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs. Costs will include the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, shall cease to accrue when the use thereof is no longer necessary for the changed Work. Equipment or machinery with a value of less than \$1,000 will be considered small tools.

SC-12.04. Add the following new paragraph immediately after paragraph 12.04.E:

When establishing the contract time, an allowance will be made for four (4) calendar days of work lost per month due to inclement weather conditions. The Contractor, at the time of each periodic pay request, shall submit to the Engineer and Owner for approval a list of all working days lost due to either inclement weather or site conditions caused by inclement weather for the period. Accompanying his list should be a summary of the specific conditions that caused the loss. This request will be reviewed by the Engineer in light of observations made by the Engineer and resident inspector. Approval of the periodic payment estimate by the Engineer and Owner will also include approval of the weather delay request. After substantial completion, and not until then, a change order must be executed if a time extension for weather related delays is requested by the Contractor. The time extension must be based solely on the time requested within the periodic payment estimates. Subtracted from this time will be the four (4) days per month allowance assumed in the contract. There cannot be a decrease in contract length if the allowance for inclement weather exceeds the actual number of days lost due to inclement weather. To convert working days into calendar days, multiply the working days by seven (7) and divide by the number of working days in a typical workweek.

SC-14.02.A.3 Add the following language at the end of paragraph 14.02.A.3:

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

SC-14.02.C.1. Delete paragraph 14.02.C.1 in its entirety and insert the following in its place:

1. The Application for Payment with Engineer's recommendations will be presented to the Owner for consideration. If the Owner finds the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 14.02.D will become due thirty (30) days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

PART 2 – FINAL PAYMENT

Listed are the necessary documents required before final payment is made to contractors. Some of the items may not be applicable on each project or in all contracts of the same project. When more than one contractor is on the same project, most of the following items will be submitted for each.

1. Final change order shall be updated and reflect the changes to correlate with the as-built drawings.
2. For projects where performance and payment bonds are in effect, a "Consent of Surety as to Final Payment" is needed. When surety bonds are not provided, contractors will furnish the owner required evidence of payment in full for all materials, labor and any other items procured under the contract. Form RD 1924-10, "release by Claimants", and/or Form RD 1924-9, "Certificate of Contractor's Release", may be used for this purpose.
3. A statement signed by the Design Consultant stating that the work has been inspected and that the construction was completed in accordance with the approved contract documents. Exhibit E of EJCDC No. 1910-1-FA, "Notice of Acceptability of Work", should be used for this purpose.
4. A statement from the borrower indicating full acceptance of the project.
5. A letter or permit release from VDOT stating that all VDOT requirements for restoration of the work area have been satisfied.

Change Order No. _____

Date of Issuance: _____ Effective Date: _____

Project: <u>Augusta Mill Place Water - Phase A</u>	Owner: <u>Augusta County Service Authority</u>	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.: <u>14-10</u>

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments: (List documents supporting change):

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price: \$ _____	Original Contract Times: <input type="checkbox"/> Working days <input type="checkbox"/> Calendar days Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: \$ _____	[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order: \$ _____	[Increase] [Decrease] of this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial completion (days or date): _____ Ready for final payment (days or date): _____

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____ Engineer (Authorized Signature) & ACSA	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____
Approved by Funding Agency (if applicable): _____		Date: _____

Change Order Instructions

A. GENERAL INFORMATION

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Price or Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Orders to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order should be used.

B. COMPLETING THE CHANGE ORDER FORM

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Owner or Contractor for approval, depending on whether the Change Order is a true order to the Contractor or the formalization of a negotiated agreement for a previously performed change. After approval by one contracting party, all copies should be sent to the other party for approval. Engineer should make distribution of executed copies after approval by both parties.

If a change only applies to price or to times, cross out the part of the tabulation that does not apply.

SECTION 00945 WORK CHANGE DIRECTIVE

No. _____

DATE OF ISSUANCE _____ EFFECTIVE DATE _____

OWNER Augusta County Service Authority

CONTRACTOR _____

Contract: Augusta Mill Place Water Project - Phase A

Project: _____

OWNER'S Contract No. _____ ENGINEER's Project No. 14-10

You are directed to proceed promptly with the following change(s):
Description:

Purpose of Work Change Directive:

Attachments: (List documents supporting change)

If OWNER or CONTRACTOR believe that the above change has affected the Contract Price any Claim for a Change Order based thereon will involve one or more of the following methods as defined in the Contract Documents.

Method of determining change in Contract Price:

- Unit Prices
- Lump Sum
- Cost of the Work _____

Estimated increase (decrease) in Contract Price:
\$ _____
If the change involves an increase, the estimated amount is not to be exceeded without further authorization.

Estimated increase (decrease) in Contract Times:
Substantial Completions: _____ days;
Ready for final payment: _____ days.

RECOMMENDED: _____

AUTHORIZED: _____

ENGINEER

OWNER

By: _____

By: _____

EJCDC No. 1910-8-F (1996 Edition)

WORK CHANGE DIRECTIVE

INSTRUCTIONS

A. GENERAL INFORMATION

This document was developed for use in situations involving changes in the Work which, if not processed expeditiously, might delay the Project. These changes are often initiated in the field and may affect the Contract Price or the Contract Times. This is not a Change Order, but only a directive to proceed with Work that may be included in a subsequent Change Order.

For supplemental instructions and minor changes not involving a change in the Contract Price or the Contract Times, a Field Order should be used.

B. COMPLETING THE WORK CHANGE DIRECTIVE FORM

Engineer initiates the form, included in a description of the items involved and attachments.

Based on conversations between Engineer and Contractor, Engineer completes the following:

METHOD OF DETERMINING CHANGE, IF ANY, IN CONTRACT PRICE: Mark the method to be used in determining the final cost of the Work involved and the estimated net effecting on the Contract Price. If the change involves an increase in the Contract Price and the estimated amount is approached before the additional or changed Work is completed, another Work Change Directive must be issued to change the estimated price or Contractor may stop the changed Work when the estimated time is reached. If the Work Change Directive is not likely to change the Contract Price, the space for estimated increase (decrease) should be marked "Not Applicable."

Once Engineer has completed and signed the form, all copies should be sent to Owner for authorization because Engineer alone does not have authority to authorize changes in Price or Times. Once authorized by Owner, a cop should be sent by Engineer to Contractor. Price and Times may only be changed by Change Order signed by Owner and Contractor with Engineer's recommendation.

Paragraph 10.03.A.2 of the General Conditions requires that a Change Order be initiated and processed to cover any undisputed sum or amount of time for Work actually performed pursuant to this Work Change Directive.

Once the Work covered by this directive is completed or final cost and times are determined, Contract should submit documentation for inclusion in a Change Order.

THIS IS A DIRECTIVE TO PROCEED WITH A CHANGE THAT MAY AFFECT THE CONTRACT PRICE OR CONTRACT TIMES. A CHANGE ORDER, IF ANY, SHOULD BE CONSIDERED PROMPTLY.

SECTION 01100 – GENERAL REQUIREMENTS**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Augusta County Service Authority – Augusta Mill Place Water Project - Phase A
 - 1. Project Location: West End of Mill Place Parkway, Verona, VA
 - 2. Owner: Augusta County
 - 18 Government Center Lane
 - Verona, Virginia 24482
- B. ENGINEER Identification: The Contract Documents for this project were prepared by Peed & Bortz, LLC, Civil and Environmental Engineers, 20 Midway Plaza Drive Ste. 100, Christiansburg, VA 24073.
- C. The Work consists of construction of an elevated 170' high nominal 500,000-gallon water storage tank, control valving, gravel access road, site work, and appurtenances.

1.3 CONTRACT

- A. In addition to the tank contract, connecting piping will be constructed by others. Site work, including access road, may be constructed by others.

1.4 PRODUCTS

- A. Exclusive of tank structure components, all products shall be from the Augusta County Service Authority List of Approved Products included in Appendix. Proposed alternate products must be approved by OWNER. Additional material specifications in this section are intended to supplement the Approved Products List. Where any conflicts exist, the Approved Products List shall take precedence.

1.5 WORK SEQUENCE

- A. Due to construction time requirements, tank contract will be let initially. Connecting pipes will be constructed by others, and will be completed prior to when tank filling commences.

1.6 USE OF PREMISES

- A. All work will be performed in existing easements and/or property secured by Augusta County. Other than the access road entrance, no work will be performed on VDOT property.
- B. Potable water for use by CONTRACTOR will be available initially at the fire hydrant along the Mill Place Parkway alignment after obtaining contract meter from ACSA.

1.7 FUTURE WORK

- A. Due to construction time requirements, tank contract will be let initially. Connecting pipes will be constructed by others, and will be completed as necessary to fill tank. In addition site work may be constructed by others.

1.8 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "Master Format" numbering system.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred, as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by CONTRACTOR. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by CONTRACTOR or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.9 RECORD DRAWINGS

- A. General: The CONTRACTOR will submit to the ENGINEER at the Final Completion inspection, record drawings of the project. ENGINEER will provide CONTRACTOR with one set of reproducible plan sheets upon request. The record drawings provided to the ENGINEER will be in a legible, reproducible format and show all revisions/changes to the plans made during construction, including horizontal and vertical location changes.
- B. As-built locations of all above grade appurtenances will be provided in State Plane coordinates with an accuracy of +/- 0.25 foot. Elevations will be surveyed at the completion of the project by a Virginia certified Land Surveyor or if agreed upon in advance by the OWNER, the CONTRACTOR may provide data via another pre-approved collection method.

1.10 MATERIAL TESTING

- A. Earthwork, Concrete, and Aggregate testing: The OWNER will procure an approved testing agency to test materials in accordance with the Specifications. OWNER's representative will test coatings.

1.11 SCHEDULE OF VALUES

- A. Schedule of Values: The CONTRACTOR will provide a suitable schedule of values for each lump sum bid item citing estimated material quantities and the associated unit costs. The schedule of values will be presented to the ENGINEER at the pre-construction conference for the ENGINEER's approval.

1.12 CONSTRUCTION STAKING

- A. General: The CONTRACTOR will be responsible for providing all construction staking and all other surveying needs.

1.13 PERMITS

- A. Building Permit: CONTRACTOR will be responsible for applying for and obtaining the Building Permit through Augusta County. OWNER will be responsible for permit fee.

1.14 WATER MAIN TESTING

- A. General: The OWNER will provide a volume of water equal to 1.5 times the volume of the lines for pressure testing. Any additional water required by the CONTRACTOR may be purchased from Augusta County Service Authority.
- B. CONTRACTOR may utilize fire hydrants to fill the water mains. CONTRACTOR shall coordinate with ACSA and may only utilize hydrants in the presence of ACSA representative. CONTRACTOR shall utilize appropriate backflow prevention at all times. CONTRACTOR is responsible for installing (and properly abandoning) any additional taps, temporary piping, pumps, flushing appurtenances, de-chlorination of flushing water, etc., as required to properly test the force main.

1.15 BLASTING

- A. General: Blasting will be done in strict accordance with the most recent edition of the Virginia Statewide Fire Prevention Code (VR 394-01-6). The CONTRACTOR will adhere to the requirements of Augusta County and will notify the County prior to any blasting.

1.16 OSHA REQUIREMENTS

- A. General: The CONTRACTOR will be responsible for performing all tank work, excavation, pipe installation and backfilling in accordance with applicable OSHA Standards. The CONTRACTOR's responsibility also extends to providing a "Competent Person" as defined by the OSHA regulation referenced above on the job site, and for providing OWNER with documentation that all of OWNER's personnel are properly trained.

1.17 TRAFFIC

- A. Traffic control will not be required.

1.18 BURNING

- A. CONTRACTOR may burn brush provided CONTRACTOR complies with all local, state and federal regulations. CONTRACTOR will obtain all permissions required to burn debris on private lands and restoration of area when complete. Burning debris and associated activities will be at no additional cost to the OWNER. CONTRACTOR will obtain permission from the appropriate Augusta County office prior to any burning.

1.19 FENCING

- A. CONTRACTOR will replace (in-kind or better) or repair all disturbed fencing.

PART 2 - PRODUCTS (NOT USED)**PART 3 - EXECUTION (NOT USED)****END OF SECTION**

SECTION 01330 - SUBMITTAL PROCEDURES**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. Work Included: The CONTRACTOR shall provide submittals for the ENGINEER's approval to show compliance with the specifications. Unacceptable submittals shall be revised and resubmitted as necessary until compliance with the specifications is achieved.
- B. Related Section: Additional Sections of the Documents which are referenced in this Section include:
 - 1. Section 00710 – General Conditions

1.2 QUALITY ASSURANCE

- A. Coordination of Submittals: The CONTRACTOR shall be responsible for reviewing the Specifications to ensure that the items being submitted conform in all respects with the requirements. All submittals shall be provided to the ENGINEER at least 3 weeks prior to commencing work on the items being submitted.
- B. Substitutions:
 - 1. The CONTRACTOR is bound to the standards of quality established in the Contract Documents. Refer to Article 6 of the General Conditions regarding “Equals”.
 - 2. The substitution of materials or equipment shall not be permitted unless the ENGINEER has given prior approval for the substitution in writing.
 - 3. The CONTRACTOR shall certify that the proposed substitution has been determined to be equal or superior to the product specified. The proposed substitution shall be in complete compliance with the provisions in the Contract Documents.

PART 2 - PRODUCTS

2.1 SUBMITTALS

- A. General: The CONTRACTOR shall comply with Article 6 of the General Conditions regarding “Submittals”.
- B. Submissions: Submittals will be stamped by the ENGINEER in one of the following ways:
 - 1. “Approved” – No exceptions are taken, subject to compliance with the Contract Documents.
 - 2. “Approved as Corrected” – Minor corrections are noted and a resubmittal is not required, subject to compliance with the corrections and the Contract Documents.
 - 3. “Not Approved” – The submittal material, method or system is totally rejected and does not meet the intent of the Specifications.
 - 4. “Revise and Resubmit” – Revise prior to resubmittal is required.

- C. Submission Procedure: The CONTRACTOR shall provide a minimum of 6 copies of each submittal to the ENGINEER for review. The ENGINEER will retain 2 copies, the Inspector receives 1 copy, the OWNER receives 1 copy, and the CONTRACTOR receives the remaining copies.

2.2 SHOP DRAWINGS

- A. Scale and Measurements: Shop drawings shall be to a scale sufficiently large to show all pertinent aspects of the item.
- B. Review Comments: The ENGINEER will show all review comments on each copy of the submittal to be distributed as stated in Article 6 of the general conditions.

2.3 MANUFACTURER'S LITERATURE

- A. General: The CONTRACTOR shall provide all manufacturers' data pertinent to the submittal, clearly showing which portions of the contents are being provided for review. Submittals not depicting which item and option(s) are proposed may be returned "Not Approved" and require re-submittal.

PART 3 - EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

- A. Numbering: All submittals shall be consecutively numbered. Resubmittals shall cite the original submittal number for reference.
- B. Transmittal: Each submittal shall be accompanied by a transmittal letter showing all the information required for identification and checking, including the appropriate Specification sections.
- C. Submittal Log: The CONTRACTOR shall maintain a submittal log for the duration of the Work that indicates current status of all submittals. The submittal log shall be available to the ENGINEER at all times for the ENGINEER's review.

3.2 ENGINEER'S REVIEW

- A. General: Review by the ENGINEER does not relieve the CONTRACTOR from responsibility for errors that may result from the submitted data.
- B. Revisions: All revisions requested by the ENGINEER will be required. If the CONTRACTOR is considering any required revision to be changed, he shall notify the ENGINEER as provided in the General Conditions.

END OF SECTION

SECTION 01450 - TESTING & INSPECTION REQUIREMENTS**PART 1 - GENERAL**

1.1 TESTING

- A. **Testing Required:** Testing shall be required for the following items of Work:
1. Water line and tank bacteriological
 2. Water line and tank leakage
 3. Backfill compaction
 4. Concrete
 5. Coatings
- B. **Payment:** The OWNER shall be responsible for procurement and payment for an Independent Testing Laboratory for analysis of field samples. Testing performed exclusively for the CONTRACTOR's convenience shall be the sole responsibility of the CONTRACTOR. The OWNER will be responsible for the cost of testing when additional tests are made at the OWNER's request for an item that has been previously tested and found to be acceptable.
- C. **Taking Samples:** All specimens and samples shall be taken and cured/prepared by the Independent Testing Laboratory personnel.
- D. **Qualifications:** Individuals taking and performing the field tests shall have the proper training and qualifications.
- E. **Codes and Regulations:** All testing shall be performed in accordance with all pertinent codes, regulations and standards.
- F. **Scheduling:** The CONTRACTOR shall be responsible for coordination of testing.

1.2 INSPECTION

- A. **Inspection Required:** It is anticipated that the Resident Project Representative for the project will be provided by ACSA.
- B. **Payment:** OWNER will provide payment for RPR services, code compliance inspection, & materials testing.
- C. **General:** Inspections and testing required by codes or ordinances, a planning authority, or which are made by a legally constituted authority shall be the responsibility of and shall be paid for by the OWNER, unless otherwise provided for in these specifications.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. Equipment: The Independent Testing Laboratory shall be responsible for supplying all necessary equipment required for testing.

PART 3 - EXECUTION

3.1 CONNECTION TO EXISTING SYSTEM

- A. Newly constructed valves and/or pipes to be connected to the existing ACSA system shall remain closed and/or disconnected pending Substantial Completion or authorization of OWNER.

END OF SECTION

SECTION 01610 - DELIVERY, STORAGE, AND HANDLING**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. Work Included: Products to be used in the work shall be properly stored and handled as described in this section. This section is not intended as a substitution for good judgment by the CONTRACTOR, nor is it intended to limit protective measures to be taken by the CONTRACTOR during construction.

1.2 QUALITY ASSURANCE

- A. General: The CONTRACTOR shall take the necessary measures to protect the materials and work as required.

1.3 MANUFACTURER'S RECOMMENDATIONS

- A. General: Unless otherwise approved by the ENGINEER or specified herein, the CONTRACTOR shall comply with the manufacturer's recommendations on product handling, storage and protection.

1.4 PACKAGING

- A. General: Products shall be delivered to the job site in their manufacturer's original container with labels intact and legible. Damaged materials shall be immediately replaced at no additional cost to the OWNER. The ENGINEER may reject, as non-complying, any materials that do not bear the proper identification such as manufacturer, grade, quality and other pertinent information.

1.5 PROTECTION OF SURFACES

- A. General: The CONTRACTOR shall protect and maintain all finished surfaces from damage during storage and construction. Finished surfaces shall remain clean, unmarred and suitably protected until the work is accepted by the OWNER.

1.6 REPAIRS AND REPLACEMENTS

- A. General: In the event of damage, the CONTRACTOR shall make the necessary replacements as approved by the ENGINEER at no additional cost to the OWNER. No extension of contract time will be given for work associated with replacement of damaged materials. Damaged materials shall be removed immediately from the jobsite.

1.7 DELIVERY AND STORAGE

- A. Delivery: The CONTRACTOR shall be responsible for making all the arrangements for the delivery, unloading, receiving and storage of materials.

- B. Storage: The CONTRACTOR shall store all products and materials in a protected location to prevent any damage or deterioration due to moisture, freezing temperatures or other detrimental conditions.
- C. Damaged or Rejected Material: Any damaged or rejected material shall be removed from the job site immediately.

END OF SECTION

SECTION 02080 – UTILITY PIPE AND MATERIALS**PART 1 GENERAL****1.1 REFERENCES**

1. General: The Work shall comply with the most recent or tentative standards as published at the date of the Contract.
2. Related Sections: Additional Sections of the Documents which are referenced in this Section Include:
 - 1) Section 01450 – Testing & Inspection Requirements
 - 2) Section 02085 - Valves and Cocks
 - 3) Section 02317- Excavating, Trenching, and Backfilling for Utilities
 - 4) Section 02510 - Water Distribution

1.2 QUALITY ASSURANCE

1. Quality Assurance: All pipe and fittings shall be new, free from defects or contamination and shall, whenever possible, be the standard product of a single manufacturer.

PART 2 PRODUCTS**2.1 APPROVED PRODUCTS**

1. All products shall be from the Augusta County Service Authority List of Approved Products included in Appendix A. Proposed alternate products must be approved by OWNER. Additional material specifications in this section are intended to supplement the Approved Products List. Where any conflicts exist, the Approved Products List shall take precedence.

2.2 MISCELLANEOUS DEVICES

1. Floor Drains: Drains shall conform to ANSI/ASME A 112.21.1. Floor drains shall be coated cast iron with double drainage flange, weepholes, threaded outlet connection, integral bell trap, and adjustable polished nickel alloy round removable strainer. Strainer shall be 6 inches in diameter and shall be made with light duty grate in buildings except in traffic areas where medium duty shall be used.
2. Pressure Gauges: Pressure gauges shall be bronze Bourdon tube in cast aluminum case with male 1/4 inch IPT connection at bottom, at least 4 1/2 inch face diameter with a range adequate to measure all working pressures, installed with brass piston type pulsation dampener. Gauges on the suction side of pumps shall be a pressure and vacuum gauge with a range adequate to measure all working pressures. Each gauge shall be mounted with a bronze ball cock to allow removal or servicing and a piston type pressure snubber to protect the gauge from rapid changes in line pressure. Gauges for use in wastewater applications shall be isolated from direct contact with wastewater by means of a diaphragm type isolator.
3. Tapping Saddles: Saddles shall be made of a malleable material and have flat stainless steel straps. Rubber gaskets shall be required for all pipe sizes and classes. Lead gaskets are prohibited. Saddles shall provide full support around the circumference of the pipe and have a bearing area of sufficient width along the axis of the pipe 1-1/2 inch minimum. Saddles shall not have lugs that will dig into the pipe when the saddle is tightened. The U-bolt type strap will not be allowed. Saddles shall be Ford FS 202, Mueller DE2S SERIES, Romac Style 202S or approved equal.

PART 3 EXECUTION**3.1 EXCAVATION, BACKFILLING AND COMPACTION**

1. General: Trench excavation shall be in accordance with Section 02317 – Excavation, Trenching, and Backfilling for Utilities

3.2 SEPARATION OF WATER AND SEWER LINES

1. Parallel Installation:

- 1) Normal conditions – Water mains shall be separated at least 10 feet horizontally from a sewer or sewer manhole. The distance shall be measured edge-to-edge. All water and sewer lines shall be installed a minimum of 20 feet from structures, including but not limited to, buildings, columns, and signs. Sewer lines and wells shall be separated a minimum of 50 feet.
- 2) Unusual conditions – When local conditions prevent a horizontal separation of 10 feet, the Contractor shall notify the Authority's Representative. The Authority's Representative, after consultation with the Virginia Department of Health, shall provide special instructions for construction within the area of conflict. In some cases, if authorized by the Authority's Representative, the 10 foot separation requirement may be waived provided that:
 - a) The bottom (invert) of the water main shall be at least 18 inches above the top (crown) of the sewer.
 - b) Where this vertical separation cannot be obtained, the sewer shall be constructed of AWWA approved water pipe, pressure tested in place to 30 psi without leakage prior to backfilling.
 - c) The sewer manhole shall be of watertight construction and tested in place.

2. Crossings:

- 1) Normal conditions – Water lines crossing over sewers shall have a separation of at least 18 inches between the bottom of the water line and the top of the sewer.
- 2) Unusual conditions – When local conditions prevent a vertical separation described above, the Contractor shall notify the Authority's Representative. The Authority's Representative, after consultation with the Virginia Department of Health, shall provide special instructions for construction within the area of conflict. In some cases, if authorized by the Authority's Representative, the following construction shall be used:
 - a) Sewers passing over or under water mains shall be constructed of AWWA approved water pipe, pressure tested in place to 30 psi without leakage prior to backfilling. Sewer pipe shall also be centered at the point of water line crossing such that the joints are equidistant from the crossing.
 - b) Water lines passing under sewers shall, in addition, be protected by providing:
 - A vertical separation of at least 18 inches between the bottom of the sewer and the top of the water line.
 - Adequate structural support for the sewers to prevent excessive deflection of the joints and the settling on and breaking of the waterline.

- That the length of the water line be centered at the point of the crossing so that joints shall be equidistant and as far as possible from the crossing.
- 3. **Intersections:** No water pipe shall pass through or come in contact with any part of the sewer or sewer manhole. Nor shall any water distribution flushing device be directly connected to any sewer.
- 4. **Special Cases:** In the event that existing utilities or field conditions make it impossible or impractical to meet the separation requirements, the Contractor shall notify the Authority's Representative. The Authority's Representative, after consultation with the Virginia Department of Health, shall provide special instructions for construction within the area of conflict.

3.3 INSTALLATION OF PIPE AND FITTINGS

1. **General:** No valve, hydrant, or other appurtenance on existing water lines shall be opened or closed for any purpose by the Contractor. Any opening or closing of valves, hydrants, whatsoever shall be by the Authority only. The Contractor shall notify the Authority at least 48 hours prior to the need to open or close any appurtenance, except in emergencies, at which time the Authority shall be notified immediately.
2. **Depth and Cover:** All water lines shall be constructed with a properly prepared trench, pipe bedding, and backfill. All water lines shall have a minimum of 42-inch and maximum of 60-inch cover measured from the top of the pipe to the finished grade at the proposed pipe centerline. Only under extraordinary circumstances and with special permission of the Authority shall water lines be deeper than 60 inches, or less than 42-inches deep (see Standard Detail W-1).
3. **Slope:** When installing gravity sewer on slopes of less than one percent, laser technology shall be used to insure proper grades.
4. **Handling:** Pipe shall be placed in the trench in such a manner as to prevent damage to pipe and protective coatings and linings. Under no circumstances shall pipe be dropped or dumped into the trench. As the temperature approaches or drops below freezing, extra care shall be used in handling pipe.
5. **Cleaning:** Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. Spigot and bell ends of pipe and gaskets shall be cleaned and lubricated according to manufacturer's instructions. If the pipe cannot be placed without getting debris into it, the Authority may require that a heavy tightly woven canvas bag of suitable size be placed over each end of the pipe before lowering the pipe into the trench and left there until the connection is made to the adjacent pipe. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug. If water accumulates in the trench, plugs shall remain in place until the trench is dry.
6. **Cutting:** Pipe shall be cut in a neat and workmanlike manner without damage to the pipe. Unless otherwise authorized by the Authority's Representative, cutting shall be done by means of approved type of mechanical cutters. Wheel cutters shall be used when practicable. Use of oxy-acetylene torch or similar method to cut pipe will not be permitted.
7. **Direction of Laying:** All pipe shall be laid with bell ends facing in the direction of laying unless otherwise directed by the Authority's Representative. Where pipe is laid on a grade of 10 percent or greater, or for gravity pipe systems, the laying shall start at bottom and shall proceed upward with the bell ends of pipe upgrade. Each piece of pipe shall be laid true to line and grade. The bottom of the trench shall be smoothly graded and bell holes provided so that the trench bottom provides uniform support to the barrel of the pipe when in final position. Adjustments to line or grade shall be made by removing or adding granular material under the barrel. In no case shall wedges or blocks be used under the body of the pipe. The pipe shall be pushed fully "home" by hand, with a bar and block of wood to cushion the bell, or other similar methods for large diameter pipe.

8. **Bedding:** Bedding of pipe shall be placed to the depth shown on the plans or standard details and shall be compacted to specified density. Bedding of ductile iron pressure pipe shall consist of firm subgrade with excavation for bell holes. When in rock excavation or for gravity sewer, bedding shall consist of a gravel base as shown in Standard Details W-1 and S-1.

Special care must be taken during installation of ribbed PVC pipe to insure ribs are completely imbedded in the bedding material to prevent settling after installation. This material (sometimes referred to as “haunching”) from the bedding to the springline must be rodded with bars or consolidated with shovels to assure complete filling of the voids between each rib. If pipe is completely covered with bedding/haunching material the same procedures shall be followed to prevent any voids between the pipe ribs.

9. **Lateral Connections:** In-Line wyes and tees for cleanouts/laterals shall be installed during initial construction. When lines are required to be tapped, connections shall be made using an approved watertight saddle. Tapping into the ribbed PVC pipe with the wye tapping saddle or the Inserta Tee will only be authorized to accommodate additional requirements subsequent to acceptance of project by the Authority or as explicitly authorized by the Authority’s Representative.
10. **Deflection at Joints:** Maximum deflection for force main and pressure pipe joints will be as follows:

Pipe Size	Allowable Deflection (in inches)							
	Ductile Iron (Push on) Lengths				Ductile Iron (Mechanical) Lengths			
	12'	16'	18'	20'	12'	16'	18'	20'
4"	12	17	19	21	21	28	31	34
6"	12	17	19	21	18	24	27	30
8"	12	17	19	21	13	18	20	22
10"	12	17	19	21	13	18	20	22
12"	12	17	19	21	13	18	20	22
16"	7.5	10	11	12	9	12	13.5	15

11. **Installation of Fittings:** Fittings shall be installed with the same care that mainline pipe is installed. Caps or plugs shall be braced to prevent blow off during testing.

- 1) Ductile iron fittings used on Force main and Other Pressure Pipe shall be supported in accordance with PART 2 PRODUCTS of this Section.

Use fittings and gaskets manufactured by the pipe manufacturer designed specifically for connection to, and repair of, ribbed PVC pipe. Installation of fittings and repairs to pipe must be in accordance with the Manufacturer’s procedures and recommendations.

12. **Jointing:**

- 1) **Mechanical Joints:** When installing mechanical joint (MJ) ductile iron pipe, the socket, spigot end and rubber gasket shall be thoroughly washed with soapy water to remove any grease or grit that might damage the gasket. In making up the joint, the gland for MJ pipe followed by the gasket, shall be placed over the plain end of the pipe and inserted into the socket. The gasket shall be pushed into position without excessive force and evenly seated in the socket of the pipe bell, and the gland for MJ pipe, then moved into position against the face of the rubber gasket.
- 2) **Flanged Joints:** Where flanged joints are used, they shall be installed by skilled workmen in accordance with the best standard practice. Bolts shall be tightened so as to evenly distribute the joint stress and insure proper pipe alignment.

13. Setting of Valves: Valves shall be installed in accordance with manufacturer's instructions and shall be in accordance with Section 02085 - Valves and Cocks and as shown on the Standard Details.
14. Joint Restraint: Pressure pipe lines shall be mechanical joint and protected against joint pulling or thrust damage by suitable mechanical joint restraining glands installed at direction changes as a result of fittings and all other critical points. Other methods of restraint may be approved by the Authority depending on the conditions.

Rods and clamps, for use on hydrant installations only, shall be galvanized or otherwise rust proof treated.

Mechanical joint pipe and restraining devices shall be installed in accordance with Standard Detail W-14 and shall be in accordance with the Approved Products List.

3.4 TESTING

1. General: The Authority's Representative shall be present at all required water/sewer facility testing. Copies of all test results shall be submitted to the Authority's Representative.

3.5 PIPELINE TESTING

1. General: Water for the first test shall be provided by the Authority. Subsequent water for tests shall be at the Contractor's expense in accordance with Section 01450 – Testing & Inspection Requirements. In the event the mains are damaged and are in need of repairing, cleaning, disinfection, flushing, testing, or similar operational actions, this shall be in accordance with the most current standard issued by AWWA.
2. Working Pressure shall be 150 PSI.
2. Pressure Testing – Water and Force Mains:
 - 1) Test Section: Pressure and leakage testing shall be conducted on each valved section (between adjacent valves) of pressure pipeline. Testing taps shall be provided and installed by Contractor as necessary where service connections are not available. Force mains and other pressure pipe without valves shall be tested in sections not to exceed 5,000 feet.
 - 2) Procedures: Pressurization, air removal, and allowances shall be in accordance with AWWA C 600, Section 5. Testing shall begin on the first valved section of line within ten days after its completion. Waterline shall not be considered ready for testing until all service taps have been installed. If testing is performed before services are installed additional testing may be required. The pressure and leakage tests shall be conducted concurrently for a duration of two hours. Testing through fire hydrants shall not be permitted. The valved section of the pipe under consideration shall be slowly filled with water and brought to the specified pressure based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, by means of a pump. Before supplying the specified test pressure, all air shall be expelled from the pipe.

Testing shall not begin until at least seven days after the last concrete anchor, if used, has been poured on the section of line being tested (if high early concrete is used, two days). The Authority's Representative shall observe all leakage tests. If the pipe fails to meet test requirements, all leaks shall be repaired and defective pipe replaced at the Contractor's expense. The test shall be repeated until satisfactory results are obtained. The Contractor shall be charged for all retests at the normal rates for inspection services in accordance with Section 01450 – Testing & Inspection Requirements.

Any exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, valves, hydrants, or joints that are discovered following the pressure test shall be repaired or replaced with sound material, and the test shall be repeated until it meets the testing requirements.

- 3) Test Pressures: Test pressure shall not exceed the rated pressure of valves, piping, or thrust restraint design pressures. For test pressures less than 200 psi, Contractor shall demonstrate that there is no significant pressure (other than static) in the adjacent sections of pipeline to the one being tested.

Valves shall not be operated in either the opening or closing direction at differential pressures above the rated pressure. When hydrants are in the test section, the test shall be made against closed hydrant valves. The system shall be stabilized at the test pressure before conducting the leakage test.

- 4) Leakage: Leakage shall be defined as the quantity of water that must be supplied into the valved pipe section to maintain pressure within 5 psi of the specified test pressure. The allowable leakage shall not exceed the values given in table labeled Allowable Leakage Per 1,000 Feet of Pipeline.

Allowable Leakage Per 1,000 Feet (305 m) of ductile iron or 1111 feet (339 m) of PVC Pipeline - gph (multiply by 2 for 2 hour test)

Avg. Test Pressure psi	Pipe Diameter										
	3	4	6	8	10	12	14	16	18	20	24
300	0.39	0.52	0.78	1.04	1.30	1.56	1.82	2.08	2.34	2.60	3.12
275	0.37	0.50	0.75	1.00	1.24	1.49	1.74	1.99	2.24	2.49	2.99
250	0.36	0.47	0.71	0.95	1.19	1.42	1.66	1.90	2.14	2.37	2.85
225	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.25	2.70
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12	2.55
175	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98	2.38
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84	2.21
125	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	1.68	2.01
100	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.80

- 5) Test acceptance shall be determined on the basis of passing the above mentioned test. If any test of laid pipe fails, the contractor shall locate and make approved repairs as necessary until the line passes the test.
- 6) All visible leaks are to be repaired, regardless of the amount of leakage.

3.6 DISINFECTION

- 1. General: Disinfection of water mains shall be in accordance with Section 02510 - Water Distribution.

3.7 EXPOSED PIPING IDENTIFICATION

- 1. General: To identify exposed piping, the different lines shall have contrasting colors. Pipes and valves shall be color coded in a manner that will permit ready identification of pipes at any location. Labeling of the identification of the pipe with or without an accompanying color code shall be considered as an acceptable substitute for the color scheme contained herein. Where color bands are utilized, the bands are to be one-inch wide and placed on 18 inch centers.

Potable Water Line – Dark Blue
 Drain & Overflow Line – Light Brown

END OF SECTION

SECTION 02085 - VALVES AND COCKS**PART 1 GENERAL****1.1 REFERENCES**

1. General: The work shall comply with the most recent standards or tentative standards as published at the date of the contract and as listed in this specification.
2. Related Sections: Additional Sections of the Documents which are referenced in this Section include:
 - 1) Section 02080 - Utility Pipe and Materials

1.2 SYSTEM DESCRIPTION

1. General: Valves shall be non-rising stem, with handwheel, lever, nut, or hydraulic operator, as shown on the Plans and specified herein.

1.3 DELIVERY, STORAGE AND HANDLING

1. Delivery: Deliver valves to the job site packaged, tagged, and marked.
2. Storage: Store valves at the job site in a manner to prevent damage and accumulation of dirt and rust.

PART 2 PRODUCTS**2.1 APPROVED PRODUCTS**

1. All products shall be from the Augusta County Service Authority List of Approved Products included in Appendix A. Proposed alternate products must be approved by OWNER. Additional material specifications in this section are intended to supplement the Approved Products List. Where any conflicts exist, the Approved Products List shall take precedence.

2.2 CONTROL VALVES

1. The altitude control valve will be installed on the tank inlet line and open when the tank level drops to replenish the tank. The valve will sense the tank head from a customer installed sensing line run back to the CDS6AS pilot mounted on the valve. When the valve opens it will modulate to maintain a minimum back pressure on the system while filling. There will also be a solenoid shutoff feature to electrically open and close the valve. This solenoid will be energized to close the main valve. The solenoid will be energized to shut off when the tank is at high water level. When the level drops to some predetermined minimum, the solenoid will be de-energized and the valve will open to fill. It can be controlled through telemetry and be the main open and close control for the altitude valve. The hydraulic CDS6A altitude control will be set at the high/high water level to ensure that the altitude valve will close and the tank can't overflow when power is lost. There shall be an X144 insertion meter installed on the inlet body tapping of the valves to provide a flow signal to SCADA while filling.
2. The main valves will be 16" and 8" flanged 100-20 main valve model that are reduced ported. The 16" valve will have a 12" seat area and the 8" valve will have a 6" seat area. These main valves will be diaphragm actuated and consist of three major components. The body, diaphragm assembly and the cover with cover bearing. The main valve will be ductile iron and have SS trim. This trim will consist of a solid one piece stainless steel seat and the disc guide. There shall be no snap ring type seats and no stem bearing inserts. The diaphragm assembly shall be fully guided throughout its entire stroke. The main valve will have a fusion bonded epoxy coating on all ferrous metal surfaces. It will be a packless valve with no o-rings or packing glands anywhere within the main valve. The main valve will have a locating lip to provide

for stem alignment and also ease of maintenance. All main valve internal and external surfaces will have an NSF61 approved fusion bonded epoxy coating.

3. The pilot control system will have 3 different pilot controls. The electrical solenoid control for opening and closing the main valve off at tank high water level or when the SCADA system signals it to shut. The CRL back pressure pilot control to throttle the main valve to maintain a backpressure on the system while filling. Lastly, the CDS6A hydraulic altitude control for high level shutoff for loss of power control. The pilot system will also have a closing speed controls. The pilot control system will contain an X105LCW limit switch to monitor valve open or closed position. There shall be an X144 insertion meter designed to provide a flow signal to the PLC while the valve is open and feeding the tank. It will be 24VDC loop powered and provide a 4-20ma output signal of flow. This will be passive flow monitoring through the 16" and 8" altitude valves.
4. The manufacturer shall warranty the valve for 3 years from date of shipment. The manufacturer shall also provide a direct factory employee for start up, training and adjustment.
5. The valve shall be a 610-19BCMPVYKC D.S. X105LCW as manufactured by Cla-Val Co. Newport Beach, Ca.

PART 3 EXECUTION

3.1 INSTALLATION - ALL VALVES

1. **General:** Valve installation shall comply with Standard Details and the Manufacturer's recommendations.
2. **Stems:** Shall be oriented for accessibility as approved by the Authority's representative. Do not install valves with stems in the downward direction.
3. **Setting of Valves:** A valve box shall be provided for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the wrench nut of the valve, with the box cover flush with the surface of the finished grade or as directed by the Authority's Representative. Valves boxes shall be installed in accordance with the Standard Details W-7.
4. **Transmitting Forces:** Valves and valve boxes shall be installed so no forces are transmitted to the valve through the piping or valve boxes. All valves shall be provided with retainer glands and concrete block underneath.
5. **Cleaning:** All valves and appurtenances shall be flushed clear of all foreign material after installation.
6. **Calibration:** Contractor shall furnish the service of factory authorized service Engineer to instruct and check out the calibration of backwash plug valve.
7. **Testing:** Field test all valves and appurtenances for proper operation, proper adjustments and settings, freedom from vibration, binding, scrapings, and other defects. Check all valve supports for strength and high quality workmanship. All defects shall be corrected to the satisfaction of the Authority's Representative. Hydrostatic and leakage tests shall be in accordance with Section 02080 - Utility Pipe and Materials.

END OF SECTION

SECTION 02200 - SITE CONSTRUCTION**PART 1 GENERAL****1.1 REFERENCES**

1. General: The work shall comply with the most recent standards or tentative standards as published at the date of the contract and as listed in this specification.

1.2 QUALITY ASSURANCE

1. Cast-in Place Concrete: Cast-in-place concrete shall comply with the Building Code Requirements for Structural Concrete (ANSI/ACI 318) and all applicable requirements of the Specifications for Structural Concrete (ANSI/ACI 301).
3. Notify Authority's Representative to schedule Geotechnical Engineer to observe the following:
 - 1) Subgrade prior to placing base stone
 - 2) Base stone

It is CONTRACTOR's responsibility to coordinate inspections with the Geotechnical Engineer.

1.3 SUBMITTALS

1. Concrete Mix Designs:
 - 1) Prior to proceeding with any concrete work, secure concrete mix designs from the concrete supplier, and submit to the Authority's Representative for review and approval.
 - 2) Distribute approved mix designs to testing laboratory, batch plant, job site, and governmental agencies having jurisdiction.

1.4 MAINTENANCE

1. Roads: CONTRACTOR shall maintain and repair proposed and existing roads as necessary during the construction period, and provide for additional applications of compacted #21A stone to access road after materials delivery is complete, as required.

1.5 DEFINITIONS

1. Clearing: Clearing shall consist of the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.
2. Grubbing: Grubbing shall consist of the removal and disposal of brush, stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas.

1.6 EROSION AND SEDIMENT CONTROL

1. General: Erosion and Sediment control is the sole responsibility of CONTRACTOR. No site requiring additional Erosion and Sediment Control work will be accepted by the Authority.

PART 2 PRODUCTS**2.1 ACCESS ROAD AND TANK AREA**

1. General: Gravel roads, access drives, parking areas, or other gravel surfaces shall consist of a minimum of 6 inches of compacted VDOT #21A aggregate unless shown otherwise on the plans.
2. Subgrade: Subgrade shall conform to VDOT Specification 305.

PART 3 EXECUTION**3.1 SITE WORK**

1. Clearing: An acceptable site shall have all trees, stumps, roots, brush, and other vegetation in areas to be cleared cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated on the plans to be left standing. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require. A healthy stand of grass shall be provided on all cleared areas of the site.
2. Grubbing: Material to be grubbed, together with logs and other organic debris not suitable for foundation purposes, shall be removed to a depth of not less than 12 inches below the original ground in areas such as proposed buildings, grassed areas, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the adjacent surfaces.
3. Disposal of Materials: All disposal of debris and unsuitable or surplus material is the sole responsibility of the Contractor. All excess materials must be removed from the site prior to acceptance by the Authority.
4. Drainage: CONTRACTOR shall be responsible for providing proper stormwater drainage for the site .

3.2 ACCESS ROAD AND TANK AREA

1. Subgrade: Uniformly smooth grade excavated areas, filled sections and adjacent transition areas. Subgrade shall be rolled and compacted prior to stone application.
2. Surface Drainage: The surface of all road work shall slope and drain surface water toward catch basins or swales. If water stands, grading shall be corrected to prevent standing water, subject to the Authority's Representative's approval.

3.3 SEEDING

1. Preparation: Rake the soil surface to remove all root clumps, stones, and debris 1 inch or greater in size. True up all depressions and edges. Soil in the area to be seeded shall be prepared in accordance with VESCH and VDOT 602 and 603.
2. Application: Seeding shall conform with VESCH 3.31 or VESCH 3.32, and VDOT 603. Initial seeding shall consist of uniformly applying seed, mulch, and water on prepared areas. Over-seeding shall consist of applying seed, mulch, and water to areas previously seeded.
3. Grading: Establish a smooth grade ready to receive seed. Finish grade must conform to the grades and elevations as shown on the plans.
4. Topsoil: Topsoil shall be in place for all areas to be permanently seeded.

END OF SECTION

SECTION 02317 - EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES**PART 1 GENERAL****1.1 REFERENCES**

1. General: The work shall comply with the most recent standards or tentative standards as published at the date of the contract and as listed in this specification.

1.2 DEFINITIONS

1. Controlled Fill and Compacted Backfill: Controlled fill and compacted backfill are satisfactory materials compacted according to these Standards. Controlled fill is required beneath all areas on which final grade is not placed on original excavated soil.
2. Satisfactory Materials: Materials classified by ASTM D 2487 as GW, GP, GM, GC, SW, SP, SM, SC, ML, and CL are satisfactory as fill for overlot grading and are satisfactory in-situ.
3. Unsatisfactory Materials: Materials classified by ASTM D 2487 as OL, OH, MH, CH, and PT are unsatisfactory in-situ and as fill. Unsatisfactory materials also include those materials containing roots and other organic matter, trash, debris, frozen materials, mud, and stones larger than 6 inches. Unsatisfactory materials also include man-made fills, refuse, or backfills from previous construction.
4. Cohesionless and Cohesive Materials: Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines have plasticity index of zero.
5. Degree of Compaction: Degree of compaction is a percentage of the maximum density obtained by the test procedure presented in ASTM D 698 or ASTM D 1557 as specified, abbreviated above as a percent of laboratory maximum density.
6. Topsoil: Material obtained from excavations, suitable for topsoils, shall consist of friable clay loam, free from roots, stones, other undesirable material and shall be capable of supporting a good growth of grass.
7. Rock: Rock shall consist of boulders measuring 1/2 cubic yard or more and materials that cannot be removed without systematic drilling and blasting such as rock material in ledges, bedded deposits, unstratified masses and conglomerate deposits, and below ground concrete or masonry structures, exceeding 1/2 cubic yard in volume.
8. Unyielding Material: Unyielding material shall consist of rock and gravelly soils with stones greater than 18 inches in any dimension.
9. Unstable Material: Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.
10. Select Granular Material: Select granular material shall consist of well-graded sand, gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall not contain more than 10 percent by weight of material passing a No. 200 mesh sieve. The maximum allowable aggregate size shall be 1 inch, or the maximum size recommended by the pipe manufacturer, whichever is smaller.
11. Select Initial Backfill Material: Initial backfill material shall consist of select granular material or satisfactory materials free from rocks 1 inch or larger in any dimension.

1.3 QUALITY ASSURANCE

1. Testing Results: Copies of all laboratory and field test reports shall be submitted to the Authority's Representative within 72 hours of the completion of the test.

PART 2 PRODUCTS

N/A

PART 3 EXECUTION

3.1 EXCAVATION AND PREPARATION OF TRENCH

1. General: Excavation within the VDOT right-of-way shall be in accordance with VDOT requirements.
2. Depth: Depth of trenches shall be as shown on plans and Standard Details except that the trench shall be excavated to allow for a depth of 1/4 of the pipe's outside diameter or a minimum of 6 inches of ASTM D 448 #68 aggregate bedding for gravity sewer. For force main and water main, excavation for bell holes in firm subgrade shall be sufficient except in rock where 6 inches of bedding, ASTM D 448 #68 stone, will be required. Where the trench is inadvertently excavated to a depth below grade, it shall be backfilled with ASTM D 448 #68 stone, compacted to provide sound and uniform support for the pipe at the proper level as shown on the plans. Minimum cover over any pipe shall be 42 inches. Maximum cover over any pipe shall be 18 feet, unless otherwise approved by the Authority.
3. Width: Width shall be sufficient to allow pipe installation without walking or standing on pipe. The trench width at a point 12 inches above the top of the pipe shall be 8 inches on each side of the pipe unless otherwise directed by the Authority's Representative. Excavation at manholes and similar structures shall be sufficient to leave at least 12 inches clearance between their outer surface and the embankment or sheeting. See Standard Detail W-1 and S-1 regarding pipe installation.
4. Excess and Unsuitable Material: Wet or otherwise unsuitable soil at the subgrade shall be removed to a minimum depth of 12 inches below the bottom of the pipe or to a depth required by the Authority's Representative and replaced with compacted ASTM D 448 #68 stone to the bottom of the normal trench bedding, See Standard Details W-1 and S-1.

When the bottom of the trench or subgrade is found to consist of material that is unstable to such a degree that it cannot be removed, the Developer's Engineer shall submit plans to the Authority's Engineer for review showing the proposed foundation for the pipe and/or appurtenances, using concrete or other material. Concrete encasement may be required where the amount of cover material would be two feet in depth (or less) over the top of the pipe.

5. Rock Excavation: Ledge rock, boulders, and large stones shall be removed to provide a clearance of at least 6 inches below and on each side of all pipe, manholes, valves or other appurtenances and overdepth shall be backfilled with satisfactory material and compacted in conformance with BACKFILLING subsection. These clearances shall also be observed for pieces of concrete or masonry and other debris or subterranean structures, such as masonry walls, piers, or foundations that may be encountered during excavation. See Standard Details W-1 and S-1.
6. Trench Protection: Protection shall be the sole responsibility of the Contractor.
7. Pumping, Bailing, and Draining: The Contractor shall remove any water which may accumulate or be found in the trenches or other excavations and shall keep the excavations clear of water while work is being installed, unless approval to the contrary is granted by the Authority's Representative.

8. **Blasting:** Blasting shall be in accordance with local ordinances and shall be the sole responsibility of the Contractor.

3.2 BACKFILLING

1. **Materials:** All backfill materials shall be free from mud, refuse, construction debris, organic material, boulders, frozen or otherwise unsuitable material. Select initial backfill shall be as defined in Part 1 of this section. Remaining backfill may contain stones up to 5 inches in their greatest dimension, unless otherwise specified. The Contractor may backfill with the excavated material, provided it meets the conditions as stated above.
2. **Gravity Sewer Bedding:** Bedding shall be required on all gravity sewer lines, and shall be in accordance with Standard Detail S-1. Bedding material shall extend from the excavated trench bottom to the pipe springline (midpoint) except on PVC pipe where it shall extend to 6 inches above the top of the pipe. Bedding material shall be compacted to 95 percent of maximum density as measured by ASTM D 698.
3. **Pressure Pipe Bedding:** Bedding for pressure pipe shall consist of firm subgrade with excavation for bell holes. When trench is in rock or non-select material bedding shall consist of a gravel base, unless shown otherwise on plans, and shall be in accordance with Standard Detail W-1. Gravel bedding material shall extend from the excavated trench bottom to the pipe springline (midpoint). Bedding material shall be compacted to 95 percent of maximum density as measured by ASTM D 698.
4. **Backfilling to Grade:** Initial backfill shall be with select material to a depth of at least two feet over the pipe and compacted prior to placement of remaining backfill. Initial backfill shall be placed in lifts not to exceed 6 inches (prior to compaction). Remaining backfilling shall be carried up evenly in lifts not to exceed 2 feet.
5. **Backfilling in Controlled Areas:** Backfill under pavement, proposed pavement, or in areas within rights-of-way shall be in layers of selected earth not more than 6 inches in thickness, and each layer shall be compacted to a minimum of 95 percent of maximum density at optimum moisture when tested in accordance with ASTM D 698. Compaction shall be in accordance with instructions in this Section as modified herein. The top course of backfill directly under pavement shall consist of aggregate base material meeting the requirements of VDOT #21A stone. The depth of this course shall be at least 1-1/2 times greater than the existing base course, but in no case shall be less than 6 inches. Moisture content shall be within 20 percent of optimum.
6. **Backfill Compaction Testing:** The Contractor shall demonstrate the adequacy of backfill compaction by performing density testing of the completed trench at no cost to the Authority. Testing shall be performed by an independent testing laboratory qualified to perform such tests and approved by Authority's Representative. Density testing shall be performed at three depths for each test location: surface, mid-depth, and near maximum trench depth. The character of the backfill material will be observed during the excavation for density testing to determine conformance with the specifications. Density testing shall be performed using nuclear field density equipment or conventional weight-volume methods. If the weight-volume method is used, volume shall be determined by using the sand replacement test (ASTM D 1556) or liquid displacement methods (ASTM D 2167). If nuclear methods are used, the trench correction effect shall be accounted for by recalibrating the nuclear gauge on its calibration block at the location of each test prior to taking the density measurement. The Contractor shall furnish all equipment, tools, and labor to prepare the test site for testing. Testing shall be performed by an independent testing laboratory qualified to perform such tests and approved by the Authority's Representative. All testing shall be witnessed by the Resident Project Representative. The test shall be repeated until satisfactory results are obtained. The Contractor shall be charged for all retests at the normal rates for inspection services.
 - 1) **Normal Testing Frequency:** One test shall be performed within the first 500 feet of pipe installed by each crew. This test will be used as an initial evaluation of the compaction methods being used. Beyond the initial 500 feet, one test shall be performed in each 1,000 foot section of pipe installed or

fraction thereof. Testing shall progress as each 1,000 foot section is completed. The location of the test within each section shall be selected by the Resident Project Representative. Testing which indicated that unacceptable material has been incorporated into the backfill, or that insufficient compaction is being obtained shall be followed by expanded testing to determine the limits of the unacceptable backfill.

- 2) Expanded Testing Requirements: If normal testing within a test section indicated unacceptable backfill, the Authority's Representative may require additional testing within the same test section to determine the limits of unacceptable backfill. Unacceptable backfill within the limits established by the testing shall be removed and replaced by the Contractor at no cost to the Authority. Additional testing beyond that required may be performed by the Contractor at his expense to further delineate limits of unacceptable backfill.
- 3) Additional Testing: Testing beyond the normal frequency or expanded testing required which is requested by the Authority's Representative, and approved by the Authority, shall be at the Authority's expense.

END OF SECTION

SECTION 02510 - WATER DISTRIBUTION**PART 1 GENERAL****1.1 REFERENCES**

1. General: The work shall comply with the most recent standards or tentative standards as published at the date of the contract and as listed in this specification.
2. Related Sections: Additional Sections of the Documents which are referenced in this Section include:
 - 1) Section 02080 - Utility Pipe and Materials
 - 2) Section 02085 - Valves and Cocks
3. American National Standards Institute (ANSI)/American Water Works Association (AWWA):
 - 1) C 651 Standard for Disinfecting Water Mains
4. American National Standards Institute / National Sanitation Foundation (ANSI/NSF):
 - 1) Std. 61 Drinking Water System Components-Health Effects

PART 2 PRODUCTS**2.1 MATERIALS**

1. General: All materials for use with potable water shall be in accordance with applicable ANSI/AWWA standards and approved for use with potable water in accordance with ANSI/NSF 61.
2. Waterlines: Water mains and distribution lines shall be ductile iron pipe; thickness class 52 for pipe diameters 12 inches and less, and thickness class 51 for pipe diameters 14 inches and greater, in accordance with Section 02080 – Utility Pipe and Materials. The Authority reserves the right to select the type of material. (See the Approved Products List for a complete list of manufacturer's materials and model numbers approved for use.)
3. Service Laterals: Service laterals shall be type “K” copper and shall be 1” minimum in diameter when serving 2 or more connections or under roadways. Laterals serving only one connection may be ¾” in diameter. Laterals shall be in accordance with the Section 02080 - Utility Pipe and Materials and Standard Detail W-8.
4. Pipe Fittings: All fittings 4 inch and larger shall be ductile iron and shall be in accordance with the Section 02080 - Utility Pipe and Materials.
5. Valves: All valves shall be in accordance with Section 02085 - Valves and Cocks.
6. Concrete: Miscellaneous concrete shall be VDOT Type A-3 specifications.
7. Restrained Joints: Joint restraint shall be performed by mechanical joint pipe and retainer glands in accordance with Section 02080 – Utility Pipe and Materials. Tie rods may be used with hydrant installations in accordance with Section 02080 – Utility Pipe and Materials.
8. Stone: Stone for repair of gravel road shoulder shall be VDOT #25 or #26.
9. Vault and Interior Piping: Pipe lines inside of buildings or vaults shall be flanged ductile iron pipe or stainless steel.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPE, FITTINGS, AND ACCESSORIES

1. Pipe and Fitting Installation: All work shall be in accordance with Section 02080 - Utility Pipe and Materials.
2. Valve Installation: All work shall be in accordance with Section 02085 - Valves and Cocks.

3.2 DISINFECTION

1. Disinfecting Water Mains: Water mains and accessories shall be disinfected using the “continuous-feed” or “slug method” in accordance with ANSI/AWWA C 651. The “Tablet Method” described in ANSI/AWWA C 651 shall not be used. The Contractor shall obtain the most recent applicable AWWA standard. This standard shall be at jobsite with access granted to the Authority’s Representative. Care shall be taken to minimize entrance of foreign material into pipe, fittings and valves. The main shall be flushed prior to disinfection with sufficient flow to produce a velocity of 2.5 fps. Flushing shall take place in areas with adequate drainage.

1) Continuous Feed Method

During construction, calcium hypochlorite granules shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500-ft intervals. The quantity of granules shall be as shown in Table 1. This procedure shall provide a strong chlorine concentration in the first flow of flushing water that flows down the main. The main shall be filled prior to flushing to eliminate air pockets and to remove particulates.

Water supplied from a temporary, backflow prevented connection to the existing distribution system or other approved source of supply shall be made to flow at a constant, measured rate into the newly installed water main. At a point not more than 10 ft downstream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 50 mg/L free chlorine. The chlorinated water shall remain in the pipe at least 24 hours, after which, the chlorine concentration in the water shall be at least 10 mg/l. All valves and appurtenances shall be operated while the chlorinated water remains in the pipe. Table 2 gives the amount of chlorine required for each 100 ft of pipe of various diameters.

Table 1. Application of Calcium Hypochlorite Granules in Water Main for the Continuous Feed Method

Pipe Diameter (inch)	Calcium Hypochlorite Granules (ounce)
4	1.0
6	2.0
8	4.0
12	8.0
16	16.0

Direct feed chlorinators, which operate solely from gas pressure in the chlorine cylinder, shall not be used for the application of liquid chlorine.

Table 2. Chlorine Required to Produce 50 mg/L Concentration in 100 ft. of Pipe by Diameter.

Pipe Diameter (inch)	100% Chlorine (lb)	1% Chlorine Solution (gallon)
4	0.026	0.32
6	0.060	0.72
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88
16	0.434	5.20

2) Slug Method

Calcium hypochlorite granules shall be placed in the main during construction as in the Continuous Feed Method. Preliminary flushing and chlorinating of the main shall be the same as in the Continuous Feed Method except for free chlorine concentrations and contact time. At a point not more than 10 ft. downstream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 100 mg/L free chlorine. The chlorine shall be applied continuously and for a sufficient period to develop a "slug" of chlorinated water that will, as it moves through the main, expose all interior surfaces to a concentration of 100 mg/L for at least 3 hours.

The free chlorine residual shall be measured in the slug as it moves through the main at intervals not more than 2000 ft.

As the chlorinated water flows past fittings and valves, related valves and hydrants shall be opened so as to disinfect appurtenances and pipe branches.

After the required retention period, the main shall be flushed using potable water until the water leaving the system shows a chlorine concentration of less than 1 mg/L or no higher than that prevailing in the water used for flushing. A neutralizing chemical shall be applied to the water to be wasted to neutralize thoroughly the remaining chlorine residual.

In the event the mains are damaged and are in need of repairing, cleaning, disinfection, flushing, testing, or similar operational actions, they shall be done in accordance with the most current standard issued by AWWA (AWWA C-601).

2. **Final flushing:** Shall be performed with potable water and shall follow to ensure that the chlorine concentration is not higher than that generally prevailing in the system. Chlorinated water shall not be discharged to any water course or drainage way until it is diluted or reduced to a level, which will result in no damage to aquatic life.
3. **Bacteriological Tests:** After final flushing and before the water main is placed in service, 2 consecutive samples shall be collected at 24 hours intervals for each 2000 feet of line. These samples shall be tested for bacteriological quality by the State Laboratory or other certified laboratory and shall show the absence of coliform organisms. Samples will be collected by the Authority Inspector (through the use of sample taps supplied by the Contractor) and delivered to the Testing Laboratory by the Authority within 48 hours of written notifications from Contractor. If the initial disinfection fails to produce satisfactory samples, the new main may be flushed again and re-sampled. If bacteriological samples still fail to produce acceptable results, then disinfection shall be repeated until satisfactory samples have been obtained. The contractor/developer will be billed by the Authority for the cost of the bacteriological testing.

END OF SECTION

SECTION 02821 - CHAIN LINK FENCES**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. Work Included: Furnish and supply all materials, equipment, and labor for chain link fences as shown on the plans and specified hereunder.

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide chain-link fences capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Minimum Post Size and Maximum Spacing for Wind Velocity Pressure: Determine based on mesh size and pattern specified, and on the following minimum design wind pressures and according to CLFMI WLG 2445:
 2. Determine minimum post size, group, and section according to ASTM F 1043 for framework up to 12 feet high, and post spacing not to exceed 10 feet.
- B. Lightning Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences.
1. Fence posts, rails, and fittings.
 2. Chain-link fabric, reinforcements, and attachments.
 3. Hardware.
 4. Accessories: Barbed wire.
- B. Shop Drawings: Show locations of fences, posts, rails, tension wires, details of extended posts, extension arms, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, elevations, sections, details of post anchorage, attachment, bracing, and other required installation and operational clearances.
- C. Product Certificates: For each type of chain-link fence signed by product manufacturer.
1. Strength test results for framing according to ASTM F 1043.
- D. Qualification Data: For Installer.
- E. Field quality-control test reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed chain-link fences similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
 - 1. Engineering Responsibility: Preparation of data for chain-link fences, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

1.5 REFERENCES

- A. ASTM 123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel.
- B. ASTM F 1043 Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Like Fence Framework.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

PART 2 - PRODUCTS

2.1 MATERIAL REQUIREMENTS

- A. Pump Station Fencing: Security fence around pump station site shall comply with material requirements specified within this section.
- B. Ballpark Fencing: Relocated fencing around ball field shall comply with specified material requirements, except where deviations are required to match existing fence height and style. CONTRACTOR shall inspect existing fence and note required deviations for ENGINEER review.

2.2 CHAIN-LINK FENCE FABRIC

- A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with ASTM A 392, CLFMI CLF 2445, and requirements indicated below:
 - 1. Steel Wire Fabric: Metallic-coated wire with a diameter of 0.192 inch.
 - a. Mesh size: 2-1/8 inches.
 - b. Weight of Metallic (Zinc) Coating: ASTM A 392, Type II, Class 1, 1.2 oz./sq. ft. with zinc coating applied after weaving.
 - 2. Selvage: Twisted top and knuckled bottom.

2.3 INDUSTRIAL FENCE FRAMING

- A. Posts and Rails: Comply with ASTM F 1043 for framing, ASTM F 1083 for round pipe, and the following:
1. Group: IA, round steel pipe, Schedule 40.
 2. Fence Height:
 - a. Perimeter Fence: 8' high fabric with 3-strand barbed wire on angled support arms.
 3. Strength Requirement: Light industrial according to ASTM F 1043.
 4. Post Diameter and Thickness: According to ASTM F 1043.
 - a. Gate Post: According to ASTM F 900.
 5. Coating for Steel Framing:
 - a. Metallic Coating:
 - 1) Type A, consisting of not less than minimum 2.0-oz./sq. ft. average zinc coating per ASTM A 123/A 123M or 4.0-oz./sq. ft. zinc coating per ASTM A 653/A 653M.

2.4 TENSION WIRE

- A. General: Provide horizontal tension wire at the following locations:
1. Location: Extended along top and bottom of fence fabric.
- B. Metallic-Coated Steel Wire: 0.177-inch- diameter, marcelled tension wire complying with ASTM A 817, ASTM A 824, and the following:
1. Metallic Coating: Type II, zinc coated (galvanized), with the following minimum coating weight:
 - a. Matching chain-link fabric coating weight.

2.5 FITTINGS

- A. General: Comply with ASTM F 626.
- B. Barbed Wire Arms: Pressed steel or cast iron, with clips, slots, or other means for attaching strands of barbed wire, and means for attaching to posts, or integral with post cap; for each post, unless otherwise indicated, and as follows:
1. Line posts with arms that accommodate top rail or tension wire.
 2. Corner arms at fence corner posts, unless extended posts are indicated.
 3. Type I, single slanted arm for three strands of barbed wire.

2.6 GATE

- A. General: Gate shall be counterbalanced sliding type of full fence height and width as shown on plans. Gate frame shall be constructed of heavy duty round steel tubing and provided with chain-link fabric and barbed wire similar to the main fence. Steel or nylon rollers shall be attached to the mounting posts to fully support the gate. Counterbalance length shall be no more than 50% of opening width. Supplier is responsible for designing support system to be compatible with fence dimensions and layout shown. Gate shall include padlockable gate latch.

2.7 BARBED WIRE

- A. Zinc-Coated Steel Barbed Wire: Comply with ASTM A 121, Standard grade for the following two-strand barbed wire:
 - 1. Standard Size and Construction: 0.099-inch- diameter line wire with 0.080-inch- diameter, 2-point round barbs spaced not more than 5 inches o.c.

2.8 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance.
 - 1. Do not begin installation before final grading is completed, unless otherwise permitted by ENGINEER.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL

- A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.

3.4 CHAIN-LINK FENCE INSTALLATION

- A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- B. Post Setting: Set terminal posts in concrete and in-line posts with mechanical anchors or by mechanically driving into soil at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
 - a. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.
 3. Mechanically Driven Posts: Drive into soil to depth of 36 inches. Protect post top to prevent distortion.
- C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.
- D. Line Posts: Space line posts uniformly at 10 feet o.c.
- E. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts.
1. Locate horizontal braces at midheight of fabric 6 feet or higher, on fences with top rail and at 2/3 fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- F. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch- diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric.
1. Top Tension Wire: Install tension wire through post cap loops.
 2. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric and tie to each post with not less than same diameter and type of wire.
- G. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2 inches between finish grade or surface and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
- H. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.
- I. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at 1 end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.
- J. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side.
- K. Barbed Wire: Install barbed wire uniformly spaced, angled toward security side of fence. Pull wire taut and install securely to extension arms and secure to end post or terminal arms.

END OF SECTION

SECTION 08100 – STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: Provide steel doors, complete in place with finish hardware installed, where shown on the plans, as specified herein, and as needed for a complete and proper installation.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01330 - Submittal Procedures.
- B. Color Selection: Door colors shall be as selected by the Owner from color charts provided by the Contractor.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01610 - Delivery, Storage, and Handling and with manufacturer's recommendations.
- B. Steel Door Storage: Store doors and frames at building site under cover. Avoid use of non-vented plastic or canvas shelters which can create humidity chamber. If cardboard becomes wet, remove carton immediately. Provide 1/4 inch spaces between stacked doors to promote air circulation.

1.4 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers.

PART 2 - PRODUCTS

2.1 STEEL DOORS

- A. General: Provide steel doors and frames of the dimensions as shown on the plans that comply with SDI 100 and ASTM E 152. Exterior doors shall be 1 3/4 inches thick, and interior doors shall be 1 3/8 inches thick.
- B. Face: Shall be minimum 18 gauge cold-rolled steel sheets completely flushed and seamless comply with ASTM A 569 and ASTM A 568.
- C. Core: Interior doors shall be hollow core. Exterior doors shall be insulated.
- D. Windows: Where indicated on the Drawings, doors shall be furnished with windows to allow visual inspection of areas.

- E. Frames: Shall be fabricated of minimum 16 gauge, cold-rolled furniture steel complying with ASTM A 366 and ASTM A 568 or hot-rolled steel complying with ASTM A 569 and ASTM A 568.
- F. Supports and Anchors: Shall be fabricated of not less than 18 gauge galvanized sheet steel.
- G. Primer: Shall be rust-inhibitive enamel or paint as specified by ANSI A 224.1.
- H. Finish: Shall be manufacturer's standard baking epoxy or enamel paint.
- I. Hardware: Door hardware shall be as specified in Section 08700 - Door Hardware.

2.2 OTHER MATERIALS

- A. General: Provide other materials, not specifically described, but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.
- B. Caulking: All openings around doors shall be caulked with a silicone caulk of a color that will blend with surrounding surfaces. Joints shall be wide enough to permit the caulking to penetrate but not wide enough to necessitate backup.

PART 3 - EXECUTION

3.1 METAL FRAME AND DOOR INSTALLATION

- A. General: Installation of metal frames and doors shall be done in accordance with final shop plans, manufacturer's data, as specified in this Section, and at locations shown on the plans.
- B. Tolerances: Metal doors shall be installed accurately in frames within clearances specified in SDI 100.
- C. Prime Coat Touch-up: Immediately after erection, any rusted or damaged areas of prime coat shall be sand smoothed and primer touched-up.
- D. Protection Removal: Immediately prior to final inspection, all protective plastic wrappings shall be removed.
- E. Final Adjustments: Check and re-adjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION 08100

SECTION 08360 – OVERHEAD DOORS**PART 1 GENERAL****1.1 DESCRIPTION**

1. Work Included: Provide and install roll-up overhead doors, including weather-stripping, door operators, and accessories where shown on the plans, as specified herein and as needed for a complete and proper installation.

1.2 SUBMITTALS

1. Comply with pertinent provisions of Section 01330 - Submittal Procedures.
2. Color Selection: Door colors shall be as selected by the Owner from color charts provided by the Contractor. Owner shall select from a palette of standard door colors.

1.3 DELIVERY, STORAGE, AND HANDLING

1. Comply with pertinent provisions of Section 01610 - Delivery, Storage, and Handling and with manufacturer's recommendations.

PART 2 PRODUCTS**2.1 MATERIAL**

1. Curtain: Curtain slats shall be insulated 24 gauge galvanized steel interlocking sections designed to meet 20 psf minimum wind load. Provide high strength endlocks fastened with two rivets each on alternate slats. Provide windlocks as required to meet design wind load, minimum 20 psf. Bottom bar to be structural steel angles with vinyl weather seal.
2. Guides: Guides shall be formed of structural steel, minimum 3/16 inch thick. Provide windlock bars as required to meet design wind load, minimum 20 psf.
3. Insulation: Insulation shall be urethane foam with an in place R value of at least 6.0
4. Door Dimensions: Door opening dimensions shall be as indicated on the Drawings.
5. Hood: Hood shall be #24 gauge galvanized steel with a baked-on enamel primer. Provide minimum 1/4 inch thick intermediate supports as required to prevent excessive sag.
6. Operation: Unit shall be equipped with hand chain wheel operator.
7. Weather-stripping: Equip bottom bar with vinyl weather-strip which extends into guides, to seal against exterior flat face of door curtain. Equip curtain side guide with vinyl weatherseal. Equip hood with interior air baffle to close space between top of hood and curtain.

2.2 FINISH

1. Provide manufacturer's standard factory powder coat finish consisting of primer and topcoat(s). Owner to select color from manufacturer's standard color palette.

PART 3 EXECUTION

3.1 INSTALLATION

1. General: Install doors complete with all operating equipment and necessary hardware in accordance with manufacturer's instructions.
2. Adjusting: Lubricate bearings and sliding parts as recommended by the manufacturer. Adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

END OF SECTION 08360

SECTION 08700 – FINISH HARDWARE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: Provide finish hardware for swinging doors.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01330 - Submittal Procedures.
- B. Submit product data, cut sheets, and hardware schedule for use based on the requirements of the Drawings and Specifications.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01610 - Delivery, Storage, and Handling and with manufacturer's recommendations.

1.4 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Hinges, butts and pivots: Full-mortise, 5 knuckle ball-bearing type with nonremovable pins at exterior doors; Stanley or approved equal.
- B. Locksets and latchsets: Each door shall be provided with a plain keyless latch set and cylinder deadlock equal to Russwin Stilemaker Series. Deadlock shall be provided and installed by the CONTRACTOR. Deadlocks shall be keyed to match existing keys presently used by the OWNER.
- C. Closers:
 - 1. Low frequency doors: LCN 4030/4130 series or approved equal
 - 2. High frequency doors (fire-labeled doors, toilet room doors, entry doors): LCN 4010/4110 series or approved equal.
- D. Door Trim: Kickplates, armor plate, plastic plates; Brookline or approved equal.
- E. Stops: Ives or approved equal.
- F. Weatherstripping and Thresholds: ADA Compliant; Reese or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Follow guidelines of DHI "Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames" and hardware manufacturers' instructions.
- B. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.
- C. Adjust operation, clean and protect.

END OF SECTION 08700

SECTION 09902 PAINTING NEW ELEVATED WATER TANK**PART 1 - GENERAL**

1.1 SCOPE

- A. The work of this section includes the surface preparation and painting of all surfaces related to the elevated water storage tank as indicated in the drawings and as specified herein.

1.2 REFERENCE SPECIFICATIONS AND STANDARDS

- A. Without limiting the general aspects of other requirements of these specifications, all surface preparation, coating and painting of surfaces shall conform to the applicable requirements of the Steel Structures Painting Council and the manufacturer's printed instructions.
- B. The ENGINEER's decision shall be final as the interpretation and/or conflict between any of the referenced specifications and standards contained herein.

1.3 CONTRACTOR

- A. The CONTRACTOR shall have five years practical experience and successful history in the application of specified products in similar projects.
- B. CONTRACTOR shall substantiate this requirement by furnishing a list of references and job completions.
- C. Applicator must successfully demonstrate to the product manufacturer the ability to apply the material correctly and within the confines of the specifications.
- D. The CONTRACTOR must provide a letter from the manufacture stating their acceptance of the contractor for this project to apply these products.
- E. The CONTRACTOR shall possess the applicable license to perform the work as herein described and as specified by local, state and federal laws.
- F. The CONTRACTOR shall provide a site mock up with each paint system as a representative of how the systems shall be installed and their final appearance, which is to be approved by the ENGINEER before any work is started.
- G. For overcoat projects this mock up shall be used to test for adequate adhesion.
- H. This approved mock up shall be the quality standard for the rest of the project.

1.4 QUALITY ASSURANCE

- A. General

1. Quality assurance procedures and practices shall be utilized to monitor all phases of surface preparation, application, and inspection throughout the duration of the project.
 2. Procedures or practices not specifically defined herein may be utilized provided they meet recognized and accepted professional standards and are approved by the ENGINEER.
- B. Surface Preparation
1. Surface preparation will be based upon comparison with "Pictorial Surface Preparation Standards for Painting Steel Surfaces", SSPC Vis 1 and ASTM Designation D2200; "Standard Methods of Evaluating Degree of Rusting on Painted Steel Surfaces" SSPC Vis 2 and ASTM Designation D610; "Visual Standard for Surfaces of New Steel Airblast Cleaned with Sand Abrasive" or "Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coating and Polymer Overlays" and ICRI CSP Surface Profile Chips.
- C. Application
1. No coating or paint shall be applied when the surrounding air temperature or the temperature of the surface to be coated is below the minimum required temperature for the specified product; to wet or damp surfaces or in fog or mist; when the temperature is less than 5 degrees F. above the dewpoint; when the air temperature is expected to drop below 40 degrees F. within six hours after application of coating.
 2. Dewpoint shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with U.S. Department of Commerce Weather Bureau Psychrometric Tables.
 3. If above conditions are prevalent, coating or painting shall be delayed or postponed until conditions are favorable.
 4. The day's coating or painting shall be completed in time to permit the film sufficient drying time prior to damage by atmospheric conditions.
- D. Thickness and Holiday Checking
1. Thickness of coatings and paint shall be checked with a non destructive, magnetic type thickness gauge.
 2. The integrity of coated interior surfaces shall be tested with an approved inspection device.
 3. Non destructive holiday detectors shall not exceed the voltage recommended by the manufacturer of the coating system.
 4. For thicknesses between 10 and 20 mils (250 microns and 500 microns), a non sudsing type wetting agent, such as Kodak Photo Flo, may be added to the water prior to wetting the detector sponge.
 5. All pinholes shall be marked, repaired in accordance with the manufacturer's printed recommendations, and retested.
 6. No pinholes or other irregularities will be permitted in the final coating.
- E. Inspection Devices
1. The CONTRACTOR shall furnish, until final acceptance of coating and painting, inspection devices in good working condition for detection of holidays and measurement of dry film thickness of coating and paint.
 2. The CONTRACTOR shall also furnish U.S. Department of Commerce; National Bureau of Standard certified thickness calibration plates to test accuracy of dry film thickness gauges and certified instrumentation to test accuracy of holiday detectors.
 3. All necessary testing equipment shall be made available for the ENGINEER's use at all times until final acceptance of application. Holiday detection devices shall be operated in the presence of the ENGINEER.

F. Hold Point Inspections

1. The coating manufacture technical representative shall visit the job site to support the CONTRACTOR's personnel and OWNER or OWNER's Representative as needed and/or requested.
2. Visits shall be made on a weekly basis as a minimum or as needed to review hold points for the OWNER or OWNER's Representative.
3. Additional visits shall be made as needed and/or requested by OWNER or OWNER's Representative or CONTRACTOR.
4. 48 hours' notice is required by the CONTRACTOR for each hold point inspection.
5. Hold point includes the interior and exterior surface prep and the application of each coat.

1.5 SAFETY AND HEALTH REQUIREMENTS

A. General

1. In accordance with requirements set forth by regulatory agencies applicable to the construction industry and manufacturer's printed instructions and appropriate technical bulletins and manuals, the CONTRACTOR shall provide and require use of personnel protective lifesaving equipment for persons working on or about the project site.

B. Head and Face Protection and Respiratory Devices

1. Equipment shall include protective helmets, which shall be worn by all persons while in the vicinity of the work.
2. In addition, workers engaged in or near the work during sandblasting shall wear eye and face protection devices and air purifying half mask or mouthpiece respirators with appropriate filters.
3. Barrier creams shall be used on any exposed areas of skin.

C. Ventilation

1. Where ventilation is used to control hazardous exposure, all equipment shall be explosion proof.
2. Ventilation shall reduce the concentration of air contaminant to the degree a hazard does not exist.
3. Air circulation and exhausting of solvent vapors shall be continued until coatings have fully cured.

D. Sound Levels

1. Whenever the occupational noise exposure exceeds maximum allowable sound levels, the CONTRACTOR shall provide and require the use of approved ear protective devices.

E. Illumination

1. Adequate illumination shall be provided while work is in progress, including explosion proof lights and electrical equipment.
2. Whenever required by the ENGINEER, the CONTRACTOR shall provide additional illumination and necessary supports to cover all areas to be inspected.
3. The ENGINEER shall determine the level of illumination for inspection purposes.

F. Confined Space

1. When applicable it is mandatory that all work be performed in compliance with OSHA'S rules and regulations for working in confined space.
2. Atmospheres within confined spaces as defined by the Occupational Safety and Health Administration are classified as being either a Class A, Class B or Class C environment.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Materials specified are those that have been evaluated for the specific service.
- B. Products of the Tnemec Co. are listed to establish a standard of quality.
- C. Equivalent materials of other manufacturers may be substituted on written approval of the ENGINEER.
- D. Requests for substitution shall include manufacturer's literature for each product giving the name, product number, generic type, descriptive information, solids by volume, recommended dry film thickness and certified independent lab test reports showing results to equal the performance criteria of the products specified herein.
- E. No request for substitution shall be considered that will decrease film thickness or offer a change in the generic type of coatings specified.
- F. In addition, a list of five similar projects shall be submitted in which each product has been used and rendered satisfactory service.
- G. Requests for product substitution shall be made at least ten (10) days prior to bid date.
- H. Manufacturer's color charts shall be submitted to the ENGINEER at least 30 days prior to paint application.
- I. General CONTRACTOR and painting CONTRACTOR shall coordinate work so as to allow sufficient time (five to ten days) for paint to be delivered to the jobsite.
- J. All materials shall be brought to the jobsite in original, sealed containers.
- K. They shall not be used until the ENGINEER has inspected contents and obtained data from information on containers or labels.
- L. Materials exceeding storage life recommended by the manufacturer shall be rejected.
- M. All coatings and paints shall be stored in enclosed structures to protect them from weather and excessive heat or cold.
- N. Flammable coatings or paint must be stored to conform to City, County, State and Federal safety codes for flammable coating or paint materials.
- O. At all times, coating and paints shall be protected from freezing.

2.2 INTERIOR TANK COATING SYSTEM

Surface Preparation: SSPC SP10/NACE 2 Near White Metal Blast Cleaning. All unwelded seams will be filled. The surface shall be clean and dry before painting.

1st Coat: Zinc Rich Aromatic Urethane applied at 2.5 – 3.5 dry mils.
(performance equal to Tnemec Series 91H20 Theme-Zinc)

Stripe Coat: NSF Approved Polyamidoamine Epoxy applied at 3.0 – 5.0 dry mils.

(performance equal to Tnemec Series N140 Pota-Pox Plus)

2nd Coat: NSF Approved Polyamidoamine Epoxy applied at 6.0 – 8.0 dry mils.
(performance equal to Tnemec Series N140 Pota-Pox Plus)

3rd Coat: NSF Approved Polyamidoamine Epoxy applied at 6.0 – 8.0 dry mils.
(performance equal to Tnemec Series N140 Pota-Pox Plus)

EXTERIOR TANK COATING SYSTEM

Surface Preparation: SSPC SP6/NACE 3 Commercial Blast Cleaning. The surface shall be clean and dry before painting.

1st Coat: Zinc Rich Aromatic Urethane applied at 2.5 – 3.5 dry mils.
(performance equal to Tnemec Series 91H20 Tneme-Zinc)

2nd Coat: Aliphatic Acrylic Polyurethane applied at 3.0 – 5.0 dry mils.
(performance equal to Tnemec Series 73 Endura Shield)

3rd Coat: Advanced Thermoset Solution Fluoropolymer applied at 2.0 – 3.0 dry mils.
(performance equal to Tnemec Series 700 Hydro-Flon)

Lettering / Logo: Two coats of a Advanced Thermoset Solution Fluoropolymer(performance equal to Tnemec Series 700-color HydroFlon) shall be used for the lettering/ logo applied at a dry film thickness of 2.0 – 3.0 per coat.

Calking: Fill all gaps between the concrete foundation and the bottom plates of the steel tank with a Modified Polyurethane (performance equal to Tnemec Series 265 Elasto-Shield TG). Overlap 1/8 inch on both sides of the gap.

Concrete Foundation: The concrete foundation shall be cleaned and shall receive two coats of 100% Solid Inorganic Hybrid Water-Based Epoxy (performance equal to Tnemec Series 27WB-15BL Typoxy) at 4.0 – 8.0 dry mils.

PART 3 - EXECUTION

3.1 GENERAL

- A. All surface preparation, coating and painting shall conform to applicable standards of the Steel Structures Painting Council, and the manufacturer's printed instructions.
- B. Material applied prior to approval of the surface by the ENGINEER shall be removed and reapplied to the satisfaction of the ENGINEER at the expense of the CONTRACTOR.
- C. All work shall be performed by skilled craftsmen qualified to perform the required work in a manner comparable with the best standards of practice.
- D. Continuity of personnel shall be maintained and transfers of key personnel shall be coordinated with the ENGINEER.
- E. The CONTRACTOR shall provide an English speaking supervisor at the work site during cleaning and application operations.

- F. The supervisor shall have the authority of sign change orders, coordinate work, and make decisions pertaining to the fulfillment of the contract.
- G. Dust, dirt, oil, grease or any foreign matter that will affect the adhesion or durability of the finish must be removed by washing with clean rags dipped in an approved cleaning solvent and wiped dry with clean rags.
- H. The CONTRACTOR's coating and painting equipment shall be designed for application of materials specified and shall be maintained in first class working condition.
- I. Compressors shall have suitable traps and filters to remove water and oils from the air. CONTRACTOR's equipment shall be subject to approval of the ENGINEER.
- J. Application of the first coat shall follow immediately after surface preparation and cleaning and before rust bloom or flash rusting occurs.
- K. Any cleaned areas not receiving first coat within this period shall be recleaned prior to application of first coat.

3.2 SURFACE PREPARATION

- A. The latest revision of the following surface preparation specifications of the Steel Structures Painting Council shall form a part of this specification.
- B. Solvent Cleaning (SSPC SP1)
 - 1. Removal of oil, grease, soil and other contaminants by use of solvents, emulsions, cleaning compounds, steam cleaning or similar materials and methods which involve a solvent or cleaning action.
- C. Hand Tool Cleaning (SSPC SP2)
 - 1. Removal of loose rust, loose mill scale and other detrimental foreign matter to degree specified by hand chipping, scraping, sanding and wire brushing.
- D. Power Tool Cleaning (SSPC SP3)
 - 1. Removal of loose rust' loose mill scale and other detrimental foreign matter to degree specified by power wire brushing, power impact tools or power sanders.
- E. Brush-Off Blast Cleaning (SSPC-SP7/NACE 4)
 - 1. Brush-off blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose coating.
 - 2. Tightly adherent mill scale, rust, and coating may remain on the surface.
 - 3. Mill scale, rust, and coating are considered tightly adherent if they cannot be removed by lifting with a dull putty knife after abrasive blast cleaning has been performed.
- F. Commercial Blast Cleaning (SSPC-SP6/NACE 3)
 - 1. Blast cleaning until at least 66 percent of each element of surface area is free or all visible residues.
- G. Near White Blast Cleaning (SSPC SP10/NACE 2)
 - 1. Blast cleaning to nearly white metal cleanliness, until at least 95 percent of each element of surface area is free of all visible residues.

- H. Surface Preparation of Concrete (SSPC SP13/NACE 6)
 - 1. This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems.
- I. Power Tool Cleaning to Bare Metal (SSPC-SP11)
 - 1. This standard covers the requirements for power tool cleaning to produce a bare metal surface and to retain or produce a minimum 25 micrometer (1.0 mil) surface profile.
 - 2. This standard is suitable where a roughened, clean, bare metal surface is required, but where abrasive blasting is not feasible or permissible.
- J. Blast cleaning for all surfaces shall be by dry method unless otherwise directed.
- K. Particle size of abrasives used in blast cleaning shall be that which will produce a 1.5 – 2.0 mil (37.5 microns – 50.0 microns) surface profile or in accordance with recommendations of the manufacturer of the specified coating or paint system to be applied.
- L. Abrasive used in blast cleaning operations shall be new, washed, graded and free of contaminants that would interfere with adhesion of coating or paint and shall not be reused unless specifically approved by the ENGINEER.
- M. During blast cleaning operations, caution shall be exercised to insure that surrounding existing coatings or paint are not exposed to abrasion from blast cleaning.
- N. The CONTRACTOR shall keep the area of his work and the surrounding environment in a clean condition.
- O. He shall not permit blasting materials to accumulate as to constitute a nuisance or hazard to the accomplishment of the work, the operation of the existing facilities, or nuisance to the surrounding environment.
- P. Blast cleaned surfaces shall be cleaned prior to application of specified coatings or paint.
- Q. No coatings or paint shall be applied over damp or moist surfaces.
- R. Specific Surface Preparation: Surface preparation for the specific system shall be as noted in Section 2.01 Paragraphs D.

3.3 APPLICATION, GENERAL

- A. Coating and paint application shall conform to the requirements of the Steel Structures Painting Council Paint Application Specification SSPC PA1, latest revision, for "Shop, Field and Maintenance Painting," and the manufacturer of the coating and paint materials.
- B. Thinning shall be permitted only as recommended by the manufacturer approved by the ENGINEER, and utilizing the thinners stated in Section 2.01 Paragraphs D.
- C. Each application of coating or paint shall be applied evenly, free of brush marks, sags, runs, with no evidence of poor workmanship.
- D. Care shall be exercised to avoid lapping on glass or hardware.
- E. Coatings and paints shall be sharply cut to lines. Finished surfaces shall be free from defects or blemishes.

- F. Protective coverings or drop cloths shall be used to protect floors, fixtures, and equipment.
- G. Care shall be exercised to prevent coatings or paint from being spattered onto surfaces that are not to be coated or painted.
- H. Surfaces from which materials cannot be removed satisfactorily shall be recoated or repainted as required to produce a finish satisfactory to the ENGINEER.
- I. When two coats of coating or paint are specified, where possible, the first coat shall contain sufficient approved color additive to act as an indicator of coverage or the two coats must be of contrasting color.
- J. Film thickness per coat specified in Section 2.01 Paragraphs D are minimum required.
- K. If roller application is deemed necessary, the CONTRACTOR shall apply additional coats as to achieve the specified thickness.
- L. All material shall be applied as specified.
- M. All welds, edges and other irregular surfaces shall receive a brush coat of the specified product prior to application of the first complete coat.

3.4 COATING SYSTEMS APPLICATION

- A. After completion of surface preparation as specified for the specific system, materials shall be applied as noted in Section 2.01 Paragraphs D.

3.5 COLOR SCHEME

- A. Color(s) submittals will be made to the ENGINEER for approval prior to application.

3.6 SOLVENT VAPOR REMOVAL

- A. Where appropriate all solvent vapors shall be completely removed by suction type exhaust fans and blowers before placing in operating service.

3.7 CLEAN UP

- A. Upon completion of the work, all staging, scaffolding, and containers shall be removed from the site or destroyed in a manner approved by the ENGINEER.
- B. Coating or paint spots and oil or stains upon adjacent surfaces shall be removed and the jobsite cleaned.
- C. All damage to surfaces resulting from the work of this section shall be cleaned, repaired, or refinished to the satisfaction of the ENGINEER at no cost to the OWNER.

3.8 WARRANTY

- A. The CONTRACTOR will warrant the work free of defects in material and workmanship for a period of one year from the acceptance of the work.

- B. At the end of one year, the CONTRACTOR will return for a one-year anniversary inspection of the work.
- C. The CONTRACTOR will correct any deficiencies found with no cost to the OWNER.
- D. Inspections shall be conducted in to conform to OWNERs spec.

3.9 DISINFECTION

- A. Disinfection of interior surfaces shall be performed in the presence of the ENGINEER in accordance with all requirements of applicable AWWA Standards and regulatory agencies.
- B. Disinfection shall be performed after protective coatings have been applied to the interior surfaces and allowed to thoroughly cure.
- C. Prior to disinfecting, the complete interior shall be washed down with clean water and thoroughly flushed out.
- D. All interior surfaces shall be thoroughly washed with a solution having a minimum chlorine content of 200 PPM and allowed to contact with surface for not less than two hours. Chlorine solution accumulated on the bottom shall be drained to waste.
- E. Following chlorination, fill tank with potable water.
- F. All water used in sterilization of tank shall be dechlorinated prior to discharge. The total residual chlorine in the discharge shall not be greater than 0.5 mg/l.

END SECTION

SECTION 13210 – COMPOSITE ELEVATED WATER STORAGE TANK**PART 1 - GENERAL**

1.1 SUMMARY

A. Work Included

1. This Section includes the design, construction, testing and commissioning of a Composite Elevated Tank and related work including foundation, painting, electrical and appurtenances.

B. Related Documents

1. Drawings and the general provisions of this document, including General Conditions, Supplemental Conditions, Special Provisions and other Sections apply to work in this Section.

1.2 REFERENCES

A. The following Specifications, Codes and Standards may be referenced in this Section. All references are to the latest published edition.

1. American Concrete Institute (ACI)
 - 117-10 Standard Tolerances for Concrete Construction and Materials
 - 228.1R-03 In-Place Methods to Estimate Concrete Strength
 - 301-05 Specification for Structural Concrete
 - 304-00 Guide for Measuring, Mixing, Transporting and Placing Concrete
 - 305-10 Hot Weather Concreting
 - 306-10 Cold Weather Concreting
 - 318-08 Building Code Requirements for Structural Concrete
 - 347-04 Guide to Formwork for Concrete
 - 371R-08 Guide for the Analysis, Design and Construction of Elevated Concrete and Composite Steel-Concrete Water Storage Tanks
2. American Institute of Steel Construction (AISC)
 - S335 Specification for Structural Steel Buildings
3. American National Standards Institute (ANSI)
 - B16.5 Pipe Flanges and Flanged Fittings
4. American Society of Civil Engineers (ASCE)
 - ASCE 7 Minimum Design Loads for Buildings and Other Structures
5. American Society for Testing Materials (ASTM)
 - A 123 Zinc Coatings on Iron and Steel Products
 - A 240 Stainless Steel Plate, Sheet and Strip for Pressure Vessels
 - A 285 Pressure Vessel Plates, Carbon Steel
 - A 774 Welded Stainless Steel Fittings
 - A 778 Welded Stainless Steel Tubular Products
6. American Water Works Association (AWWA)
 - C652-02 Disinfection of Water-Storage Facilities
 - D100-11 Welded Steel Tanks for Water Storage
 - D102-11 Coating Steel Water Storage Tanks
 - D107-10 Composite Elevated Tanks for Water Storage

7. Federal Aviation Administration (FAA)
70/7460-1H Obstruction Marking and Lighting
8. National Association of Corrosion Engineers (NACE)
RP0178 Recommended Practice - Fabrication Details, Surface Finish
Requirements and Proper Design Considerations for Tanks and Vessels to be Lined
for Immersion Service
9. National Fire Protection Association (NFPA)
NEC National Electric Code
780 Standard for the Installation of Lightning Protection Systems
10. National Sanitation Foundation (NSF)
61 Standard for Drinking Water System Components
11. Occupational Safety and Health Administration (OSHA)
29 CFR Part 1926 Safety and Health Regulations for Construction
12. Steel Structures Painting Council (SSPC)
VIS-89 Visual Standard for Abrasive Blast Cleaned Steel

1.3 SYSTEM DESCRIPTION

A. Elevated Tank

The Composite Elevated Tank shall consist of the following: foundation, reinforced concrete support structure and a welded steel water tank. The support tower shall extend vertically from the foundation as a circular concrete support structure/wall. A structural concrete dome shall be provided as structural support for the contained water within the perimeter of the wall. A reinforced concrete ring beam shall be provided to connect the welded steel water tank, concrete dome and concrete support wall. The Composite Elevated Tank shall be in accordance with the shape, dimensions and details required by these Specifications and Drawings. Dimensions may be slightly adjusted to suit the Composite Elevated Tank Manufacturer's standard structure shape.

B. Operating Parameters

Minimum capacity within operating range: 500,000 US gallons (Base Bid)

Maximum operating range: 35 ft.

Elevation - top capacity: 1535.0 ft. (all tank size alternates)

- grade slab approx. 1371.0 ft.

- final grade approx. 1370.5 ft.

C. General Design

1. Design Standards

- a. The structural design of the Composite Elevated Water Storage Tank shall conform to AWWA D107 and the following design standards. In case of conflict between the Standard and the criteria listed below, the more stringent requirement shall apply.

Reinforced Concrete Foundation - ACI 318

Concrete Support Structure – AWWA D107 and ACI 318

Welded Steel Water Tank – AWWA D107

- b. Seismic Load – Seismic loads shall be determined in accordance with AWWA D107, Section 4.2.8. Seismic design criteria shall be determined in accordance with AWWA D107, Section 4.2.7.

Region Dependent Transition Period (TL) = TBD (Fig. 1)

Site Class TBD (Table 3) - see geotechnical consultant's soil report

MCE Spectral Response Acceleration at 0.2sec (SS) and 1sec (S1) (Fig's. 3-16)

SS = TBD

S1 = TBD

Longitude = W79 00 47 (at tank center)

Latitude = N38 11 01 (at tank center)

Importance Factor (I) = TBD (Sec. 4.2.7.7)

- c. Snow Load- snow load shall be determined in accordance with AWWA D107, Section 4.2.5 (20 psf minimum loading).

2. Foundation Design- AWWA D107

- a. The foundation shall be designed by the Composite Elevated Water Storage Tank Contractor to safely support the structure based on the foundation recommendations within the geotechnical consultant's soil report. Foundations shall be sized in accordance with load combinations defined by AWWA D-107, Sec. 4.3

1.4 SUBMITTALS

A. Bid Proposal (Submit the following with the proposal):

1. Experience List - A completed contracts summary shall demonstrate a minimum of ten years experience in the design and construction of Composite Elevated Tanks. Contractor shall list a minimum of five completed Composite Elevated Tanks of similar capacity. Provide the location, capacity, Owner's name and contact information, Engineer's name and contact information and year completed. Failure to provide this information shall be cause for rejection of the bid (See also 1.5.1).
2. Tank Drawing - A preliminary section view drawing of each sized Composite Elevated Tank proposed for this project. The drawing shall include sufficient detail to illustrate tank geometry, surface areas, materials of construction, primary dimensions, the high water level elevation, concrete support structure wall thickness and other information required to show compliance with this Specification. If the proposed design does not comply with this Specification, this shall be cause for rejection of the bid.
3. Foundation Drawing – A drawing of the preliminary design of the foundation for each sized Composite Elevated Tank proposed for this project. The drawing shall include sufficient detail to illustrate foundation geometry, materials of construction, preliminary dimensions and approximate quantities of concrete and reinforcing steel. Failure to provide this information shall be cause for rejection of the bid.

B. Construction Drawings

1. Provide elevation, plan and sectional view drawings of the foundation, concrete support structure, welded steel water tank and all appurtenant equipment and accessories. Show the location, dimensions, material specifications and finish requirements. The submission shall be sealed by a professional engineer registered in the State of Virginia.
2. Reinforced concrete details shall include construction joints, openings and inserts. Reinforcement shall be clearly indicated on the structural drawings and identified by mark numbers that are used

on the fabrication schedule. Location, spacing and splice dimensions shall also be shown. Placement and fabrication details shall conform to ACI 318.

3. Steel tank details shall include weld joints and a layout showing all primary and secondary shop and field welds.

C. Construction Procedures

1. Provide design, detail drawings and procedures for the support structure forming system. Details shall include location of form and construction joints, rustications and any form ties. The criteria and minimum elapsed time for adjacent concrete placement shall also be clearly stated in the construction procedures. Procedures shall yield a minimum of twenty-four (24) hours of cure time before form removal (See also 3.2.2).
2. Provide shop and field weld procedures for all structural joints on the steel tank.

D. Design Data

1. Provide a table showing capacity of the tank in gallons at all levels in one ft. increments.
2. Provide a summary of the design for the foundation, concrete support structure, welded steel water tank and other components. Include the design basis, the loads and load combinations and the results. Also include results of the finite element and finite difference analyses of the interface region.

E. Product Data

1. Provide separate concrete mix designs for each specified concrete compressive strength indicated on the drawings.
2. Provide technical data and manufacturer's standard color chart of all coating products to be used.
3. Provide manufacturer's descriptive information for appurtenant equipment and accessories that are not detailed on the construction drawings.

F. Reports/Certification

1. Provide documentation of all tests, inspections and certifications required by this Section.
2. Provide general qualifications of all welders.

G. Operation/Maintenance

1. Provide operating instructions and maintenance procedures for the Composite Elevated Tank and applicable appurtenant equipment, mechanical components, safety equipment, and miscellaneous accessories.

1.5 QUALITY ASSURANCE

A. Qualification of Manufacturer

1. A turnkey Composite Elevated Tank Manufacturer/Contractor shall perform the work described in this Section. No part of the design or construction of the concrete support structure or welded steel water tank shall be subcontracted. The Contractor shall have designed, constructed and placed in service a minimum of five (5) Composite Elevated Tanks of similar capacity in the past ten (10) years.
2. The Contractor shall employ a full-time Professional Engineer with a minimum five (5) years cumulative experience in the design and construction of Composite Elevated Tanks. The engineer shall be registered in accordance with these specifications and shall be in responsible charge of the work.
3. The Contractor shall own and maintain all equipment necessary for the turnkey construction of the Composite Elevated Tank as specified herein. This includes the formwork for the concrete

support structure construction as well as the fabrication and erection equipment required for the welded steel water tank construction. Neither the concrete support structure construction or the welded steel water tank fabrication and erection shall be subcontracted.

4. Acceptable manufacturers meeting these qualifications are:
 - a. Caldwell Tanks, Inc., CB&I Constructors, Inc. and Landmark Structures, Inc.

B. Regulatory Requirements

1. The Specifications, Codes and Standards referenced in paragraph 1.2 shall govern the work with regard to materials, design, construction, inspection and testing to the extent specified.
2. The Composite Elevated Tank shall be designed and constructed in compliance with applicable federal, state and local regulations.
3. Personnel safety equipment shall be provided in accordance with OSHA requirements and the manufacturers' documentation.

1.6 DELIVERY, STORAGE, & HANDLING

A. Handling and Shipping

The Contractor shall handle materials and fabricated components in a manner that will protect them from damage. Allow painted materials adequate cure time prior to stacking or shipping.

B. Storage and Protection

Protect delivered materials and equipment from damage. Store in well drained areas and provide blocking to minimize contact with the ground.

1.7 PROJECT CONDITIONS

A. Permits and Easements

1. Permits, licenses and easements required for permanent structures, changes in existing facilities or necessary advancement of the specified construction shall be secured and paid for by the Owner prior to the start of construction. These include site access easements, highway crossing permits, etc.
2. Licenses or permits of a temporary nature or as required by specific trades shall be the responsibility of the Contractor. These include the County building permit and airspace authority approval for crane equipment. County building permit fee shall be waived.

- B. Existing Conditions - A geotechnical consultant has carried out a soils investigation at the site and a soil report has been incorporated within these specifications. The net allowable bearing pressure of shallow foundation and/or the allowable capacity of deep foundation elements have been defined in this report. The Contractor shall be responsible for securing any further geotechnical information required beyond that provided in this report. The Owner shall retain the services of the Geotechnical consultant to verify the adequacy of the bearing stratum after the Contractor has carried out the excavation and before any concrete or reinforcement is placed.

- C. Access - The Contractor shall provide access from public roads to the tank site unless otherwise specified.

D. Working Conditions

1. Safety and Health - The Contractor shall comply with safe working practices and all health and safety regulations of OSHA, state and local health regulatory agencies and Material Safety Data Sheets (MSDS). Provide protective and lifesaving equipment for persons working at the site.

2. Times for Work - Times for work shall comply with local, state and federal regulations and laws.

1.8 SEQUENCING AND SCHEDULING

A. Schedule

The Contractor shall provide an anticipated schedule for design, submittals, site work and the major components or phases of construction including foundation, concrete support structure and welded steel water tank, tank painting, electrical installation and other significant activities. Update the schedule as required.

B. Notification

The Contractor shall provide notification of the intent to start work at least seven days prior to commencing each major phase of work.

C. Certifications

1. Provide certification from the Engineer of Record that the Composite Elevated Tank has been completely designed in accordance with the requirements of the Specification.
2. Provide certification that field testing and inspection requirements of item 3.4 have been performed and the results comply with the requirements of the specification.

1.9 GUARANTEES

- A. The Contractor shall guarantee the structure, appurtenant equipment and accessories provided under this Section against defective design, workmanship, or materials for a period of one year from the date of Substantial Completion. If notified within this period, the Contractor shall repair any defects caused by faulty design, workmanship, or material furnished under these specifications at no cost to the Owner. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed. Defects caused by damaging service conditions, such as electrolytic, chemical, or abrasive, are not covered by this guarantee.
- B. All guarantees from any manufacturer or installer of materials, equipment and accessories not manufactured by the Composite Elevated Tank manufacturer and that are provided under this Section, shall be obtained by the Contractor and submitted to the Owner. Refer to Section 09902 PAINTING NEW ELEVATED WATER TANK concerning coatings guarantees.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Reinforced Concrete. Concrete materials and reinforcement shall comply with ACI 318 and AWWA D107, except as modified in this Section.
- B. Steel Tank. Welded steel water tank components, including steel plates, sheets, structural shapes and filler metals shall be in accordance with AWWA D107.

2.2 CONCRETE FOUNDATION

- A. The concrete foundation shall be designed in accordance with ACI 318. Minimum specified compressive strength shall be 4000 psi at 28 days. Reinforcing steel shall be ASTM A615 Grade 60. The service load reinforcement tension stress shall not exceed 30,000 psi under dead plus water load unless flexural cracking is otherwise controlled in accordance with ACI 318.

2.3 CONCRETE SUPPORT STRUCTURE

The concrete support structure shall be designed in accordance with ACI 318. The specified compressive strength of concrete shall be as required by design, but not less than 4000 psi at 28 days. The maximum specified compressive strength of concrete for the wall and dome shall be 6000 and 5000 psi respectively.

A. Support Wall

1. The support wall shall be reinforced concrete with a minimum thickness of 8 in. exclusive of any architectural relief. Wall thickness shall be provided such that the average compressive stress due to the weight of the structure and stored water is limited to 25% of specified compressive strength, but not greater than 1000 psi. A minimum total wall reinforcement of 0.15% vertically and 0.20% horizontally shall be distributed approximately equally to each face. A minimum of 0.75% vertical reinforcement shall be provided in the top 6 ft. of the wall extending into the concrete ring beam. Minimum concrete cover for interior/exterior faces shall be 1 in. and 1-1/2 in. respectively.

B. Tank Floor

1. The tank floor shall be a reinforced concrete dome not less than 8 in. thick. The average compressive stress due to the weight of the structure and stored water shall not exceed 15% of the specified compressive strength, nor greater than 600 psi. Minimum total reinforcement in orthogonal directions shall be 0.40% distributed approximately equally to each face. Additional reinforcement shall be provided for stress caused by edge restraint effects.

C. Openings

1. The effects of openings in the wall shall be considered in the design. Not less than 60% of the interrupted reinforcement in each direction shall be placed each side of the opening. Reinforcement shall extend past the opening not less than half the transverse opening dimension.
2. Openings 8 ft. 0 in. or wider used for vehicle access shall be strengthened against vehicle impact and local buckling by means of an internal buttress located on each side of the opening. The buttress shall consist of a thickened, reinforced concrete wall section that is integrally formed and placed with the concrete support structure.

2.4 CONCRETE SUPPORT STRUCTURE/STEEL TANK INTERFACE

A. Interface Region

1. The interface region includes those portions of the concrete support structure and steel tank affected by the transfer of forces from the tank cone and the tank floor to the concrete support structure. This includes a ring beam and connection details. The Contractor shall provide evidence that a thorough review of the interface region has been performed. Finite element and finite difference analyses are the required methods for examining such local stresses in detail.
2. The geometry of the interface shall provide for positive drainage and not allow either condensate or precipitation to accumulate at the top of the concrete wall or ring beam.

B. Ring Beam

1. The ring beam shall be reinforced concrete with a nominal width and height of at least two times the concrete support structure wall thickness. Minimum radial and circumferential reinforcement shall be 0.25%. For direct tension, reinforcement shall be provided such that the average service load stress in tension reinforcement due to the weight of the structure and stored water does not exceed 12,750 psi.
2. Ring beam design shall consider unbalanced forces from the welded steel tank cone and concrete dome, load conditions varying with water level, eccentricity of loads resulting from design geometry and allowance for variations due to construction imperfection and tolerance.

2.5 WELDED STEEL TANK**A. General**

The steel tank shall be all welded construction and shall be designed, fabricated and erected in accordance with applicable sections of AWWA D107. The required capacity and dimensions of the tank are noted on the drawings and in this Section of the specifications. All exposed lap joints shall be fully seal welded on both sides.

B. Plate Thickness

All members shall be designed to safely withstand the maximum stress to which they may be subjected during erection and normal operation. The minimum thickness of any steel plate in contact with water shall be 1/4 in. The minimum thickness of any steel plate not in contact with water shall be 3/16 in.

C. Roof Support

All structural members supporting the roof of the steel tank shall be flat bar or sealed square tubular sections. I-beams or other sections with horizontal projections may be used if the nominal depth is 10 in. or greater. Support beams shall be seal welded to the underside of the roof plate along the entire length of the beam.

D. Cone

1. Conical sections of the tank shall be designed using one of the 3 methods described in AWWA D107, Section 5.3.5. Inspections and reports shall be provided to the extent required by AWWA D107.

E. Bottom Liner

Liner plates shall be shop fabricated to conform to the shape of the concrete dome. They may be placed directly on the concrete. All liner plate seams shall be lap welded on the topside only with continuous fillet welds or continuous butt welds with backup bars. The minimum thickness for liner plates shall be 1/4 in.

2.6 APPURTENANCES AND ACCESSORIES**A. General**

Accessories shall comply with the minimum requirements of the Specifications, Codes and Standards listed in paragraph 1.2, current applicable safety regulations and the operating requirements of the structure.

B. Ladder Access

1. Ladders shall be provided from the slab on grade inside the base of the concrete support structure to the upper walkway platform located below the tank floor. The tank floor manhole shall be provided with ladder access from the upper platform. A ladder shall extend from the upper platform, through the access tube interior to the roof. A ladder mounted on the access tube

exterior shall be provided for access to the tank interior, extending from the roof manhole to the tank floor.

2. Ladders that terminate at platforms or landings shall extend 48 in. above the platform elevations. A removable extension kit (Bilco Ladder-Up Safety Post or equal) shall be added to the fall protection system for all ladders not extending 48 in. above the platform elevations.
3. Ladders located in the concrete support structure shall be galvanized steel. Tank interior and access tube ladders shall be coated in accordance with the tank interior coating system.
4. Ladder side rails shall be a minimum 3/8 in. by 2 in. with a 16 in. clear spacing. Rungs shall be minimum 3/4 in. diameter, spaced at 12 in. centers and plug welded into holes drilled in the side rails. The surface of the rungs shall be knurled, dimpled, or otherwise treated to minimize slipping.
5. Ladders shall be secured to the adjacent structure by brackets located at intervals not exceeding 10 ft. Brackets shall be of sufficient length to provide a minimum distance of 7 in. from the center of the rung to the nearest permanent object behind the ladder. Ladder brackets located on the access tube exterior shall be reinforced at the access tube shell so that potential ice damage is confined to the ladder and bracket; and not the access tube shell.

C. Safe Climbing Device/Safety Equipment

OSHA compliant safe climbing system shall be provided on all ladders. Two sleeves with snap hooks shall be provided that are designed to be operated with the system. Two harnesses with shock resistant lanyards shall be provided with the system. Shall be North/Honeywell No. 526-101-001R (galvanized rail). Two personal fall arrest equipment attachment points (supporting 5000 lbs. each) shall be centrally located on tank roof.

D. Rest Platforms

Rest platforms shall be provided at maximum 50 ft. intervals along the interior concrete support structure ladder. The platforms shall be nominal 5 ft. x 5 ft. and platform floor shall be grating. Openings shall be provided in the landings to accommodate the ladder that shall have a straight-run its full height. All platform components shall be galvanized steel and attachment hardware shall be zinc plated.

E. Platforms

A 4 ft. wide upper walkway platform shall be located at the top of the concrete support structure to provide access from the concrete support structure ladder to the roof access ladder located on the interior of the access tube. Platforms shall be provided with handrails, midrails and toe plates in accordance with OSHA requirements. Grating shall be used for the walking surface. All components shall be galvanized steel and attachment hardware shall be zinc plated.

F. Concrete Support Structure Doors

1. Personnel Door - Refer to Sections 08100 Steel Doors and Frames, and 08700 Finish Hardware. Quantity, location and size of personnel door(s) shall be as shown on the project drawings.
2. Overhead Vehicle Door
Provide a manually operated 10 ft. x 10 ft. overhead steel rolling door located in the base of the tower. Refer to Sections 08360 Overhead Doors, and 08700 Finish Hardware. Size and location of the overhead door shall be as indicated on the project drawings.

G. Tank Openings

1. Floor - Provide a 30 in. diameter manhole through the tank floor. The manhole shall be operable from a ladder located on the upper platform and shall be designed to withstand the pressure of the tank contents without leakage. The manhole assembly shall include a stainless steel hand wheel operator and threaded components.
2. Roof - Provide one 30 in. diameter weatherproof access hatch on the roof of the tank. The hatch will allow access from the roof to the interior tank ladder. The hatch opening shall have a

minimum 4 in. curb. Hatch cover to be constructed of aluminum and shall have a 2 in. downward edge, stainless steel hardware and locking mechanism.

3. Roof – Provide one 24 in. diameter exhaust hatch located adjacent to the roof hatch. The exhaust hatch will be flanged with a bolted removable cover and designed such that an exhaust fan may be connected for ventilation during painting. The opening shall have a minimum 4 in. curb.

H. Access Tube

1. Provide a 48 in. diameter centrally located access tube through the welded steel water tank to provide access to the tank roof from the upper walkway platform. A 30 in. diameter access hatch shall allow egress from the access tube to the roof. The openings shall have a minimum 4 in. curb. Hatch cover to be constructed of aluminum and shall have a 2 in. downward edge, stainless steel hardware and locking mechanism.
2. The area under the access tube shall be provided with a galvanized drip pan to prevent condensation from dripping onto the concrete floor slab below. The drip pan shall extend 3 in. beyond the drip line of the access tube. A 3/4 in. PVC drain pipe shall be provided to drain condensate to the overflow.

I. Roof Railing

A 42 in. high roof handrail shall be provided to enclose all centrally located roof accessories. The roof railing shall be a minimum of 15 ft. diameter.

J. Rigging Access

A removable access panel shall be located at the top of the concrete support structure accessible from a platform and shall provide access to the exterior rigging rails located near the welded steel tank/concrete support structure interface. This access panel shall be stainless steel or aluminum and have a minimum size of 24 in. by 36 in. In most cases, this removable access panel serves as one of the concrete support structure vents.

K. Utility Rails

Provide permanently installed utility rails suitable for rolling trolleys on the interior of the welded steel tank at the wall/roof and access tube/roof connections. Provide an exterior utility rail at the base of the welded steel tank adjacent to the concrete support structure. Provide an interior concrete support structure utility rail at the top of the concrete support structure in order to assure access for maintenance of piping.

L. Piping

1. Inlet and Outlet Pipes - Provide a 16 in. diameter inlet pipe and a 16 in. diameter outlet pipe. Inlet pipe shall extend from the base of the concrete support structure thru the floor elevation of the welded steel tank to the high water level. Outlet pipe shall extend from the base of the concrete support structure thru the floor elevation of the welded steel tank. Provide a minimum of 6 in. high removable silt stop where the outlet pipe enters the tank. The bottom capacity level of the tank's operating range shall be at or above the elevation of the top of the silt stop. Pipe material within the concrete support structure shall be minimum 10-gauge 304L stainless steel.

The inlet and outlet pipes shall be designed to support all related static and dynamic loads. Suitable galvanized brackets, guides and hangers shall be provided on the wall of the concrete support structure and welded steel water tank floor at intervals not exceeding 20 ft.

The inlet and outlet pipes shall be designed and constructed to accommodate any differential movement caused by settlement and by thermal expansion and contraction over the range of extreme temperature differences expected for the concrete support structure and pipe. The required flexibility shall be provided by an expansion joint located in the vertical section of pipe.

2. Overflow Pipe - Provide a 12 in. diameter overflow pipe. The top of the overflow shall be located within the welded steel water tank at the overflow elevation. The overflow pipe shall be routed beside or inside the central access tube and extend to grade inside the concrete support structure. A base elbow shall direct the overflow through the wall of the concrete support structure, where the pipe shall be terminated with a No. 4 mesh screen. Pipe material within the support structure shall be minimum 10-gauge 304L stainless steel. If the top of the overflow pipe is located above top capacity level, the tank shall be designed for the additional capacity provided by the difference.

The entrance to the overflow pipe shall be designed for the maximum inlet flow rate. The design shall be based on the water level cresting within 6 in. above the overflow elevation. A weir shall be provided if the entrance capacity of the overflow pipe diameter is not adequate. The Contractor's standard vortex prevention device shall also be used.

The overflow shall be designed to support all related static and dynamic loads. Suitable galvanized brackets, guides and hangers shall be provided on the wall of the concrete support structure and welded steel water tank floor at intervals not exceeding 20 ft. The overflow and weir section within the tank shall be coated carbon steel and supported by the central access tube.

The overflow pipe shall be designed and constructed to accommodate any differential movement caused by settlement and by thermal expansion and contraction over the range of extreme temperature differences expected for the concrete support structure and pipe. The required flexibility shall be provided by an expansion joint located in the vertical section of pipe.

3. Stainless Steel Requirements - Pipe and fittings shall be Type 304L stainless steel fabricated from material meeting the requirements of ASTM A240. Fabrication, inspection, testing, marking and certification of pipe and fittings shall be in accordance with ASTM A778 and A774, respectively. Backing flanges shall be in accordance with ASTM A285-C drilled to ANSI B16.5 Class 150. Pipe, fittings and flange thickness shall be in accordance with the manufacturers certified pressure rating for the applicable service pressures.

M. Ventilation

1. Tank Ventilation - A tank vent shall be provided, located near the center on the tank roof above the maximum weir crest elevation. It shall consist of a support frame, screened area and cap. The support shall be fastened to a flanged opening in the tank roof. The vent cap shall be provided with sufficient overhang to prevent the entrance of wind driven debris and precipitation. A minimum of 4 in. shall be provided between the roof surface and the vent cap.

The tank vent shall have an intake and relief capacity sized to prevent excessive pressure differential during the maximum flow rate of water, either entering or leaving the tank. The overflow pipe will not be considered as a vent. The maximum flow rate of water exiting the tank shall be calculated assuming a break in the inlet/outlet at grade when the tank is full. The vent shall be provided with an insect screen. Vent capacity shall be determined based on open area provided by the screen.

2. Support Structure Ventilation - As a minimum, one louvered vent shall be provided at the top of the concrete support structure. This vent shall be accessible from the upper platform and may also be designed to provide access to the exterior rigging rails located at the welded steel tank/concrete support structure intersection. Vents shall be galvanized steel with stainless steel or aluminum insect screen.

N. Interior Floors

1. Slab on Grade - Provide a 6 in. thick, 3500 psi concrete floor slab in the base of the concrete support structure. The slab shall be supported on compacted granular fill and shall be reinforced with #5 reinforcing steel bars at 12 in. centers each way. Provide 1/2 in. expansion joint between floor slab and concrete support structure and at pipes and supports that extend through the floor. Place cap strip and sealant over the expansion joint.

O. Lightning Protection

1. Provide a lightning protection system for the Composite Elevated Tank and any roof mounted equipment that may be damaged by lightning. Install the system in accordance with NFPA 780 with materials that meet UL96 and UL96a.
2. Minimum requirements include two 28 strand by 14-gauge copper conductors bonded to the steel tank 180 degrees apart. The conductors shall be fastened to the interior concrete support structure at 3 ft. minimum spacing and shall terminate with buried 5/8 in. diameter by 8 ft. long copper clad ground rods.

P. Identification Plate

1. A tank identification plate shall be mounted near the personnel door. The identification plate shall be corrosion resistant and contain the following information:
 - a. Tank Contractor
 - b. Contractor's project or file number
 - c. Tank capacity
 - d. Height to High Water Level
 - e. Date erected

2.7 ELECTRICAL AND LIGHTING

- A. Refer to Sections 16010 Electrical Requirements, 16400 Low Voltage Distribution, and 16500 Lighting of the Project Specifications

2.8 STEEL TANK PAINTING

- A. Refer to Section 09902 PAINTING NEW ELEVATED WATER TANK.

2.9 SOURCE QUALITY CONTROL

- A. Tests
Review mill test certifications of all steel plate, structural components and reinforcement to ensure compliance with specification requirements.
- B. Quality Assurance
Provide quality assurance of shop fabricated components in accordance with AWWA D100.

PART 3 - EXECUTION**3.1 EXAMINATION****A. Foundation Excavation**

The foundation bearing surface and excavation shall be inspected and verified by a geotechnical engineer retained by the Owner prior to construction of the foundation.

B. Environmental Conditions

Prior to performing any work, verify the expected temperature, humidity and weather conditions are within the specified ACI limitations for executing the work.

C. Elevated Tank Components

After completion of each major component and prior to proceeding with the next stage of construction, verify that tolerance inspections and material quality control tests conform to this specification.

3.2 REINFORCED CONCRETE CONSTRUCTION**A. Reinforcement**

1. Fabrication, placement, development and splicing of reinforcement shall be in accordance with ACI 318 and ACI 117.
2. Concrete support structure reinforcement shall be installed with plastic supports. Maximum spacing of supports for welded wire fabric shall be 5 ft. centers, horizontal and vertically.

B. Architectural Concrete Construction (Concrete Support Structure or Pedestal Shaft)

1. The exposed exterior surface of the concrete support structure is designated as architectural concrete. The concrete and formwork requirements of this Section shall be strictly enforced to ensure concrete of the highest practicable structural and architectural standard. Concrete proportioning, placing and finishing shall be in accordance with the ACI 301, Chapter 18, except as modified by this Section. Formwork design, installation and removal shall comply with the minimum requirements of ACI 318 and ACI 117 and with the applicable requirements of ACI 347 and ACI 371R, except as modified by this Section.
2. Attention shall be given to ensure the same concrete design mix is used throughout the concrete support structure. The proportion, type and source of cement and aggregates shall not be changed. Uniform moisture content and placing consistency shall be maintained.
3. Drop chutes shall be used in all wall concreting operations where concrete placement is 5 ft. and greater in drop height. Concrete shall be placed directly between reinforcement layers to prevent aggregate segregation and form splatter with the resulting finish variations.
4. Forming systems not designed for lateral pressures associated with full height plastic concrete head shall be designed with the provision of ties and bracing such that concrete components conform to the correct dimensions, shape, alignment and elevation without leakage of mortar. Formwork systems shall be designed to safely support all loading conditions. Embedded items shall be properly positioned and secured. Form surfaces shall be cleaned of foreign materials and coated with a release agent prior to placing reinforcement. Do not allow excessive release agent to accumulate on the form. Steel forms shall be coated with non-staining, rust preventative form oil or otherwise protected.

5. The forming system for the concrete support structure wall shall be fully engineered and detailed with procedures to meet the increased demands of architectural concrete. The concrete support structure shall be constructed with a jump form process using form segments prefabricated to match the wall curvature. Concrete pour height shall be a minimum of 4 ft. and a maximum of 12 ft. Form panels shall extend the full height of the concrete pour using only vertical panel joints. Form systems that are designed to lap the previous wall pour shall be sealed to prevent grout leakage. Form system shall incorporate a positive means of adjustment to maintain dimensional tolerances specified herein. Panels shall be designed for lateral pressures associated with full height plastic concrete head; support and bracing shall be provided for construction related impact loads and wind loads. Working platforms that allow safe access for inspection and concrete placement shall be provided. Form facing material shall be metal, or plywood faced with plastic or fiberglass.
6. The form system shall incorporate a uniform pattern of vertical and horizontal rustications to provide architectural relief to the exterior wall surface. Rustication strips shall be attached to the form face to minimize potential grout leakage that results in broken corners, color variations and rock pockets. All construction joints and panel joints shall be located in rustications. Vertical panel joints shall be sealed using closures that combine with the form pattern to prevent grout leakage and panel joint lines. All joints shall be grout tight in order to prevent leakage during concrete placement. The vertical and horizontal rustications shall be proportioned and combined to impart a symmetrical architectural pattern to the completed structure. No architectural form treatment is required on the interior surface.
7. Support structure concreting shall be capable of segmented placement procedures only when required. Temporary vertical bulkheads shall divide the wall pour into segments corresponding to a single batch (truckload) of concrete. The bulkheads shall be located at rustications; braced rigid and tight to maintain vertical alignment under concrete load without grout leakage. Wall segment concrete shall be placed continuously to full form height from a single load. Placement from multiple batches is not permitted. Temporary bulkheads shall not be removed until adjacent concrete is placed.
8. Wall forms shall not be disturbed or removed for a minimum period of twenty four (24) hours after concrete placement. Additionally, in no instance shall the forms be removed before the concrete has attained sufficient strength to prevent forming operations or environmental loads from causing surface damage or excessive stress. Form removal shall be based on early age concrete strength testing. The minimum concrete strength shall be established by the Contractor, based on an analysis of stress at critical stages throughout the forming and concrete operations. Early age concrete testing shall be in accordance with ACI 228.1R-03.
9. The formwork system for the domed structural floor shall be designed to support all construction loads. Adequate shoring and bracing shall be provided to transfer loads without appreciable movements. Form surfaces shall be steel, plastic, or fiberglass coated material. Shoring and forms for the structural dome slab shall remain in place until the concrete has gained sufficient strength to carry the floor weight without damaging deflections.

C. Concrete

Concrete proportioning, production, placement, quality control and curing procedures shall comply with ACI 318 and ACI 117. Concrete shall satisfy the specific structural, durability and architectural requirements of the completed components.

1. Proportioning - The proportions of materials for concrete shall be established to provide adequate workability and proper consistency to permit concrete to be worked readily into the forms and around reinforcement without excessive segregation or bleeding. If high range water reducer is used, concrete slump prior to addition shall be 3 to 4 in. The slump, after addition of high range water reducer, shall be a maximum of 9 in. Air shall be entrained to provide concrete with 3.5% to 6.5% air content.
2. Production - Concrete that arrives at the project with slump below that suitable for placing may have water added within the limits of the maximum permissible water-cement ratio. Maximum slump shall not be exceeded. The water shall be incorporated by additional mixing equal to at

least half of the total mixing time required. For concrete with site-administered high range water reducer, the preplasticized minimum slump requirement shall be attained as permissible by addition of water and mixing prior to the addition of the water reducer.

3. Placement - Prior to concrete placement, all snow, ice, water, or other foreign material shall be removed from the spaces that the concrete will occupy. Concrete shall be deposited in its final position in accordance with ACI 318 or the applicable building code. Drop chutes or tremies shall be used in walls and columns to prevent free-fall of the concrete over 5 ft. and to allow the concrete to be placed through the cage of reinforcing steel. These shall be moved at short intervals to prevent stacking of concrete.
4. Vibration - All concrete shall be consolidated by vibration so that the concrete is thoroughly worked into the corners of forms and around the reinforcement and embedded items to eliminate all air or stone pockets which may cause honeycombing. Internal vibrators shall be the largest practical size that can be used in the work and shall be operated by competent workmen.
5. Wall Finish - Provide a smooth form finish for the interior and exterior concrete support structure. Tie holes shall be plugged using grout on the interior and manufactured plugs on the exterior that match the color of the cured concrete as closely as possible. Provide a light sandblast to the exposed exterior concrete support structure surface.
6. Dome Finish - Provide a smooth form finish for the interior dome slab. The unformed surface shall have a floated finish.

D. Weather

1. Concrete shall not be placed during precipitation or extreme temperatures unless protection is provided.
2. During cold weather the recommendations of ACI 306 shall be followed.
3. During hot weather the recommendations of ACI 305 shall be followed.

E. Concrete Support Structure Dimensional Tolerances

Support structure concrete construction shall conform to the following:

1. Variation in thickness
Wall -3.0% to +5.0%
Dome -6.0% to +10.0%
2. Concrete support structure variation from plumb:
in any 10 ft. of height - 1 in.
in any 50 ft. of height - 2 in.
maximum in total height - 3 in.
3. Concrete support structure diameter variation - 0.4% (not to exceed 3 in.)
4. Dome floor radius variation - 1.0%
5. Level alignment variation:
from specified elevation - 1 in.
from horizontal plane - 1/2 in.
6. The offset between adjacent pieces of formwork facing material shall not exceed the following:
Exterior exposed surfaces - 1/8 in.
Interior exposed surfaces - 1/4 in.
Unexposed surfaces - 1/2 in.

3.3 FOUNDATION

A. Excavation

After verification of the foundation bearing surface, a 2 in. thick concrete working slab within the lower excavation limits may be provided. Grade the site to prevent runoff from entering the excavation.

B. Finish

Formed surfaces shall have a smooth form finish when exposed and a rough form finish when not exposed.

3.4 FIELD QUALITY CONTROL

A. Concrete Testing and Inspection

1. The evaluation and acceptance of concrete shall be in accordance with Section 5.6 of ACI 318 and ACI 117, except as modified in this Section.
2. Three cylinders shall be made from each sample required. A 7-day compressive strength test shall be used to supplement the 28 day tests.
3. Slump, air, temperature and compressive cylinder testing shall be performed by an independent laboratory. The Owner shall retain the independent laboratory and provide the Contractor with copies of all test results.
4. The dome floor radius variation shall be verified, and the concrete support structure radius, plumbness, level alignment variation, formwork facing material variation, and thickness shall be verified for each concrete lift at 45 degree intervals. An inspection report by the Contractor documenting these verifications shall be provided to the Owner at project completion.

B. Welded Steel Water Tank Testing & Inspection

1. Inspection procedures for the welded steel tank shall be as required by AWWA D107, Section 9, "Inspection and Testing". Radiographic inspection of full penetration butt-welded joints shall be made by an independent inspection company retained by the Owner.
2. Conical sections of the welded steel water tank designed using Method 2 or Method 3 of AWWA D107 shall be inspected in accordance with Section 9.4 of AWWA D107.
3. Weld joints of plate over the structural concrete floor shall be tested for leaks by vacuum box/soap solution testing, or equivalent method

END OF SECTION 13210

SECTION 13211 – SPHEROID ELEVATED WATER STORAGE TANK**PART 1 - GENERAL****1.1 SUMMARY**

The Contractor shall be responsible for all labor, materials and equipment necessary for the design, fabrication, construction, painting, disinfection and testing of an elevated, welded carbon steel water storage tank supported by a steel support pedestal, commonly referred to as a “Pedisphere” or “Spheroid” style.

1.2 QUALIFICATION OF MANUFACTURER

The design and construction of the water storage tank shall only be undertaken by a Contractor with a minimum of five years experience with elevated tank construction. The Contractor must be able to demonstrate experience through the design and construction of at least ten similar style water tanks. The Contractor shall not subcontract the design or erection of the steel tank, pedestal and base cone support structure.

1.3 SUBMITTALS

Submittals shall be in accordance, as applicable, with Paragraph 1.4 of Section 13210 COMPOSITE ELEVATED STORAGE TANK. No bid will be considered unless this information is provided with the proposal.

1.4 STANDARD SPECIFICATIONS

All work on the water storage tank shall fully conform to the requirements of the latest published editions of the following Standard Specifications:

- A AWWA (American Water Works Association) D100 Standard for Welded Carbon Steel Tanks for Water Storage.
- B AWWA D102 - Standard for Painting Steel Water Storage Tanks
- C AWWA C652 - Standard for Disinfection of Water Storage Facilities.
- D AWS (American Welding Society) D1.1
- E NSF (National Sanitation Foundation) 61 - Materials in contact with Potable Water.
- F Steel Structures Painting Council Manual - Volume 1 - Good Painting Practice.
- G Steel Structures Painting Council Manual - Volume 2 - Systems and Specifications.

H ACI 318 - Building Code Requirements for Reinforced Concrete

I ACI 301 –Specifications for Structural Concrete

1.5 SYSTEM DESCRIPTION

The elevated tank shall be all-welded construction of the most economical design. All members of structural steel or of reinforced concrete shall be designed to safely withstand the maximum stresses to which they may be subjected during erection and operation. Refer to Paragraph 1.3.B of Section 13210 COMPOSITE ELEVATED STORAGE TANK for operating parameters.

1.6 WORKING DRAWINGS

After contract award and prior to construction, the Contractor shall provide engineering drawings and design calculations for the elevated steel tank and the foundation. Drawings shall show the size and location of all structural components and the foundations along with reinforcement details, the required strength and grade of all materials and the size and arrangement of principle piping and equipment. The drawings and calculations shall bear the certification of a professional Engineer licensed in the State of Virginia. The design coefficients and resultant loads for snow, wind and seismic forces, and the methods of analysis shall be documented

PART 2 - DESIGN

2.1 GENERAL

The structural design of the elevated storage tank shall conform to the following design standards except as modified or clarified as follows:

A Foundations – AWWA D100 and ACI 318 – Building Code Requirements for Reinforced Concrete

B Steel Tank - AWWA D100

C Steel Tank Painting – AWWA D102.

2.2 ENVIRONMENTAL LOADS – AWWA D100 and ASCE 7

A Wind Load – Wind pressure shall be determined in accordance with AWWA D100, Section 3.1.4. Basic wind speed used in the Wind Pressure formula shall be determined using the mapped site location and Figure 1 of AWWA D100. For tanks located in coastal regions, the Owner’s Engineer shall consider the use of an increased basic wind speed as appropriate.

Basic Wind Speed (BWS) = TBD MPH

B Seismic Load – Seismic loads shall be determined in accordance with AWWA D100, Section 13.

1. Region Dependent Transition Period (TL) = TBD (Fig. 19)
2. Site Class TBD (Table 25)

3. MCE Spectral Response Acceleration at 0.2 sec (SS) and 1 sec (S1) (Fig's. 5-18)
SS = TBD
S1 = TBD
Longitude = W79 00 47 (at tank center)
Latitude = N38 11 01 (at tank center)
4. Importance Factor (IE) = TBD (Table 24)

C Snow Load – Snow load shall be determined in accordance with AWWA D100, Section 3.1.3.1.

2.3 FOUNDATION

A Geotechnical investigation has been carried out at the site and a copy of the report is included with the Contract Documents. Recommendations for the foundation and allowable bearing capacities are defined in this report. The Owner shall retain the services of the Geotechnical consultant to verify the adequacy of the bearing stratum after the Contractor has carried out the excavation and before any concrete or reinforcement is placed. The concrete foundation shall be designed by the Contractor based upon the recommendations in the geotechnical report. The report must provide the allowable soil bearing pressure with appropriate factors of safety, the active and passive earth pressure coefficients, the angle of soils internal friction, its cohesion, unit weight and recommendations for bearing depth and backfill requirements.

2.4 STEEL TANK

A. General

1. The tank and supporting structure shall be of all-welded steel design and construction. All materials, design, fabrication, erection, welding, testing and inspection of the steel tank shall be in accordance with the applicable sections of AWWA D100 except as modified in this document. The tank shall have a spherical shape for capacities of 150,000 gallons and less, and a spheroidal shape for capacities 200,000 gallon and greater.
2. The supporting structure shall be a butt-welded single pedestal having a minimum shaft diameter adequate for the capacity and height of tower. Transition sections at the top and bottom of the pedestal shall be in accordance with the manufacturer's standard. The transition from the base to the pedestal shall be a truncated cone with a compression ring. The transition from pedestal to tank shall be a compression ring with truncated cone for tank capacities 150,000 gallons and less. The transition from pedestal to tank shall be a double-curved smooth knuckle for tank capacities of more than 150,000 gallons.

B. Minimum Plate Thickness

The minimum thickness for any part of the structure shall be 3/16 inch for parts not in contact with water and 1/4 inch for parts in contact with water. At junctions in plates where meridional forces are discontinuous such as cone to cylinder junctions or cone to base plate junctions, a tension or compression ring may be required to resist radial forces generated by the discontinuous membrane forces. In these regions, allowable stresses shall not exceed the following stress:

1. Tension ring stress shall not exceed the lesser of 15,000 PSI or one half of the minimum specified yield of the plate material.
2. Compression ring stresses shall not exceed 15,000 PSI.

3. The overturning moment used in designing the pedestal and foundation shall include the moment due to eccentricity of the gravity loads caused by deflection of the structure under wind or seismic conditions (i.e. P-delta effect). Working Drawings

PART 3 - CONSTRUCTION

3.1 CONCRETE FOUNDATION

The foundation shall be designed and constructed to safely and permanently support the structure. The basis of the foundation construction shall be consistent with the soils investigation data included herein at the end of these specifications. Appropriate changes to construction schedule and price will be negotiated if, during excavation, soil conditions are encountered which differ from those described in geotechnical report. The concrete foundation shall be constructed in accordance with ACI 301. Minimum concrete compressive strength shall be 4,000 PSI.

3.2 STEEL TANK CONSTRUCTION

A. General

The erection of the steel tank shall comply with the requirements of Section 10 of AWWA D100 except as modified by these documents.

B. Welding

All shop and field welding shall conform to AWS and AWWA D100, Section 10. The contractors shall ensure that the welders or welding operators are qualified in accordance with ASME Section IX or ANSI/AWS B2.1.

C. Fabrication

All fabrication and shop assembly shall conform to the requirements of AWWA D100, Section 9, Shop Fabrication.

D. Erection

Plates subjected to stress by the weight or pressure of the contained liquid shall be assembled and welded in such a manner that the proper curvature of the plates in both directions is maintained. Plates shall be assembled and welded together by a procedure that will result in a minimum of distortion from weld shrinkage.

E. Inspection and Testing

Inspection of shop and field welds shall be in accordance with AWWA D100, Section 11, Inspection and Testing. All inspection shall be performed prior to interior and exterior field painting. Radiographic inspection shall be performed by an independent testing agency retained by the Owner..

F. Roof Lap Joints

All interior lap joints shall be sealed by means of caulking or continuous seal welding. This shall include penetrations of roof accessories.

G. Painting and Disinfection. Surface preparation and coating of all steel surfaces shall be in accordance with Section 09902 PAINTING NEW ELEVATED WATER TANK.

PART 4 - APPURTENANCES AND ACCESSORIES**4.1 GENERAL**

Items shall be in full conformity with the current applicable OSHA safety regulations and the operating requirements of the structure. Unless otherwise noted in this Section, Appurtenances and Accessories shall be in accordance, as applicable, with Paragraph 2.6 of Section 13210 COMPOSITE ELEVATED STORAGE TANK.

4.2 LADDERS

Access ladders shall be provided at the following locations:

- A Grade to upper platform.
- B Upper platform to tank floor manhole.
- C Upper platform to steel tank roof mounted on access tube interior.
- D Exterior of access tube to provide access from the roof manhole to the tank floor.

Ladder side rails shall be a minimum 3/8 inch by 2 inches with a 16 inch clear spacing. Rungs shall not be less than 3/4 inch, round or square, spaced at 12 inch centers. The surface of the rungs shall be knurled, dimpled or otherwise treated to minimize slipping. At platforms or landings, the ladder shall extend a minimum 4 feet above the platform. Ladders shall be secured to adjacent structures by brackets located at intervals not exceeding 10 feet. Brackets shall be of sufficient length to provide a minimum distance of 7 inches from the center of the rung to the nearest permanent object behind the ladder.

4.3 FALL PROTECTION

Ladders shall be equipped with a fall arrest system meeting OSHA regulations. The system shall be supplied complete with safety harnesses, locking mechanisms, lanyards and accessories for two persons. Shall be North/Honeywell No. 526-101-001R (galvanized rail). Two personal fall arrest equipment attachment points (supporting 5000 lbs. each) shall be centrally located on tank roof.

4.4 UPPER PLATFORM

An upper platform shall be located at the top of the support pedestal to provide access from the pedestal ladder to the roof access ladder located on the interior of the access tube. Platform shall include a 24" x 36" access hatch with opening to allow ladder and safety device to continue 48" minimum above the platform floor.

4.5 ROOF HANDRAIL

A roof handrail shall be provided surrounding the roof manholes, vents and other roof equipment. Handrail shall comply with OSHA requirements.

4.6 CONDENSATE CEILING

Steel condensate ceiling located at the junction of the pedestal shaft and base cone complete with drain and 24" x 36" access hatch with opening to allow ladder and safety device to continue 48" minimum above the platform floor.

4.7 OPENINGS**A Roof Hatches**

1. Provide two access hatches on the roof of the tank. One hatch shall be 30 inch diameter and allow access from the roof to the interior of the tank. The hatch will be hinged and equipped with a hasp for locking. The hatch cover shall have a 2 inch downward edge. The second hatch will be 24

inch diameter and flanged with a removable cover so constructed that an exhaust fan may be connected for ventilation during painting operations. The openings shall have a minimum 4 inch curb.

2. Provide one 30 inch diameter hinged access hatch on the access tube roof. The hatch cover shall have a 2 inch downward edge.

B Tank Vent

The tank vent should be centrally located on the tank roof above the maximum weir crest elevation. The tank vent shall have an intake and relief capacity sufficiently large that excessive pressure or vacuum will not be developed during maximum flow rate. Maximum flow rate should be based on a break in the inlet/outlet pipe when the tank is full. The vent shall be designed, constructed and screened so as to prevent the ingress of wind driven debris, insects, birds and animals. The vent should be designed to operate when frosted over or otherwise clogged. The screens or relief material shall not be damaged by the occurrence and shall return automatically to operating position after pressure or vacuum is relieved.

C Tank Floor Manhole

A minimum 18 x 24 inch elliptical access manhole shall be provided in the tank bottom accessible from the upper platform or from a ladder that extends from the platform to the opening. The hatch shall open inward.

D Pedestal Hatch

A 24" diameter manhole shall be located near the top of the pedestal for access to the exterior painter's rail located near the tank/pedestal interface. This opening shall be accessible from the upper pedestal platform.

4.4 ACCESS TUBE

A minimum 36" diameter access tube shall be provided for tanks with capacities of 150,000 gallons and less, or 48" diameter access tube on tanks with capacities 200,000 gallons and greater. The access tube will be provided from the top of the pedestal to the tank roof.

4.5 RIGGING

Interior and exterior rigging devices shall be provided for painting, inspecting and maintaining the structure and accessories. A continuous bar or tee rail near the top of the exterior support structure shall be provided. The rail may be attached to the support column or steel tank. A painter's rail attached to the roof, pipe couplings with plugs in the roof or other attachments that provide complete access for painting of tank interior shall be furnished.

4.6 PIPING

A General

Exterior of pipes exposed to stored water shall be coated with tank interior wet system. Exterior of pipes in the pedestal and base cone shall be coated with tank interior dry system.

B Inlet and Outlet Piping

Provide a 16 in. diameter inlet pipe and a 16 in. diameter outlet pipe. Inlet pipe shall extend from the base of the concrete support structure thru the floor elevation of the welded steel tank to the high water level. Outlet pipe shall extend from the base of the concrete support structure thru the floor elevation of the welded steel tank. Provide a minimum of 6 in. high removable silt stop where the outlet pipe enters the tank. The bottom capacity level of the tank's operating range shall be at or above the elevation of the top of the silt stop. Pipe material within the concrete support structure shall be minimum 10-gauge 304L

stainless steel. The inlet and outlet pipes shall be designed to support all related static and dynamic loads. Suitable galvanized brackets, guides and hangers shall be provided on the wall of the concrete support structure and welded steel water tank floor at intervals not exceeding 20 ft. The inlet and outlet pipes shall be designed and constructed to accommodate any differential movement caused by settlement and by thermal expansion and contraction over the range of extreme temperature differences expected for the concrete support structure and pipe. The required flexibility shall be provided by an expansion joint located in the vertical section of pipe.

C Overflow

The overflow pipe shall be designed to carry the maximum design flow rate. The steel overflow pipe will be 12 inch in diameter and shall have a minimum wall thickness of 1/4". A suitable weir shall be provided with the crest at High Water Level. The overflow pipe shall extend down from the weir box through the tank, pedestal, and base cone. The overflow pipe shall penetrate the base cone wall approximately 1 to 2 feet above grade and discharge onto a concrete splash pad. The point of discharge shall have a 45 degree elbow and be equipped with a stainless steel screened end.

4.7 INTERIOR FLOOR

A concrete slab-on-grade shall be provided inside the base cone. The floor shall be a minimum of 6 inches thick, and reinforced with 6x6/W2.9 x W2.9 WWF. Isolation joints shall be provided at junctions with walls, columns, equipment or piping foundations.

4.8 PERSONNEL DOOR

A 36" by 80" access door with a flush threshold shall be located in the base of the pedestal cone. A step over threshold is not acceptable. The door shall be fabricated from steel plate with adequate stiffening and specifically designed for use with the tank. The access door will be equipped with handle, drip cover and dead bolt lock. Commercial hollow metal doors and frames are not acceptable.

4.9 IDENTIFICATION PLATE

A tank identification plate shall be mounted near the personnel door. The identification plate shall be corrosion resistant and contain the following information.

- A Tank Contractor
- B Contractor's project or file number
- C Tank capacity
- D Height to High Water Level
- E Date erected

PART 5 - GUARANTEE

- 5.1 The Contractor shall guarantee the structure, appurtenant equipment and accessories provided under this Section against defective design, workmanship, or materials for a period of one year from the date of Substantial Completion. If notified within this period, the Contractor shall repair any defects caused by faulty design, workmanship, or material furnished under these specifications at no cost to the Owner. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed. Defects caused by damaging service conditions, such as electrolytic, chemical, or abrasive, are not covered by this guarantee.

- 5.2 All guarantees from any manufacturer or installer of materials, equipment and accessories not manufactured by the tank manufacturer and that are provided under this Section, shall be obtained by the Contractor for the benefit of the Owner and submitted to the Owner. Refer to Section 09902 PAINTING NEW ELEVATED WATER TANK concerning coatings guarantees.

END OF SECTION 13211

SECTION 16010 – ELECTRICAL REQUIREMENTS**PART 1 GENERAL****1.1 REFERENCES**

1. General: The work shall comply with the most recent standards or tentative standards as published at the date of the contract and as listed in this specification.
2. Related Sections: Additional Sections of the Documents which are referenced in this Section Include:
 - 1) Section 16400 - Low Voltage Distribution
 - 2) Section 16500 - Lighting

1.2 SUBMITTALS

1. General: The following shall be submitted. Materials and equipment will be approved based on the manufacturer's published data.
2. Detail Plans: Detail plans shall be submitted for approval and shall consist of a complete list of equipment and materials, including manufacturer's descriptive and technical data; catalog cuts; and any special installation instructions that may be required. Detail plans shall be submitted for all materials and equipment specified. Applicable schematic diagrams, equipment layout and anchorage shall be shown.
3. Test Reports: The label or listing of the Underwriters Laboratories, Inc. shall be submitted as evidence that the materials or equipment conform to the applicable standards of that agency.
4. Certificates of Compliance: For other than equipment and materials specified to conform to UL publications, a manufacturer's statement indicating complete compliance with the applicable Federal Specification, or standard of the ASTM, NEMA or other commercial standard, is acceptable.

1.3 QUALITY ASSURANCE

1. Standard Products: Materials and equipment shall be the standard catalog products of a UL listed manufacturer regularly engaged in the manufacture of the products that have been in satisfactory use for at least 2 years. All materials and equipment shall be in accordance with the ACSA Approved Products List included in section D of these Construction Standards
2. U.L. Listing: Equipment shall be constructed in a UL 508 and UL 913 listed controls manufacturing facility as applicable. The manufacturer shall provide certification of both ratings with submittals. The equipment shall bear the appropriate UL serialized label indicating the equipment supplied shall be constructed in accordance with the practices and requirements of UL.
3. Alternate Manufacturers: Alternate equipment must be approved by the Authority's Engineer. Any alternate equipment shall be noted as "alternate" when submittals are sent in for review.
4. Wiring: All wiring shall be minimum 600 volt UL type MTW or AWM and have a current carrying capacity of not less than 125% of the full load current. The conductors shall be in complete conformity with the National Electric Code, state, local and NEMA electrical standards. For ease of service and maintenance, all wiring shall be color coded. The wire color code shall be clearly indicated on all submittal and as-built drawings.

5. **Bundled Wire:** All control wiring shall be contained within wiring duct with covers as manufactured by Panduit or equal. Where dimensional constraints prevent the use of wiring duct, wires shall be bundled and tied not less than every three inches with nylon self-locking cable ties as manufactured by Panduit or equal. Every other cable tie shall be fastened to the enclosure door or inner device panel with a cable tie mounting plate with pressure tape. Where wiring crosses hinged areas such as when trained from the inner device panel to the enclosure door, spiral wrap shall be used.

1.4 DELIVERY, STORAGE AND HANDLING

1. **General:** Delivery, storage, and handling shall be the responsibility of the Contractor and at a minimum shall be conducted in accordance with the manufacturer's recommendations.

PART 2 PRODUCTS

2.1 PANEL BOARD

1. Shall be as indicated in Section 16400 - "Low Voltage Distribution".

2.2 LIGHTING

1. Shall be as indicated in Section 16500 - "Lighting".

2.3 CONDUCTORS AND CABLES

1. **General:** All conductors used in the wiring system shall be soft drawn copper wire, having a conductivity of not less than 98 percent of that of pure copper, with 600 volt rating, unless otherwise noted. Wire shall be as manufactured by Capital, General Cable, Triangle or approved equal. Unless otherwise indicated, wiring shall consist of insulated conductors installed in rigid metallic conduit.
2. **Conductor Types:** The conductor types shall be as follows, unless otherwise noted:
 - 1) Service entrance shall be type THHN or XHHW, rated at 90 degrees C.
 - 2) Feeders and branch circuits shall be type THW or THWN, rated at 75 degrees C.
 - 3) Control circuits shall be type TFF, rated at 60 degrees C.

2.4 CONDUIT

1. **Conduit:** Rigid conduit shall be galvanized rigid steel conduit or Intermediate Metal Conduit (IMC) with a minimum size of 3/4 inch unless otherwise noted. Exposed exterior conduit shall be PVC coated galvanized rigid steel, supported by PVC coated hardware with stainless steel fasteners. Underground conduit shall be Schedule 40 PVC. Flexible metal conduit shall be Liquid-Tight type, approved for continuous grounding, and shall be used only where approved by NFPA 70 and local codes. Conduit, couplings, and connectors shall be products of a reputable manufacturer, as manufactured by Allied Tube and Conduit, Triangle Conduit and Cable, National Electric, or approved equal.

Provide two 1 1/2 in. conduits for future exterior lighting, extending from the entrance panel through the slab on grade to a point 6 in. outside the foundation or support wall. Cap ends.

2.5 BOXES

1. **Outlet Boxes:** Outlet boxes shall be made of galvanized sheet steel unless otherwise noted or required by NFPA 70. Boxes shall be a minimum of 4 inches square, and shall be complete with the approved type of connectors and required accessories. Boxes shall be manufactured by Appleton, Raco, Steel City or

approved equal. Outlet boxes for exposed work shall be handy boxes with handy box covers unless otherwise noted. Outlet boxes located on the exterior in damp or wet locations or as otherwise noted shall be threaded cast aluminum device boxes such as Crouse-Hinds Type "FS" or "FD".

2. **Receptacle Boxes:** Wall receptacles shall be mounted approximately 18 inches above the finished floor (AFF) unless otherwise noted. All receptacle boxes shall be equipped with grounding lead which shall be connected to grounding terminal for the device. Receptacles shall be provided adjacent to the entrance panel and at three additional equally spaced locations along the interior wall, at upper landing, and at top of access tube.
3. **Switch Boxes:** Wall switches shall be mounted approximately 54 inches AFF unless otherwise noted. Where two or more switches are located, the switches shall be mounted in a gang outlet box with gang cover. Switches with pilot lights, motor starting switches and other special switches that will not conveniently fit under gang wall plates may be individually mounted.
4. **Lighting Fixture Boxes:** Lighting fixture outlet boxes shall be furnished with the necessary accessories to install the fixture. The supports must be such as not to depend on the outlet box supporting the fixture. The supports for the lighting fixture shall be independent of the ceiling system.
5. **Pull Boxes:** Pull boxes shall be installed at all necessary points, whether indicated on the plans or not, to prevent injury to the insulation or other damage that might result from pulling resistance or other reasons necessary for proper installation. Minimum box dimensions shall not be less than NFPA 70 requirements and shall be increased if necessary for practical reasons or where required to fit a job condition. Where boxes are used in connection with closed conduit, plain covers attached to the box with a suitable number of counter-sunk flat head machine screws shall be used. Pull boxes shall be constructed of galvanized sheet steel, minimum 12 gauge.

2.6 RECEPTACLES

1. **Heavy Duty Receptacles:** Receptacles located outside or in wet locations shall be heavy duty, duplex, NEMA 5-15R, 15 amperes, 125 volts, with spring door gasketed covers similar to Crouse Hinds W1RD-1.
2. **Interior Receptacles:** Receptacles shall be specification grade, UL listed, NEMA 5-15R, brown duplex, 15 ampere, 125 volts AC, similar to Leviton Model 5262.

2.7 ELECTRICAL SURGE PROTECTION

1. Surge protection shall be installed to protect electrical components in accordance with minimum International Society of Automation (ISA) standards.
 - a) All field analog instruments shall be protected by surge suppression on the instrument.
 - b) All analog signals coming from instrumentation to the main panel box shall be protected with surge suppression.
 - c) All digital input/output signals and instrumentation shall be protected by inline fuses.
 - d) Transient voltage surge suppression (TVSS) shall be installed at the main power feed and in the main control panel.
 - e) Insulation and grounding of suppressors shall be in conformance with manufacturers recommendations.

PART 3 EXECUTION

3.1 INSTALLATION

1. **General:** Equipment specified in this section shall be installed in accordance with the manufacturer's recommendations and must meet all applicable requirements of NFPA 70 and NFPA 101, unless more stringent requirements are indicated herein or shown. The installations shall comply with all applicable laws and ordinances in effect at the building site, with applicable regulations of the National Electric Code and with regulations of the utility company furnishing power to the site. All systems shall be completely assembled, tested, adjusted, and demonstrated to be ready for operation prior to acceptance by the Authority.
2. **Field Service:** The manufacturer of valving system shall provide the services of a factory trained service technician for a minimum of two eight-hour days of field service to inspect the installed equipment, supervise start-up of the equipment and train the OWNER's personnel in the proper maintenance and operation of the equipment.

3.2 INSTALLATION OF CONDUCTORS AND CABLES

1. **Sizes:** Branch-circuit conductors shall be not smaller than 12 AWG. Conductors for 120-volt branch circuits more than 100 feet long and conductors for 277-volt branch circuits more than 230 feet long, from panel to load center, shall be increased one size to prevent excessive voltage drop. Class 1 remote control and signal circuit conductors shall be not smaller than 14 AWG. Class 2 remote control and signal circuit conductors shall be not smaller than 16 AWG. Gages of all wiring shall be adequate to meet the requirements of NFPA 70.
2. **Wiring Methods for Cable Systems:** Cables shall be installed concealed behind ceiling or wall finish where practical. Cables shall be threaded through holes bored on the approximate centerline of wood members; notching of surfaces will not be permitted. Sleeves shall be provided through bond beams of masonry-block walls for threading cables through hollow spaces. Exposed cables shall be installed parallel or at right angles to walls or structural members. In rooms or areas not provided with ceiling or wall finish, cables and outlets shall be installed so that a room finish may be applied in the future without disturbing the cable or resetting the boxes. Exposed nonmetallic-sheathed cables less than 4 feet above floors shall be protected from mechanical injury by installation in conduit or tubing.
3. **Aluminum Cables and Conductors:** **Aluminum conductors shall only be permitted on service entrance.** Aluminum conductors shall have ampacity of not less than the copper conductors. Wire connectors of insulating material or solderless pressure connectors properly taped shall be utilized for all splices. Pressure connectors for aluminum conductors shall have tinned aluminum bodies. Aluminum contact surfaces of conductors and connectors shall be cleaned and covered with antioxidant compound prior to making the connections.

3.3 INSTALLATION OF RACEWAYS

1. **Conduit Types:** Only metal conduits will be permitted when required for shielding or other special purposes indicated, or when required by conformance to NFPA 70. Nonmetallic conduit and tubing may be used in damp, wet or corrosive locations, when permitted by NFPA 70 and the conduit or tubing system is provided with appropriate boxes, covers, clamps, screws or other appropriate type of fittings. Except as otherwise specified, Intermediate Metal Conduit (IMC) may be used as an option for rigid steel conduit in areas as permitted by NFPA 70.
2. **Conduit Sizes:** Conduit shall be of ample size to permit the ready insertion and withdrawal of conductors without abrasion. Conduit sizes shown are based on the use of copper conductors with insulation types as described in Part 2 Products.

3. Conduit Installation: All joints shall be cut square, reamed smooth and drawn up tight. All bends shall be free of dents or flattening. Conduit throughout the project shall be securely supported to the building structure in a neat and workmanlike manner. Conduits shall be continuous from outlets to cabinets, panels, junction or pull boxes, and shall enter and be secured at all such enclosures so that each system shall be electrically continuous throughout. Raceways shall be concealed within finished walls, ceilings, and floors unless otherwise permitted by Authority.
4. Exposed Raceways: Exposed raceways or conduit shall be installed parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings.
5. Changes in Direction of Runs: Changes in direction of runs shall be made with symmetrical bends or cast-metal fittings. Field-made bends and offsets shall be made with an approved hickey or conduit-binding machine. Crushed or deformed raceways shall not be installed. Trapped raceways in damp and wet locations shall be avoided where possible. Care shall be taken to prevent the lodgment of plaster, dirt, or trash in raceways, boxes, fittings and equipment during the course of construction. Clogged raceways shall be entirely freed of obstructions or shall be replaced.
6. Underground and Below Slab-on-Grade Conduit: All electrical wiring below slab-on-grade shall be protected by a conduit system. No conduit system shall be installed horizontally within concrete slabs-on-grade. Conduit passing vertically through slabs-on-grade shall be rigid steel or IMC. Rigid steel or IMC conduits installed below slab-on-grade or in the earth shall be field-wrapped with 0.010-inch thick pipe-wrapping plastic tape applied with a 50 percent overlay, or shall have a factory-applied polyvinyl chloride, plastic resin, or epoxy coating system.
7. Conduit in Slabs: Conduits shall be installed as close to the middle of concrete slabs as practical without disturbing the reinforcement. Outside diameter shall not exceed 1/3 of the slab thickness, and conduits shall be spaced not closer than 3 diameters on centers except at cabinet locations where the slab thickness shall be increased as necessary.
8. Conduit Stub-ups: Conduits stubbed up through concrete floors for connections to freestanding equipment shall be provided with a short elbow and an adjustable top or coupling threaded inside for plugs, set flush with the finished floor. Wiring shall be extended in rigid threaded conduit to the equipment, except that where required, flexible conduit may be used 6 inches above the floor. Screwdriver-operated threaded flush plugs shall be installed in conduits from which no equipment connections are made to suit the devices installed.
9. Supports: Metallic conduits and tubing shall be securely and rigidly fastened in place at intervals of not more than 10 feet and within 3 feet of boxes, cabinets, and fittings, with approved pipe straps, wall brackets, conduit clamps, conduit hangers, threaded C-clamps, or ceiling trapeze. C-clamps or beam clamps shall have strap or rod-type retainers. Rigid plastic conduits (if permitted as a wiring method) shall be supported as indicated above, except that they will be supported at intervals as indicated by NFPA 70. Loads and supports shall be coordinated with supporting structure to prevent damage or deformation to the structures, but no load shall be applied to joist bridging. Fastenings shall be by wood screws or screw-type nails to wood; by toggle bolts on hollow masonry units; by expansion bolts on concrete or brick; by machine screws, welded threaded studs, heat-treated or spring-steel-tension clamps on steel work. Nail-type nylon anchors or threaded studs driven in by a powder charge and or machine screws. Raceways or pipe straps shall not be welded to steel structures. Holes cut to a depth of more than 1-1/2 inches in reinforced concrete beams or to a depth of more than 3/4 inch in concrete joists shall avoid cutting the main reinforcing bars. Holes not used shall be filled. In partitions of light steel construction, sheet-metal screws may be used. Conduit shall not be supported using wire or nylon ties. Raceways shall be installed as a complete system and be independently supported from the structure. Supporting means will not be shared between electrical raceways and mechanical piping or ducts and shall not be fastened to hung ceiling supports. Conduits shall be fastened to all sheet-metal boxes and cabinets with two locknuts where required by NFPA 70, where insulating bushings are used, and where bushings cannot be brought into firm contact with the box; otherwise, a single locknut and bushing may be used. Bushings shall be installed on the ends

of all conduits and shall be of the insulating type where required by the NFPA 70. Threadless fittings for electrical metallic tubing shall be of a type approved for the conditions encountered. A pull wire shall be inserted in each empty raceway in which wiring is to be installed by others if the raceway is more than 50 feet in length and contains more than the equivalent of two 90 degree bends, or where the raceway is more than 150 feet in length. The pull wire shall be of No.14 AWG zinc-coated steel, or of plastic having not less than 200-pound tensile strength. At least 10 inches of slack shall be left at each end of the pull wire.

10. Communication Raceways: Communication raceways indicated shall be installed in accordance with the previous requirements for conduit and tubing and with the additional requirements that no length of run shall exceed 50 feet for 1/2 inch and 3/4 inch sizes, and 100 feet for 1 inch or larger sizes, and shall not contain more than two 90 degree bends or the equivalent. Additional pull or junction boxes shall be installed to comply with these limitations whether or not indicated. Inside radii of bends in conduits of 1 inch size or larger shall be not less than ten times the nominal diameter.

3.4 BOXES AND SUPPORTS

1. General: Boxes shall be provided in the wiring or raceway systems wherever required for pulling of wires, making connections, or mounting of devices or fixtures. Boxes for metallic raceways, 4 inches by 4 inches nominal size and smaller, shall be of the cast-metal hub type when located in normally wet locations, when flush and surface mounted on outside of exterior surfaces, or when located in hazardous areas. Large size boxes shall be NEMA 4 or as shown. Boxes in other locations shall be sheet steel except that aluminum boxes may be used with aluminum conduit, and nonmetallic boxes may be used with nonmetallic sheathed or metallic-armored cable system, when permitted by NFPA 70. Junction boxes shall not be permitted in wet wells.
2. Mounting: In partitions of light steel construction, bar hangers with 1 inch long studs, mounted between metal wall studs or metal stud "C" brackets snapped on and tab-locked to metal wall studs, shall be used to secure boxes to the building structure. When "C" brackets are used, additional box support shall be provided on the side of the box opposite the brackets. The edge of boxes for electrical devices shall be flush with the finished surfaces in gypsum, plasterboard installation. Boxes for mounting lighting fixtures shall be not less than 4 inches square except smaller boxes may be installed as required by fixture configuration, as approved. Boxes installed for concealed wiring shall be provided with suitable extension rings or plaster covers, as required. The bottom of boxes installed in masonry-block walls for concealed wiring shall be flush with the top of a block to minimize cutting of blocks, and boxes shall be located horizontally to avoid cutting webs of block. Indicated elevations are approximate. Unless otherwise indicated, boxes for wall switches shall be mounted 54 inches above finished floors. Cast-metal boxes installed in wet locations and boxes installed flush with the outside of exterior surfaces shall be gasketed. Separate boxes shall be provided for flush or recessed fixtures when required by the fixture terminal operating temperature, and fixtures shall be readily removable for access to the boxes unless ceiling access panels are provided. Boxes and supports shall be fastened to wood with wood screws or screw-type nails of equal holding strength, with bolts and metal expansion shields on concrete or brick, with toggle bolts on hollow masonry units, and with machine screws or welded studs on steel work. Threaded studs driven in by powder charge and provided with lockwashers and nuts, or nail-type nylon anchors may be used in lieu of expansion shields, or machine screws. In open overhead spaces, cast-metal boxes threaded to raceways need not be separately supported except where used for fixture support; cast-metal boxes having threadless connectors and sheet metal boxes shall be supported directly from the building structure or by bar hangers. Hangers shall not be fastened to or supported from joist bridging. Where bar hangers are used, the bar shall be attached to raceways on opposite sides of the box and the raceway shall be supported with an approved type fastener not more than 24 inches from the box. Penetration of more than 1 - 1/2 inches into reinforced-concrete beams or more than 3/4 inches into reinforced-concrete joists shall avoid cutting any main reinforcing steel.
3. Boxes for Use with Raceway Systems: Boxes for use with raceway systems shall be not less than 1-1/2 inches deep except where shallower boxes required by structural conditions are approved. Sheetmetal boxes for other than lighting fixtures shall be not less than 4 inches square except that 4 inches by 2 inches

boxes may be used where only one raceway enters the outlet. Minimum size boxes for telephone outlets shall be not smaller than 4-1/2 inches square and 3-1/2 inches deep.

4. Boxes for Use with Cable Systems: Boxes for use with cable systems shall be not less than 3 inches x 2 inches sectional boxes, 2 inches deep.
5. Pull Boxes: Pull boxes of not less than the minimum size required by NFPA 70 shall be constructed of aluminum or galvanized sheet steel, except where cast-metal boxes are required in locations specified above. Boxes shall be furnished with screw-fastened covers. Where several feeders pass through a common pull box, the feeders shall be tagged to indicate clearly the electrical characteristics, circuit number, and panel designation.

3.5 DEVICE PLATES

1. General: One-piece type device plates shall be installed for all outlets and fittings. Screws shall be of metal with countersunk heads, in a color to match the finish of the plate.
2. Mounting: Plates shall be installed with all four edges in continuous contact with finished wall surfaces without the use of mats or similar devices. Plaster fillings will not be permitted. Plates shall be installed with an alignment tolerance of 1/16 inch. The use of sectional-type device plates will not be permitted. Plates installed in wet locations shall be gasketed and provided with a hinged, gasketed cover, unless otherwise specified.

3.6 GROUNDING

1. General: Noncurrent-carrying metal parts of electrical equipment shall be effectively grounded by bonding to the ground bus provided in the service equipment or panelboard.
2. Ground Wire: A green ground wire shall be furnished regardless of the type of conduit.

END OF SECTION

SECTION 16400- LOW-VOLTAGE DISTRIBUTION**PART 1 GENERAL****1.1 SUMMARY**

1. Work includes furnishing and installing switches, panelboards, other devices for the distribution of electric power systems. Plans may be considered schematic only and do not show all appurtenances which may be necessary for a complete system and compliance with all codes.

1.2 SUBMITTALS

1. Materials and equipment will be approved based on the manufacturer's published data.
2. Detail drawings shall be submitted for approval and shall consist of a complete list of equipment and materials, including manufacturer's descriptive and technical data; catalog cuts; and any special installation instructions that may be required. Detail drawings shall be submitted for all materials and equipment specified. Drawings shall show applicable schematic diagrams, equipment layout and anchorage.
3. The label or listing of the Underwrites Laboratories, Inc., will be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this label or listing, the Contractor shall submit a statement from a nationally recognized, adequately equipped testing agency indicating that the items have been tested in accordance with required procedures and that the materials and equipment comply with all contract requirements. However, materials and equipment installed in hazardous locations must bear the UL label unless the Engineer specifically approves the data submitted from other testing agency in writing. For other than equipment and materials specified to conform to UL publications, a manufacturer's statement indicating complete compliance with applicable Federal Specification, or standard of the American Society for Testing and Materials, National Electrical Manufacturers Association or other commercial standard, is acceptable.

1.3 QUALITY ASSURANCE

1. Materials and equipment shall be installed in accordance with recommendations of the manufacturer and as shown.
2. The installation shall conform to the requirements of NFPA 70 and NFPA 101, unless more stringent requirements are indicated herein or shown.

1.4 DELIVERY, STORAGE, AND HANDLING

1. Delivery, storage, and handling shall be the responsibility of the Contractor and at a minimum shall be conducted in accordance with the manufacturer's recommendations.

PART 2 PRODUCT**2.1 SWITCHES**

1. Disconnect Switches: Disconnect switches shall be general duty, non-fusible safety switches, voltage ratings as required, ampere ratings as required, similar to Square D Cat. No. DU321RB. Disconnect switches for mounting outside or in wet areas shall have NEMA 4 enclosures.

2.2 CIRCUIT BREAKERS

1. Circuit Breakers: Circuit breakers shall be plug-on, quick-make, quick-break, thermal-magnetic, trip indicating. All multi-pole breakers shall have common trips. Branch circuit breakers feeding convenience outlets shall have sensitive instantaneous trip settings of not more than 10 times the trip rating of the breaker, to prevent repeated arcing shorts. Single pole 15 and 20 ampere circuit breakers shall be UL listed as "Switching Breakers" at 120 Volts and shall carry the SWD marking.
2. Ground Fault Protection: UL Class A (5 milliamperes sensitivity) ground fault circuit protection shall be provided on 120-Volt receptacle branch circuits as specified on the plans. This protection shall be an integral part of the branch circuit breaker, which also provides overload and short circuit protection for branch circuit wiring. Tripping of a branch circuit breaker containing ground fault circuit interruption shall not disturb the feeder circuit to the panelboard. A single pole circuit breaker with integral ground fault circuit interruption shall require no more panelboard circuit space than a conventional single pole circuit breaker.
3. Lock-Out Devices: Circuit breakers to all motors or drives greater than 1 HP shall be equipped with devices suitable for pad lock attachment to lock breaker in the power off state.

2.3 CIRCUIT BREAKER PANEL

1. Panelboards: Minimum 200 amp panelboard shall be provided at tank and located within the tank pedestal. Panelboard shall be service entrance rated with Nema 4 steel enclosure. Panelboards shall be Underwriters Laboratory (UL) listed and shall be similar to Square D type NQO.
2. Bussing: Panelboard bussing shall be such that any two adjacent single-pole breakers are connected to opposite polarities in such a manner that two-pole breakers can be installed in any location. All current carrying parts of the buss assembly shall be plated.

PART 3 EXECUTION

3.1 INSTALLATION

1. Equipment specified in this section shall be installed in accordance with the manufacturer's recommendations at the locations as shown on the plans.

END OF SECTION

SECTION 16500 - LIGHTING**PART 1 GENERAL****1.1 DESCRIPTION**

1. Work Included: Furnish and install all equipment required for providing the lighting.

1.2 REFERENCES

1. General: The work shall comply with the most recent standards or tentative standards as published at the date of the contract and as listed in this specification using the abbreviation shown.
2. National Fire Protection Association (NFPA):
 - 1) 70 National Electrical Code

1.3 SUBMITTALS

1. Shop Plans: Shop plans for lighting fixtures shall indicate each type together with manufacturer's name and catalog number. No fixtures shall be delivered to the job until authorized by the ENGINEER.

PART 2 PRODUCTS**2.1 LIGHTING FIXTURES**

1. General: Light fixtures shall be provided and installed as shown on the plans and specified herein. Spare lamps shall be provided of adequate number and type to allow complete replacement of lamps in two of each fixture unit type provided.
2. Interior Lights: Interior lights fixtures shall be enclosed and gasketed, 150-watt incandescent type with aluminum body, clear glass globe and guard. Aluminum mounting hardware and brackets shall be provided to suit the installation. Incandescent light fixtures shall be provided 10 ft. above the slab on grade at equal horizontal intervals along the support wall not exceeding 20 ft. These lights shall be controlled by a single switch located 3 ft. 6 in. above the slab on the interior wall, adjacent to the open side of the access door.

Incandescent light fixtures shall also be provided adjacent to the access ladder on the support wall at vertical intervals not exceeding 25 ft. The lower light shall be placed 10 ft. above the floor slab and may be accommodated by a base light if it is located within 5 ft. of the ladder. The upper ladder light shall be placed above the upper platform. A light shall be provided 8 ft. above any intermediate platform. Lights shall be provided at the top and bottom of the interior access tube. These lights shall be controlled by a single switch located 3 ft. 6 in. above the slab at the base of the ladder.
3. Exterior Lights: Exterior door light fixtures shall be enclosed and gasketed, 100-watt high pressure sodium wall mount type with aluminum base housing, polycarbonate cover, prismatic refractor, internal reflector and low temperature ballast. Fixtures shall be vandal resistant and provided with a photo control. Fixtures shall be provided above the personnel access door and on both sides of the vehicle door.
4. Obstruction Lighting: The obstruction light shall be centrally located on the roof of the tank above all permanent installations. It shall be a steady burning, dual fixture type with a lamp-out relay switch. The fixture shall be weather sealed, corrosion resistant, with aluminum base and housing. Red globes with 116-watt clear traffic signal lamps rated at 8000 hour life shall be provided. A pilot light located near the electrical panel shall be provided to indicate when the primary bulb has failed. Obstruction lighting shall be provided in accordance with FAA standards.

PART 3 EXECUTION**3.1 INSTALLATION**

1. General: All lighting fixtures shall be installed as indicated on the plans, in accordance with manufacturer's recommendations and must meet all applicable requirements of NFPA 70.

END OF SECTION

APPENDIX A

ACSA APPROVED PRODUCTS LIST

D. List of Approved Products			
<u>Water Line Pipe, Fittings and Appurtenances</u>		Other materials proposed for use must receive approval from the Augusta County Service Authority. It shall be the Developer's responsibility to provide documentation which demonstrates an alternate item is "equal" to the item found on the Approved Products List	
<u>Ductile Iron Pipe & Fittings</u>	<u>Manufacturer</u>	<u>Model/Series</u>	
<u>Pipe</u>	American (ACIPCO)		
	Atlantic States Cast Iron Pipe Co.		
	Clow		
	Griffin Pipe Products Co.		
	US Pipe		
<u>Fittings</u>	Clow		
	Griffin		
	Sigma		
	Star Pipe Products		
	Tyler Union		
	US Pipe		
<u>Joint Restraint</u>			
<u>Mechanical Joint Restraint</u>	EBA Iron Inc.	Mega-Lug Series 1100	
	Ford	Series 1300	
	Romac Industries	Grip Ring, Roma-Grip	
	Sigma Co.	One-Lok - D-SLDE	
	Tyler Union	TUF-Grip	
	Star Pipe Products	Stargrip Series 3000, 3000S, Starlug	
<u>Push-On Joint Restraint</u>	EBA Iron Co.	Mega-Lug Series 1700	
	Ford	Series 1390	
	Romac Industries	611	
	Sigma	SSLDH	
	Star Pipe Products	Stargrip Series 3100P, 3100S	
<u>Internal Restraining Gasket*</u>	US Pipe	Field Lok 350	
	Or as required by pipe manufacturer & approved by ACSA		
	*All joints containing these gaskets must be marked with warning tape with the text "LOCKING GASKET"		
<u>Casing Pipe End Seals</u>	Cascade	Style CCES	
	APS	Models AM, AC, AW	
	CCI-Pipeline Systems Inc. (Precision Pipe and Products Inc.)	Models ESW, ESC	
<u>Gate Valves</u>	American Flow Control (American Darling)	2500	
	AVK	45	
	Clow	2639	
	Kennedy	KS-RW	
	*Mueller	A-2361-20 (*for 14" & larger only)	
<u>Butterfly Valves</u>	Bray		
	DeZurik		
	Kennedy		
	M&H		
<u>Plug Valves</u>	DeZurik		
	Kennedy		
	M&H		
<u>Valve Boxes & Lids (2 piece boxes slip/sliding type)</u>	Bingham & Taylor	Fig. 4908	
	Capitol Foundry	Standard 2 pc Slide Type	
	Tyler Union	Series 6855	
	East Jordan Iron Works	Series 8555	

	<u>Manufacturer</u>	<u>Model/Series</u>	
<u>Fire Hydrants</u>			
	American Flow Control (American Darling)	B-84-B-5	
	AVK	Model 27	
	Clow	Medallion F25-45-5.25	
	Kennedy Valve Co.	K-81 D - 5.25	
	Mueller	A-423	
<u>Air Release Valves</u>			
	Cla-Val	Series 34	
	Crispin Valve	M10	
	Val-Matic	15A	
<u>Blow Off Assembly 2"</u>			
	Kupferle	Mainguard 78	
	Mueller	A-412	
<u>Water Metering Equipment</u>			
<u>Small Valves 1/2" - 2-1/2"</u>			
	AY McDonald	2035 Series	
	Kennedy	Bronze	
	Milwaukee	1151	
	Nibco	T-113	
	Stockham (Crane Energy)	B-100	
<u>Small Ductile Iron Pipe & Fittings - 1-1/2" - 3"</u>			
	Harco	(Internal epoxy coating and external bituminous tar exterior coating required)	
<u>Copper Fittings & Adaptors - 3/4" x 1"</u>			
	AY McDonald	(compression fittings only)	
	Mueller		
<u>Corporation Stop - 3/4" - 2"</u>			
	Ford	F1000-Q Series	
	Mueller	H15008	
<u>Meter Setter</u>			
5/8", 3/4", 1"	AY McDonald	Standard Yoke Bar	
	Ford	500 Series	
	Mueller	8B	
	AY McDonald	08UTM (U-Branch for dual connections in single box)	
1-1/2"	Ford 70 Series	VBB76-12B-11-66-NL	
	AY McDonald	20B615WWFF 665	
2"	Ford 70 Series	VBB77-12B-11-77-NL	
	AY McDonald	20B715WWFF 775	
<u>Angle Valve</u>			
5/8", 3/4", 1"	AY McDonald	4642BYT	
<u>Expander Wheel</u>			
	AY McDonald	4139 Series	
	Ford	EC Series	
<u>Box & Covers</u>			
	<u>Box Manufacturer</u>	<u>Cover Manufacturer</u>	<u>Model/Series</u>
5/8" - 1" meter	Carson/MidStates		MS182420-NK (SKU No. 00182038)
	DFW		DFW-182424FTP
		Ford	A-32-T
		AY McDonald	74M-32A-T
Dual 5/8" meters	Carson/MidStates		MS182420-NK (SKU No. 00182038)
	DFW		DFW-182424FTP
		Ford	A-32-T
		AY McDonald	74M-32A-T
1 1/2"-2" meter	Carson/MidStates		MS3630B-NK
	DFW		DFW-3630
		Ford	A-3-T with EXT-5
		AY McDonald	74M-3A-T with 74MX5

	<u>Manufacturer</u>	<u>Model/Series</u>		
<u>Meter (all with touch read)</u>				
5/8" - 1"	Invensys	SR II Positive Displacement		
1 1/2" - 10"	Invensys	OMNI Series		
<u>Type K Copper Tubing</u>				
3/4" - 1"	Mueller Industries			
	Howell Metal			
	Cambridge-Lee (IUSA)			
<u>Plastic Water Service Tubing (PE)</u>				
	(Under evaluation by ACSA)			
<u>PVC Pipe, Fittings, Valves</u>				
<u>PVC Schedule 80 - 1/2" - 16"</u>				
	Charlotte Pipe & Foundry			
	Harco			
	Harvel Plastics			
	National Pipe & Plastics			
	Spears			
<u>Backflow Preventer (models as designated by ACSA Cross-Connection Control Program)</u>				
	AMES			
	Conbraco (Apollo)			
	Febco			
	Hersey (Mueller)			
	Watts			
	Wilkins (Zurn)			
<u>Pressure Reducing Valves (PRVs) and Control Valves</u>				
	Cla-Val			
	Watts	(sizes 3" and smaller, lead free only)		
<u>Pipe Spacers in Casing (304 SS or HDPE)</u>				
	Cascade Waterworks Manufacturing	CCS		
	CCI-Pipeline Systems Inc. (Precision Pipe and Products Inc.)	CSS		
	RACI			
	BWM	SS		
<u>Repair Clamps and Dresser Couplings</u>				
	Ford			
	Romac			
	Smith Blair			
	Hymax (by TPS)			
<u>Tapping Saddle (all double strap)</u>				
	Ford	FS 202		
	Mueller	DR2S		
	Romac	202S		
	Smith Blair	317		
<u>Tapping Sleeve (all stainless steel)</u>				
	Ford	FAST		
	Mueller	H-304SS		
	Romac	SST, STS420		
	Power Seal	3490		
<u>Tapping Valves</u>				
	American Flow Control	2500 series		
	AVK	45 series		
	Clow	2639 series/model F-6114		
	Kennedy	KS-RW		
	*Mueller	T-2361-16 (*for 14" & larger only)		

	<u>Manufacturer</u>	<u>Model/Series</u>		
<u>Underground Pipe Insulation</u>				
	Pittsburgh Corning	FOAMGLAS Insulation		
	NOMACO	Arcticflex		
<u>Water Sampling Station</u>				
	Kupferle	Eclipse #88 or MainGuard #94WM		
<u>Sanitary Frostproof Yard Hydrants</u>				
	Freeze Flow by Hoepfner	Executive Hydrant		
<u>Sanitary Sewer Pipe and Fitting Materials</u>				
<u>PVC Pipe & Fittings (Non Pressure)</u>				
<u>PVC SDR 35 - 4"-15"</u>				
	Certaineed Pipe			
	Diamond Plastics Corp.			
	National Pipe & Plastics			
	North American Pipe Corporation			
<u>PVC C900 Water Pipe - (can be used through casing with joint restraint for sanitary sewer)</u>				
	Ipex			
	Diamond Plastics Corp.			
	National Pipe & Plastics			
	North American Pipe Corporation			
<u>PVC Fittings</u>				
	Harco Fittings			
	Multi Fitting			
<u>Repair Fittings and Clean-outs</u>				
	Fernco			
	Geneco (clean-outs)			
<u>Ductile Iron Pipe and Fittings (Force main, deep installation, other special conditions - Class 50)</u>				
<u>Pipe</u>				
	American (ACIPCO)			
	Atlantic States Cast Iron Pipe Co.			
	Clow			
	Griffin Pipe Products Co.			
	US Pipe			
<u>Fittings</u>				
	Clow			
	Griffin			
	Sigma			
	Star Pipe Products			
	Tyler Union			
	US Pipe			
<u>Sewer Connection Saddle</u>				
	Romac	CB (ACSA approved for use only on 4-6" connections)		
	Inserta Fittings Co.	Inserta Tee		

	<u>Manufacturer</u>	<u>Model/Series</u>		
<u>Manholes and Appurtenances</u>				
<u>Pre-Cast Reinforced Concrete Manholes</u>				
	Concrete Pipe & Precast (CP&P) (formerly Hanson Pipe / Americast)			
	Winchester Building Supply (WBS)			
	Tindall Corporation			
<u>Frame and Cover, Riser Rings</u>				
			<u>Cover</u>	<u>Frame</u>
	East Jordan Iron Works, Inc.	1040C (Standard)	1040ACLGS with cam locks (Watertight)	1045Z
	U. S. Foundry & Mfg. Corp.	CMH1313AUGUSTA	SP-CMH1313CLWT (Watertight)	USF 755
<u>Cleanout Frame and Cover</u>				
	East Jordan Iron Works, Inc.	1566A		1566Z
	Capitol Foundry	PCO-1*MOD (non-traffic areas only)		
<u>Concrete Manhole Connectors (flexible boot)</u>				
	A-LOK Products, Inc.	Z-LOK Connector		
	NPC, Inc.	Kor-N-Seal		
	Press-Seal Gasket Cor.	Press-Boot		
		PSX Direct Drive		
<u>Grout</u>				
	Preco Industries, LTD	Preco-Patch		
	Master-Flow	713 Grout		
<u>Butyl Resin Sealers</u>				
	Concrete Products Supply Co.	CPS-210		
	Concrete Sealants, Inc.			
<u>Sewer Combination Air Valves</u>				
	Cla-Val	36-WW		
	Crispin Valve	US Series		
	Val-Matic	801A		
<u>Sewer Backflow Preventer Valves (for vented manholes only)</u>				
	Josam	67100A		
		(or approved equal to the above)		
<u>Pump Stations (water and sewer)</u>				
<u>Sewer Pumps</u>				
	Flygt Submersible			
	Gorman-Rupp			
<u>Sewer Flow Meters (magnetic)</u>				
	Foxboro (Invensys)			
	Emco			
	Rosemount			
<u>Float Switches (all mercury free)</u>				
	Flygt ENM			
	Conery Mfg., Inc.			
<u>Controls & Electrical</u>				
	SquareD			
	Cutler-Hammer			
	Allan-Bradley			
<u>Variable Frequency Drive's (VFD'S)</u>				
	SquareD			
	Cutler-Hammer			
	Siemens			
	Benshaw			
	Allan-Bradley			

	<u>Manufacturer</u>	<u>Model/Series</u>		
<u>Hydro-Tanks</u>				
	Highland Tank			
	Adamson Global Technology Corporation			
<u>Pre-Fab Buildings</u>				
	Clear Flow Co.	Stonewall		
<u>Access Hatches (Load rating shall be H20 unless otherwise approved)</u>				
	Bilco Type K or KD			
	Halliday			
	E-Z Set Hatch Co.			
<u>Chlorine Feed Equipment</u>				
	Regal Gas			
<u>Chemical Feed Pumps</u>				
	LMI			
	Blue-White			
<u>Water Booster Pumps</u>				
	AMT (Gorman Rupp)			
	Goulds			
	Grundfos			
	Fairbanks Morse			
<u>Well Pumps</u>				
	Goulds			
	Grundfos			
<u>Vertical Turbine Pumps</u>				
	Fairbanks Morse			
	Goulds			
<u>Pump Motors</u>				
	Baldor			
	Franklin			
	Lincoln Electric			
	US Motor			
<u>SCADA - Pressure, Level and Temperature Transmitters</u>				
	Rosemount			
	Kobold			
<u>I/O Boards and Processors</u>				
	As supplied by Westerman Companies or approved equal			
<u>Radios and Antenna</u>				
	As supplied by Westerman Companies or approved equal			
<u>Antenna Pole/Tower</u>				
	As supplied by Shenandoah Tower or approved equal			
<u>All Stations Shall be Equipped With the Following Purchased from Westerman Co.</u>				
	1 - CT4000 Front End Processor			
	1 - CA1511 Modem			
	1 - I/O-4480 Status Card			
	1 - I/O 4240 Analog Input Card			
	1 - 10-AH Battery			
	1 - 150-15 Power Supply			
	1 - Metrocom Radio			
	1 - MFB-9157 Antenna			
	1 - 102A Phase Moniter			
	7 - AC Input Relays			
	2 - DC Input Relays			
	1 - 41003 Surge Protector			
	1 - 24"x30" NEMA 4 Box			
	1 - 25' Telephone Pole for Antenna			
	7/8" Coaxial Cable to Reach from the Control Panel to the Antenna			

APPENDIX B

GEOTECHNICAL REPORT FOR TANK SITE



Telephone (540) 966-4795
Fax (540) 992-4234

686 Lee Highway South
Roanoke, Virginia 24019

SUBSURFACE INVESTIGATION

MILL PLACE

ELEVATED WATER STORAGE TANK

AUGUSTA COUNTY, VIRGINIA

Geotechnics, Inc.

Commission No. 4511

28 December 2013

SUBSURFACE INVESTIGATION
MILL PLACE
ELEVATED WATER STORAGE TANK
AUGUSTA COUNTY, VIRGINIA

General -

Three (3) test borings were made at the above-identified site on the 19th of December 2013 with a CME-45 trailer-mounted power auger using six (6) inch diameter hollow-stem continuous flight augers. Standard Penetration tests were made at five (5) foot intervals or less, with an automatic SPT hammer. A track dozer was required to access the proposed water tank site.

The tank center was staked in the field, prior to our arrival on-site. Borings No. 1, 2 and 3 were drilled about fourteen (14) feet northwest, north and southwest of the tank center; respectively.

All soil samples were retained by Geotechnics and may be examined at this office, upon request, for a period of sixty (60)

days from the date of this report by the Owner, his Engineer, Contractors or other authorized persons.

Detailed descriptions of the materials encountered and recorded groundwater measurements are shown on the accompanying boring logs.

Location -

The proposed Water Storage Tank Lot is located on the ridge top at the west end of the Mill Place Development in Augusta County, Virginia; and just east of the Green Hills Industrial Park complex, as shown on the attached site sketch. The tank site proper is essentially flat, at roughly Elevation 1368.

General Geology -

The proposed water tank site is located on the Staunton 7.5 Minute USGS Topographic Quadrangle, which has been mapped in detail by Eugene K. Rader (*Geology of the Staunton, Churchville, Greenville and Stuarts Draft Quadrangles, Virginia*, Virginia Division of Mineral Resources Report of Investigations 12). The geologic mapping indicates the water tank site is underlain by the Martinsburg Formation of Ordovician Age. The Martinsburg consists of olive-green to gray shale and fine-grained thin-

bedded sandstone. The bedrock reportedly strikes or trends northeast-southwest and dips steeply to the southeast.

Soils -

Soils identified in the test borings include topsoil, colluvium and residuum. A 0.5 foot to 0.7 foot thickness of topsoil was penetrated at the ground surface in all three (3) borings.

Colluvium (soil transported and deposited by gravity) was encountered beneath the topsoil in all borings, and varied in thickness from about 1.5 feet to 1.9 feet. The colluvium was described as tan and reddish-tan silty clay.

Residuum (material derived from the in-place weathering or decomposition of bedrock) was identified beneath the colluvium in all borings. The residuum was described as tan silty sand with shale fragments, or highly weathered to decomposed tan and gray shale.

All three (3) test borings were advanced to auger refusal at depths ranging from 17.4 feet to 18.6 feet.

Foundation Conditions -

Standard Penetration tests on residuum indicate the allowable bearing value varies from about 5,000 PSF to more than

8,000 PSF. The allowable bearing value for weathered shale bedrock (beneath auger refusal) usually ranges from about 4 TSF to 8 TSF or more, depending upon the degree of weathering.

Laboratory Testing -

Two (2) split-spoon samples from the test borings were selected for laboratory Soil Classification Testing. Sample No. 2 from Boring 1 classified as a silty sand (SM) with rock fragments, with a Liquid Limit of 45, a Plastic Limit of 39 and a Plasticity Index of 6, and 41.1% passing a No. 200 Sieve. The natural moisture content was 27.3%.

Sample No. 1 from Boring 3 classified as a silty sand (SM) with rock fragments, with a Liquid Limit of 36, a Plastic Limit of 30 and a Plasticity Index of 6, and 19.4% passing a No. 200 Sieve. The natural moisture content was 13.9%.

The natural moisture content was determined on nine (9) soil samples from the test borings, and the natural moisture contents are shown in Table I. The natural moisture content ranged from 9.8% to 35.8%, averaging about 22.1%.

Discussion -

It is our understanding the proposed Elevated Water Storage Tank will be 400,000 to 500,000 Gallon Capacity,

approximately 195 feet tall with a twenty-four (24) to twenty-eight (28) foot diameter center pedestal. The proposed tank site is essentially flat, at roughly Elevation 1368, and only minimal site grading work will be required to develop the site.

Borings No. 1, 2 and 3 were drilled about fourteen (14) feet northwest, north and southwest of the tank center; respectively. All three (3) test borings encountered firm residuum (decomposed shale) two (2) to three (3) feet below the present ground surface; and all three (3) borings refused on weathered shale bedrock at depths ranging from 17.4 feet to 18.6 feet.

The test borings indicate the proposed Water Storage Tank may be founded on a mat or slab foundation bearing on firm silty sand (decomposed shale) about five (5) feet below the present ground surface. An allowable bearing value not to exceed 2.5 TSF (5,000 PSF) may be utilized for foundation design. The maximum soil pressure from overturning loads should not exceed 3 TSF. Total settlement should not exceed one (1) inch provided the foundation is properly installed.

The tank site should be excavated to subgrade and the exposed surface should be proof-rolled in the presence of an engineering geologist or soils engineer to check for soft spots or other deficiencies. Any soft material should be undercut and

replaced with select stone backfill (such as VDOT No. 21-A crushed stone) or lean concrete.

If a mat or slab foundation is not practical due to the heavy overturning loads or uplift, the proposed structure may be founded on a deep foundation system consisting of micro piles installed into the underlying shale bedrock. Micro piles are usually designed and installed by a Specialty Contractor; by drilling a small diameter hole (typically 3.5 to 6 inches in diameter), placing steel reinforcement in the borehole and grouting the pile in-place. The capacity of the pile is derived from the bond stress between the shale and the grout. For softer shale bedrock, the ultimate bond stress usually ranges from about 50 to 100 pounds per square inch of surface contact area. Field pile load tests should be performed to verify the pile capacities.

The following additional parameters may be utilized for the on-site (SM) soil between a depth of five (5) feet and auger refusal:

Soil Moist Unit Weight	= 120 PCF
Effective Friction angle (ϕ')	= 32°
Coefficient of Passive Resistance	= 0.31

Soils are frequently classified as having low, moderate or high shrink-swell potential based on a correlation with the

Plasticity Index (PI). Soils with a PI between 0 and 15 are considered to have a low shrink-swell potential. Soils with a PI between 15 and 30 are considered to have a moderate shrink-swell potential. Soils with a PI of 30 or more are considered to have a high shrink-swell potential. Based on the Plasticity Index, the on-site soils have a low shrink-swell potential; and no special design provisions are required due to shrink-swell soils.

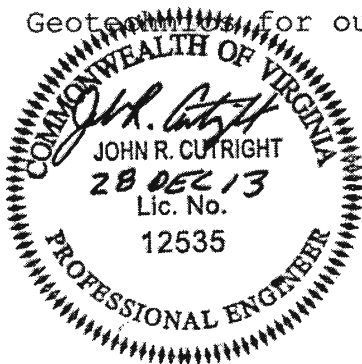
The geologic mapping and soil test borings indicate Site Classification C should be utilized for Seismic Design.

Groundwater was not encountered in the test borings and is not anticipated to be a problem provided the foundation work is not performed during or immediately after a prolonged wet period.

Conclusions and Recommendations -

1. It is our understanding the proposed Elevated Water Storage Tank will be 400,000 to 500,000 Gallon Capacity, approximately 195 feet tall with a twenty-four (24) to twenty-eight (28) foot diameter center pedestal. The proposed tank site is essentially flat, at roughly Elevation 1368, and only minimal site grading work will be required to develop the site.
2. All three (3) test borings encountered very firm decomposed shale from a depth of two to three feet to auger refusal at a depth of seventeen to eighteen feet.

3. The test borings indicate the proposed Water Storage Tank may be founded on a mat or slab foundation bearing on firm silty sand (decomposed shale) about five (5) feet below the present ground surface. An allowable bearing value not to exceed 2.5 TSF (5,000 PSF) may be utilized for foundation design. The maximum soil pressure from overturning loads should not exceed 3 TSF.
4. If a mat or slab foundation is not practical due to the heavy overturning or uplift loads, the proposed structure may be founded on a deep foundation system consisting of micro piles installed into the underlying shale bedrock. The ultimate bond stress for softer shale bedrock usually ranges from about 50 to 100 pounds per square inch of surface contact area. Pile load tests should be performed in the field to verify the adequacy of the installed piles.
5. Groundwater was not encountered in the test borings and is not anticipated to be a problem provided the foundation work is not performed during or immediately after a prolonged wet period.
6. Upon completion of the Plans and Specifications, and prior to release for construction, a copy should be submitted to Geotechnics, Inc. for our review and comments.

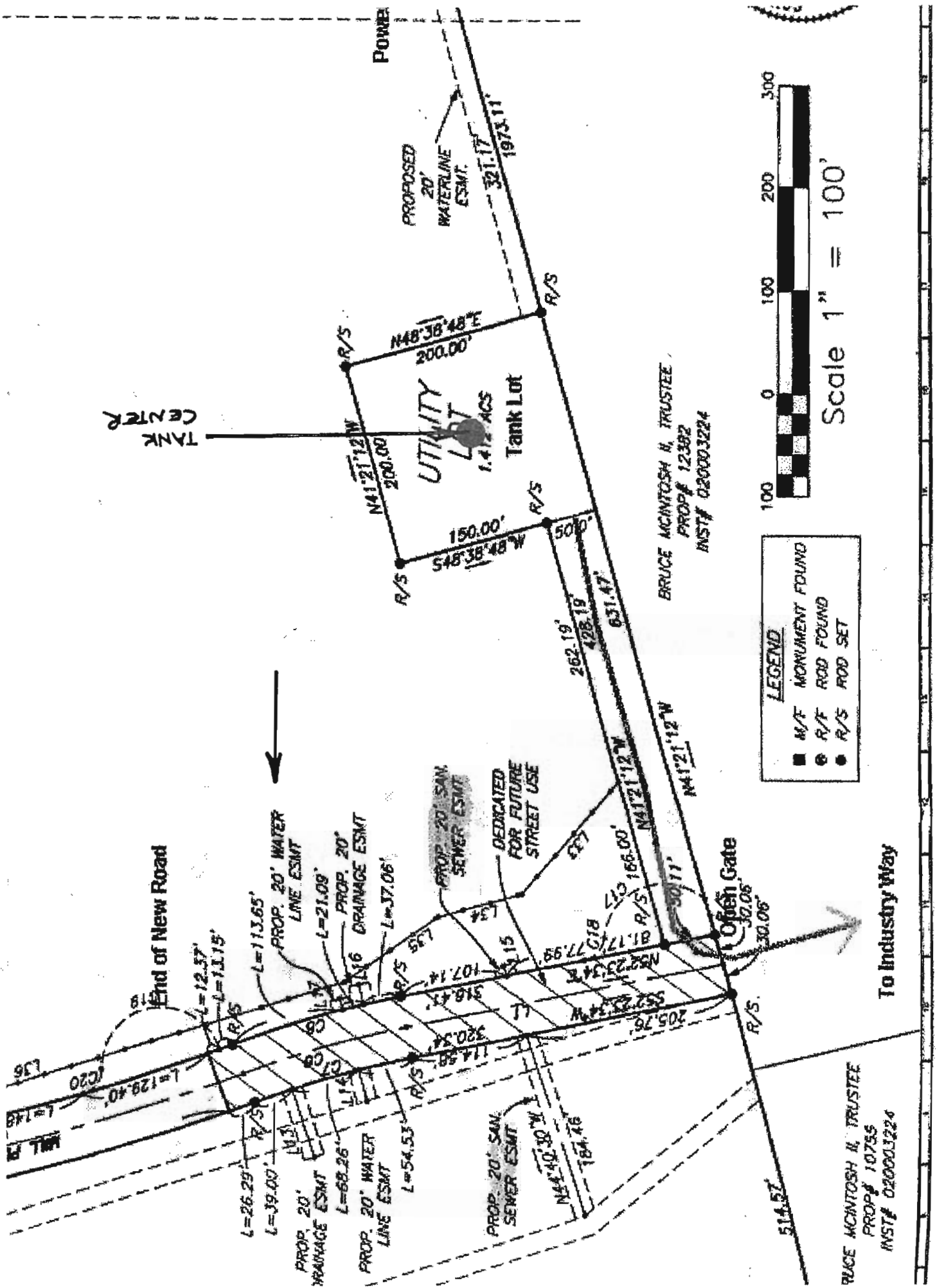


Geotechnics, Inc.
686 Lee Highway South
Roanoke, Virginia 24019

TABLE I

NATURAL MOISTURE CONTENTS

BORING		SAMPLE	DEPTH	% MOIST
1		1	2.0'-3.5'	27.5
1		2	5.0'-6.5'	27.3
1		3	10.0'-11.5'	35.8
1		4	15.0'-16.5'	30.8
2		1	2.0'-3.5'	22.9
2		2	5.0'-5.5'	9.8
2		3	10.0'-10.9'	19.1
3		1	2.0'-3.5'	13.9
3		2	5.0'-5.8'	11.5
			AVERAGE	22.1



TANK CENTER

UTILITY
Tank Lot
1.412 ACS

BRUCE MCINTOSH & TRUSTEE
PROP# 12392
INST# 020003224

LEGEND

- M/F MONUMENT FOUND
- R/F ROD FOUND
- R/S ROD SET



Scale 1" = 100'

End of New Road

To Industry Way

Open Gate

BRUCE MCINTOSH & TRUSTEE
PROP# 10755
INST# 020003224

MILL PLACE
ELEVATED WATER TANK

BORING LOG

Comm. No. 4511

Location AUGUSTA CO, VA

Structure WATER TANK

Sheet 1 of 1

Geologist

Boring No. 1

Contractor Geotechnics, Inc.

Engineer JRC

Date 19 DEC 13

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 18.6'
1368	0						Rock ---- Wt. of hammer 140# Avg. fall of hammer 30" El of ground water ----
1367.3	0.7		TOPSOIL				REMARKS
			COLLUVIUM Tan and Reddish-Tan Silty CLAY				
1365.5	2.5		RESIDUUM Tan Silty SAND with Shale Fragments (Decomposed Shale)	3 9 15	0.5' 0.5' 0.5'	1	
				5 11 16	0.5' 0.5' 0.5'	2	
				4 7 15	0.5' 0.5' 0.5'	3	
1355.5	12.5		Highly Weathered to Decomposed Tan and Gray Shale				
				12 25 26	0.5' 0.5' 0.5'	4	
1349.4	18.6		AUGER REFUSAL BOTTOM OF HOLE Completed: 4:00 PM 19 DEC 13	50	0.3'	5	
							Auger Refusal 18.3' SAMPLE 18.3'-18.6' Tools Bouncing, No Recovery W.L. @ Completion: Dry

MILL PLACE
 ELEVATED WATER TANK
 Location AUGUSTA CO, VA

BORING LOG
 Structure WATER TANK
 Geologist _____
 Engineer JRC

Comm. No. 4511
 Sheet 1 of 1
 Boring No. 2
 Date 19 DEC 13

Contractor Geotechnics, Inc.

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data	
Elevation	Depth	Legend		Blows	Penetration		Length of hole 17.4'	
1368	0						Rock ---- Wt. of hammer 140# Avg. fall of hammer 30" El of ground water ----	
1367.5	0.5		TOPSOIL				REMARKS	
			COLLUVIUM					
1366	2.0		Tan and Reddish-Tan Silty CLAY	5	0.5'			SAMPLE 2.0'-3.5' NM = 22.9%
			RESIDUUM	11	0.5'			
		Tan Silty SAND with Shale Fragments (Decomposed Shale)	17	0.5'				
1364	4.0		Highly Weathered to Decomposed Tan and Gray Shale	30	0.5'		SAMPLE 5.0'-5.5' NM = 9.8%	
				9	0.5'		SAMPLE 10.0'-10.9' NM = 19.1%	
				30	0.4'			
				50	0.2'		SAMPLE 15.0'-15.2' Tool Bouncing, No Recovery	
1350.6	17.4		AUGER REFUSAL BOTTOM OF HOLE Completed: 4:45 PM 19 DEC 13				W.L. @ Completion: Dry	

**MILL PLACE
ELEVATED WATER TANK**

BORING LOG

Comm. No. 4511

Location AUGUSTA CO, VA

Structure WATER TANK

Sheet 1 of 1

Geologist _____

Boring No. 3

Contractor Geotechnics, Inc.

Engineer JRC

Date 19 DEC 13

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 18.1'
1368	0						Rock ----
							Wt. of hammer 140#
							Avg. fall of hammer 30"
							El of ground water ----
							REMARKS
1367.4	0.6		TOPSOIL				
			COLLUVIUM Tan and Reddish-Tan Silty CLAY				
1365.5	2.5		RESIDIUM	6	0.5'		SAMPLE 2.0'-3.5'
1365	3.0		Tan Silty SAND with Shale Fragments (Decomposed Shale)	16	0.5'		LL= 36, PL=30, PI=6 (SM)
			Highly Weathered to Decomposed Tan and Gray Shale	30	0.5'		19.4% Passing No. 200
							NM = 13.9%
				20	0.5'		SAMPLE 5.0'-5.8'
				30	0.3'		NM = 11.5%
				50	0.2'		SAMPLE 10.0'-10.2'
							Tools Bouncing, No Recovery
				50	0.2'		SAMPLE 15.0'-15.2'
							Tool Bouncing, No Recovery
1349.9	18.1		AUGER REFUSAL BOTTOM OF HOLE Completed: 5:20 PM 19 DEC 13				W.L. @ Completion: Dry