



June 10, 2015

Mr. Jeff Derouen - Executive Director
KY Public Service Commission
211 Sower Blvd.
Frankfort, Kentucky 40601

RECEIVED

JUN 11 2015

**PUBLIC SERVICE
COMMISSION**

**RE: Cannonsburg Water District
RD Funded Water System Improvements Project
PSC Case No. 2015-00181**

Dear Mr. Derouen:

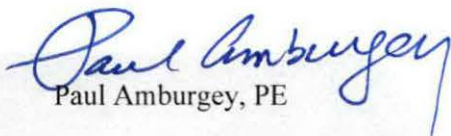
As requested by Mr. Randy Jones of Rubin and Hays, please find enclosed herewith the following info relative to this application as filed with your office:

1. Copy of plans, specifications on DVD
2. One (1) hard paper copy of plans, specifications. The cover sheet of the plans has the Engineer's seal, signature, and date.

Should there be additional questions, please call.

Sincerely,

E. L. Robinson Engineering



Paul Amburgey, PE

cc: Sharon Hambrick/Danny Clarkston- Cannonsburg WD
Randy Jones- Esq. Rubin and Hays



E.L. ROBINSON
ENGINEERING

Public Water &
Wastewater Systems Development

Bridge & Structural Engineering

Oil & Natural Gas Systems
Development

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Construction Management

Geotechnical Engineering

Surveying & Technology

Mine Engineering

Land Planning & Landscape
Architecture

Site Development

USDA RD Funded Water System Improvements

**Contract 1- Existing W/L, Stream Crossings Replacement,
Improvements to Existing Midland Trail, Tarpin Ridge BPS,
New BPS at Dog Fork and Midland Heights Rd.**

**Contract 2- Improvements to Existing Tarpin Ridge
and Princess Tanks**

**Contract 3- Existing Residential Water Meter
Replacement**

Prepared for:

***Cannonsburg Water District,
Boyd County KY***

December 2014

**E. L. Robinson Engineering
3145 Greenup Avenue
Ashland, KY 41101
Ph: (606) 571-1849
Fax: (606) 326-1890**

T: 606.326.1890

elrobjnsoneengineering.com



Addendum No. 1

DATE: April 10, 2015
REFERENCE: Cannonsburg, KY Water District
USDA Funded Water System Improvements
**Contract 1- Waterline/Stream Crossings Replacement,
Improvements to Existing BPS's at Midland Trail, Tarpin Ridge
New BPS's at Dog Fork, Meadewood Heights Rd**

BID DATE: UNCHANGED APRIL 14, 2015:10:00 AM, Cannonsburg WD Office

The bidders shall note the following items pertaining to this ADDENDUM NO. 1 which is clarifications to the subject Plans, Specifications dated DECEMBER 2014.

ITEM 1 – Contract 1- Refer to Technical Specifications- SDADATA RTU Module- Section 11300 - Bid Form- Items 12, 13, Plan Sheet 9

A copy of the supplier's quote (Straeffler Pump) on the SCADATA RTU telemetry transmitters that are required to be installed at the new Dog Fork and Meadewood Height BPS locations is attached. Contractors are advised the quote is for furnishing and installation of (2) units as required (1 at each BPS) complete including the RTU telemetry module, antennas, poles, and cable. Since both units are identical, the Contractor should include this quote divided between Bid Items 12 and 13.

This is the only quote available since the Water District's existing telemetry system is supplied by this equipment manufacturer also.

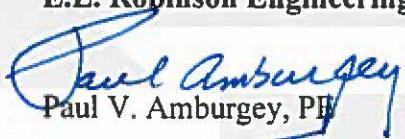
ITEM 2 – Contract 1- Refer to Technical Specifications- VFD Pump Controllers- Section 11010, 11015 - Plans Sheets 9, 10

Plan Sheets 8, 9 indicate that two (2) pressure transducers are required at each BPS. The pressure transducer on the BPS discharge piping side only is required. Only the "Low Suction Cutout" pressure switch on the suction piping side is required and is to be wired into both pumps on-off controls to shut the pump off in the event of a low suction condition.

The VFD Pump Controllers as specified are capable of controlling the on-off operation of the pumps without additional controls. Alternate VFD manufacturers will be considered only if an added interface control panel, with circuitry, meters are provided for a complete operable system.

This Addendum is to be noted on the BID FORM.

Prepared by:
E.L. Robinson Engineering Co.


Paul V. Amburgey, PE

Copy: Copy provided to Contract 1 Plan holders of record



Straeffer Pump & Supply, Inc.

Since 1967

January 19, 2015

Straeffer Quote #JPC025595

To: Paul Amburgey, P.E.
E.L. Robinson Engineering
3145 Greenup Avenue
Ashland, KY 41101

Subject: Scadata System
Cannonsburg, KY

Good morning Mr. Amburgey –

Per your conversation with Kevin Stock from Scadata, we are pleased to offer the following proposal for your consideration:

- One (1) - Lot equipment, software and programming per the attached scope of supply from Scadata. To include: modifications to the existing Scadata software suite; two (2) new RTU units; appropriate antennas and coaxial cable: start-up & training.
- One (1) - Installation, to include: two (2) 20", 1-1/4" schedule 40 aluminum poles for antenna mounting (one for each site); appropriate unistrut, conduit, fittings and wiring for mounting. Installation price includes setting the antenna tower and all labor necessary to ensure proper functionality of the system.

Your Price, F.O.B. Shipping Point (freight included)-----S 11,500.00

Notes:

- Estimated lead time would be 3-4 weeks from receipt of order.
- Freight to the job site has been included

Please review and advise any questions you may have.

Our terms, with approved credit, are net 30 days with 1.5% interest added to past due accounts, as well as all costs and expenses incurred in collecting any amount due, including reasonable attorney's and collection fees. We also accept, for your convenience, American Express, MasterCard, Visa, and discover credit cards.

Thank you for the opportunity,

Joe Collins
Vice-President



INFORMATION ON PROJECT

DATE: March 20, 2015

PROJECT: Cannonsburg Water District – USDA Funded Water System Improvements

LOCATION: Cannonsburg rural Boyd County, Kentucky

OWNER/ADDRESS: 1606 Cannonsburg Road, Ashland, Kentucky 41102

OWNER CONTACT/PHONE: Danny Clarkston, (606) 928-9808

DESCRIPTION/WORK QUANTITIES:

Contract 1- Existing waterline and major stream crossings (2) replacement. Improvements to existing Midland Trail, Tarpin Ridge BPS, new BPS at Dog Fork and Midland Heights Rd.

Contract 2- Sandblast, Painting, improvements to existing Tarpin Ridge and Princess Tanks

Contract 3- Existing residential water meter replacement

ESTIMATED COST RANGE: Contract 1- (\$425,000 - \$450,000); Contract 2- \$275,000-\$325,000. Contract 3- \$875,000 to \$925,000

WAGE RATES: State Prevailing Wage Rates are applicable to project.

PROJECT STATUS: Bid opening has been scheduled for April 14, 2015. Bids to be opened at 10:00 A.M.. at Cannonsburg Water District Office, 1606 Cannonsburg Road, Ashland, Kentucky 41102

PLAN AVAILABILITY: March 24, 2015 from Engineer. (\$100.00 Deposit per Contract)

DODGE OFFICES: DODGE SCAN OTHER _____

BONDING REQUIRED: BID BOND 5% PERFORMANCE/PAYMENT BOND 100%

COMMENTS Plan/specs deposit charge is non-refundable

BY Paul Amburgey P.E.
PROJECT MANAGER

**SPECIFICATIONS
AND
CONTRACT DOCUMENTS
FOR THE
CANNONSBURG, KY WATER DISTRICT**

RD FUNDED WATER YSTEM IMPROVEMENTS

Contract 1- Existing W/L, Stream Crossings Replacement, Improvements to Existing Midland Trail, Tarpin Ridge BPS, New BPS at Dog Fork and Midland Heights Rd.

Contract 2- Improvements to Existing Tarpin Ridge and Princess Tanks

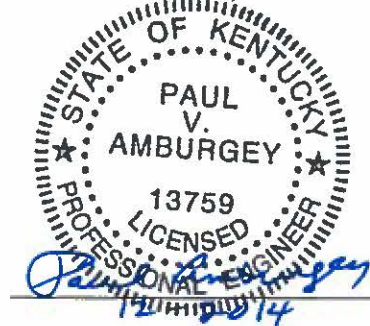
Contract 3- Existing Residential Water Meter Replacement

BOYD COUNTY, KENTUCKY

DECEMBER 2014

PREPARED BY:

**E.L. ROBINSON ENGINEERING
3145 GREENUP AVENUE
ASHLAND, KY 41101**



PAUL V. AMBURGEY, P.E.

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SECTION 1
ADVERTISEMENT FOR BIDS

**ADVERTISEMENT FOR BIDS
CANNONSBURG WATER DISTRICT
BOYD COUNTY, KENTUCKY
USDA FUNDED WATER SYSTEM IMPROVEMENTS**

Sealed bids for the construction of the USDA Funded Water System Improvements, as follows:

-Contract 1- Existing W/L, Stream Crossings Replacement, Improvements to Existing Midland Trail, Tarpin Ridge BPS, New BPS at Dog Fork and Midland Heights Rd.

-Contract 2- Improvements to Existing Tarpin Ridge and Princess Tanks

-Contract 3- Existing Residential Water Meter Replacement

Bids will be received by the Owner, the Cannonsburg Water District until April 14, 2015. Bids will be opened at 10:00 AM Local Time at the office of the Owner located at 1606 Cannonsburg Road, Ashland, Kentucky 41102. Bids received after the scheduled closing time for the reception of bids will be returned unopened to the Bidder.

Contracts 1, 2, and 3 each require furnishing of labor, equipment, and materials compete. The contract completion time is listed on the bid form for each respective contract.

The Bidding Documents, consisting of Plans, Specifications, and Contract Documents may be examined at the following places:

| | |
|--|---|
| Cannonsburg Water District 1606 Cannonsburg Road Ashland, Kentucky 41102 Phone: 606-928-9808 Contact: Danny Clarkston General Manager | E.L. Robinson Engineering 3145 Greenup Avenue Ashland, KY 41101 Phone: 606-571-1849 Contact: Paul Amburgey P.E. Director of Engineering KY |
|--|---|

The Bidding Documents may also also be viewed at McGraw Hill Construction Dodge Scan, for subscribing members.

Bidding Documents may be purchased/obtained from E.L. Robinson Engineering, 3145 Greenup Avenue, Ashland, KY 41101 upon payment of one hundred dollars (\$100.00) per set, per Contract which is not subject to refund.

The sealed envelope containing the Bidder Information and Form of Proposal must have the following information clearly printed or typed on the front lower left hand corner:

“Bid for USDA Funded Water System Improvements for the Cannonsburg Water District:
Contracts 1, 2 or 3 Submitted by: (insert name & address of bidder).”

All required information must be included in the envelope for the bid to be considered responsive.

No bidder may withdraw their bid for a period of 90 days following date of receipt of bids. The Owner reserves the right to reject any and all bids, to waive informalities, and to reduce the scope of the project units if necessary so the accepted bid (s) are within budgeted funds.

Bids shall be accompanied by a certified check or bid bond payable to the Cannonsburg Water District in an amount not less than five percent (5%) of the base bid.

A Performance and Payment Bond each in the amount of 100 percent of the Contract Price issued by responsible surety will be required of the successful Bidder.

Any contract or contracts awarded under this Invitation for Bids are expected to be funded by a grant and loan from USDA Rural Development. Neither the USDA nor any of its departments, agencies, or employees is or will be a party to this Invitation for Bids or any resultant contract.

CANNONSBURG WATER DISTRICT

By: Robert McGuire, Chairman

Published: ASHLAND DAILY INDEPENDENT March 25, 2015

SECTION 2
INFORMATION FOR BIDDERS

INFORMATION FOR BIDDERS

BIDS will be received by Cannonsburg Water District, Ashland, Kentucky (herein called the "OWNER"), at the Water District Office on 1606 Cannonsburg Road until April 14, 2015 at 10:00 AM, local time and then at said office publicly opened and read aloud.

Each BID shall be submitted in a sealed envelope, addressed to the Cannonsburg Water District, 1606 Cannonsburg Road at Ashland, Kentucky, 41102.

Each sealed envelope containing a BID shall be plainly marked on the outside as "BID" for USDA RD Funded Water System Improvements- Contract 1- Waterlines, Booster Pump Stations Improvements, Contract 2- Improvements to Existing Water Tanks, or Contract 3- Existing Residential Water Meter Replacement.

The envelope should bear on the outside the BIDDER'S name, address, and license number if applicable and the name of the project for which the BID is submitted. If forwarded by mail, the sealed envelope containing the BID must be enclosed in another envelope addressed to the OWNER at 1606 Cannonsburg Road, Ashland, Kentucky 41102.

All BIDS shall be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. Only one copy of the BID form is required.

The OWNER may waive any informalities or minor defects or reject any or all BIDS. Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered. No BIDDER may withdraw a BID within 90 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the BIDDER.

BIDDERS must satisfy themselves of the accuracy of the estimated quantities in the BID Schedule by examination of the site and a review of the drawings and specifications including ADDENDA. After BIDS have been submitted, the BIDDER shall not assert that there was a misunderstanding concerning the quantities of WORK or of the nature of the WORK to be done.

The OWNER shall provide to BIDDERS prior to BIDDING, all information which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

The CONTRACT DOCUMENTS contain the provisions required for the construction of the PROJECT. Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the CONTRACTOR or relieve the contractor from fulfilling any of the conditions of the contract.

Each BID shall be accompanied by a BID bond payable to the OWNER for five percent of the total amount of the BID. As soon as the BID prices have been compared, the OWNER will return the BONDS of all except the three lowest responsible BIDDERS. When the Agreement is executed the bonds of the two remaining unsuccessful BIDDERS shall be returned. The BID BOND of the successful BIDDER will be retained until the PAYMENT BOND and PERFORMANCE BOND have been executed and approved, after which it will be returned. A certified check may be used in lieu of a BID BOND.

A PERFORMANCE BOND and a PAYMENT BOND each in the amount of 100 percent of the CONTRACT PRICE, with a corporate surety approved by the OWNER, will be required

for the faithful performance of the contract.

Attorneys-in-fact who sign BID BONDS or PAYMENT BONDS and PERFORMANCE BONDS must file with each BOND a certified and effective dated copy of their power of attorney.

The party to whom the contract is awarded will be required to execute the Agreement and obtain the PERFORMANCE BOND and PAYMENT BOND within ten (10) calendar days from the date when NOTICE OF AWARD is delivered to the BIDDER. The NOTICE OF AWARD shall be accompanied by the necessary Agreement and BOND forms. In case of failure of the BIDDER to execute the Agreement, the OWNER may consider the BIDDER in default, in which case the BID BOND accompanying the proposal shall become the property of the OWNER.

The NOTICE TO PROCEED shall be issued within ten (10) days of the execution of the Agreement by the OWNER. Should there be reasons why the NOTICE TO PROCEED cannot be issued within such period, the time may be extended by mutual agreement between the OWNER AND CONTRACTOR. If the NOTICE TO PROCEED has not been issued within the ten (10) day period or within the period mutually agreed upon, the CONTRACTOR may terminate the Agreement without further liability on the part of either party.

The OWNER shall make such investigations as deemed necessary to determine the ability of the BIDDER to perform the WORK, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the obligations of the Agreement and to complete the WORK contemplated therein.

A conditional, unbalanced or, qualified BID shall not be accepted.

Award shall be made to the lowest responsible BIDDER.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the PROJECT shall apply to the contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its BID.

Further, the BIDDER agrees to abide by the requirements under Executive Order No. 11246, as amended, including specifically the provisions of the equal opportunity clause set forth in the SUPPLEMENTAL GENERAL CONDITIONS.

The low BIDDER shall supply the names and addresses of major material SUPPLIERS and SUBCONTRACTORS when required to do so by the OWNER.

The ENGINEER is E.L. Robinson Engineering The ENGINEER'S ADDRESS IS 3145 Greenup Avenue, Ashland, KY 41101.

The Amounts retained under provisions of the CONTRACT DOCUMENTS shall not be placed in escrow account nor invested for the benefit of the contractor.

Note: The following information must be included with the BID package: 1) BID Form, BID BOND, BIDDER Questionnaire, USDA RD Certification Forms

SECTION 3

GENERAL CONDITIONS

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 Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by

ACEC

AMERICAN COUNCIL OF ENGINEERING COMPANIES



ASCE American Society
of Civil Engineers

P/E National Society of
Professional Engineers
Professional Engineers in Private Practice

AMERICAN COUNCIL OF ENGINEERING COMPANIES

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PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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(703) 548-3118
www.agc.org

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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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. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *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.
 4. *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.
 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *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.
 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner 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.
 10. *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.
 11. *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.

12. *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 submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *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).
14. *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.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *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.
18. *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.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *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.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *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.
23. *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.
24. *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.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *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.

27. *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.
28. *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.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *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.
32. *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.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *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.
35. *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.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *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.
38. *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.
39. *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.

40. *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.
41. *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.
42. *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.
43. *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.
44. *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.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *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 Subcontractor.
48. *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.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *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.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by 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 words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated 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 information in the Contract Documents and with the design concept of the 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 that 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. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

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 indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 - 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; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, 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.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

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, REUSE

3.01 *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 reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated 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, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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 discovers, or has actual knowledge of, 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 (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then 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 had actual knowledge 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, or code, or the instruction of any Supplier (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 its consultants, including electronic media editions; or
 2. reuse any 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 prohibitions 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. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by 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 known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
 - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the 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 officers, directors, members, partners, employees, agents, consultants, or subcontractors 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 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, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall 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 provided by others; 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:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the 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 officers, directors, members, partners, employees, agents, consultants, or subcontractors 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. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.
- 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 written notice to Contractor: (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, members, 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, members, 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 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 or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- 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 and loss payee 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 and loss payee 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.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such 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, be written on an occurrence basis, 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, members, 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 contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
 4. 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);
 5. 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
 6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. 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, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). 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, members, 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 a loss payee;
 - 2. be written on a Builder's Risk "all-risk" 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 that 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 loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown 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,

members, 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 a loss payee.

- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this 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 loss payee 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.
- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

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 as loss payees (and the officers, directors, members, 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 loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, 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 as loss payees (and the officers, directors, members, 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 Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, 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, members, 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 Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner 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, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner 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 Owner's exercise of this power. If such objection be made, Owner 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, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner 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.

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; and
 - 3) it has a proven record of performance and availability of responsive service.
- 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 if 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 requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by 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) 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 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 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; and
 - 4) 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 a Change Order in the case of a substitute and 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 so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable 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 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 a loss payee 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, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, 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, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors 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 specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, 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 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, members, 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. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. 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. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. 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 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).
- F. 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 accepted 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:
 - a. 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;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

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 officers, directors, members, partners, employees, agents, consultants, and subcontractors 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, members, 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 officers, directors, members, partners, employees, agents, consultants, or subcontractors 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, members, 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 through 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, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and 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 such work; provided, however, that Contractor may cut or alter others' 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 wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *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 with respect to 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 relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner's responsibilities, if any, with 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 with 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. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

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.

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 believes 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.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

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, 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.D.

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 the provisions of any bond require notice to be given to a surety 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), 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 Times 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 WORK

11.01 *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 not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

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 on the Work. 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, as 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, express and courier services, 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.
- 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 quantity of any item of Unit Price Work performed by Contractor differs materially and significantly 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 Paragraphs 12.01.C.2.a and 12.01.C.2.b 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.C.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors 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. 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, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's 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 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, Contractor shall, if requested by Engineer, uncover such Work 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 written 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 for 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 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, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and 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. 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. there are other items entitling Owner to a set-off against the amount recommended; or
 - d. 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 remedies the reasons for such action.
3. Upon a subsequent determination 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 and subject to interest as provided in the Agreement.

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, Contractor, and Engineer shall make an 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 remove its property and 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, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D 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 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.6;
 - 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 might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, 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.

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 repeated 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 RESOLUTION

16.01 *Methods and Procedures*

- A. Either Owner or Contractor may 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 and the other party to the Contract. 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 the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *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.

SECTION 4

SUPPLEMENTAL GENERAL CONDITIONS

Supplementary Conditions as included with this Section modify or supersede the General Conditions as noted. Contractor's Insurance requirements are included in this Section as well as the specific project requirements relating to RUS funding.

STATE WAGE RATES

Note: State prevailing wage rates are applicable to all Project Contracts and are enclosed. The latest prevailing wage determination will be inserted in the specifications booklet by Engineer upon advertising project for bids.

USDS RUS Project Sign Detail

Contracts 1 only is required to supply and erect one (1) USDA RUS Project Information Sign. See detail included with this Section. Location of sign to be determined at Pre-Construction Conference.

KYDOW Approval of Plans/Specifications

The KYDOW approval letter on the Plans/Specifications is enclosed and incorporated in the contract documents

SUPPLEMENTARY CONDITIONS

SUPPLEMENTARY CONDITIONS

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

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CONSTRUCTION SPECIFICATIONS INSTITUTE

This Guide to the Preparation of Supplementary Conditions has been prepared for use with the Standard General Conditions of the Construction Contract (EJCDC C-700, 2007 Edition). Their provisions are interrelated and a change in one may necessitate a change in the other. The suggested language contained in the Guide to the Preparation of Instructions to Bidders (EJCDC C-200, 2007 Edition) is also carefully integrated with the suggested language of this document. Comments concerning their usage are contained in EJCDC guidance documents.

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Supplementary Conditions

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC C-700 (2007 Edition). All provisions which are not so amended or supplemented remain in full force and effect.

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

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

SC-1.01.A.9 *Defined Terms*

SC-1.01.A.9 Add the following language at the end of last sentence of Paragraph 1.01.A.9:

The Change Order form to be used on this Project is EJCDC C-941. Agency approval is required before Change Orders are effective.

SC-1.01.A.51 Add the following language at the end of the last sentence of Paragraph 1.01.A.51:

A Work Change Directive cannot change Contract Price or Contract Times without a subsequent Change Order.

SC-1.01.A.52 Add the following new Paragraph after Paragraph 1.01.A.51:

Abnormal Weather Conditions – Conditions of extreme or unusual weather for a given region, elevation, or season as determined by Engineer. Extreme or unusual weather that is typical for a given region, elevation, or season should not be considered Abnormal Weather Conditions.

SC-1.01.A.53 Add the following new Paragraph after Paragraph 1.01.A.52:

Agency - The Project is financed in whole or in part by USDA Rural Utilities Service pursuant to the Consolidated Farm and Rural Development Act (7 USC Section 1921 et seq.). The Rural Utilities Service programs are administered through the USDA Rural Development offices; therefore, the Agency for these documents is USDA Rural Development.

SC- 2.02 *Copies of Documents*

SC-2.02 Delete Paragraph 2.02.A in its entirety and insert the following in its place:

- A. Owner shall furnish to Contractor up to 1 printed or hard copy of the Project Manual and 2 copies of the Drawings.

SC-4.02 *Subsurface and Physical Conditions*

SC-4.02 Delete Paragraphs 4.02.A and 4.02.B in their entirety and insert the following:

- A. No reports of explorations or tests of subsurface conditions at or contiguous to the Site, or drawings of physical conditions relating to existing surface or subsurface structures at the Site, are known to Owner.

SC-4.06 *Hazardous Environmental Conditions*

SC-4.06 Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

- A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.
- B. Not Used.

SC-5.04 *Contractor's Liability Insurance*

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 (e.g., Longshoreman's): | Statutory |
| c. Employer's Liability: | <u>\$500,000</u> |

2. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverage's and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

- | | |
|--|--------------------|
| a. General Aggregate | <u>\$1,000,000</u> |
| b. Products - Completed Operations Aggregate | <u>\$500,000</u> |

- c. Personal and Advertising Injury \$500,000
- d. Each Occurrence (Bodily Injury and Property Damage) \$500,000
- e. Property Damage liability insurance will provide Explosion, Collapse, and Under-ground coverage's where applicable.
- f. Excess or Umbrella Liability
- b. General Aggregate \$1,000,000
- c. Each Occurrence \$500,000
- 3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:
 - a. Combined Single Limit of \$500,000
- 4. The Contractual Liability coverage required by Paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:
 - a. Bodily Injury:
 - Each person \$500,000
 - Each Accident \$500,000
 - b. Property Damage:
 - Each Accident \$500,000
 - Annual Aggregate \$500,000

SC-SC-5.04(D) Unless otherwise stated in Specific Project Requirements the Contractor shall purchase and maintain during the Contract Time "All Risk Builders' Risk Insurance," and/or "Installation Floater Insurance," and/or "Boiler and Machinery Insurance," and any and all insurance requirements of section GC-5.06 of the General Conditions as applicable for the type of work to be performed upon the Project to the full insurable value thereof for the benefit of the Owner, the Contractor, Subcontractors and Suppliers as their interest may appear. This provision shall in no way release the Contractor or Contractor's Surety from obligations under the Contract Documents to fully complete the Project. The original policy(s) shall be filed with the Owner or his designated representative.

SC-5.06 *Property Insurance*

SC-5.06 Delete Paragraph 5.06 in its entirety.

SC-5.07 Delete Paragraph 5.07 in its entirety.

SC-5.08 Delete Paragraph 5.08 in its entirety.

SC-5.10 Delete Paragraph 5.10 in its entirety.

SC-6.06 *Contractors Responsibilities*

SC-6.06C Amend Paragraph 6.01.C by adding the following text to the end of the Paragraph:

The Contractor shall not award work valued at more than fifty percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

SC-10.01 *Changes in the Work*

SC-10.01A Amend Paragraph 10.01A by adding the following text to the end of the Paragraph:

All Contract Change Orders must be concurred in by Agency before they are effective

SC-14.02 *Payments to Contractor*

SC-14.02.B.3 Amend Paragraph 14.02.B.3 by adding the following text to the end of the Paragraph:

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 and replace with the following:

The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 15.01.E will become due twenty (20) days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

The Agency must approve all Applications for Payment before payment is made.

SC-16.01 *Dispute Resolution*

SC-16.01 Delete paragraph 16.01 in its entirety. OWNER and CONTRACTOR hereby agree that Article 16 of the General Conditions to the Agreement between OWNER and CONTRACTOR is amended to include the following agreement of the parties:

16.01 Judicial System

A. All claims, disputes and other matters in question between Owner and Contractor arising out of or relating to the Contract Documents or the breach thereof that cannot be resolved through mutual negotiation (except for claims which have been waived by the making or acceptance of

final payment as provided by Paragraph 14.09) will be decided through the District Court within the County of record for project. Arbitration will be entered into only if agreed upon in writing by both parties.

SC-18.01 Add new Article 18, titled "FEDERAL REQUIREMENTS"

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.

B. 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" (Attachment GC-A) before Owner submits the executed Contract Documents to Agency for approval.

C. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

D. 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. 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.

D. 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.

E. In the event this Contract is terminated as provided in paragraph 19.04.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.

F. Owner, Agency, the Comptroller General of the United States, 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 Agreement, for the purpose of making audits, examinations, excerpts,

and transcriptions. Engineer shall maintain all required records for three years after final payment is made and all other pending matters are closed.

G. 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.

H. 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.

I. If this Contract exceeds \$100,000, compliance with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h) and 42 USC 7401et. seq.), section 508 of the Clean Water Act (33 U.S.C. 1368) and Federal Water Pollution Control Act (33 USC 1251 et seq.), Executive Order 11738, and Environmental Protection Agency regulations is required. Contractor will report violations to the Agency and the Regional Office of the EPA.

SC 19.09 Add the following after Article 19.08 with the title "State Energy Policy":

J. 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.

SC 19.10 Add the following after Article 19.09 with the title "Equal Opportunity Requirements":

K. 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."

L. 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.

M. 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.

N. 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 U.S.C. 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.

O. When constructing a Project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental conditions:

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 (Standard Flood Hazard Area) delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, e.g., alluvial soils on NRCS Soil Survey Maps.
3. Historic Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact or human remains 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.

5. Mitigation Measures – The following environmental mitigation measures are required on this Project: Temporary erosion control during construction.

CERTIFICATE OF OWNER'S ATTORNEY AND AGENCY CONCURRENCE

CERTIFICATE OF OWNER'S ATTORNEY

PROJECT NAME: _____

CONTRACTOR NAME: _____

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.

Name Date

AGENCY CONCURRENCE

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 Representative Date

Name

ENGINEER'S CERTIFICATION OF FINAL PLANS AND SPECIFICATIONS

PROJECT NAME: _____

The final Drawings and Specifications, other assembled Construction Contract Documents, bidding-related documents (or requests for proposals or other construction procurement documents), and any other Final Design Phase deliverables, comply with all requirements of the U.S. Department of Agriculture, Rural Utilities Service, to the best of my knowledge and professional judgment.

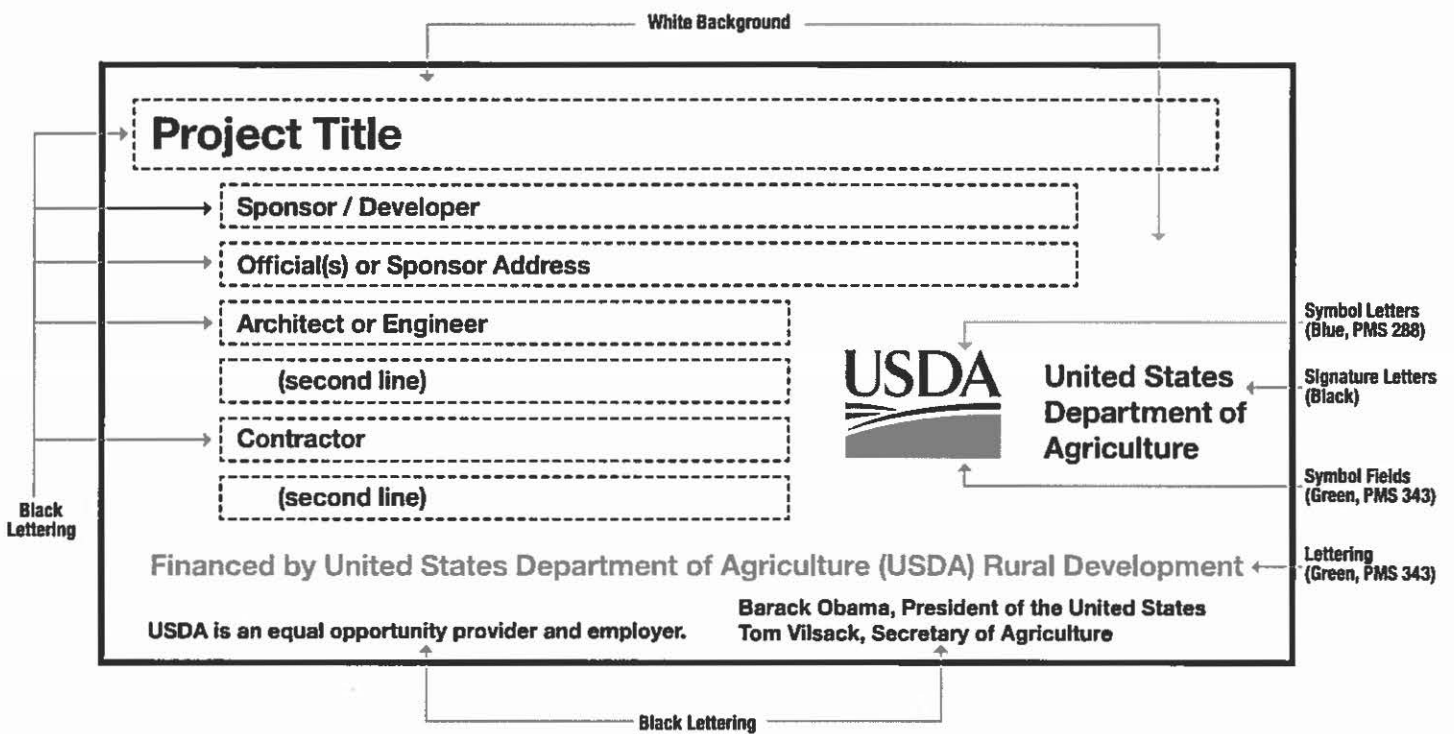
If the Engineers Joint Contract Documents Committee (EJCDC) documents have been used, all modifications required by RUS Bulletin 1780-26 have been made in accordance the terms of the license agreement, which states in part that the Engineer "must plainly show all changes to the Standard EJCDC Text, using 'Track Changes' (redline/strikeout), highlighting, or other means of clearly indicating additions and deletions." Such other means may include attachments indicating changes (e.g. Supplementary Conditions modifying the General Conditions).

Engineer

Date

Name and Title

TEMPORARY CONSTRUCTION SIGN FOR RURAL DEVELOPMENT PROJECTS



SIGN DIMENSIONS: 1200 mm x 2400 mm x 19 mm (approx. 4' x 8' x ¾")
PLYWOOD PANEL (APA RATED A-B GRADE-EXTERIOR)



Steven L. Beshear
Governor

KENTUCKY LABOR CABINET
DEPARTMENT OF WORKPLACE STANDARDS
DIVISION OF EMPLOYMENT STANDARDS,
APPRENTICESHIP & MEDIATION
1047 US Hwy 127 S - Suite 4
Frankfort, Kentucky 40601
Phone: (502) 564-3534
Fax (502) 696-1897
www.labor.ky.gov

Larry Roberts
Secretary

Anthony Russell
Commissioner

January 20, 2015

Paul Amburgey
E L Robinson Engineering
3145 Greenup Ave.
Ashland KY 41101

Re: City of Cannonsburg, Existing Water System Improvements

Advertising Date as Shown on Notification: February 1, 2015

Dear Paul Amburgey:

This office is in receipt of your written notification on the above project as required by KRS 337.510 (1).

I am enclosing a copy of the current prevailing wage determination number CR 2-018, dated December 22, 2014 for BOYD County. This schedule of wages shall be attached to and made a part of the specifications for the work, printed on the bidding blanks, and made a part of the contract for the construction of the public works between the public authority and the successful bidder or bidders.

The determination number assigned to this project is based upon the advertising date contained in your notification. There may be modifications to this wage determination prior to the advertising date indicated. In addition, if the contract is not awarded within 90 days of this advertising date or if the advertising date is modified, a different set of prevailing rates of wages may be applicable. It will be the responsibility of the public authority to contact this office and verify the correct schedule of the prevailing rates of wages for use on the project. Your project number is as follows: 010-H-00257-14-2, Heavy/Highway

Sincerely,

Anthony Russell
Commissioner



KENTUCKY LABOR CABINET
PREVAILING WAGE DETERMINATION
CURRENT REVISION
LOCALITY NO. 018

BOYD, CARTER & GREENUP COUNTIES

Determination No. CR 2-018 2014

Date of Determination: December 22, 2014

| |
|---|
| Project No. 010-H-00257-14-2 Type: ___ Bldg _x_ HH |
|---|

This schedule of the prevailing rate of wages for Boyd, Carter & Greenup Counties has been determined in accordance with the provisions of KRS 337.505 to 337.550. This determination shall be referred to as Prevailing Wage Determination No. CR 2-018 2014

Apprentices shall be permitted to work as such subject to Administrative Regulations 803 KAR 1:010. Copies of these regulations will be furnished upon request to any interested person.

Overtime is to be computed at not less than one and one-half (1 1/2) times the indicated BASE RATE for all hours worked in excess of eight (8) per day, and/or in excess of forty (40) per week. However, KRS 337.540 permits an employee and employer to agree, in writing, that the employee will be compensated at a straight time base rate for hours worked in excess of eight (8) hours in any one calendar day, but not more than ten (10) hours worked in any one calendar day, if such written agreement is prior to the over eight (8) hours in a calendar day actually being worked, or where provided for in a collective bargaining agreement. The fringe benefit rate is to be paid for each hour worked at a straight time rate for all hours worked.

Fringe benefit amounts are applicable for all hours worked except when otherwise noted.

Welders will receive rate for craft in which welding is incidental.

NOTE: The type of construction shall be determined by applying the following definitions:

BUILDING CONSTRUCTION

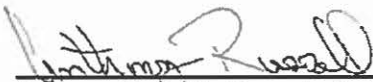
Building construction is the construction of sheltered enclosures with walk-in access for the purpose of housing persons, machinery, equipment, or supplies. It includes all construction of such structures, the installation of utilities and the installation of equipment, both above and below grade level, as well as incidental grading, utilities and paving.

HIGHWAY CONSTRUCTION

Highway construction includes the construction, alteration or repair of roads, streets, highways, runways, taxiways, alleys, trails, paths, parking areas, and other similar projects not incidental to building or heavy construction. It includes all incidental construction in conjunction with the highway construction project.

HEAVY CONSTRUCTION

Heavy projects are those projects that are not properly classified as either "building" or "highway". For example, dredging projects, water and sewer line projects, dams, flood control projects, sewage treatment plants and facilities, and water treatment plants and facilities are considered heavy.



Anthony Russell, Commissioner
Department of Workplace Standards
Kentucky Labor Cabinet

Determination No. CR 2-018 2014
December 22, 2014

ASBESTOS/INSULATION WORKERS:

Includes duct (hot/cold), pipe insulator & pipe wrapping:

| | |
|-----------------|---------|
| BASE RATE | \$31.04 |
| FRINGE BENEFITS | 18.33 |

Hazardous Material Handlers: (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging & disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems):

| | |
|-----------------|---------|
| BASE RATE | \$21.00 |
| FRINGE BENEFITS | 9.72 |

BOILERMAKERS:

| | |
|-----------------|---------|
| BASE RATE | \$35.79 |
| FRINGE BENEFITS | 16.71 |

BRICKLAYERS:

BOYD & GREENUP COUNTIES:

Bricklayers: BUILDING

| | |
|-----------------|---------|
| BASE RATE | \$21.86 |
| FRINGE BENEFITS | 4.75 |

CARTER COUNTY:

Bricklayers: BUILDING

| | |
|-----------------|---------|
| BASE RATE | \$28.50 |
| FRINGE BENEFITS | 17.94 |

BOYD, CARTER & GREENUP COUNTIES:

Tile Setters: BUILDING

| | |
|-----------------|---------|
| BASE RATE | \$28.42 |
| FRINGE BENEFITS | 9.30 |

Tile Finishers: BUILDING

| | |
|-----------------|---------|
| BASE RATE | \$23.97 |
| FRINGE BENEFITS | 9.30 |

Bricklayers: HEAVY & HIGHWAY

| | |
|-----------------|---------|
| BASE RATE | \$28.29 |
| FRINGE BENEFITS | 16.80 |

CARPENTERS:

BOYD, CARTER & GREENUP COUNTIES:

Includes form work & scaffold building:

BUILDING

| | |
|-----------------|---------|
| BASE RATE | \$28.55 |
| FRINGE BENEFITS | 16.29 |

Carpenters: HEAVY & HIGHWAY

| | |
|-----------------|---------|
| BASE RATE | \$27.50 |
| FRINGE BENEFITS | 14.96 |

Piledrivermen: HEAVY & HIGHWAY

| | |
|-----------------|---------|
| BASE RATE | \$27.75 |
| FRINGE BENEFITS | 14.96 |

Divers: HEAVY & HIGHWAY

| | |
|-----------------|---------|
| BASE RATE | \$41.63 |
| FRINGE BENEFITS | 14.96 |

CEMENT MASONS/CONCRETE FINISHERS:

BOYD & GREENUP COUNTIES: BUILDING

| | |
|-----------------|---------|
| BASE RATE | \$29.09 |
| FRINGE BENEFITS | 18.94 |

CARTER COUNTY: BUILDING

| | |
|-----------------|-------|
| BASE RATE | 22.84 |
| FRINGE BENEFITS | 8.41 |

ELECTRICIANS:

| | | | |
|---|---------------|-----------------|---------|
| <u>BOYD COUNTY:</u> | BUILDING | BASE RATE | \$32.62 |
| | | FRINGE BENEFITS | 21.45 |
| <u>GREENUP COUNTY:</u> | BUILDING | BASE RATE | \$31.70 |
| | | FRINGE BENEFITS | 14.21 |
| <u>CARTER COUNTY:</u> | BUILDING | BASE RATE | 23.18 |
| | | FRINGE BENEFITS | 8.16 |
| <u>BOYD, CARTER & GREENUP COUNTIES:</u> | | | |
| Cable Splicers: | HEAVY HIGHWAY | BASE RATE | \$32.68 |
| | | FRINGE BENEFITS | 18.13 |

LINE CONSTRUCTION:

| | | | |
|---|----------|-----------------|---------|
| Linemen/Cable Splicer/Technician | BUILDING | BASE RATE | \$31.45 |
| | | FRINGE BENEFITS | 12.38 |
| Groundman/Truck Driver | BUILDING | BASE RATE | \$15.35 |
| | | FRINGE BENEFITS | 12.38 |
| Equipment Mechanic: | BUILDING | BASE RATE | \$22.29 |
| | | FRINGE BENEFITS | 12.38 |
| Equipment Operator A: (John Henry Rock Drill, D6 (or equivalent) and above, Trackhoe Digger, Cranes (greater than 25 tons and less than 45 tons): | | | |
| | BUILDING | BASE RATE | \$28.00 |
| | | FRINGE BENEFITS | 12.38 |
| Equipment Operator B: Cranes (6-25 tons) Backhoes, Road Tractor, Dozer up to D5, Pressure Digger Wheeled or Tracked and all Tension Wire Stringing Equipment: | | | |
| | BUILDING | BASE RATE | \$24.52 |
| | | FRINGE BENEFITS | 12.38 |
| Equipment Operator C: Trencher, Vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton or below) & Skid Steer Loaders: | | | |
| | BUILDING | BASE RATE | \$19.33 |
| | | FRINGE BENEFITS | 12.38 |

ELEVATOR CONSTRUCTORS:

| | |
|-----------------|---------|
| BASE RATE | \$38.53 |
| FRINGE BENEFITS | 20.035 |

GLAZIERS:

| | |
|-----------------|---------|
| BASE RATE | \$28.50 |
| FRINGE BENEFITS | 5.70 |

IRONWORKERS:

(Ornamental, Reinforcing & Structural)

BOYD, CARTER & GREENUP COUTIES:

| | | |
|---|-----------------|---------|
| Up to 10 miles radius of Union Hall, Ashland, Ky, 1643 Greenup Ave: | BASE RATE | \$31.33 |
| | FRINGE BENEFITS | 21.33 |
| 10 to 50 mile radius of Union Hall, Ashland, Ky, 1643 Greenup Ave: | BASE RATE | \$31.73 |
| | FRINGE BENEFITS | 21.33 |
| 50 mile radius & over of Union Hall, Ashland, Ky, 1643 Greenup Ave: | BASE RATE | \$33.33 |
| | FRINGE BENEFITS | 21.33 |

LABORERS / BUILDING:

BOYD & GREENUP COUNTIES:

Common or General, Landscape Laborer & Pipelayer:

| | | |
|----------|-----------------|---------|
| BUILDING | BASE RATE | \$27.40 |
| | FRINGE BENEFITS | 14.05 |

Grade Checker, Mason Tender-Brick, Mason Tender-Cement/Concrete, Mason Tender,-Brick (Hod) & Screw Operator:

| | | |
|----------|-----------------|---------|
| BUILDING | BASE RATE | \$27.55 |
| | FRINGE BENEFITS | 14.05 |

LABORERS / BUILDING:

CARTER COUNTY:

Common or General:

| | | |
|----------|-----------------|---------|
| BUILDING | BASE RATE | \$14.01 |
| | FRINGE BENEFITS | 4.34 |

Mason Tender – Brick:

| | | |
|----------|-----------------|---------|
| BUILDING | BASE RATE | \$18.23 |
| | FRINGE BENEFITS | 7.08 |

Mason Tender – Cement/Concrete:

| | | |
|----------|-----------------|---------|
| BUILDING | BASE RATE | \$12.48 |
| | FRINGE BENEFITS | 0.00 |

LABORERS / HEAVY HIGHWAY:

GROUP 1: Aging & Curing of Concrete; Asbestos Abatement Worker; Asphalt Plant; Asphalt; Batch Truck Dump; Carpenter Tender; Cement Mason Tender; Cleaning of Machines; Concrete; Demolition; Dredging; Environmental – Nuclear, Radiation, Toxic & Hazardous Waste – Level D; Flag person; Grade Checker; Hand Digging & Hand Back Filling; Highway Marker Placer; Landscaping, Mesh Handler & Placer; Puddler; Railroad; Rip-rap & Grouter; Right-of-Way; Sign, Guard Rail & Fence Installer; Signal Person; Sound Barrier Installer; Storm & Sanitary Sewer; Swamper; Truck Spotter & Dumper; Wrecking of Concrete Form; & General Cleanup:

| | | |
|-----------------|-----------------|---------|
| HEAVY & HIGHWAY | BASE RATE | \$21.80 |
| | FRINGE BENEFITS | 11.96 |

GROUP 2: Batter Board Man (Sanitary & Storm Sewer); Brick mason Tender; Mortar Mixer Operator; Scaffold Builder; Burner & Welder; Bushhammer; Chain Saw Operator; Concrete Saw Operator; Deckhand Scow Man; Dry Cement Handler; Environmental – Nuclear, Radiation, Toxic & Hazardous Waste – Level C; Forklift Operator for Masonry; Form Setter; Green Concrete Cutting; Hand Operated Grouter & Grinder Machine Operator; Jackhammer; Pavement Breaker; Paving Joint Machine; Pipelayer; Plastic Pipe Fusion; Power Driven Georgia Buggy & Wheel Barrow; Power Post Hole Digger; Precast Manhole Setter; Walk-Behind Tamper; Walk-Behind Trencher; Sand Blaster; Concrete Chipper; Surface Grinder; Vibrator Operator; & Wagon Driller:

| | | |
|-----------------|-----------------|---------|
| HEAVY & HIGHWAY | BASE RATE | \$22.05 |
| | FRINGE BENEFITS | 11.96 |

GROUP 3: Asphalt Luteman & Raker; Gunnite Nozzleman; Gunnite Operator & Mixer; Grout Pump Operator; Side Rail Setter; Rail Paved Ditch; Screw Operator; Tunnel (Free air); & Water Blaster:

| | | |
|-----------------|-----------------|---------|
| HEAVY & HIGHWAY | BASE RATE | \$22.10 |
| | FRINGE BENEFITS | 11.96 |

GROUP 4: Caisson Worker (Free Air); Cement Finisher; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Levels A & B; Miner & Driller (Free Air); Tunnel Blaster; & Tunnel Mucker (Free Air); Directional & Horizontal Boring; Air Track Drillers (All Types); Powdermen & Blasters; Troxler & Concrete Tester if Laborer is Utilized:

| | | |
|-----------------|-----------------|---------|
| HEAVY & HIGHWAY | BASE RATE | \$22.70 |
| | FRINGE BENEFITS | 11.96 |

MILLWRIGHTS:

BOYD & GREENUP COUNTIES:

| | |
|-----------------|---------|
| BASE RATE | \$30.60 |
| FRINGE BENEFITS | 13.78 |

CARTER COUNTY:

| | |
|-----------------|---------|
| BASE RATE | \$33.73 |
| FRINGE BENEFITS | 17.43 |

OPERATING ENGINEERS / BUILDING:

BOYD & GREENUP COUNTIES:

GROUP 1: Bituminous paver, crane (including truck & tower), elevating grader and all types of loaders, hoist (1 drum), hoisting engine (2 or ore drums), motor scraper, bulldozer, mechanic, power blade, motor grader, roller (bituminous), forklift (regardless of lift height & except when used for masonry construction), core drill, concrete paver, hoist, rotary drill, kecal loader, backhoe, backhoe track, trackhoe:

| | | |
|----------|-----------------|---------|
| BUILDING | *BASE RATE | \$30.46 |
| | FRINGE BENEFITS | 14.15 |

GROUP 2: Cable Crane (50 tons and over), Hydraulic Crane (100 tons & over):

| | | |
|----------|-----------------|---------|
| BUILDING | *BASE RATE | \$31.31 |
| | FRINGE BENEFITS | 14.15 |

***Crane with boom 150 feet and over, including jib, shall received \$.50 above rate**

GROUP 3: Form grader, roller (rock), tractor (50 hop and over), truck crane oiler, farm tractor with attachments, except backhoe, highlift & endloader, elevator (when used for hoisting), hoisting engine (1 drum or buck hoist), forklift (when used for masonry construction):

| | | |
|----------|-----------------|---------|
| BUILDING | BASE RATE | \$25.92 |
| | FRINGE BENEFITS | 14.15 |

GROUP 4: Roller (earth), Tractor (under 50 HP), Oiler:

| | | |
|----------|-----------------|---------|
| BUILDING | BASE RATE | \$24.60 |
| | FRINGE BENEFITS | 14.15 |

OPERATOR BOBCAT/SKID LOADER

| | |
|-----------------|---------|
| BASE RATE | \$19.51 |
| FRINGE BENEFITS | 5.38 |

OPERATOR COMPACTOR

| | |
|-----------------|---------|
| BASE RATE | \$24.53 |
| FRINGE BENEFITS | 0.00 |

OPERATOR EXCAVATOR

| | |
|-----------------|---------|
| BASE RATE | \$19.18 |
| FRINGE BENEFITS | 5.16 |

OPERATOR HIGHLIFT

| | |
|-----------------|---------|
| BASE RATE | \$25.00 |
| FRINGE BENEFITS | 0.00 |

OPERATING ENGINEERS / BUILDING:

CARTER COUNTY:

Cable Crane (50 tons >), Hydraulic Crane (100 tons >):

| | | |
|----------|-----------------|---------|
| BUILDING | BASE RATE | \$31.31 |
| | FRINGE BENEFITS | 14.15 |

Cherry Picker, Crane, Forklift, Grader/Blade:

| | | |
|----------|-----------------|---------|
| BUILDING | BASE RATE | \$30.46 |
| | FRINGE BENEFITS | 14.15 |

OPERATING ENGINEERS / BUILDING: (CONTINUED)

CARTER COUNTY:

| | | | |
|--------|----------|-----------------|---------|
| Oiler: | BUILDING | BASE RATE | \$24.60 |
| | | FRINGE BENEFITS | 14.15 |

OPERATING ENGINEERS / HEAVY & HIGHWAY:

GROUP 1: A-Frame Winch Truck; Auto Patrol; Backfiller; Batch Plant; Bituminous Paver; Bituminous Transfer Machine; Boom Cat; Bulldozer; Mechanic; Cableway; Carry-all Scoop; Carry Deck Crane; Central Compressor Plant; Clamshell; Concrete Mixer (21 cu. ft. or Over); Concrete Paver; Truck-Mounted Concrete Pump; Core Drill; Crane; Crusher Plant; Derrick; Derrick Boat; Ditching & Trenching Machine; Dragline; Dredge Operator; Dredge Engineer; Elevating Grader & Loaders; Grade-All; Gurries; Heavy Equipment Robotics Operator/Mechanic; High Lift; Hoe-Type Machine; Hoist (Two or More Drums); Hoisting Engine (Two or More Drums); Horizontal Directional Drill Operator; Hydrocrane; Hyster; KeCal Loader; LeTourneau; Locomotive; Mechanic; Mechanically Operated Laser Screed; Mechanic Welder; Mucking Machine; Motor Scraper; Orangepeel Bucket; Piledriver; Power Blade; Pumpcrete; Push Dozer; Rock Spreader, attached to equipment; Rotary Drill; Roller (Bituminous); Scarifier; Scoopmobile; Shovel; Side Boom; Subgrader; Tailboom; Telescoping Type Forklift; Tow or Push Boat; Tower Crane (French, German & other types); Tractor Shovel; Truck Crane; Tunnel Mining Machines, including Moles, Shields or similar types of Tunnel Mining Equipment:

| | | |
|-----------------|-----------------|---------|
| HEAVY & HIGHWAY | *BASE RATE | \$28.85 |
| | FRINGE BENEFITS | 14.15 |

GROUP 2: Air Compressor (Over 900 cu. ft. per min.); Bituminous Mixer; Boom Type Tamping Machine; Bull Float; Concrete Mixer (Under 21 cu. ft.); Dredge Engineer; Electric Vibrator; Compactor/Self-Propelled Compactor; Elevator (One Drum or Buck Hoist); Elevator (when used to Hoist Building Material); Finish Machine; Firemen & Hoist (One Drum); Flexplane; Forklift (Regardless of Lift Height); Form Grader; Joint Sealing Machine; Outboard Motor Boat; Power Sweeper (Riding Type); Roller (Rock); Ross Carrier; Skid Mounted or Trailer Mounted Concrete Pump; Skid Steer Machine with All Attachments; Switchman or Brakeman; Throttle Valve Person; Tractair & Road Widening Trencher; Tractor (50 HP or Over); Truck Crane Oiler; Tugger; Welding Machine; Well Points; & Whirley Oiler:

| | | |
|-----------------|-----------------|---------|
| HEAVY & HIGHWAY | *BASE RATE | \$26.24 |
| | FRINGE BENEFITS | 14.15 |

GROUP 3: All off Road Material Handling Equipment, including Articulating Dump Trucks; Greaser on Grease Facilities servicing Heavy Equipment:

| | | |
|-----------------|-----------------|---------|
| HEAVY & HIGHWAY | *BASE RATE | \$26.65 |
| | FRINGE BENEFITS | 14.15 |

GROUP 4: Bituminous Distributor; Burlap & Curing Machine; Cement Gun; Concrete Saw; Conveyor; Deckhand Oiler; Grout Pump; Hydraulic Post Driver; Hydro Seeder; Mud Jack; Oiler; Paving Joint Machine; Power Form Handling Equipment; Pump; Roller (Earth); Steersman; Tamping Machine; Tractor (Under 50 HP); & Vibrator:

| | | |
|-----------------|-----------------|---------|
| HEAVY & HIGHWAY | *BASE RATE | \$25.95 |
| | FRINGE BENEFITS | 14.15 |

***Cranes with booms 150 ft. & over (including Jib) and where the length of the boom in combination with the length of the piling leads equals or exceeds 150 ft. - \$1.00 over Group 1 rate. Employees assigned to work below ground level are to be paid 10% above basic wage rate. This does not apply to open cut work.**

PAINTERS:

BOYD COUNTY:

| | | | |
|-------------|----------|-----------------|---------|
| Spray Only: | BUILDING | BASE RATE | \$25.46 |
| | | FRINGE BENEFITS | 15.10 |

GREENUP COUNTY:

| | | | |
|-------------|----------|-----------------|---------|
| Spray Only: | BUILDING | BASE RATE | \$19.26 |
| | | FRINGE BENEFITS | 3.50 |

BOYD & GREENUP COUNTIES:

| | | | |
|----------------------|----------|-----------------|---------|
| Brush & Roller Only: | BUILDING | BASE RATE | \$18.00 |
| | | FRINGE BENEFITS | 5.16 |

CARTER COUNTY:

| | | | |
|-------------|----------|-----------------|---------|
| Spray only: | BUILDING | BASE RATE | \$21.80 |
| | | FRINGE BENEFITS | 5.90 |

| | | | |
|-----------------|----------|-----------------|---------|
| Brush & Roller: | BUILDING | BASE RATE | \$21.48 |
| | | FRINGE BENEFITS | 3.90 |

BOYD, CARTER & GREENUP COUNTIES:

| | | | |
|-------------------------|----------|-----------------|---------|
| Sign Painter & Erector: | BUILDING | BASE RATE | \$20.23 |
| | | FRINGE BENEFITS | 3.25 |

PAINTERS / HEAVY HIGHWAY:

| | | | |
|---|-----------------|-----------------|---------|
| Bridges, Locks, Dams, Tension Towers & Energized Substations: | HEAVY & HIGHWAY | BASE RATE | \$31.03 |
| | | FRINGE BENEFITS | 15.10 |

| | | | |
|------------------------------|-----------------|-----------------|---------|
| Power Generating Facilities: | HEAVY & HIGHWAY | BASE RATE | \$27.79 |
| | | FRINGE BENEFITS | 15.10 |

PLUMBERS & PIPEFITTERS:

(Including HVAC Pipe & System Installation):

| | |
|-----------------|---------|
| BASE RATE | \$33.00 |
| FRINGE BENEFITS | 18.95 |

ROOFERS: (excluding metal roofs):

BOYD & GREENUP COUNTIES:

| | | |
|---|-----------------|---------|
| (Including built up roofs, modified roof, rubber roof & single ply roof): | BASE RATE | \$27.00 |
| | FRINGE BENEFITS | 11.58 |

| | | |
|-----------------------|-----------------|---------|
| Shake & Shingle Roof: | BASE RATE | \$19.31 |
| | FRINGE BENEFITS | 6.25 |

CARTER COUNTY:

| | |
|-----------------|---------|
| BASE RATE | \$16.42 |
| FRINGE BENEFITS | 1.50 |

SHEETMETAL WORKERS (including metal roofs):

(HVAC duct installation)

| | |
|-----------------|---------|
| BASE RATE | \$25.76 |
| FRINGE BENEFITS | 17.19 |

SPRINKLER FITTERS:

| | |
|-----------------|---------|
| BASE RATE | \$29.50 |
| FRINGE BENEFITS | 15.85 |

TRUCK DRIVERS / BUILDING:

| | | | |
|----------------|----------|-----------------|---------|
| 10 Yard Truck: | BUILDING | BASE RATE | \$16.27 |
| | | FRINGE BENEFITS | 1.50 |
| Dump Truck: | BUILDING | BASE RATE | \$15.47 |
| | | FRINGE BENEFITS | 2.74 |

TRUCK DRIVERS / HEAVY HIGHWAY:

| | | | |
|---|-----------------|-----------------|---------|
| Mobile Batch Truck Tender: | HEAVY & HIGHWAY | BASE RATE | \$16.57 |
| | | FRINGE BENEFITS | 7.34 |
| Greaser, Tire Changer, & Mechanic Tender: | HEAVY & HIGHWAY | BASE RATE | \$16.68 |
| | | FRINGE BENEFITS | 7.34 |
| Single Axle Dump & Flatbed, Semi-Trailer or Pole Trailer when used to pull building materials & equipment; Tandem Axle Dump; Distributor; Mixer, & Truck Mechanic: | HEAVY & HIGHWAY | BASE RATE | \$16.86 |
| | | FRINGE BENEFITS | 7.34 |
| Euclid, Other Heavy Earthmoving Equipment & Lowboy; Articulator Cat Truck & 5 Axle Vehicle; Winch & A-Frame when used in transporting materials; Ross Carrier; Fork Lift Truck when used to transport building materials; & Drivers on Pavement Breaker | HEAVY & HIGHWAY | BASE RATE | \$16.96 |
| | | FRINGE BENEFITS | 7.34 |

**End of Document
CR 2-018 2014
December 22, 2014**

STEVEN L. BESHEAR
GOVERNOR



LEONARD K. PETERS
SECRETARY

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
200 FAIR OAKS LANE, 4TH FLOOR
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

February 4, 2015

Mr. Danny Clarkston
Cannonsburg Water District
1606 Cannonsburg Rd
Ashland, KY 41102

RE: Cannonsburg Water District
AI # 33800, APE20140003
PWSID # 0100064-14-003
Existing RD Funded Water System
Improvements
Boyd County, KY

Dear Mr. Clarkston:

We have reviewed the plans and specifications for the above referenced project. The plans include:

- Water line construction of approximately
 - 2,800 feet of 8-inch PVC
 - 225 feet of 10-inch HDPE
 - 200 feet of 4-inch HDPE
- Construction of hydro-pneumatic booster pump stations with variable speed pumps
 - Dog Fork Road with 2 pumps at 55 gpm with 282 feet of TDH
 - Meadwood Heights with 2 pumps at 45 gpm with 71 feet of TDH
- Upgrade Tarpin Ridge Booster Pump Station with 2 pumps at 350 gpm with 258 feet TDH
- Upgrade the pump controls and replace the motor control center of the Midland Trail Booster Pump Station
- Replace 2,900 existing bronze touch read residential meters with new radio read meters
- Tank rehabilitation including sand blasting, and recoating the interior and exterior of the tanks; replacing tank vent system, level gages, interior ladders and providing separate inlet/outlet fill lines for the Princess Hill 300,000 gallon and Tarpin Ridge 50,000 gallon water storage tanks.

Cannonsburg Water District
AI # 33800, APE20140003
PWSID # 0100064-14-003
Existing RD Funded Water System Improvement
Boyd County, KY
February 4, 2015
Page 2 of 3

- Installation of new tank mixing system using Solar Bee model GS-9, Madera Corp or equivalent, in both the Princess Hill 300,000 gallon and Tarpin Ridge 50,000 gallon water storage tanks. Conditions, listed below, apply.

This is to advise that plans and specifications for the above referenced project are APPROVED with respect to sanitary features of design, as of this date with the requirements contained in the attached construction permit and also with following stipulations:

1. If variable speed pumps are not used on the hydro-pneumatic booster stations listed above, the tanks will need to be increased in size to comply with Ten States Standards.
2. Within forty-five days of this letter, a list of parameters that will be tested to determine if this mixing system is effective shall be submitted to the Engineering Section. If this is not provided to the Engineering Section, it may cause this construction permit to be withdrawn.
3. Within two years of this letter, a report demonstrating whether the mixing system is effective shall be submitted to the Engineering Section. This report shall include data for twelve months of operation. If the installation has not been completed within two years, and the construction permit has not expired, the report shall be submitted within thirteen months of completion of installation.
4. If additional units are to be installed on this tank or any other tank in the distribution system, the report demonstrating whether the mixing system is effective shall be submitted with the construction permit application for installation of additional units. If this has not been provided, this may result in a Notice of Deficiency on future installations.
5. The mixing system shall be thoroughly disinfected before being placed into a water storage tank.
6. If condition no. 4 above is not met, or if entry is made into the water tank during construction, the tank shall be thoroughly disinfected following completion of work on the tank and before being placed into service.
7. Disposal of heavily chlorinated water from the tanks disinfection process shall be in accordance with Kentucky Division of Water requirements.
8. Two or more successive sets of bacteriological samples, taken at 24-hour intervals, shall be taken and reported (using the most expedient method) to the Division of Water following disinfection.

Cannonsburg Water District
AI # 33800, APE20140003
PWSID # 0100064-14-003
Existing RD Funded Water System Improvement
Boyd County, KY
February 4, 2015
Page 3 of 3

9. Samples shall indicate microbiologically satisfactory water prior to placing the tank back into operation.
10. When this project is completed, the owner shall submit a written certification to Division of Water that the above referenced installation has been completed in accordance with the approved specifications. Such certification shall be signed by licensed professional engineer.

This approval has been issued under the provision of KRS Chapter 224 and regulations promulgated pursuant thereto. Issuance of this approval does not relieve the applicant from the responsibility of obtaining any other approval, permits or licenses required by this Cabinet and other state, federal and local agencies.

Unless construction of this project begins within two years from the date of this approval letter, the approval shall expire. If this approval expires, the original plans and specifications may be resubmitted for a new comprehensive review.

If you have any questions concerning this project, please contact Mr. Mohammed Mohiuddin at 502-564-3410 extension 4827.

Sincerely,



Mark Rasche, P.E.
Supervisor, Engineering Section
Water Infrastructure Branch
Division of Water

MR: MM
Enclosures

- C: E L Robinson Engineering (by e-mail only)
Boyd County Health Department (by e-mail only)
Public Service Commission (by e-mail only)
Division of Plumbing (by e-mail only)

SECTION 5

TECHNICAL SPECIFICATIONS

**CANNONBURG WATER DISTRICT
WATER SYSTEM IMPROVEMENTS
CONTRACTS 1, 2, & 3**

TECHNICAL SPECIFICATIONS

June 2014

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GENERAL
Section 00001

GENERAL INFORMATION

Project Title

Section 1. 2014-15 USDA- RD Funded Water System Improvements for the Cannonsburg Water District.

Scope of Work

Section 2. The work to be performed consists of furnishing all materials, labor equipment and the execution of all operations necessary for the completion of the mentioned contract for the Cannonsburg Water District.

The Major items of work include:

-Contract 1- Existing W/L, Stream Crossings Replacement, Improvements to Existing Midland Trail, Tarpin Ridge BPS, New BPS at Dog Fork and Midland Heights Rd.

-Contract 2- Improvements to Existing Tarpin Ridge and Princess Tanks

-Contract 3- Existing Residential Water Meter Replacement

Scheduling of Work

Section 3. The work shall be scheduled so the water lines can be put into service by phases and at the earliest possible date.

The Contractor shall coordinate all required shut-downs of water lines in use with the Cannonsburg Water District; so as to cause the least inconvenience to existing users thereof.

All work shall be completed within time limit established in other portions of the Contract Documents.

Traffic Maintenance

Section 4. All traffic must be maintained at all times on public streets and roadways. No road or street shall be closed without special written permission from the Owner.

Traffic must be maintained on Boyd County Fiscal Court maintained roads in accordance with the Standard Drawings.

Water for Testing and Sterialization

Section 5. The Owner will pay for water for 1 initial fill (sterilization), and 1 final filling (bac-tee testing) for the Contract 1- Waterline replacement work. For the Contract 2- Water Tanks Re-furbishing work, the Contractor will be provided sufficient water to dis-infect the tank per AWWA Standard D105- Method 2.

If the Contractor is negligent and requires additional water, the Owner will bill the Contractor at a cost of \$4.50/1,000 gallons. For the Water Tank work, the Contractor

The Cannonsburg Water District will assist the Contract1 Contractor with draining, valving off/isolation of the existing Princess and Tarpin Ridge tanks. The Contractor shall then have free use of the tank for renovation work. There are no requirements for furnishing temporary water storage while the Princess and Tarpin Ridge tanks are undergoing improvements. The Water District will maintain service using the other Tarpin Ridge tank and the Coffey 1.0 MG tank located across U.S. 60.

GENERAL

Section 01000

Standards

Section 1. All material furnished by the Contractor to be installed on the Project shall conform to the minimum requirements of the latest revisions in effect on the date of the standard specification published by the described organizations, unless other requirements are stated in these specifications. The standard specifications are combined under a single caption, for the sake of brevity, whenever referred to in the specifications as follows:

| | |
|--|-------|
| American Society of Testing Materials | ASTM |
| American Standards Association | ASA |
| American Water Works Association | AWWA |
| American Concrete Institute | ACI |
| American Association of the State Highway Officials | AASHO |
| Standard Specifications for Road and Bridge Construction, Kentucky Department of Highways | KDOH |
| Federal Specifications | FED |
| American Railway Engineering Association | AREA |
| Occupational Safety and Health Administration | OSHA |
| National Electric Code | NECK |
| Steel Structures Painting Council | SSPC |
| Fiberglass Reinforced Pipe Institute | FRPI |
| Kentucky Basic Building Code | KBBC |

The standards referred to, except as modified in these specifications, shall have the same force and effect as though printed herein. These standards are not furnished to bidders because contractors, manufacturers, and trades involved are generally assumed to be familiar with their requirements. The Consulting Engineer will furnish, upon request, information as to how copies of and standards, included by reference only, may be obtained.

Inspection and Testing

Section 2. The manufacturer of the specific materials shall establish the necessary quality control and inspection practice to assure compliance with the individual specification outlined above for the particular material.

Construction Site

Section 3. The construction area shall be confined to the limits of the public right-of-way in streets, the limits of the construction easements on private property as set forth by the Owner or to the property belonging to the Owner. The limits for the construction area are shown on the detailed construction drawings.

Samples

Section 4. Samples of materials or equipment submitted for review and contract compliance shall have a label indicating the material represented, its place of origin, and the name of the producer, the Contractor expecting to use the equipment, and the work for which the material will be used. Samples of finished materials shall be marked to indicate where they are required by the drawings and specifications.

Each delivery of samples shall be accompanied under separate cover by letter in duplicate from the Contractor containing a list of the samples, as indication of where the materials are intended to be used and the brands of materials and names of the manufacturers.

Acceptance of any samples shall not be taken in itself to change or modify any contract requirements, for acceptance shall be only for the characteristics or for the use of the material. The Project Manager, whenever he may deem it necessary, may take test samples from the various materials or equipment delivered to the site of the work by the Contractor. If any such test samples fails to meet the specification requirements, any previous approvals will be withdrawn and such material or equipment shall be subject to removal and replacement by the Contractor with material or equipment meeting the specification requirements; or, at the discretion of the Project Manager, the defective materials and equipment may be permitted to remain in place subject to a satisfactory adjustment of the contract.

Climatic Conditions

Section 5. All work which will be affected by climatic conditions, (wind, rain, frost, freezing or any other environmental conditions) shall be suspended unless permission is given by the Project Manager to proceed. Whenever work proceeds under any such conditions, the Contractor shall provide approved facilities for protecting all the materials and the finished work. This will include heating of materials if required for their proper installation.

END OF SECTION

SECTION 01060

APPLICABLE CODES

PART 1 - GENERAL

1.01 SCOPE

- A. All materials, products and construction procedures used during the execution of this Contract or incorporated in the Work shall comply with the latest provisions of applicable codes, regulations, and standards. A partial listing includes the following:
1. State Building Code.
 2. National Fire Codes.
 3. Regulations and Standards of the Occupational Safety and Health Act (OSHA), of the U.S. Department of Labor, and of the State.
 4. National Electrical Code.
 5. National Electric Safety Code (NESC).
 6. Underwriter's Laboratories, Inc.
 7. National Electrical Manufacturer's Association
 8. American National Standards Institute.
 9. American Society for Testing Materials.
 10. American Society of Heating, Refrigerating and Air Conditioning Engineers.
 11. Institute of Electrical and Electronics Engineers.
 12. All other applicable codes, regulations listed in the Specifications, and standards of utility companies.
- B. Specific provisions of codes, regulations and standards may be referenced in the Specifications to assist the Contractor and identify options selected by the Engineer. Such references do not relieve the Contractor from compliance with other applicable provisions of the codes, regulations and standards not specifically referenced.
- C. Should any change in the Work be required to comply with applicable codes, regulations, or standards, the Contractor shall refer same to the Owner.
- D. Should any change in the Work be required to comply with local regulations, field conditions, or the request of other parties, the Contractor shall refer same to the Owner for approval before any Work which deviates from the Original requirements and/or intent of the Drawings and Specifications is started. In the event of disagreement as to the necessity of such changes, the decision of the owner will be final and binding.

END OF SECTIONS

SECTION 01301

SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Submittal Procedures.
- B. Construction Progress Schedules.
- C. Proposed products List.
- D. Shop Drawings.
- E. Product Data.
- F. Samples.
- G. Manufacturers' Instruction.
- H. Manufacturers' Certificates.
- I. Resubmittals.

1.02 RELATED SECTIONS

- A. Section 01400, Quality Control: Manufacturers' Field Services and Reports.
- B. Section 01700, Contract Closeout: Contract Warranty and Manufacturer's Certificates Closeout Submittals.

1.03 SUBMITTAL PROCEDURES

- A. Transmit each submittal with AIA Form G810 or Engineer accepted form.
- B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.
- C. Identify Project, Contractor, Subcontractor or Supplier; pertinent Drawing sheet and detail number(s), and Specification Section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialled certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.
- E. Make all submittals far enough in advance of Schedule dates of installation to provide all required time for review, for securing necessary reviews by others, for possible revision and resubmittal, for placing orders and securing delivery. Deliver, postage prepaid. Schedule submittals to expedite the Project, and deliver to the Engineer at business address. Coordinate submission of related items.
- F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- G. Provide space for Contractor and Engineer review stamps.

- H. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- I. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.
- J. In scheduling, allow at least ten (10) full working days (Monday through Friday, less legal holidays) for the Engineer's review and approval. Following his receipt of the submittal the Engineer will return via first class mail. The Engineer is required by the Owner to provide prompt disposition of all submittals, and will transmit the submittal, request for additional information, or a notification that additional time will be required for review and approval due to the complexity of the submittal, within the ten (10) working day period. Regardless of the size and complexity of the submittal, review and approval shall be complete within thirty (30) working days.

1.04 PROPOSED PRODUCTS LIST

- A. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.05 SHOP DRAWINGS

- A. Submit in the form of one reproducible transparency and one opaque reproduction, or, submit the number of copies which the Contractor requires, plus three (3) copies which will be retained by the Engineer.

1.06 PRODUCT DATA

- A. Submit the number of copies which the Contractor requires, plus three (3) copies which will be retained by the Engineer.
- B. Mark each copy to identify applicable products, models, options, and other data. Mark out inapplicable areas. Supplement manufacturers' standard data to provide information unique to this Project.
- C. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in Section 01700 - Contract Closeout.

1.07 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Engineer's selection.
- C. Include identification on each sample, with full Project information.
- D. Submit the number of samples specified in individual Specification Sections; one of which will be retained by the Engineer.
- E. Reviewed samples which may be used in the Work are indicated in individual Specification Sections.

1.08 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual Specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.09 MANUFACTURER'S CERTIFICATES

- A. When specified in individual Specification Sections, submit manufacturers' certificate to the Engineer for review, in quantities specified for Project Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product, but must be acceptable to the Engineer.

1.10 RESUBMITTALS

- A. The Owner may request a fee to be paid by the Contractor for submittals which are being reviewed by the Engineer for the third time or more. Each claim by the Owner will be substantiated on a time and material basis.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not used

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Quality assurance and control of installation.
- B. References.
- C. Field samples.
- D. Mock-up.
- E. Inspection and testing laboratory services.
- F. Manufacturers' field services and reports.

1.02 RELATED SECTIONS

- A. Section 01060, Applicable Codes.
- B. Section 01090, Reference Standards.
- C. Part 3, General Conditions, Section 41: Shop Drawings and Samples.
- D. Section 01600, Material and Equipment: Requirements for Material and Product Quality.

1.03 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.04 REFERENCES

- A. Conform to reference standard by date of issue current on date of Contract Documents.

1.05 FIELD SAMPLES

- A. Install field samples at the site as required by individual specifications Sections for review.

- B. Acceptable samples represent a quality level for the Work.
- C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by the Engineer.

1.06 MOCK-UP

- A. Tests will be performed under provisions identified in this Section.
- B. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Where mock-up is specified in individual Sections to be removed, clear area after mock-up has been accepted by the Engineer.

1.07 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual Specification Sections, require material or product suppliers, or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment and lubrication as applicable, and to initiate instructions when necessary.
- B. Manufacturer's personnel are to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- C. Submit report in duplicate within 10 days of observation to the Engineer for review.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01410

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Section and payment.
- B. Contractor submittals.
- C. Laboratory responsibilities.
- D. Laboratory reports.
- E. Limits on testing laboratory authority.
- F. Contractor responsibilities.
- G. Schedule of inspections and tests.

1.02 RELATED SECTIONS

- A. Part 3, General Conditions.
- B. Section 01650, Starting of Systems: Testing, Adjusting, and Balancing of Systems.
- C. Section 01700, Contract Closeout: Project Record Documents.
- D. Individual Specification Sections: Inspections and Tests Required, and Standards for Testing.

1.03 REFERENCES

- A. ANSI/ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- B. ANSI/ASTM E329 - Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

1.04 SELECTION AND PAYMENT

- A. Contractor shall employ and pay for services of an independent testing laboratory to perform specified inspection and testing.
- B. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of ANSI/ASTM E329 and ANSI/ASTM D3740.
- B. Laboratory: Authorized to operate in State in which Project is located.
- C. Laboratory Staff: Maintain a full time State registered Engineer on staff to review services.

- D. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards (NBS) Standards or accepted values of natural physical constants.

1.06 CONTRACTOR SUBMITTALS.

- A. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time registered Engineer and responsible officer.
- B. Submit copy of report of Laboratory Facilities Inspection made by Materials Reference Laboratory of National Bureau of Standards (NBS) during most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.07 LABORATORY RESPONSIBILITIES

- A. Test samples of mixes submitted by Contractor.
- B. Provide qualified personnel at site. Cooperate with the Engineer and Contractor in performance of services.
- C. Perform specified inspection, sampling, and testing of Products in accordance with specified standards.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- E. Promptly notify the Engineer and Contractor of observed irregularities or non-conformance of work or products.
- F. Perform additional inspections and tests required by the Engineer.

1.08 LABORATORY REPORTS

- A. After each inspection and tests, promptly submit two copies of laboratory report to the Engineer, and to Contractor.
- B. Include:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Name of inspector.
 - 4. Date and time of sampling or inspection.
 - 5. Identification of product and Specifications section.
 - 6. Location in the Project.
 - 7. Type of inspection or test.
 - 8. Date of test.
 - 9. Results of tests.
 - 10. Conformance with Contract Documents.
- C. When requested by the Engineer, provide interpretation of test results.

1.09 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of Contractor.
- D. Laboratory has no authority to stop the Work.

1.10 CONTRACTOR RESPONSIBILITIES

- A. Deliver to laboratory at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.
- B. Cooperate with laboratory personnel, and provide access to the Work.
- C. Provide incidental labor and facilities to provide access to Work to be tested, to obtain and handle samples at the site or at source of Products to be tested, to facilitate tests and inspections, storage and curing of test samples.
- D. Notify the Engineer and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.
- E. Where excavated material available for compacting proves to be unsuitable or the Contractor finds it impractical to use the excavated material to meet the requirements, the Contractor shall, at not extra cost compensation, procure suitable backfill material elsewhere and dispose of the unsuitable material.

1.11 SCHEDULE OF INSPECTIONS AND TESTS

- A. Inspection and tests for soil and rock shall be in accordance with Division 2 and ASTM D3470.
- B. Inspections and tests for concrete shall be in accordance with Division 3.
- C. Owner will provide testing lab services for soil to determine acceptability of the fill or material solely for the Owner's own benefit. Additional tests and inspections desired by the Contractor to meet compaction limits shall be provided by the Contractor.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01560

TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Water Control.
- B. Dust Control.
- C. Erosion and Sediment Control.
- D. Noise Control.
- E. Pest Control.
- F. Pollution Control.

1.02 RELATED SECTIONS

- A. NOT APPLICABLE.

1.03 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.04 DUST CONTROL

- A. Execute Work by methods to minimize raising dust from construction operations.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.05 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize amount of bare soil exposed at one time.
- C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. Include such temporary measures as straw bale barrier, sediment basin, silt fence, storm drains inlet protection, temporary seeding per Soil Conservation Service, "Water Management and Sediment Control for Urbanizing Areas" publication.

1.06 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Substitutions.
- E. Prequalification.

1.02 RELATED SECTIONS

- A. Section 01400 - Quality Control: Product quality

1.03 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- C. Provide interchangeable components of the same manufacturer, for similar components.
- D. Brand Name Products Specified: The use of brand names in the contract Documents shall in each instance be understood to mean that: (a) a standard for comparison of equality has been established by the Engineer to identify his design objectives in easily recognized terms; (b) the name(s) identified are an effort on the part of the Engineer to assist all prospective Bidders to locate, with ease, source(s) for equipment and/or materials that can conform to Specification requirements; and (c) although the Engineer recognizes the fact that brands other than those names may be generally available and purported to be capable of achieving the same result, and may be submitted by a Contractor as substitutes for those named, the burden of proof of equality shall rest entirely upon the Contractor.

Under no circumstances shall the appearance in the Contract Documents of a particular brand, model, or type designation for equipment or material be inferred as automatic basis for acceptance of equipment or material bearing that designation, merely because the designation appears in these Documents. Acceptance of all items proposed, whether named or not, will be judged solely upon demonstration by the Contractor that each item meets all performance requirements specified.

1.04 TRANSPORTATION AND HANDLING

- A. Transport and handle Products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to assure that Products comply with requirements, quantities are correct, and Products are undamaged.
- C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

1.05 STORAGE AND PROTECTION

- A. Store and protect Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive Products in weather-tight, climate controlled enclosures.
- B. For exterior storage of fabricated Products, place on sloped supports, above ground.
- C. Provide off-site storage and protection when site does not permit on-site storage or protection.
- D. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- F. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.
- G. Arrange storage of Products to permit access for inspection. Periodically inspect to assure Products are undamaged and are maintained under specified conditions.

1.06 SUBSTITUTIONS

- A. Engineer will consider requests for Base Equipment Substitutions (Alternate Equipment) proposed by the Contractor in the BID after the "Notice to Proceed" is issued for equipment which is not prequalified for the Base Bid Equipment Schedule. See Part 1.07 for Equipment which is not prequalified for the Base Bid Equipment Schedule. See Part 1.07 for Equipment Prequalifications.
- B. Substitutions may be considered when a Product becomes unavailable through no fault of the Contractor.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A request constitutes a representation that the Contractor:
 - 1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
 - 2. Will provide the same warranty for the Substitution as for the specified Project.
 - 3. Will coordinate installation and make changes to other work which may be required for the work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension which may subsequently

- become apparent.
5. Will reimburse Owner for review or redesign services associated with re-approval by authorities.
- E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- E. Substitution Submittal Procedure:
1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
 2. Submit Shop Drawings, Product data, and certified test results attesting to the proposed Product equivalence.
 3. The Engineer will notify Contractor, in writing, of decision to accept or reject request.

1.07 EQUIPMENT PREQUALIFICATION

- A. Equipment shall be provided by a manufacturer/supplier experienced in the design and production of similar type, size and capacity equipment.
- B. Within 10 days prior to the Bid Opening, manufacturer/suppliers who are not currently listed in the Base Bid Equipment Schedule must obtain pre-bid qualification, from the Engineer, of the equipment specified to be able to quote to Bidders on the Base Bid.
- C. Manufacturer/Supplier shall submit to the Engineer all necessary information specified and any other pertinent information requested by the Engineer after review of the prequalification submittal. This submittal shall constitute a representation that the manufacturer/supplier:
 1. Has determined that it meets or exceeds the quality and capacity levels of the specified products.
 2. Will provide a warranty as specified in Section 01740.
 3. Will coordinate installation and start-up and make changes to other Work which may be required for the work to be complete with no additional cost to Owner.
 4. Waives claims for additional costs or time extensions which may subsequently become apparent.
 5. Will reimburse Owner for review or redesign services associated with approval.
 6. Submittal must be signed and sealed by a Registered Professional Engineer who may be an employee of the manufacturer.
- D. Manufacturer/Supplier may request a prequalification submittal conference with the Engineer if submittal is rejected by Engineer.
- E. Manufacturer/Supplier shall allow five (5) working days review time by the Engineer for prequalification submittal.

- F. Bidder must make certain that equipment is prequalified before including the proposed equipment in their Base Bid.
- G. Contractors may review pre-bid qualified equipment (Alternate Equipment) Shop Drawings by appointment with the Engineer or by contacting the manufacturer/supplier directly. The Engineer shall not deliver Shop Drawings to any Plan Holder.
- H. Selection of Alternate Equipment by Contractor constitutes a representation that:
 - 1. Proposed product meets or exceeds the quality level of the specified product.
 - 2. Will provide the same warranty for the Alternate as for the specified product.
 - 3. Will coordinate installation and make changes to other work which may be required for the work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent.

1.08 PATENT INFRINGEMENT

- A. The Contractor, at his own expense, will defend, save harmless, settle or otherwise dispose of any suit brought against the Owner or its representatives which is based on a claim that the equipment proposed and offered by the Contractor, and the operation thereof in accordance with the methods specified by the Contractor constitutes an infringement on any United States patent or patents prior to the dates of the proposal and acceptance of the equipment, and will pay all damages and costs awarded therein against the Owner, or any amounts agreed upon in any settlement or disposal thereof with the Contractor's consent, if such Contractor is duly notified in writing of such suit and given authority, information and assistance (at the expense of the Contractor) for the defense of same, provided that the Contractor will not be liable for any claim or infringement based upon the operation of the equipment proposed by the Contractor not substantially conforming to the methods specified by the Contractor's written operation instruction, or on any modifications of the equipment not approved by the Contractor in writing, or on the use of the equipment proposed (or any part thereof) in connection with a patented process over which the Contractor has no control.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01650

STARTING OF SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Starting Systems.
- B. Demonstration and instructions.
- C. Testing, adjusting, and instructions.

1.02 RELATED SECTIONS

- A. Section 01400, Quality Control: Manufacturers Field Reports
- B. Section 01700, Contract Closeout: System Operation and Maintenance Data and Extra Materials.

1.03 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Engineer seven (7) days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of responsible manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual Specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

1.04 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled times, at equipment location.
- E. Prepare and insert additional data in Operations and Maintenance Manuals when need for additional data becomes apparent during instruction.
- F. The amount of time required for instruction on each item of equipment and system is that specified in individual Sections.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Closeout Procedures.
- B. Substantial Completion.
- C. Final Cleaning.
- D. Adjusting.
- E. Project Record Documents.
- F. Operation and Maintenance Data.
- G. Warranties.
- H. Spare Parts and Maintenance Materials.

1.02 RELATED SECTIONS

- A. Section 01500, Construction Facilities and Temporary Controls: Progress Cleaning.
- B. Section 01650, Starting of Systems: System Start-Up, Testing, Adjusting, and Balancing.
- C. Section 01730, Operation and Maintenance Data.
- D. Section 01740, Warranties and Bonds.

1.03 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection.
- B. Provide submittal to Engineer that are required by governing or other authorities.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.04 SUBSTANTIAL COMPLETION

- A. Contractor:
 - 1. Submit written certification to Engineer that Project is substantially complete.
 - 2. Submit list of major items to be completed or corrected.
- B. Engineer will make an inspection within seven (7) days after receipt of certification, together with Owner's representative.
- C. Should Engineer consider that Work is substantially complete:

1. Contractor shall prepare, and submit to Engineer, a list of items to be completed or corrected, as determined by the inspection.
2. Engineer will prepare and issue a Certificate of Substantial Completion, containing:
 - a. Date of Substantial Completion.
 - b. Contractor's list of items to be completed or corrected, verified and amended by Engineer.
 - c. The time within which Contractor shall complete or correct Work of listed items.
 - d. Time and date Owner will assume possession of Work or designated portion thereof.
 - e. Responsibilities of Owner and Contractor for:
 1. Insurance.
 2. Utilities.
 3. Operation of mechanical, electrical and other systems.
 4. Maintenance and cleaning.
 5. Security.
 - f. Signatures of:
 1. Engineer.
 2. Contractor.
 3. Owner.

3. Owner occupancy of Project or Designated Portion of Project:
 - a. Contractor shall:
 1. Obtain Certificate of Occupancy.
 2. Perform final cleaning in accordance with Section 01710.
 - b. Owner will occupy Project, under provisions stated in Certificate of Substantial Completion.
4. Contractor: Complete Work listed for completion or correction, within designated time.

D. Should Engineer consider that Work is not substantially complete:

1. Engineer shall immediately notify Contractor, in writing, stating reasons.
2. Contractor: Complete work, and send second written notice to Engineer, certifying that Project, or designated portion of Project, is substantially complete.
3. Engineer will re-inspect Work.

1.05 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Clean equipment and fixtures to a sanitary condition.
- D. Clean filters of operating equipment.
- E. Clean debris from roofs, gutters, downspout, and drainage systems.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.

- G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.06 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.07 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following Record Documents; record actual revisions to the Work:

1. Contract Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other Modifications to the Contract.
5. Reviewed Shop Drawings, product data, and samples.

- B. Store Record Documents separate from documents used for construction.

- C. Record information concurrent with construction progress.

- B. Specifications: Legibly mark and record at each product Section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and Modifications.

- C. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measure depths of foundations in relation to finish first floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Contract Drawings.

- F. Submit documents to Engineer with claim for final Application for Payment.

1.08 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual Specifications Sections.

- B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

- C. All spares shall be coated or packed in an approved fashion to prevent corrosion or deterioration during long time storage. Packaging shall be marked in an approved fashion to identify each spare part.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01710

CLEANING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Related Requirements:
 - 1. Project Closeout: Section 01700.
 - 2. Cleaning for Specific Products or Work: Specification Section for that work.
- B. Maintain premises free from accumulations of waste, debris, and rubbish, caused by operations.
- C. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for occupancy.

1.02 SAFETY REQUIREMENTS

- A. Hazards Control:
 - 1. Store volatile wastes in covered metal containers, and remove from premises daily.
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 1. Do not burn or bury rubbish and waste materials on project site.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 - 3. Do not dispose of wastes into streams or waterways.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute cleaning to ensure that building, grounds and public properties are maintained free from accumulations of waste materials and rubbish.
- B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- C. At reasonable intervals during progress of work, clean site and public properties, and dispose of waste materials, debris and rubbish.
- D. Provide on-site containers for collection of waste materials, debris and rubbish.

- E. Remove waste materials, debris and rubbish from site and generally dispose of at public or private dumping areas off Owner's property.
- F. Handle materials in a controlled manner with as few handling as possible; do not drop or throw materials from heights.
- G. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

3.02 FINAL CLEANING

- A. Refer to Section 01700.

END OF SECTION

SECTION 01730

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Format and content of Manuals.
- B. Instruction of Owner's personnel.
- C. Schedule of submittals.

1.02 RELATED SECTIONS

- A. Section 01400, Quality Control: Manufacturer's Instructions.
- B. Section 01600, Material and Equipment: Systems Demonstration.
- C. Section 01700, Contract Closeout: Contract Closeout Procedures.
- D. Section 01740, Warranties and Bonds.
- E. Individual Specifications Sections: Specific requirements for Operation and Maintenance data.

1.03 QUALITY ASSURANCE

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.04 FORMAT

- A. Prepare data in the form of an instructional manual.
- B. Binders: Commercial quality, 8-1/2 x 11 inch three-ring binders with hardback, cleanable, plastic covers; one inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- C. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; list title of Project and identify subject matter of contents.
- D. Arrange content by systems under Section numbers and sequence of Table of Contents of this Project Manual.
- E. Provide tabbed fly leaf for each separate project and system, with typed description of product and major component parts of equipment.
- F. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.05 CONTENTS, EACH VOLUME

- A. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Engineer, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.
- B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- E. Type Text: As required to supplement product data.
- F. Warranties and Bonds: Bind in copy of each.

1.06 MANUAL FOR MATERIALS AND FINISHES

- A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.
- B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional Requirements: As specified in individual product Specifications Sections.

1.07 MANUAL FOR EQUIPMENT SYSTEMS

- A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- B. Panelboard Circuit Directories: Provide electrical service characteristics, controls and communications.
- C. Include color coded wiring diagrams as installed.
- D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instruction.

- E. Maintenance Requirements: Include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instruction; and alignment, adjusting, balancing, and checking instructions.
- F. Provide servicing and lubrications schedule, and list of lubricants required.
- G. Include manufacturer's printed operation and maintenance instructions.
- H. Include sequence of operation by controls manufacturer.
- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- L. Include test and balancing reports as specified in Section 01400.
- M. Additional Requirements: As specified in individual product Specification Sections.

1.08 INSTRUCTION OF OWNER PERSONNEL

- A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.
- B. For equipment requiring seasonal operation, perform instructions for other seasons within six months.
- C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- D. Prepare and insert additional data in Operation and Maintenance Manual when needed for such data becomes apparent during instruction.

1.09 SUBMITTALS

- A. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- B. Submit one copy of completed volumes in final form 15 days prior to final inspection. Copy will be returned after final inspection, with Engineer comments. Revise content of documents as required prior to final inspection.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01740

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Preparation and submittal.
- B. Time and schedule of submittals.

1.02 RELATED SECTIONS

- A. Part 3, General Conditions, Section 32: Guarantee of Work.
- B. Section 01700, Contract Closeout: Contract Closeout Procedures.
- C. Section 01730, Operation and Maintenance Data.

1.03 FORM OF SUBMITTALS

- A. Bind in commercial quality, 8-1/2 x 11 inch binders with hardback, cleanable, plastic covers.
- B. Label cover of each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible principal.
- C. Table of Content: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the Specification Section in which specified, and the name of the project or work item.
- D. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

1.04 PREPARATION OF SUBMITTALS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item or work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

1.05 TIME OF SUBMITTALS

- A. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
- B. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
- C. For items of Work when acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

1.06 WARRANTIES

- A. Except as otherwise specifically provided in the Contract Documents, all warranties on equipment and systems shall extend for one calendar year from the date of the particular equipment of system. During the warranty period, the contractor is responsible for repair or replacement of all failures and defects, exclusive of ordinary and routine maintenance and failure traceable to the lack thereof. This requirement shall be thoroughly explained by the Contractor to all prospective equipment suppliers. The provisions of any usual warranty, terms of sale, etc. by supplier shall not be substituted for this requirement, except where such substitution provides an extended warranty beyond the requirements of this paragraph. These warranty requirements are of the essence of the Contract between the Contractor and Owner.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01910

PROJECT MEETINGS

1.0 GENERAL

1.1 DESCRIPTION

- A. Work included under this section includes attending the prebid conference, contract signing, pre-construction conference and progress meetings.

2.0 APPLICATION

A. Pre-bid Conference

All prospective bidders are required to attend a pre-bid conference. The bidder's failure to comply with this requirement will cause disqualification of Contractor's bid..

B. Contract Signing

a. Within ten (10) days after the issuance of the Notice of Award, the Contractor shall be required to appear at the office of the Engineer or the Owner so that he may sign the contract and within ten (10) days thereafter the Contractor will be given Notice to Proceed.

b. The Contractor shall be represented at the meeting by two top ranking officers of the company; if a corporation, the president and secretary; if a partnership, at least two partners.

1. The Contractor shall bring the following items:

- a. Six (6) copies of the performance bond
- b. Six (6) copies of the payment bond
- c. Six (6) copies of the insurance documents, including the power of attorney.
- d. Six (6) copies of the Workers' Compensation certificate
- e. The corporate seal

C. Pre-Construction Conference

a. As soon as possible after the contract signing, the pre-construction conference will be held at the office of the Engineer or the Owner.

b. The Contractor shall be represented at the conference by one top ranking officer of the company and the project superintendent.

c. The agenda for the conference will generally include the following discussion of topics:

1. Responsibilities of Engineer
2. Responsibilities of Owner
3. Responsibilities of Contractor
4. Responsibilities of Funding Agency
5. Coordination of utility relocation work
6. Procedures of processing periodic estimates
7. Discussion of contractor's schedule
8. Review of subcontractors
9. Procedures for change orders
10. Safety of project
11. Labor and equal employment requirements
12. Project inspection
13. Rights-of-way and easements
14. Project sign
15. Coordination between contractors
16. General contract requirements
17. Project closeout and final acceptance

D. Progress Meetings

- a. Progress meetings shall be held on a monthly basis corresponding to the submittal of the periodic estimate.
- b. The meeting shall be held at the project site.
- c. The Contractor shall be represented by the project superintendent at all meetings and by a ranking officer, of the company, if so requested by the Owner.

END OF SECTION

SECTION 01910-2

SITWORK

Section 02200

Excavation and Backfill

General

Section 1. The work covered under this section consists of furnishing all labor, materials, and equipment for excavation, backfilling, compacting, rough and final grading, required to complete the construction as shown and specified in the Contract Documents.

Sheeting and Shoring

Section 2. The Contractor shall furnish, put in place, and maintain such piling, sheeting, bracing, etc., as is required by OSHA regulations and the "Safety & Health Regulations for Construction", Title 29, Chapter XVII, CFR, Part 1926, formerly Title 29, Chapter XIII, CFR, Part 1518.

Such piling, sheeting, bracing, etc., shall be furnished, put in place, and maintained as may be required to support the sides of all excavation to prevent any movement which could cause injury to persons, structures, utilities or property, either public or private or any portion of the work being performed under this Contract.

Sheeting, if required, shall remain in place until the pipe or structure has been laid or constructed, tested for defects and repaired if necessary, and the backfill placed and compacted. Sheeting may be pulled concurrently with the placing of backfill if directed by the Project Manager.

The Contractor shall leave in place any and all sheeting, bracing, etc., which the Project Manager may direct him, in writing, to leave in place at any time during the progress of the work for the purpose of preventing injury to structures, utilities or property, either public or private.

Removal of Water

Section 3. The Contractor shall provide at all times during the construction, proper and approved equipment including pumps and well points of sufficient capacity to meet the maximum requirements for the removal of water and like wastes from all excavations. The disposal of the water and wastes shall be in such a manner as not to interfere with the proper construction of pipe lines or masonry. This disposal shall not withdraw sand or cement from concrete work or affect the prosecution of work under his own or adjacent contracts.

The Contractor shall not dispose of ground and/or surface water into newly constructed sanitary sewers or existing sanitary sewers.

Pumping sumps shall be excavated outside the trench or structure excavation lines and be of sufficient size to meet the requirements of the location. The Contractor shall pump out or otherwise remove and dispose of, as fast as it may collect, any water or like wastes which may be found or may accumulate in the excavations. Underdrains, if required to keep the excavations dry, shall lead to pumping sumps.

All excavations must be kept dry as specified for laying pipe or for placing concrete.

Rock Excavation

Section 4. All costs incurred for rock excavation shall be included in the lump sum bid for this project. There shall not be a separate pay item for rock excavations. No excavated rock shall be used for backfill.

Rock excavation is defined as material which is either solid or stratified and which cannot be removed by recognized standard excavating methods. This material will require drilling, blasting, or some other mechanical means of shattering. Boulders one (1) cubic yard and over in volume required to be removed are classified as rock excavation even though portions of it may be stratified or laminated, or may be as hard as portions of sandstone or limestone.

The Contractor shall exercise all possible care in any blasting to avoid injury to persons and adjacent property. The rock shall be well covered and sufficient warning shall be given to all persons in the vicinity of the work before blasting. Proper care shall be exercised to avoid injury to water pipes or other structures either below or above ground. Caps or other exploders shall not be kept in the same place in which dynamite or other explosives are stored. All Federal, State or local regulations covering the use of explosives shall be strictly observed; and in addition, the Contractor shall conform to any further regulations which the Project Manager may deem necessary in this respect.

The Contractor shall remove all rock that is shattered below grade due to a too deep drill hole, a too heavy charge of explosives or for any other reason, and refill the excavation to the required grade with compacted gravel or other suitable material at his expense.

All structures, pipelines, water mains, conduits, etc., below and above ground that are damaged due to blasting of rock are to be replaced or repaired by the Contractor at his expense and to the satisfaction of the Project Manager.

Rock excavation shall be to the depth required to provide a minimum of four (4) inches of clearance below all parts of pipes, valves, or fittings.

The Contractor shall provide crushed aggregate pipe bedding to the specified grade. Trench widths in rock excavations shall be eight (8) inches wider than the outside diameter of the bell of the pipe. Any excavations and backfill beyond these limits will be at the expense of the Contractor.

Buried Pipe Lines

Section 5. Pipe line trenches shall be excavated so that the pipes and appurtenances can be installed to the alignments and grades required. Pipe line trenches in all types of traveled streets, roadways, drives and parking areas to a distance of five (5) feet behind curbs and all road shoulders shall be backfilled with granular material.

If, in the opinion of the Project Manager, the material at or below the normal grade of the bottom of the trench, or other excavation is unsuitable for foundation, it shall be removed to such depths and widths as he may direct and be replaced by the Contractor with gravel, crushed stone or other acceptable materials. Payment for this work will be made as provided in "Changes in Work" in the General Provisions.

If the bottom of any excavation is removed beyond the limits shown on the drawings or described in these specifications without authorization of the Project Manager, it shall be refilled at the Contractor's expense with gravel, crushed stone, or other acceptable material.

Mechanized equipment, such as bulldozers, front end loaders, etc., shall under no conditions, be used to push excavated material directly into the open trench as backfill between the bottom of the trench and one (1) foot above the pipe.

Where gravel backfill is specified, the backfill material from one (1) foot above the pipe to the street or shoulder grade (or subgrade of pavement), shall consist of approved gravel that shall be puddled with hoe and pipe nozzle after the trench is backfilled. The Contractor shall furnish the necessary tank trucks, water, pumps, and all equipment required to settle the gravel backfill by the puddling method.

When the type of trench backfill material is not indicated on the drawings or specified, the Contractor may backfill the trench from one (1) foot above the top of the pipe to the top of the trench with excavated material provided that such material consists of loam, clay, sand, gravel, or other materials that, in the opinion of the Project Manager, are suitable for backfilling. Care shall be taken to carry the backfill up evenly in the trench.

The Project Manager reserves the right to condemn any portion of the work during the term of this Contract, should any gravel backfilled trench settle or there is any other evidence to indicate that the backfill has been improperly placed. The Contractor will be ordered to reopen the trench at those locations and replace the backfill in the proper manner without additional compensation.

Gravel Backfill

Section 6. Gravel used for backfill shall consist of natural bank gravel having durable particles graded from fine to coarse in a reasonably uniform combination with no boulders or stones larger than two (2) inches in size. It shall be free from slag, cinders, ashes, refuse, or other deleterious or objectionable materials. It shall not contain excessive amounts of loam and clay and shall not be lumpy or frozen. No more than fifteen percent (15%) shall pass a No. 200 sieve. All such materials shall be approved by the Project Manager.

Subsurface Conditions

Section 7. The Contractor shall examine, investigate and inspect the construction site as to the nature and location of the work, and the general and local conditions at the construction site, including, without limitation, the character of surface or sub-surface conditions and obstacles to be encountered on and around the construction site; and shall make such additional investigation as he may deem necessary for the planning and proper execution of the work.

Site Preparation

Section 8. All trees, brush, stumps, logs, tree roots, and structures scheduled for demolition shall be removed.

All cut and fill areas shall be properly stripped. Topsoil shall be removed to its full depth and stockpiled for use in finish grading. Any rubbish, organic and other objectionable soils, and other deleterious material, shall be disposed of off the site, or as directed by the Project Manager if on-site disposal is provided. In no case shall such objectionable material be allowed in or under the fill unless specifically authorized in writing by the Project Manager.

Prior to the addition of fill, the original ground shall be compacted to meet the requirements of the specification. Special notice shall be given to the proposed fill area at this time. If wet spots, spongy conditions, or ground water seepage is found, corrective measures must be taken before the placement of fill.

Demolition

Section 9. The Contractor shall submit a schedule for the demolition of the structures.

The Contractor shall provide all materials and equipment required to meet the goals of demolition as set forth on the construction drawings.

The Contractor shall notify the Project Manager 30 days prior to the demolition of any structure.

END OF SECTION

SITWORK

Section 02201

Excavation and Backfill - Structures

General

Section 1. Excavations shall be made for sufficient size to accommodate the dimensions and depth of structures shown on the drawings. The top soil shall be removed from the sites excavated and stock piled for use after the subsoil backfill has been completed.

Backfilling

Section 2. Fill shall be formed of satisfactory materials placed in successive horizontal layers of not more than twelve (12) inches in loose depth for the full width of the cross section. The depth of lift may be increased if the Contractor can demonstrate his ability to compact a larger lift.

All material entering the fill shall be free of organic matter such as leaves, grass, roots and other objectionable material.

The operations on earth work shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing weather, or other unsatisfactory conditions. The Contractor shall keep the work areas graded to provide drainage at all times.

The fill material shall be of the proper moisture content before compaction efforts are started. Wetting or drying of the material and manipulation to secure a uniform moisture content throughout the layer shall be required. Should the material be too wet to permit proper compaction or rolling, all work on all portions of the embankment thus affected shall be delayed until the material has dried to the required moisture content. The moisture content of the fill material should be no more than two (2) percentage points higher or lower than optimum unless otherwise authorized. Sprinkling shall be done with equipment that will satisfactorily distribute the water over the area being backfilled. The Contractor shall use vibratory rollers for compaction, except within five (5) feet of structures where hand operated vibratory compactors shall be used.

Compaction operations shall be continued until the fill is compacted to not less than 90% above foundation elevation and 95% below foundation elevation of the maximum density as determined in accordance with ASTM-D1557-70 (Modified). Any areas inaccessible to a vibratory roller shall be consolidated and compacted by mechanical tampers. The equipment shall be operated in such a manner that hardpan, cemented gravel, clay or other chunky soil material will be broken up into small particles and become incorporated with the other material in the layer.

In the construction of filled areas, starting layers shall be placed in the deepest portion of the fill, and as placement progresses, additional layers shall be constructed in horizontal planes. If directed, original slopes shall be continuously, vertically benched to provide horizontal fill planes. The size of the benches shall be formed so that the base of the bench is horizontal and the back of the bench is vertical. As many benches as are necessary to bring the site to final grade shall be constructed. Filling operations shall begin on the lowest bench, with the fill being placed in horizontal twelve (12) inch loose lifts unless otherwise authorized. The filling shall progress in this manner until the entire first bench has been filled, before any fill is placed on the succeeding benches. Proper drainage shall be maintained at all times during benching and filling of the benches, to insure that all water is drained away from the fill area.

When rock and other embankment material are excavated at approximately the same time, the rock shall be incorporated into the outer portion of the areas. Stones or fragmentary rock larger than four (4) inches in their greatest dimensions will not be allowed in the fill unless specifically authorized in writing. Rock fill

shall be brought up in layers as specified or as directed, and every effort shall be exerted to fill the voids with the finer material to form a dense, compact mass. Rock or boulders shall be disposed of as deleterious material.

Frozen material shall not be placed in the fill nor shall the fill be placed upon frozen material.

The Contractor shall be responsible for the stability of all fills and shall replace any portion, which in the opinion of the Project Manager has become displaced due to carelessness or negligence on the part of the Contractor. Fill damaged by inclement weather shall be repaired at the Contractor's expense.

Slope Ratio and Storm Water Runoff

Section 3. Slopes shall not be greater than two (2) horizontal to one (1) vertical in both cut and fill, and storm water shall not be drained over the slopes.

Grading

Section 4. The Contractor shall furnish, operate and maintain such equipment as is necessary to construct uniform layers, and control smoothness of grade for maximum compaction and drainage.

Compacting

Section 5. The compaction equipment shall be approved equipment of such design, weight and quantity to obtain the required density in accordance with these specifications.

Testing and Inspection Services

Section 6. Testing services will be provided by the Contractor.

Unauthorized Excavation

Section 7. Any excavation not authorized by the Project Manager beyond the limits of the proper construction shall be backfilled at the Contractor's expense with materials approved by the Project Manager.

END OF SECTION

SITWORK

Section 02202

Excavation and Backfill - Pressure Pipelines

Trench Excavation

Section 1. Trenches for buried pressure pipelines shall be so excavated that the pipes and appurtenances may be installed to the alignments and grades specified or required.

Trenches shall be excavated to a depth that will provide for a minimum of three feet (3'-6") of cover over the pipe as measured from the proposed or final grade to the extreme outside limits of the pipe. Greater depths may be required by the plans or job conditions.

Rock, if encountered in the bottom of the trench, shall be excavated to a depth to provide a minimum of four (4) inches clearance below the extreme outermost limits of the pipe. Backfill shall be coarse aggregate, or bank run sand. Shattered materials below the above limits shall be removed and similarly backfilled.

When soft or otherwise unsuitable material is encountered, it shall be removed to such depths and widths as determined by the Project Manager and backfilled with crushed stone or gravel as approved by him.

Except as noted above, trenches shall be so excavated that they will provide a uniform and continuous bearing and support for the barrel of the pipe on solid and undisturbed ground at every point between bellholes except for that area near the mid-section of the pipe disturbed by the withdrawal of pipe slings or other lifting tackle. Bellholes shall be provided at each and every joint.

Pipe Bedding

Section 2. Pipes shall be placed on a minimum depth of four (4) inches of bedding, as measured from the extreme outermost dimension of the pipe. The bedding material shall extend laterally to the outermost limits of the trench.

Bedding material shall be coarse aggregate or bank run sand.

The bedding material shall be placed to grade and in such a manner as to completely support the pipe for its entire length and shall be thoroughly compacted by hand tamping.

Immediately after the joint has been made, the balance of the bedding material shall be brought up to the spring line of the pipe. The material shall be placed in uniform lifts of three (3) inch layers on each side of the pipe, and thoroughly compacted by hand spading and tamping. Care shall be taken to ensure that the material is thoroughly consolidated under the haunches of the pipe.

Initial Backfilling

Section 3. Backfill material as hereinafter specified shall be placed by hand from the bottom of the trench to the springline of the pipe in three (3) inch layers. The material shall be sliced and rammed under the haunches of the pipe and thoroughly compacted by tamping and in a manner that will not disturb the alignment of the pipe or fittings. Each individual length of installed pipe shall be bedded in this manner prior to the connection thereto of an additional length of pipe.

Specified backfill material shall be placed from the springline of the pipe to a plane twelve (12) inches above the extreme outermost limits of the pipe by hand or approved mechanical methods. Under no circumstances shall material be shoveled, dumped or pushed from the top of the trench onto the pipe. Special care shall be exercised with this portion of the backfill so as to avoid injuring or displacing the pipeline.

Initial backfill material shall be as follows:

- A. When gravel trench backfill is specified or required, initial backfill shall be of the same material except that all stones larger than two (2) inches in diameter shall be removed from the immediate vicinity of the pipe.
- B. When gravel trench backfill is not specified, initial backfill material may be of finely divided selected excavated material free from stones, lumps and clumps of clay, organic material and similar undesirable materials.

Balance of Backfill

Section 4. The balance of the backfill from a plane twelve (12) inches above the top of the pipe shall be as follows:

- A. Trenches within roadways and parking areas or immediately adjacent thereto shall be backfilled with coarse aggregate or bank run sand.
- B. Trenches in other areas may be backfilled with excavated material provided such material is free from rock, boulders, large stones, sticks, clumps and lumps of clay, organic material and other similar undesirable materials.

Trenches backfilled with gravel shall be brought up evenly in the trench to the elevation of the subgrade and thoroughly compacted or consolidated by suitable equipment and means approved by the Project Manager.

Trenches backfilled with excavated material shall be brought up evenly in the trench to grade as required by conditions. When the top of the trench is at a proposed grade the material shall be neatly rounded over the top of the trench to allow for settlement. In areas of sodding or seeding, the last six (6) inches of backfill material shall be topsoil.

END OF SECTION

SITWORK

Section 02230

Concrete Walks and Steps

Work Included

Section 1. The Contractor, under this item, shall furnish all the materials for and shall properly construct all concrete walks and steps shown on the drawings.

Foundations

Section 2. The subgrade shall be carefully prepared. All soft and spongy places shall be removed, and all depressions filled with gravel or other suitable material and thoroughly compacted in layers not exceeding six (6) inches in thickness. The subgrade shall be thoroughly tamped until it has been brought to a firm, unyielding surface. It shall have a transverse slope of not more than one-half (1/2) inch per foot. The subgrade shall be thoroughly wetted before concrete is poured.

Concrete Walks and Steps

Section 3. The concrete sidewalks and steps shall be constructed to the contour and dimensions shown on the drawing with a minimum walk thickness of four (4) inches with 4 x 4 -W2.9 x W2.9 welded wire fabric. All concrete walks and steps shall be a minimum width of five (5) feet unless otherwise detailed or specified.

Forms shall be true and even, free from warp, and of sufficient strength to resist springing out of shape. Suitable metal division plates shall be provided to completely separate adjacent slabs during construction.

A three-quarter (3/4) inch joint, the full width of the sidewalk, shall be provided at least once in every thirty (30) feet of walk length, which shall be filled with asphalt plank that will not run or chip. An expansion joint filler shall be installed between the walk and any fixed structure, extending the full depth of the walk.

Concrete shall meet the requirements of the item, "Concrete Masonry," Class "A". After it has been brought to the established grade by means of a strike board, it shall be worked with a wood float to produce a medium rough surface which shall be flagged at five (5) foot intervals. The use of sand or cement to dry the surface during troweling is prohibited. The surface edges of all slabs shall be rounded to a radius of one-half (1/2) inch. As soon as the finished concrete has hardened sufficiently to prevent damage, the surfaces shall be treated with membrane curing, the material to comply with State Highway Specifications 705.07 for material and applied according to Specification 451.10.

All concrete steps shall be made non-slippery as specified under "Concrete Masonry."

Measurement & Payment

Section 4. All costs for restoration of concrete walks and steps disturbed as a part of new construction shall be included with the unit price bid by the Contractor.

END OF SECTION

SITWORK

Section 02500

Entrance Roads, Drives and Parking Areas

Work Included

Section 1. This work shall include the construction of the entrance road, drives and/or parking areas where shown and as installed on the construction drawings.

Roadways

Section 2. Scope of the work. This contract shall include the furnishing of all the labor, materials and equipment required to construct the roadways, curbs and miscellaneous improvements as shown on the drawings and as provided in these specifications.

The work includes the following principal items:

- a. Excavations and preparation of the subgrade.
- b. Construction of aggregate wearing surface.

Equipment

Section 3. Vibratory compactors used for compacting subgrade and paving shall weigh not less than ten (10) tons.

Excavations and Subgrade Preparations

Section 4. This work shall consist of excavation for the roadways, including furnishing and incorporating all water required for compacting the subgrade, disposing of unsuitable and surplus material, preparing the subgrade, finishing shoulders, slopes, and ditches, all in accordance and in reasonably close conformity with the lines, grades, thicknesses and cross sections shown on the plans, or as directed by the Engineer and/or Owner.

Access Road and Parking Area Construction

Section 5. This work shall consist of furnishing and placing an aggregate wearing course on the completed and accepted subgrade, all in accordance with and in reasonably close conformity with the lines, grades, and typical cross section specified.

END OF SECTION

SITWORK

Section 02512

Restoration of Pavement and Curbs

Work Included

Section 1. This work shall include the construction of roadway and curbs where such items have been removed in the course of the work of this project.

Roadways

Section 2. Scope of the work. This contract shall include the furnishing of all the labor, materials and equipment required to construct the roadways and curbs as provided in these specifications.

The work includes the following principal items:

- a. Preparation of the subgrade; placing and rolling the sub-base.
- b. Construction of base course pavement.
- c. Construction of curbs (N/A Grayson).
- d. Asphalt concrete pavement.
- e. Concrete pavement (N/A Grayson).

Equipment

Section 3. Vibratory compactors used for compacting subgrade and paving shall weigh not less than ten (10) tons.

Excavations and Subgrade Preparations

Section 4. Excavations for the paving shall be made to lines and grades required to accommodate the specified paving after which the areas shall be compacted to a firm foundation with a compactor. The subgrade may be brought up to final elevation by the use of suitable excavated materials; however, should soft spots develop in the compacting operations, the soft materials shall be removed and backfilled with the material specified for use as sub- base. Compaction operations shall be continued until the fill is compacted to not less than 95% of the maximum density as determined in accordance with ASTM-D1557-70 (Modified).

The subgrade preparation shall be limited to the May through October construction season.

Base Course

Section 5. All areas to be paved shall have a minimum of six (6) inches of No. 57 aggregate. All compacting operations shall include berms to a minimum width of two (2) feet on each side of the paved area. The base materials shall be evenly spread on the subgrade and shall be thoroughly compacted with equipment the compacted thickness specified.

Asphalt Concrete Pavement

Section 6. The asphalt concrete pavement shall consist of one (1) course of asphalt concrete, 2 inches thick, conforming to materials and construction methods of Item 402 of the "Standard Specifications for Road and Bridge Construction" of the State of Kentucky, Department of Highways. If required by the Project

Director Item 407, tack coat, shall be applied at 0.10 gallons per square yard over either the base course, or over the first lift of asphalt concrete, or both. Tack coat materials and construction methods shall conform to Item 407 of the "Standard Specifications for Road and Bridge Construction" of the State of Kentucky, Department of Highways.

Variation to the surface tolerances shall be corrected in a manner satisfactory to the Project Manager.

All old to new asphalt concrete joints shall be sealed with a joint sealer conforming to Item 807.02.

Concrete Pavement

Section 7. The concrete pavement shall consist of a single course of concrete to the depth required to match existing pavement and shall have a minimum twenty-eight (28) day compressive strength of 3500 psi. Forms shall be used on open sides so that the completed pavement has its original shape.

Concrete Curbs

Section 8. Concrete curbs shall be constructed of Class "A" concrete in accordance with Section 601 of the KDOH specifications. Curb cross section shall match that of existing curb.

One-half inch KDOH 807.03 preformed joint filler shall be placed at all curb returns, to either side of inlets and catch basins, where new curb abuts existing concrete and at such other locations as directed by the Project Manager.

Measurement & Payment

Section 9. All costs for restoration of asphalt or concrete pavement, or concrete/asphalt curbs disturbed as part of new construction shall be included with the appropriate unit price bid.

END OF SECTION

SITWORK

Section 02701

Polyvinyl Chloride Pipe

General

Section 1. Polyvinyl chloride (PVC) pressure pipe two inches through twelve inch shall conform to the American Society for Testing and Materials (ASTM) Standard ASTM D-2241.

Note: The Engineer retains the sole authority to approve or disapprove of PVC pressure pipe based the manufacturer's prior performance history and project references. If requested by the Engineer, the pipe manufacturer shall submit a reference listing of similar projects completed within the last 5 years in Kentucky, Ohio, or West Virginia complete with Owners Name, Address, Phone Number, and Contact Person.

Pressure class shall be 200 psi with a standard dimension ration (SDR) of 21 or 250 psi with a SDR of 17, as noted on the Plans.

Joints

Section 2. All joints on polyvinyl chloride (PVC) pressure pipe shall be made of elastomeric-gaskets. Provisions must be made for expansion and contraction at each joint with an elastomeric ring. The bell shall consist of an integral wall section with an elastomeric ring which meets the requirements of ASTM F-477 standard specifications for elastomeric seal for jointing plastic pipe. The wall thickness in the bell section shall conform to the requirements of ASTM D-3139.

All PVC Pressure Pipe shall be with twenty (20) foot laying lengths. As noted above, pipe shall be supplied with integral bells, coupling pipe is not permitted.

Anchoring Assemblies

Section 3. Anchoring assemblies will be required for all fire hydrants and hydrant valves. Anchoring assemblies will be required for setting other valves and bends, as shown on the construction drawings.

Special anchoring will be required at other places along the pipelines. Where the construction drawings call for special anchoring, it shall include ductile iron pipe with mechanical joint anchoring fittings, locked mechanical joints, pipe or positively restrained push-on joint type ductile iron pipe and fittings which allow for the deflection at the joint after assembly the equal of "Super-Lock" manufactured by the Clow Corporation.

Installation

Section 4. The installation of PVC pipelines are intended to conform with AWWA Specifications C900-75 and Appendix A as if they were totally incorporated herein, except where these specifications direct otherwise.

Fittings

Section 5. All fittings for PVC pipe shall be cast iron mechanical joints Class 250 tar coated outside, cement lined inside in accordance with ANSI/AWWA Specifications C110/A21.10, C111/A21.11.

END OF SECTION

SITWORK

Section 02718

Air Test

Method of Test

Section 1. During sewer construction all service laterals, stubs, and fittings into the sewer test section shall be properly capped or plugged so as not to allow for air loss that could cause an erroneous air test result.

Air may pass through some porous materials. If such materials are used, the pipe walls may be wetted to temporarily reduce the porosity of the material. Non-porous pipe materials need not be wetted.

After a complete span of pipe has been installed and backfilled, the plugs shall be placed in the line at each manhole and secured.

When the plugs are being placed, the pipe adjacent to the manhole shall be visually inspected to detect any evidence of shear in the pipe due to differential settlement between the pipe and the manhole.

Low pressure air shall be slowly introduced into the sealed line until the internal air pressure reaches 4 psig or 4 psig greater than the average back pressure of any groundwater above the pipe, but not greater than 9.0 psig. After a constant pressure of 4.0 psig is reached, the air supply shall be throttled to maintain the internal pressure for at least 2 minutes. This time permits the temperature of the entering air to equalize with the temperature of the pipe wall.

When temperatures have been equalized and the pressure stabilized at 4.0 psig the air hose from the control panel to the air supply shall be cut off or while the pressure is decreased to no less than 3.5 psig. At a reading of 3.5 psig, or any convenient observed pressure reading between 3.5 psig and 4.0 psig, timing shall commence using an accurate timing device.

A predetermined required time for a specified pressure drop, traditionally, a pressure drop of 1.0 psig has been specified, shall be used to determine the lines acceptability.

If the time shown in the accompanying table for the designated pipe size and length, elapses before the air pressure drops 1.0 psig, the section undergoing test shall have passed and shall be presumed to be free of defects.

If the pressure drops 1.0 psig before the appropriate time shown in the accompanying table has elapsed, the air loss rate shall be considered excessive and the section of pipe has failed the test.

If the section fails to meet the above requirements, the Contractor shall determine, at his own expense, the source of leakage and shall repair or replace all the defective materials and/or workmanship to the satisfaction of the Engineer. The extent and type of repair which may be allowed as well as results, shall be subject to the approval of the Engineer. The completed pipe installation shall then be retested and required to meet the requirements of this test.

$$T = 3.56 \cdot 10^{-5} \frac{D^2 L}{Q}$$

Where

- T = Minimum Time allowed for the air pressure to drop 1 psig, seconds
- D = Nominal pipe diameter, inches
- L = Length of test section
- Q = Allowable air leakage rate, 0.002 cubic feet/minute/square feet surface Area

Table 1

Specification Time Required for a 1.0 psig Pressure Drop for Size and Length of Pipe Indicated

| Pipe Dia. (In.) | Minimum Required Test Time in Minutes: Seconds for Pressure drop of 1.0 psig for Pipe Length L | | | | | | | |
|--------------------|---|-------|-------|-------|-------|-------|-------|-------|
| | L = 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 |
| 4 | 0:29 | 0:42 | 0:56 | 1:11 | 1:25 | 1:40 | 1:54 | 2:08 |
| 6 | 1:04 | 1:36 | 2:08 | 2:40 | 3:12 | 3:44 | 4:16 | 4:48 |
| 8 | 1:54 | 2:51 | 3:48 | 4:45 | 5:42 | 6:39 | 7:36 | 8:33 |
| 10 | 2:58 | 4:27 | 5:56 | 7:25 | 8:54 | 10:23 | 11:52 | 13:21 |
| 12 | 4:16 | 6:25 | 8:33 | 10:41 | 12:49 | 14:57 | 17:06 | 19:14 |
| 15 | 6:41 | 10:01 | 13:21 | 16:42 | 20:02 | 23:22 | 26:43 | 30:03 |
| 18 | 9:37 | 14:25 | 19:14 | 24:02 | 28:51 | 33:39 | 38:28 | 43:16 |
| 21 | 13:05 | 19:38 | 26:11 | 32:43 | 39:16 | 45:49 | 52:21 | 58:54 |
| 24 | 17:06 | 25:39 | 34:11 | 42:44 | 51:17 | 59:50 | 68:23 | 76:56 |

Manholes will be tested in accordance with the hydrostatic test section in Section 02700, "Gravity Pipelines".

END OF SECTION

SITWORK

Section 02720

Pressure Pipelines

Work Included

Section 1. The Contractor shall complete all excavations; shall protect all existing structures, utilities, and services; shall furnish all suitable tools and appliances for the safe and convenient handling of all materials to be used on the work; shall lay the pipelines, including valves, valve boxes, fire hydrants, and all other appurtenances thereto; shall install or replace any or all house service connections if specified; shall test the lines; shall disinfect water lines; shall replace all walks, driveways, grass plots, or paving; shall remove all surplus materials of every kind; and leave the entire site of the work in a presentable and satisfactory condition; all as specified herein under the various sections.

Handling and Storage of Materials

Section 2. Pressure main pipe, fittings, valves, hydrants, and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground.

Pipe shall be so handled that the coating and lining will not be damaged. If however, any part of the coating or lining is damaged the repair shall be made by the Contractor at his expense in a manner satisfactory to the Project Manager.

The Contractor shall be responsible for the safe storage of material furnished by or to him, and accepted by him, and intended for the work, until it has been incorporated in the completed project. The interior of all pipe, fittings and other accessories shall be kept free from dirt and foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that will protect them from damage by freezing.

Inspection and Responsibility for Material

Section 3. All pipeline materials shall be carefully inspected for cracks and other defects prior to installation. All material found during the progress of the work to have cracks, flaws, or other defects, shall be rejected by the Project Manager. All defective materials furnished by the Contractor shall be promptly removed by him from the site of the project.

The Contractor shall be responsible for all materials furnished by him and shall replace at his own expense all such material found defective in manufacture or damaged in handling after delivery by the manufacturer. This shall include the furnishing of all material and labor required for the replacement of installed material discovered defective prior to the final acceptance of the work.

Installation of Pressure Pipelines

Section 4. Pressure mains shall be laid and maintained to the required lines and grades with fittings, valves, and hydrants at the required locations; spigots centered in bells; and all valve and hydrant stems plumb.

Proper implements, tools, and facilities shall be provided and used by the Contractor for the safe and convenient performance of the work. All pipe, fittings, valves, and hydrants shall be carefully lowered into the trench piece by piece by means of a derrick, ropes, or other suitable tools or equipment in such a manner as to

prevent damage to pipe main materials and protective coatings and linings. Under no circumstances shall pipe main materials be dropped or dumped into the trench.

All pipe and fittings shall be carefully examined for cracks and other defects while suspended above the trench immediately before installation in final position. Spigot ends shall be examined with particular care. Defective pipe or fittings shall be laid aside as previously specified.

Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. If the pipe laying crew cannot put the pipe into the trench and in place without getting earth into it, the Project Manager may require that before lowering the pipe into the trench, a heavy, tightly woven canvas bag of suitable size shall be placed over each end and left there until the connection is to be made to the adjacent pipe. During laying operations, no debris, tools, clothing, or other materials shall be placed in the pipe.

As each length of pipe is placed in the trench, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. The pipe shall be secured in place with approved backfill material tamped under it except at the bells. Precautions shall be taken to prevent dirt from entering the joint space.

At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by the Project Manager. If water is in the trench, the seal shall remain in place until the trench is pumped completely dry.

The cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or lining so as to leave a smooth end at right angles to the axis of the pipe.

Pipe shall be laid with bell ends facing in the direction of laying, unless directed otherwise by the Project Manager. Where pipe is laid on a grade of ten (10) percent or greater, the laying shall start at the bottom and shall proceed upward with the ball ends of the pipe upgrade.

Placing Pipeline Fittings

Section 5. Pipeline fittings, plugs and caps shall be furnished and installed of the type indicated and at the location shown on the construction drawings or as directed by the Project Manager. It will be the responsibility of the Contractor to furnish and install all proper size pipe bends for both horizontal and vertical deflections that are required to construct the pressure main to the line and grade as shown on the construction drawings or as set by the Project Manager. The fittings, plugs, and caps shall be set and joined to the pipe in the manner heretofore specified for installation.

Anchorage

Section 6. The Contractor shall provide pipeline restraint at all locations shown on the construction drawings. Anchorage shall be in the form of harnessed or restrained joints for the lengths of pipe and fittings shown.

Testing Pressure Mains

Section 7. The Contractor shall subject the completed pressure pipelines to a leakage test. The test

shall be performed on all newly laid pipe in lengths not to exceed 2,000 feet or any valved section thereof. The length of the test section shall exceed the specified maximum limit only with the explicit approval of the Project Manager. The test may be conducted after the trench has been backfilled but must be completed before replacement of pavements and final restoration. All testing shall be done in the presence of the Project Manager.

The Contractor shall furnish the pump, pipe connection, temporary testing plugs and caps, if required, all necessary apparatus including the pressure gauges and meters and a supply of approved water. The Contractor shall make all necessary taps into the lines. The Contractor shall be responsible for all labor and equipment necessary to conduct the tests, including excavating and backfilling the test pit at the locations selected by the Project Manager.

The pipe shall first be completely flushed out. Then each valved section shall be slowly filled with water. All air shall be expelled from the pipe at high points by means of test plugs in valve bonnets, fire hydrants or through corporation stops installed by the Contractor for this purpose. After all the air has been expelled, the openings shall be closed and the test pressure applied by means of the test pump connected to the pipe in a manner satisfactory to the Project Manager.

The test pressure for the leakage test shall be fifty (50) percent above the normal operating pressure of the lowest point in the section of line under the test and corrected to the elevation of the test gauge. The duration of each leakage test shall be two (2) hours.

The exposed piping and/or the top of the trench shall be carefully inspected during the leakage test for any signs of leakage. Any cracked or defective pipe, fittings, valves or hydrants discovered in consequence of the leakage test shall be removed and replaced by the Contractor with sound material and the test shall be replaced until satisfactory results are obtained. The Contractor is responsible for locating, excavating and backfilling the pressure pipeline trench at no cost to the Owner, in addition to replacing the defective material if the leakage test is conducted on a backfilled pressure pipeline. The Contractor shall maintain the hydrostatic pressure at all times during the leakage test through his test pump.

Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain the specified leakage test pressure after the air has been expelled, the pipe has been filled with water, and the pressure initially applied.

No pipe installation will be accepted if the amount of leakage is greater than specified by the following equation:

$$L = \frac{ND}{7400} \sqrt{P}$$

Where

L = allowable leakage, gallons per hour.

N = Number of pipe joints being tested.

D = Nominal diameter of pipe, in.

P = Average test pressure, psig.

Disinfection of Water Mains

process of chlorinating newly laid pipe, all valves or other appurtenances shall be operated while the pipeline is filled with the chlorinating agent.

Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipeline at its extremities until the replacement water throughout its length shall, upon test, be proved comparable in quality to the water serving the public from the existing water supply system and approved by the public health authority having jurisdiction. This satisfactory quality of water delivered by the new main should continue for a period of at least two (2) full days as demonstrated by laboratory examination of samples taken from a tap located installed in such a way as to prevent outside contamination. Samples shall not be taken from an unsterilized hose or from a fire hydrant, because such samples will seldom meet bacteriological standards.

Should the initial treatment fail to result in the conditions specified, the original chlorination procedure shall be repeated until satisfactory results are obtained.

Pressure Pipelines Not Installed in Trench

Section 9. All applicable provisions of this item of work shall apply to the furnishing of materials and installation procedures for constructing pressure pipelines not installed in a trench condition.

END OF SECTION

SITWORK

Section 02722

Ductile Iron Pipe

Pipe

Section 1. Ductile cast iron pipe shall conform to the American Standard for "Ductile Iron Pipe Centrifugally Cast in Metal Molds for Water or Other Liquids", AWWA C151.

The pipe shall be Pressure Class 350, unless otherwise noted.

Joints

Section 2. Mechanical joints, bell and spigot joints and flange joints for ductile iron pipe in sizes from 2-inches through 48-inches in diameter shall conform to all of the dimensions, shapes and requirements of AWWA C110, "Cast Iron Fittings, 2-Inches through 48-Inches, for Water and Other Liquids". The mechanical joint shall also conform in all respects to AWWA C111, "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings".

Push-on joints shall be a single rubber gasket joint designed to be assembled by the positioning of a continuous, molded, rubber ring gasket in an annular recess in the pipe and forcing of the plain end of the entering pipe into the socket, thereby compressing the gasket radially to the pipe to form a positive seal. The gasket and the annular recess shall be so designed and shaped that the gasket is locked in place against displacement as the joint is assembled. The push-on type joint shall conform to the requirements of AWWA C110 and AWWA C111 where applicable.

Where ductile iron pipe with ball and socket type joints are specified, they shall be of the mechanical gland type. Provisions shall be made for longitudinal expansion and contraction with a positive stop against disengagement of the joint. Up to fifteen (15) degrees angular deflection shall be accommodated without leakage and without decrease in full diameter of pipe.

Fittings

Section 3. Cast iron or ductile iron fittings in sizes 2-inches through 48-inches for mechanical joints, bell and spigot joints and flange joints shall conform to all the requirements of AWWA C110, "Cast Iron Fittings, 2-Inches through 48-Inches, for Water and Other Liquids", and to the requirements of AWWA C111, "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings", for mechanical joints and push-on type joints. Push-on joints for cast iron fittings shall be as described in Section 2 of this item.

Ductile iron compact body mechanical joint fittings are also acceptable.

The cast iron or ductile iron fittings in sizes larger than 12-inch shall have a pressure rating of 150 psi unless the proposal sheets and/or the construction drawings stipulate that 250 psi cast iron fittings are required.

Unless specifically described on the proposal sheets and/or construction drawings, the cast iron fittings may be supplied in gray iron or ductile iron.

Coatings for Ductile Iron Pipe & Fittings

Section 4. The ductile iron pipe and cast iron or ductile iron fittings for water service shall be furnished with cement mortar lining in accordance with AWWA C104, "Cement Mortar Lining for Cast Iron Pipe and Fittings". The lining will be 1/16-inch thick for pipe sizes 4-inches through 12-inches in diameter and 3/32-inch thick for sizes 14-inch through 24-inches in diameter. A bituminous seal coat shall be applied to the lining surface immediately following the lining operation to prevent loss of moisture and insure proper curing of the cement mortar. The outside of the iron pipe shall be furnished with a protective coating as outlined in Section 09900, "Protective Coatings and Painting".

All cast iron or ductile iron fittings and ductile iron pipe which will carry sewage shall be completely coated inside and outside with a hot coal-tar varnish, to which sufficient oil has been added to make a smooth coating, tough and tenacious, when cold. The coating process shall consist of preheating and then dipping the fitting or pipe into the hot coating material.

All ductile iron pipe and fittings not installed in a trench condition shall not be coated with a coal-tar pitch on the outside. The pipe and fitting shall be coated in accordance with the Section 09900, "Protective Coatings and Painting".

Miscellaneous Jointing Material

Section 5.

a. Victaulic couplings for ductile iron pipe shall consist of malleable iron housing-clamps in two (2) or more parts, a single C-shaped rubber gasket and two (2) or more track-head steel bolts as required to assemble the housing clamps. The coupling shall be of the proper type to encircle the outside diameter of the ductile iron pipe as specified. The malleable iron in the segmental casting shall conform to ASTM A47. The track-type oval neck bolts shall conform to ASTM A183. The rubber gasket shall be Grade "R" natural rubber.

Ductile iron pipe and fittings to be joined with victaulic couplings shall be furnished with shoulders to engage the entire inner circumference of the housing-clamp. The outside surface of the pipe between the shoulder and the pipe end must be smooth and free from deep pits or swells to provide a leaktight seal for the victaulic gasket.

b. Compression sleeve couplings for plain end ductile iron pipe shall consist of one cylindrical steel middle ring with a pipe stop, two (2) resilient wedge-shaped gaskets, two (2) steel follower rings and a set of high strength steel track-head bolts. The number of bolts furnished will depend on the diameter of the couplings.

Anchoring Assemblies

Section 6. Anchoring assemblies for setting valves, fire hydrants, and special bends shall consist of two (2) mechanical joint cast iron or ductile iron gland fittings cast integrally with the pipe nipple. The anchor assembly fittings shall have a laying length of fourteen (14) inches. Anchoring pipe shall be used where long lengths of pipe are required to anchor fire hydrants. Anchoring pipe may be furnished with regular anchoring glands cast with the pipe or with a ring gland which will allow free movement of the standard mechanical joint follower gland. A mechanical joint anchoring tee may be substituted for the mechanical joint tee and anchoring piece for fire hydrant installations where applicable.

Jointing Pipe

Section 7. Joints for buried cast iron or ductile iron pressure main shall be mechanical joint, rubber compression type (push-on joint), poured bell and spigot or victaulic. Cast iron or ductile iron joints within structures may also be flange type or compression sleeve type as shown on the construction drawings. The joints shall be made in the following manner.

Mechanical Joint - The mechanical joint shall conform to the requirements of AWWA A21.11, "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings". All surfaces that come in contact with the rubber gasket shall be brushed thoroughly with a wire brush just prior to assembly to remove all rust or foreign material. The clean surface and the rubber gasket shall then be brushed with soapy water. The iron gland shall then be placed on the spigot end with the lip extension facing the joint. The rubber gasket shall then be slipped on the pipe with the thick end toward the gland. The spigot end of the pipe shall then be pushed into the bell seat after which the rubber gasket shall be forced into its retaining space in the bell. Care shall be taken to assure an even seat all around the inner surface of the bell. The gland shall be moved into place for bolting; the bolts shall be inserted and the nuts made up tightly with the fingers only.

The normal range of bolt torques to be applied and length of wrench to produce that torque to the standard cost iron bolts in a joint are as follows:

| <u>Size of Bolt</u> <u>Inches</u> | <u>Range of Torque</u> <u>Ft.-Lbs.</u> | <u>Length of Wrench</u> <u>Inches</u> |
|--------------------------------------|---|--|
| 3/4 | 60 - 90 | 10 |
| 1 | 70 - 100 | 12 |
| 1-1/4 | 90 - 120 | 14 |

The gland shall be brought up toward the pipe flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket when tightening bolts. It shall be done by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side, and last the remaining bolts. This process shall be repeated until all bolts are within the specified range of torque. If effective sealing is not attained at the maximum torque, the joint shall be disassembled and reassembled after thorough cleaning. The bolts shall not be overstressed to compensate for poor assembly.

Rubber Seal Type Joint (Push-On Joint) - The push-on type joint shall conform to the requirements of AWWA A21.11, "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings". Before assembly of the rubber seal type joint, the inside of the bell and the rubber gasket shall be wiped clean with a cloth. The gasket should then be placed in the groove of the bell in the manner that forms to the contour of the bell. A thin film of special lubricant, of the type recommended by the manufacturer of the pipe, is then applied to the inside of the gasket by brush or hand.

The plain end of the pipe shall be wiped clean and placed in approximate alignment with the bell of the pipe. The joint is then made up by exerting sufficient force on the entering pipe so that its plain end is moved past the gasket until it makes contact with the base of the socket. Pipe eight (8) inches in diameter and larger shall be socketed by fork tools or jacks.

The spigot ends of field cut pipe shall be tapered back one-eighth (1/8) inch at an angle of about thirty (30) degrees to the barrel of the pipe with a coarse file or portable grinder. All sharp or rough edges that may

injure the rubber gasket shall be removed in this operation.

Flanged Joints - The flanged joints shall conform to the requirements of AWWA A21.10, "Cast Iron Fittings, 2-Inches through 48-Inches, for Water and Other Liquids". Flanged joints shall be assembled with bolts and flat ring gaskets of the size and number as specified for "Cast Iron Pipe Flanges and Flanged Fittings". Stud or tap bolts shall be furnished when shown on the construction drawings, and when required to complete special assemblies. All exposed bolts, heads, and nuts shall be coated with two (2) coats of asphaltum or other approved metal coating after the joint has been completed.

Restrained Joints - Special anchorage shall include the use of mechanical joint anchoring fittings, couplings and pipe or positively restrained push-on type pipe and fittings which allow for deflection at the joint after assembly, the equal of "Super-Lock" manufactured by the Clow Corporation. No reduction in pipe wall thickness from that specified shall be permitted in connection with a restrained joint.

Deflection of Ductile Iron Pipe

Section 8. Whenever it is desirable to deflect mechanical-joint or push-on joint pipe in order to form a long radius curve, the amount of the deflection shall not exceed the maximum limits shown for the respective type pipe.

Table 1

Maximum Permissible Deflection in Laying Mechanical-Joint Pipe

| Size Of Pipe In Inches | <u>Maximum Permissible Deflection Per Length - Inches</u> | | | |
|------------------------------|---|--------------------------|--------------------------|--------------------------|
| | <u>12-Ft. Length</u> | <u>16-Ft. Length</u> | <u>18-Ft. Length</u> | <u>20-Ft. Length</u> |
| 6 | 18 | 24 | 27 | 30 |
| 8 | 13 | 18 | 20 | 22 |
| 10 | 13 | 18 | 20 | 22 |
| 12 | 13 | 18 | 20 | 22 |
| 16 | 9 | 12 | 13-1/2 | 15 |
| 20 | 7-1/2 | 10 | 11 | 12 |
| 24 | 6 | 8 | 9 | 10 |

Table 2

Maximum Permissible Deflection in Laying Mechanical-Joint Pipe

| Size Of Pipe In Inches | <u>Maximum Permissible Deflection Per Length - Inches</u> | | | |
|------------------------------|---|--------------------------|--------------------------|--------------------------|
| | <u>12-Ft. Length</u> | <u>16-Ft. Length</u> | <u>18-Ft. Length</u> | <u>20-Ft. Length</u> |
| 6 | 12 | 17 | 19 | 21 |
| 8 | 12 | 17 | 19 | 21 |
| 10 | 12 | 17 | 19 | 21 |
| 12 | 12 | 17 | 19 | 21 |
| 16 | 7-1/2 | 10 | 11 | 12 |
| 20 | 7-1/2 | 10 | 11 | 12 |

24

7-1/2

10

11

12

Section 9. The following section is applicable to ductile iron diffused air distribution piping. All buried air distribution piping shall be Class 50 or 51 unlined DIP, Mechanical or Bell Joint with gaskets capable of withstanding a continuous temperature of 225°F. All DIP air lines shall be exterior coated in conformance with Specification Section 02722 - paragraph Section 4.

Above ground air distribution piping shall meet the same conditions except same shall be furnished with flanged conditions and temperature resistant gaskets.

END OF SECTION

Section 02834 (32 32 23)

KEYSTONE CONCRETE RETAINING WALL

PART 1: GENERAL

1.01 Description

- A. Work shall consist of designing, furnishing and construction of a KEYSTONE Standard Unit Retaining Wall System in accordance with these specifications and in reasonably close conformity with the lines, grades, design, and dimensions shown on the plans. No alternate wall systems will be considered.
- B. Work includes preparing foundation soil, furnishing and installing leveling pad, unit drainage fill and backfill to the lines and grades shown on the construction drawings.
- C. Work includes furnishing and installing geogrid soil reinforcement of the type, size, location, and lengths designated on the construction drawings.

1.02 Related Sections

- A. Section 02300 (31 00 00) - Earthwork

1.03 Reference Documents

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM C140 Sampling and Testing Concrete Masonry Units
 - 2. ASTM C1372 Specification for Dry-Cast Segmental Retaining Wall Units
 - 3. ASTM D422 Particle-Size Analysis of Soils
 - 4. ASTM D698 Laboratory Compaction Characteristics of Soil -Standard Effort
 - 5. ASTM D1557 Laboratory Compaction Characteristics of Soil -Modified Effort
 - 6. ASTM D3034 Polyvinyl Chloride Pipe (PVC)
 - 7. ASTM D4318 Liquid Limit, Plastic Limit and Plasticity Index of Soils
 - 8. ASTM D4475 Horizontal Shear Strength of Pultruded Reinforced Plastic Rods
 - 9. ASTM D4476 Flexural Properties of Fiber Reinforced Pultruded Plastic Rods
 - 10. ASTM D4595 Tensile Properties of Geotextiles - Wide Width Strip
 - 11. ASTM D5262 Unconfined Tension Creep Behavior of Geosynthetics
 - 12. ASTM D5818 Evaluate Installation Damage of Geosynthetics
 - 13. ASTM D6637 Tensile Properties of Geogrids – Single or Multi-Rib
 - 14. ASTM D6638 Connection Strength - Reinforcement/Segmental Units
 - 15. ASTM D6706 Geosynthetic Pullout Resistance in Soil
 - 16. ASTM D6916 Shear Strength Between Segmental Concrete Units
- B. American Association of State Highway and Transportation Officials (AASHTO)
 - 1. AASHTO M 252 Corrugated Polyethylene Drainage Pipe
- C. Geosynthetic Research Institute (GRI)
 - 1. GRI-GG4 Determination of Long Term Design Strength of Geogrids
 - 2. GRI-GG5 Determination of Geogrid (soil) Pullout
- D. National Concrete Masonry Association (NCMA)

1. NCMA SRWU-1 Test Method for Determining Connection Strength of SRW
2. NCMA SRWU-2 Test Method for Determining Shear Strength of SRW

1.04 Submittals/Certification

- A. Contractor shall submit a Manufacturer's certification, prior to start of work, that the retaining wall system components meet the requirements of this specification and the structure design.
- B. Contractor shall submit construction drawings and design calculations for the retaining wall system prepared and stamped by a Professional Engineer registered in the state of the project. The engineering designs, techniques, and material evaluations shall be in accordance with the Keystone Design Manual.

1.05 Quality Assurance

- A. Contractor shall submit a list of five (5) previously constructed projects of similar size and magnitude by the wall installer where the specific retaining wall system has been constructed successfully. Contact names and telephone numbers shall be listed for each project.
- B. Contractor shall provide evidence that the design engineer has a minimum of five years of documental experience in the design for reinforced soil structures. The design engineer shall provide proof of current professional liability insurance with an aggregate coverage limit of not less than \$2,000,000.
- C. Owner shall/may provide soil testing and quality assurance inspection during earthwork and wall construction operations. Contractor shall provide any quality control testing or inspection not provided by the Owner. Owner's quality assurance program does not relieve the contractor of responsibility for quality control and wall performance.

1.06 Delivery, Storage and Handling

- A. Contractor shall check all materials upon delivery to assure that the proper type, grade, color, and certification have been received.
- B. Contractor shall protect all materials from damage due to jobsite conditions and in accordance with manufacturer's recommendations. Damaged materials shall not be incorporated into the work.

PART 2: PRODUCTS

2.01 Definitions

- A. Keystone Unit - a concrete retaining wall element machine made from Portland cement, water, and aggregates.
- B. Structural Geogrid - a structural element formed by a regular network of integrally connected tensile elements with apertures of sufficient size to allow interlocking with surrounding soil, rock, or earth and function primarily as reinforcement.
- C. Unit Drainage Fill - drainage aggregate that is placed within and immediately behind the Keystone concrete units.

- D. Reinforced Backfill - compacted soil that is placed within the reinforced soil volume as outlined on the plans.

2.02 Keystone Concrete Retaining Wall Units

- A. Keystone concrete units shall conform to the following architectural requirements:
1. Face color - concrete gray, unless otherwise specified. The Owner may specify standard manufacturers' color.
 2. Face finish - sculptured rock face in angular tri-planer configuration. Other face finishes will not be allowed without written approval of Owner.
 3. Bond configuration - running with bonds nominally located at midpoint vertically adjacent units, in both straight and curved alignments.
 4. Exposed surfaces of units shall be free of chips, cracks or other imperfections when viewed from a distance of 10 feet under diffused lighting.
- B. Keystone concrete materials shall conform to the requirements of ASTM C1372 - Standard Specifications for Segmental Retaining Wall Units.
- C. Keystone concrete units shall conform to the following structural and geometric requirements measured in accordance with ASTM C140 Sampling and Testing Concrete Masonry Units:
1. Compressive strength: ≥ 3000 psi (21 MPa);
 2. Absorption: $\leq 8\%$ (6% in northern states) for standard weight aggregates;
 3. Dimensional tolerances: $\pm 1/8"$ (3 mm) from nominal unit dimensions not including rough split face, $\pm 1/16"$ (1.5 mm) unit height - top and bottom planes;
 4. Unit size: 8" (203 mm) (H) x 18" (457 mm)(W) x 18" (457 mm)(D) minimum;
 5. Unit weight: 100-lbs/unit (45 kg/unit) minimum for standard weight aggregates.
- D. Keystone concrete units shall conform to the following performance testing:
1. Inter-unit shear strength in accordance with ASTM D6916 (NCMA SRWU-2): 1500-plf (21 kN/m) minimum at 2-psi (13 kPa) normal pressure;
 2. Geogrid/unit peak connection strength in accordance with ASTM D6638 (NCMA SRWU-1): 900-plf (13 kN/m) minimum at 2-psi (13 kPa) normal force.
- E. Keystone concrete units shall conform to the following constructability requirements:
1. Vertical setback: $1/8"$ (3 mm) \pm per course (near vertical) or 1" (25 mm) + per course per the design;
 2. Alignment and grid positioning mechanism: fiberglass pins, two per unit minimum;
 3. Horizontal gap between erected units shall be $\leq 1/2$ inch (13 mm).

2.03 Shear Connectors

- A. Shear connectors shall be 1/2-inch (12 mm) diameter thermoset isophthalic polyester resin-pultruded fiberglass reinforcement rods to provide connection between vertically and horizontally adjacent units with the following requirements:

1. Flexural Strength in accordance with ASTM D4476: 128,000 psi (882 MPa) minimum;
 2. Short Beam Shear in accordance with ASTM D4475: 6,400 psi (44 MPa) minimum.
- B. Shear connectors shall be capable of holding the geogrid in the proper design position during grid pre-tensioning and backfilling.

2.04 Base Leveling Pad Material

- A. Material shall consist of a compacted crushed stone base or non-reinforced concrete as shown on the construction drawings.

2.05 Unit Drainage Fill

- A. Unit drainage fill shall consist of clean 1" (25 mm) minus crushed stone or crushed gravel meeting the following gradation tested in accordance with ASTM D-422:

| <u>Sieve Size</u> | <u>Percent Passing</u> |
|-------------------|------------------------|
| 1 inch (25 mm) | 100 |
| 3/4-inch (19 mm) | 75-100 |
| No. 4 (4.75 mm) | 0 - 10 |
| No. 50 (300um) | 0 - 5 |

- B. Drainage fill shall be placed within the cores of, between, and behind the units as indicated on the design drawings. Not less than one cubic foot (0.028 m³), of drainage fill shall be used for each square foot (0.093 m²) of wall face unless otherwise specified.

2.06 Reinforced Backfill

- A. Reinforced backfill shall be free of debris and meet the following gradation tested in accordance with ASTM D-422:

| <u>Sieve Size</u> | <u>Percent Passing</u> |
|-------------------|------------------------|
| 2 inch (50 mm) | 100 |
| 3/4-inch (19 mm) | 100-75 |
| No. 40 (425 um) | 0-60 |
| No. 200 (75 um) | 0-35 |

Plasticity Index (PI) <15 and Liquid Limit <40 per ASTM D-4318.

- B. The maximum aggregate size shall be limited to 3/4 inch (19 mm) unless field tests have been performed to evaluate potential strength reductions to the geogrid design due to damage during construction.
- C. Material can be site-excavated soils where the above requirements can be met. Unsuitable soils for backfill (high plastic clays or organic soils) shall not be used in the backfill or in the reinforced soil mass.
- D. Contractor shall submit reinforced fill sample and laboratory test results to the Architect/Engineer for approval prior to the use of any proposed reinforced fill material.

2.07 Geogrid Soil Reinforcement

- A. Geosynthetic reinforcement shall consist of geogrids manufactured specifically for soil reinforcement applications and shall be manufactured from high tenacity polyester yarn or high density polyethylene. Polyester geogrid shall be knitted from high tenacity polyester filament yarn with a molecular weight exceeding 25,000 g/m and a carboxyl end group values less than 30. Polyester geogrid shall be coated with an impregnated PVC coating that resists peeling, cracking, and stripping.
- B. T_a , Long Term Allowable Tensile Design Load, of the geogrid material shall be determined as follows:

$$T_a = T_{ult} / (RF_{cr} \cdot RF_d \cdot RF_{id} \cdot FS)$$

T_a shall be evaluated based on a 75-year design life.

1. T_{ult} , Short Term Ultimate Tensile Strength shall be determined in accordance with ASTM D4595 or ASTM D6637.
 T_{ult} is based on the minimum average roll values (MARV).
 2. RF_{cr} , Reduction Factor for Long Term Tension Creep
 RF_{cr} shall be determined from 10,000-hour creep testing performed in accordance with ASTM D5262. Reduction value = 1.45 minimum.
 3. RF_d , Reduction Factor for Durability
 RF_d shall be determined from polymer specific durability testing covering the range of expected soil environments. $RF_d = 1.10$ minimum.
 4. RF_{id} , Reduction Factor for Installation Damage
 RF_{id} shall be determined from product specific construction damage testing performed in accordance with ASTM D5818 (GRI-GG4). Test results shall be provided for each product to be used with project specific or more severe soil type. $RF_{id} = 1.05$ minimum.
 5. FS , Overall Design Factor of Safety
 FS shall be 1.5 unless otherwise noted for the maximum allowable working stress calculation.
- C. The maximum design tensile load of the geogrid shall not exceed the laboratory tested ultimate strength of the geogrid/facing unit connection divided by a factor of safety of 1.5. The connection strength testing and computation procedures shall be in accordance with ASTM D6638 Connection Strength between Geosynthetic Reinforcement and Segmental Concrete Units (NCMA SRWU-1).
- D. Soil Interaction Coefficient, C_i
 C_i values shall be determined per ASTM D6706 (GRI:GG5) at a maximum 0.75-inch (19 mm) displacement.
- E. Manufacturing Quality Control
The geogrid manufacturer shall have a manufacturing quality control program that includes QC testing by an independent laboratory.
The QC testing shall include:
 Tensile Strength Testing
 Melt Flow Index (HDPE)
 Molecular Weight (Polyester)

2.08 Drainage Pipe

- A. If required, the drainage pipe shall be perforated or slotted PVC pipe manufactured in accordance with ASTM D-3034 or corrugated HDPE pipe manufactured in accordance with AASHTO M252.

2.09 Geotextile Filter Fabric

- A. When required, Geotextile filter fabric shall be 4.0 oz/sy, polypropylene, needlepunched nonwoven fabric.

PART 3: EXECUTION

3.01 Excavation

- A. Contractor shall excavate to the lines and grades shown on the construction drawings. Owner's representative shall inspect the excavation and approve prior to placement of leveling material or fill soils. Proof roll foundation area as directed to determine if remedial work is required.
- B. Over-excavation and replacement of unsuitable foundation soils and replacement with approved compacted fill will be compensated as agreed upon with the Owner.

3.02 Base Leveling Pad

- A. Leveling pad material shall be placed to the lines and grades shown on the construction drawings, to a minimum thickness of 6 inches (150 mm) and extend laterally a minimum of 6" (150 mm) in front and behind the Keystone wall unit.
- B. Soil leveling pad materials shall be compacted to a minimum of 95 % Standard Proctor density per ASTM D-698 or 92% Modified Proctor Density per ASTM D1557.
- C. Leveling pad shall be prepared to insure full contact to the base surface of the concrete units.

3.03 Keystone Unit Installation

- A. First course of units shall be placed on the leveling pad at the appropriate line and grade. Alignment and level shall be checked in all directions and insure that all units are in full contact with the base and properly seated.
- B. Place the front of units side-by-side. Do not leave gaps between adjacent units. Layout of corners and curves shall be in accordance with manufacturer's recommendations.
- C. Install shear/connecting devices per manufacturer's recommendations.
- D. Place and compact drainage fill within and behind wall units. Place and compact backfill soil behind drainage fill. Follow wall erection and drainage fill closely with structure backfill.
- E. Maximum stacked vertical height of wall units, prior to unit drainage fill and backfill placement and compaction, shall not exceed two courses.

3.04 Structural Geogrid Installation

- A. Geogrid shall be oriented with the highest strength axis perpendicular to the wall alignment.
- B. Geogrid reinforcement shall be placed at the strengths, lengths, and elevations shown on the construction design drawings or as directed by the Engineer.
- C. The geogrid shall be laid horizontally on compacted backfill and attached to the Keystone wall units. Place the next course of Keystone concrete units over the geogrid. The geogrid shall be pulled taut, and anchored prior to backfill placement on the geogrid.
- D. Geogrid reinforcements shall be continuous throughout their embedment lengths and placed side-by-side to provide 100% coverage at each level. Spliced connections between shorter pieces of geogrid or gaps between adjacent pieces of geogrid are not permitted.

3.05 Reinforced Backfill Placement

- A. Reinforced backfill shall be placed, spread, and compacted in such a manner that minimizes the development of slack in the geogrid and installation damage.
- B. Reinforced backfill shall be placed and compacted in lifts not to exceed 6 inches (150 mm) where hand compaction is used, or 8 - 10 inches (200 to 250 mm) where heavy compaction equipment is used. Lift thickness shall be decreased to achieve the required density as required.
- C. Reinforced backfill shall be compacted to a minimum of 95 % Standard Proctor density per ASTM D-698 or 92% Modified Proctor Density per ASTM D1557. The moisture content of the backfill material prior to and during compaction shall be uniformly distributed throughout each layer and shall be dry of optimum, + 0%, - 3%.
- D. Only lightweight hand-operated equipment shall be allowed within 3 feet (1 m) from the tail of the Keystone concrete unit.
- E. Tracked construction equipment shall not be operated directly upon the geogrid reinforcement. A minimum fill thickness of 6 inches (150 mm) is required prior to operation of tracked vehicles over the geogrid. Tracked vehicle turning should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.
- F. Rubber tired equipment may pass over geogrid reinforcement at slow speeds, less than 10 MPH (15 KPH). Sudden braking and sharp turning shall be avoided.
- G. At the end of each day's operation, the Contractor shall slope the last lift of reinforced backfill away from the wall units to direct runoff away from wall face. The Contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.

3.06 Cap Installation

- A. Cap units shall be glued to underlying units with an all-weather adhesive recommended by the manufacturer such as Keystone Kapseal.

3.07 As-built Construction Tolerances

- A. Vertical alignment: $\pm 1.5''$ (40 mm) over any 10' (3 m) distance.
- B. Wall Batter: within 2 degrees of design batter.
- C. Horizontal alignment: $\pm 1.5''$ (40 mm) over any 10' (3 m) distance.
Corners, bends & curves: ± 1 foot (300 mm) to theoretical location.
- D. Maximum horizontal gap between erected units shall be 1/2 inch (13 mm).

3.08 Field Quality Control

- A. Quality Assurance - The Owner shall/may engage inspection and testing services, including independent laboratories, to provide quality assurance and testing services during construction. This does not relieve the Contractor from securing the necessary construction quality control testing.
- B. Quality Assurance should include foundation soil inspection. Verification of geotechnical design parameters, and verification that the contractor's quality control testing is adequate as a minimum. Quality assurance shall also include observation of construction for general compliance with design drawings and project specifications. (*Quality Assurance is usually best performed by the site geotechnical engineer.*)
- C. Quality Control – The Contractor shall engage inspection and testing services to perform the minimum quality control testing described in the retaining wall design plans and specifications. Only qualified and experienced technicians and engineers shall perform testing and inspection services.
- D. Quality Control testing shall include soil and backfill testing to verify soil types and compaction and verification that the retaining wall is being constructed in accordance with the design plans and project specifications.

PART 4: MEASUREMENT AND PAYMENT

SITWORK

Section 02900

Landscaping

General

Section 1. The Contractor shall furnish and install all plant material as shown on the Construction Drawings and specified in the planting list. This work also consists of established turf by seeding, fertilizing, and mulching and includes preparation of seeding bed, fertilizing, liming, seeding; rolling, mulching, watering, all labor, materials, equipment, tools and incidentals needed to complete the work.

Materials

Section 2. Materials to be used for this project shall be:

- a. Topsoil - Topsoil as required for planting operation shall be natural, friable, fertile soil possessing characteristics of productive soil in the vicinity. It shall be free of stones, clay lumps, roots and other foreign matter.
- b. Plant Materials - All plant material shall be as specified in the planting list and shown on the Construction Drawings. Plant material shall be healthy, vigorous and representative of the species and varieties. All plants shall be free of mechanical injury, injury as a result of frost, free from insects, insect eggs and without disfiguration and other objectionable defects. All plants shall equal or exceed the minimum measurement specified on the plans. All plant materials shall be selected for shape, branching habit, natural characteristics, which at maturity shall produce a strong, full foliated specimen and shall conform to ANSI Standard Z260.1 of 1973 for Nursery Stock sponsored by the American Association of Nurserymen Incorporated.
- c. Root Protection - Balled and burlapped plants (designated B&B) shall be firmly wrapped with burlap. Balls broken before or during planting will not be accepted. Balled or burlapped plants shall be mulched and watered regularly if not planted immediately.
- d. Fertilizer - Commercial organic type, slow acting, and containing a guaranteed analysis as follows:

| | Planting | Seeding/Sodding |
|-----------------|----------|-----------------|
| Nitrogen | 10% | 8% |
| Phosphoric Acid | 6% | 32% |
| Potash | 4% | 16% |

Material shall be dry and free flowing, furnished in original unopened containers which bear the manufacturer's guaranteed statement of analysis.

- e. Peat Moss - Raw native peat, friable, clean, free of foreign substance, and in air-dry condition.
- f. Shredded Bark (for weed control with plantings) - "Paygro" or approved equivalent bark-type mulch.
- g. Staking and Wrapping - 2 x 2 sound wood stakes, 12 gauge galvanized wire, 2-ply reinforced

rubber garden hose, jute twine not less than two (2) ply, galvanized or dip painted turnbuckles having minimum lengthwise opening of three inches fitted with screw eyes, new clean standard burlap for tree trunks in 6" to 10" wide strips, or other wrapping as approved by Project Manager.

- h. Seed - Fine quality grass seed, fresh, clean, new crop seed, composed of the varieties and mixed by dealer in proportions specified below. Deliver seed to site in original unopened containers bearing dealer's statement of composition of mixture and percentages of purity and germination of each variety.

| <u>Common Name</u> | <u>By Weight</u> | <u>Percent % Purity</u> | <u>Percent Germination</u> |
|---------------------------|------------------|-------------------------|----------------------------|
| Manhattan Perennial | | | |
| Rye grass | 15 | -- | 90 |
| Creeping Red Fescue | 20 | 98 | 85 |
| Vista Kentucky Blue Grass | 63 | 85 | 87 |

Maximum weed seed content shall not exceed 0.50% for all varieties.

- i. Sod - Well rooted Kentucky Blue Grass containing a growth of no more than 30% of other grasses and clovers free from all noxious weeds such as wild mustard, thistles, quack grass, etc., and reasonably free from dandelions, crabgrass, etc. Provide sod covered with grass recently mowed to a length of not more than 3" and cut to depth equal to the fibrous roots, but not less than 2". Deliver to job site within 24 hours after being cut and install within 20 hours after being delivered. Stack where directed by Project Manager. Moisture content of the sod shall be adequately and properly maintained to assure survival. Sod shall be machine cut at a uniform soil thickness of five-eighth (5/8") inch, plus or minus one-quarter (1/4") inch at the time of cutting. Measurement for thickness shall exclude top growth and thatch.
- j. Limestone (for turf areas) - Agricultural limestone containing not less than 85 percent of calcium carbonate or calcium carbonate equivalent; meeting of the following minimum gradations: 100 percent passing a 10 mesh sieve; 98 percent, a 20 mesh sieve; 55 percent, a 60 mesh sieve; and 40 percent, a 100 mesh sieve; delivered in original unopened containers with identifying mark and analysis meeting specification requirements.
- k. Mulch (for seeding) - Approved shredded wood fiber comparable to "Silva-Fiber" as produced by Weyerhaeuser's or approved equal. In areas not suited for hydro-seeding, mulch with clean wheat or oats straw, free of weeds or foreign matter.

Planting

Section 3. Planting period shall be between March 15 and June 15 or between August 15 and November 15. Fall planting of evergreens shall be completed by December 1.

Begin planting when other divisions of the work have been sufficiently completed, and conduct under favorable weather and seasonal conditions as are normal and proper for such work. All setting of plants shall be by experienced workmen, according to the best trade practice and as specified herein.

Locate plants as indicated. Alter as necessary to avoid overhead and underground obstructions to provide proper clearances. Obtain approval from Project Manager for altered locations before planting. Final location of all plant material subject to approval by Project Manager.

Soil used in planting shall be 1 part peat to 4 parts topsoil, thoroughly mixed. Fertilize at the rate of 5 lbs. per cubic yard of soil. Fertilizer may be applied after planting. Each tree shall be watered immediately following fertilizing.

Excavate planting pits 2 foot greater for trees in diameter than the spread of roots to accommodate the backfill or prepared topsoil. Loosen the subgrade below the ball to a depth of six (6) inches.

Mulch all plants and plant beds with a 2" layer of shredded bark within two days after planting. Mulch shall entirely cover the planting pit or saucer around each plant. A water ring saucer shall be formed around the outside edge of the planting hole from existing topsoil to adequately contain the 2" layer of shredded bark mulch.

Stake trees, wrap and support immediately after planting according to best accepted practice.

Maintain all plants in a healthy, growing condition by watering, fertilizing, pruning, spraying, tightening of guys, weeding, and replacement of unhealthy plants, until all work is accepted by owner. Limit pruning to minimum necessary to remove dead or injured twigs and branches and to compensate for the loss of root system. Pruning shall not change the natural habit or shape of the plant. Make all cuts flush. Cuts over 3/4" in diameter and bruises or scars shall have cambium traced to living tissue and removed, smoothed and shaped to shed water, and treated with tree paint.

Seeding and Sodding

Section 4. Planting period shall be between March 15 and May 15, or between September 1 and November 15, or otherwise as directed by Project Manager.

After approval of finish grades, loosen topsoil to a depth of 4" and fine grade to remove ridges and depressions. Remove all debris and all sticks and stones 2" and larger in all areas to be seeded or to receive sod. No heavy objects except lawn making equipment shall be moved over lawn areas after soil is prepared, unless it is again loosened and graded.

All disturbed areas within property limit lines and other areas which may be noted to be developed in this project, not shown or noted to be developed otherwise shall be considered lawn areas, seeded or sodded as specified herein and shown on Construction Drawings.

Seeding shall proceed as follows:

- a. Apply seed, fertilizer and mulch material at the rates specified below using a "hydro-mulcher" as manufactured by Bowie, or approved equal. Small areas may be seeded mechanically as directed by Project Manager.
- b. Apply fertilizer at a rate of 16 lbs. per 1,000 square feet.
- c. Sow seed when directed by Project Manager. Sow seed at a rate of 5 lbs. per 1,000 square feet.
- d. Apply mulch at a rate of 40 lbs. per 1,000 square feet (1,600 lbs. per acre). Apply straw mulch where applicable at a rate of one bale per 1,000 square feet.
- e. The Contractor shall water, mow, replace bare and eroded areas, and otherwise maintain all grass areas properly until all work is accepted by the Owner.
- f. The Contractor shall provide necessary barricades, protection and warning signs to protect

seeded area.

Sodding shall proceed as follows:

- a. Prior to installation of sod, spread fertilizer at the rate of 28 lbs. per 1,000 square feet thoroughly incorporated into top 2" of topsoil on all areas to be sodded.
- b. Install sod when directed by Project Manager.
- c. Place sod by hand, with tight joints and no overlapping, plug all gaps with sod.
- d. Wheel sod across sod bed over boards of planks.
- e. Sprinkle sod thoroughly with water and tamp with approved sod tamper or roll as required to smooth and even finish grade and equally firm at all points.
- f. Keep new sodded areas thoroughly moist for at least two (2) weeks.
- g. Maintain new sodded areas until acceptance of Owner by watering, mowing, weeding, etc., as required. Re-sod in areas not showing proper catch.
- h. Provide necessary barricades, protection and warning signs to protect sodded areas.

Guarantee

Section 5. All plant material shall be guaranteed by the Contractor, following completion of project work. At the expiration of one (1) year following substantial completion date of Contract as outlined in the General Provisions, planting shall be inspected by the Project Manager. Plant materials that are alive and normally healthy shall be accepted. Unaccepted plant material shall be removed and replaced by the Contractor at his own expense during the next planting season. Material and method for replacement plantings shall be the same as specified for the initial planting or as approved by the Project Manager, to alleviate the resulting undesirable conditions and to achieve the same similar design. The Contractor shall make replacements until the plants show vigorous and healthy growth for a period of one (1) year from the date of substantial completion. All such replacements shall be inspected for acceptance at the end of the proving period.

END OF SECTION

SITWORK

Section 02940

Temporary Silt and Erosion Control

Scope

Section 1. This work shall consist of furnishing all labor, material, and equipment, and incidentals for the construction of silt control structures to reduce the amount of sediment delivered to waterways. Silt control structures shall be constructed as required to control silt runoff into streams at the locations directed by the Engineer or his designated Representative.

During the life of the contract, the silt control structures shall be maintained by the Contractor, and silt accumulations which threaten to damage the structures, or preclude their effective operation as determined by the Engineer, shall be removed.

Straw or Hay Bale Silt Check

Section 2. This silt check shall be constructed with straw or hay bales, staked to remain in place, as shown on the Standard Details.

The location of straw or hay bale silt checks shall be as shown on the Plan drawings, or as directed by the Engineer at the time of construction. When the usefulness of the silt checks has ended, they shall be removed, and surplus materials be disposed of.

Measurement and Payment

Section 3. Payment for installation and maintenance of the temporary silt and erosion control structures shall be considered an incidental expense to the construction. All costs for same shall be included in the unit prices bid for the several other items included with the project.

END OF SECTION

SITWORK

Section 02950

General Cleanup

General

Section 1. The Contractor shall be responsible for maintaining the site in a neat and safe manner during the period of construction. All trash and debris shall be removed or disposed.

Final Cleanup

Section 2. Upon completion of the construction, but prior to the final estimate, the Contractor shall check the entire site affected during construction and remove or dispose of all trash, debris, used building materials, etc. He shall also remove all construction equipment used for the project.

Finish Grading

Section 3. Upon removal of all debris and completion of rough grading operations all areas disturbed during construction shall be finish graded to provide for a smooth surface free of ruts, gullies or ponding areas. Large stones greater than 2 inches in size shall be removed from the site. The areas to be seeded shall then be fine raked to a smooth surface and the top 2-inches of soil loosened to form a seed bed.

Seeding

Section 4. Upon completion of finish grading operations the entire area shall be fertilized uniformly at a rate 20 pounds per 1,000 square feet with 12-12-12 composition fertilizer. The area shall then be seeded at a rate of 3 pounds per 1,000 square feet with a mix consisting of 40 percent Kentucky Bluegrass, 40 percent Creeping Red Fescue and 20 percent Annual Rye Grass, then lightly raked. Immediately after seeding the area shall be covered with straw evenly spread at a rate of 4 bales per 1,000 square feet. The seeded areas shall then be watered immediately and then watered on a daily basis until grass is established. Areas in which grass has not been established shall be re-fertilized, re-seeded and watered until grass has been established.

END OF SECTION

CONCRETE

Section 03300

Concrete Masonry

General

Section 1. This item delineates the general requirements pertaining to all concrete to be used on the project and the specific requirements for structural concrete work.

Concrete masonry work includes furnishing all materials and equipment for mixing, placing and finishing of all concrete, curing and damp-proofing, the erection and removal of falsework and forms and all other work and materials incidental to the completion of concrete masonry as herein specified.

Concrete shall be of two classes:

Class "AA" concrete shall be used in the bottom and sides of tanks, walls, footings, reinforced concrete slabs whether self-supporting or placed on grade, beams, columns, girders and in all other structural applications.

Class "A" concrete shall be used in the construction of sidewalks, curbs, drives; Class "B" concrete shall be used as encasement and cradles for pipelines, and in such other construction as specified elsewhere in these specifications or as directed by the Project Manager.

Cement

Section 2. The cement to be used shall be:

Class "AA" concrete; ASTM C-150, Portland Cement, Type I or Type IA;
Class "A" concrete; ASTM C-150, Portland Cement, Type I or Type IA;
Class "B" concrete, ASTM C-150, Portland Cement, Type I or Type IA.

Water

Section 3. Water proposed for use in concrete shall be clean and free of oil, acid, alkali, organic matter or other deleterious substances.

The test for suitability of water shall be a mortar strength test (ASTM C109) wherein the strength at twenty-eight (28) days of mortar specimens made with the water under examination and normal Portland Cement shall be at least ninety (90) percent of the strength of similar specimens made with the same cement and with water of known satisfactory quality. The test may be waived in cases where the water to be used is of known satisfactory quality.

Fine Aggregate

Section 4. Fine aggregate shall consist of natural sand, sand manufactured by crushing stone or gravel; or, subject to the approval of the Project Manager, other inert materials having similar characteristics. The particular type or types to be furnished shall be approved by the Project Manager.

Fine aggregates shall meet the grading and other requirements of ASTM C33.

Coarse Aggregate

Section 5. Coarse aggregate shall consist of crushed stone or gravel; or, subject to the approval of the Project Manager, other inert materials having similar characteristics. The particular type or types to be furnished shall be approved by the Project Manager.

Coarse aggregates shall conform to ASTM C33. Grading shall be size No. 57.

Proportioning

Section 6. It is anticipated that Ready-Mixed concrete will be used on this project. Ready-Mixed concrete shall conform to ASTM C-94. Should the Contractor elect to use job or site-mixed concrete, all plant, equipment and work shall conform to specifications provided by the Project Manager.

Concrete shall meet the following requirements:

| <u>Class</u> | <u>Minimum 28-Day Compressive Strength, psi</u> | <u>Entrained Air percent</u> | <u>Minimum Cement Content sks/cy</u> | <u>Slump Inches</u> |
|--------------|---|----------------------------------|--|-------------------------|
| "AA" | 4000 | 5.5 +- 1.5 | 6.6 | 2-3 |
| "A" | 3500 | 5.5 +- 1.5 | 7 | 4-7 |
| "B" | 2500 | 5.5 +- 1.5 | 4.8 | 2-5 |

Air-entraining admixtures conforming to ASTM C-260 may be added to Class "AA", "A" and "B" concrete.

Other admixtures conforming to ASTM C-494 may be added to concrete only upon the express, specific approval of the Project Manager. Calcium chloride or admixtures containing calcium chloride are prohibited.

The design of the concrete mix, using materials as specified, quality control and the attainment of the specified strengths and other characteristics are the sole responsibility of the Contractor.

The Contractor shall furnish to the Project Manager, for his review, mix designs for each specific class of concrete to be used on the project. The mix designs shall be based on the saturated, surface-dry weights of the aggregates and shall contain information on the specific gravities and absorption characteristics of the aggregates and the type and make of air entraining agent, if any, to be used. Other data and test results supporting the mix design shall be supplied by the Contractor to the Project Manager on request.

Quality Assurance

Section 7. The cost of quality assurance testing shall be borne by the Contractor. Quality control and the attainment of the specified strengths and other characteristics remain the sole responsibility of the Contractor.

Concrete will be tested during the course of the work as follows:

Slump shall be measured in accordance with ASTM C-143; the amount of entrained air shall be determined in accordance with ASTM C-231; yield tests to determine the cement content will be made in accordance with ASTM C-138; Compression test cylinders to determine whether the concrete is meeting the specified strength will be made and tested in accordance with ASTM C-31 and ASTM C-39 and the following requirements:

Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day. When concrete placement exceeds five (5) cubic yards, test cylinders will be made for each 150 cubic yards, or fraction thereof, and/or for each 5000 square foot of surface area, or fraction thereof, of concrete placed in the work. Four cylinders shall be made for each test. Two cylinders shall be tested at 28 days and two cylinders at 56 days.

The strength level of an individual class of concrete shall be considered satisfactory if the average of all sets of three (3) consecutive strength tests equal or exceed the specified compressive strength and no individual strength test (average of two (2) cylinders) falls below the specified compressive strength by more than 500 psi.

Should strength levels not meet the above standards or if tests of fieldcured specimens indicate deficiencies in protection and curing, steps shall be taken to assure the structural integrity and load-carrying performance of the reinforced concrete member or members. The Contractor shall be required to drill cores from the area in question in accordance with ASTM C42. Three (3) cores shall be removed for each strength test more than 500 psi below specified minimum compressive strength. If concrete in the structures will be dry under service conditions, cores shall be air-dried for seven (7) days under temperatures varying from 60 to 70 degrees F. with relative humidity under 60 percent prior to load testing. Such cores shall be tested dry. If concrete in the structure will be more than superficially wet under service conditions, cores shall be immersed in water for at least 48 hours and tested wet.

Concrete in an area represented by the core tests shall be considered structurally adequate if the average of the strengths of three (3) cores is equal to at least 85 percent of the specified minimum compression strength and if no single core is less than 75 percent thereof.

If as the result of core testing structural adequacy remains in doubt, load testing may be ordered by the Project Manager. Load tests shall be in strict accord with the applicable provisions of Chapter 20, ACI 318-77.

The Project Manager may permit the substitution of load testing for a core drilling and testing program at his discretion. All costs of core drilling and testing and/or load testing shall be paid for by the Contractor.

Failed areas, as designated by the Project Manager, shall be removed and replaced at the Contractor's expense, or such other disposition shall be made as determined by the Project Manager.

The Owner may, from time to time, make such other tests and inspections as will satisfy himself as to the quality of concrete being produced. The cost of these tests and inspections will be borne by the Owner except that the Contractor or his supplier, shall supply all required materials and such assistance as may be necessary free of charge. Tests and inspections may include:

1. Inspection of batch plant equipment and methods of storage and handling for aggregate and cement; checking of measuring devices and scales; condition and capacity of mixers and agitators;
2. Testing of cement, aggregates and admixtures for specifications compliance, and tests at the plant for slump, yield and air content;
3. Field and plant inspection of the hauling and handling and placing of concrete;
4. Slump and/or air test on every load of ready mix concrete delivered to the job site.
5. Such other tests and inspection as may be required or deemed advisable by the Project Manager.

Field-Cured Tests Cylinders. The Contractor may wish to provide field-cured test cylinders as a means of producing strength data for the early removal of formwork. The making, curing and testing of such cylinders shall be at the Contractor's expense. Molding and curing of test cylinders shall be according to the provisions of ASTM C31, "Method of Making and Curing Concrete Specimens in the Field." Curing shall be in accord with Section 7.4 of the cited standard.

Mixing and Delivery

Section 8. Mixing and delivery shall be in accordance with ASTM C-94 except that all concrete shall be delivered to the site of the work and discharge shall be completed within sixty (60) minutes for Class "AA" concrete and ninety (90) minutes after the introduction of the cement to the mix for Class "A" and Class "B" concrete. The time of introduction shall be stamped on the delivery ticket for the load by means of an automatic time clock device or by such other means as may be acceptable to the Project Manager.

Delivery tickets shall contain, in addition to the time as noted above, the project name, the class of concrete being delivered and the amount.

The temperature of the concrete shall not exceed 90NF (ninety). Loads with temperatures in excess of 90NF (ninety) shall be rejected and removed from the site of the work.

Formwork

Section 9. The Contractor shall provide forms, form ties, bracing and supports, molds and templates for the construction of the project. The purpose of the formwork is to mold the wet concrete into the final structure which conforms to shapes, lines and dimensions as required by the construction drawings. That portion of the formwork in contact with the wet concrete shall be smooth and even to provide a smooth finished surface of the concrete masonry.

Formwork shall be substantial in construction and bracing to prevent movement or deflection due to the hydrostatic loading of the wet concrete. Joints in formwork shall be tight to prevent leakage of concrete or mortar. Forms shall be braced and tied together to maintain position and shape during the pouring and compacting operations. Formwork and its supporting structure shall be designed to avoid damage or undue loading to previously placed structures or structural components. The design of formwork shall include consideration of the rate and method of concrete placement and to provide ample support for all expected loadings, weight of wet concrete, horizontal or vertical construction loads and impact loads.

Formwork shall be cleaned of cement, mortar or dirt prior to use. Formwork shall be designed to be readily removed without damage to the contained concrete masonry. Deformed, broken or otherwise defective forms or moldings may not be stored on the project site by the Contractor. Deleterious substances which may injure or discolor the finished concrete shall not be permitted on that portion of formwork to be in contact with the wet concrete.

Formwork shall comply with the provisions of ACI 347-68, "Recommended Practice for Concrete Formwork" and the handbook, "Formwork for Concrete" produced by ACI Committee 347.

Moldings and Chamfers. Unless shown otherwise on the plans or directed, suitable moldings or chamfer strips shall be placed in the angles of all forms of round or bevel the edges of the concrete. The top edges of all walls shall be chamfered three-quarter (3/4) inches unless otherwise directed.

Oiling. The inside of forms shall be coated with non-staining mineral oil or other approved material prior to placing the reinforcing steel.

Inspection. Temporary openings shall be provided at the base of column and wall forms and at other points where necessary to facilitate cleaning and inspections.

Form Ties. Snap ties, bolts, or other approved methods for holding forms in place shall be made and placed so that they will leave no metal within one (1) inch of the surface of the finished surface of concrete walls. The cutting off of such ties and bolts below the surface and repointing with mortar in said location will not be permitted. All openings left in the surface by removal of the manufactured form ties or bolts shall be properly and completely filled with mortar. Ties made of twisted wire will be permitted only in light or unimportant work and then only by permission of the Project Manager. The type of form ties proposed for use on the work shall be submitted to the Project Manager for approval before purchase and delivery to the job site. All form ties shall be removed as specified by their manufacturer.

Form Removal. The side forms of beams, girders, columns, walls and similar vertical forms may be removed after 7-days of cumulative curing time providing the side forms support no loads other than the lateral pressure of the plastic concrete and further provided that the structure is adequately supported from beneath.

Formwork supporting the underside of structural members, slabs, beams and girders, shall not be removed until the members have attained sufficient strength to safely support their own weight plus superimposed construction loads. Sufficient strength may be demonstrated by field-cured test cylinders together with a structural analysis which considers proposed loads in relation to the field cured cylinder strengths. Such analysis shall be furnished by the Contractor to the satisfaction of the Consulting Engineer.

Construction loads exceeding the combined design deadload plus liveload shall not be supported by any unshored structural member unless analysis indicates sufficient strength to support such additional loads.

Analysis prior to the removal of shoring shall not be required if proposed construction loadings will not exceed design loads and 28-day cylinder strengths meet or exceed design requirements. Analysis must consider both supporting strength and deflection of the structural member in question. Computed deflections using field-cured cylinder modulus of elasticity and proposed construction loadings shall not exceed the limits given by Table 9.5(b), "Maximum Permissible Computed Deflections," A.C.I. 318-77.

Walls designed to support lateral loads, hydrostatic pressures or equivalent fluid pressures of earth backfill and surcharge loads, shall not be subjected to such loads until such time as the 28-day cylinder tests indicate design strength has been attained. Subjection of lateral loading prior to the 28-day test may be done if a structural analysis based on field-cured cylinder tests indicate that such loading may be safely applied.

Placing Concrete

Section 10. Concrete shall be mixed, transported or conveyed only in equipment that is thoroughly cleaned and from which all hardened concrete and other foreign material has been removed.

Before depositing the concrete, all forms shall be thoroughly cleaned and the area to be occupied by the concrete shall be free from all laitance, silt, dirt, shavings, sawdust and other debris; the forms shall have been oiled and the reinforcement securely fastened in its proper position.

All concrete shall be placed on clean damp surfaces, free from standing water or upon properly consolidated fills. Concrete shall be deposited in approximately horizontal layers not to exceed 18 inches in thickness. Concreting shall not be commenced without the express approval of the Project Manager.

Class "AA" concrete shall be placed, finished and cured with special attention paid to the particular requirements and precautions to be observed for this type of concrete.

Removal of Water. Any water shall be removed from the space to be occupied by the concrete before concrete is deposited, unless otherwise directed by the Project Manager. Any flow of water into an

excavation shall be diverted through proper side drains to a sump, or be removed by other approved methods which will avoid washing the freshly deposited concrete. If directed by the Project Manager, water vent pipes and drains shall be filled by grouting or otherwise after the concrete has thoroughly hardened.

Handling. Concrete shall be handled from the mixer, or in case of ready-mixed concrete, from the transporting vehicle, to the place of final deposit as rapidly as practicable by methods which will prevent the separation or loss of the ingredients. Under no circumstances shall concrete that has partially hardened be deposited in the work. Concrete shall be deposited in the forms as nearly as practicable in its final position to avoid rehandling. It shall be so deposited as to maintain, until the completion of the unit, a plastic surface approximately horizontal. Forms for walls or thin sections of considerable height shall be provided with openings or other devices that will permit the concrete to be placed in a manner that will prevent segregation and accumulation of hardened concrete on the forms or metal reinforcement above the level of the concrete being deposited.

Concrete, regardless of the type of transporting vehicle, shall have the required quality when deposited in the forms.

Chuting. Whenever concrete is conveyed by chutes, the equipment shall be of such size and design as to insure a continuous flow in the chute. The chutes shall be of metal or metal lined, and the different portions shall have approximately the same slope. The slope shall be not less than one vertical to two horizontal and shall be such as to prevent the segregation of the ingredients. The discharge end of the chute shall be provided with a baffle plate to prevent segregation. If the distance of the discharge end of the chute above the surface of the concrete is more than four (4) feet above the surface of the concrete, a spout shall be used and the lower end maintained as near the surface of deposit as practicable. When the operation is intermittent, the chute shall discharge into a hopper. The chute shall be thoroughly cleaned before and after each run and the debris and any water used shall be discharged outside the forms.

Pneumatic Placing. Where concrete is conveyed and placed by pneumatic means, the equipment shall be suitable in kind and adequate in capacity for the work. The machine shall be located as close as practicable to the place of deposit. The discharge lines shall be horizontal or inclined upwards from the machine. At the conclusion of placement, the entire equipment shall be thoroughly cleaned.

Pumping. Where concrete is conveyed and placed by mechanically applied pressure, the equipment shall be suitable in kind and adequate in capacity for the work. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced. When pumping is completed, the concrete remaining in the pipeline, if it is to be used shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients. After this operation, the entire equipment shall be thoroughly cleaned.

Compacting. Concrete shall be compacted by mechanical vibration. The Contractor shall furnish and have in use sufficient vibration equipment of an approved type and size to properly compact each batch immediately after it is placed in the forms.

The Contractor shall provide at least one standby vibrator for each separate area of concrete being placed. The standby vibrator or vibrators shall be on hand at all times when concrete is being poured.

The vibrators shall generally be of a type that are applied directly to the concrete and that have a frequency of at least 7000 impulses per minute, except that external vibration may be used in inaccessible areas.

The concrete shall be deposited as near its final position as possible. Vibrators shall not be used for flowing the concrete or spreading it into place. Vibration shall be applied at the point of deposit and in the area of freshly deposited concrete. The vibrators shall be pushed into and pulled out of the concrete slowly. Vibration shall be of sufficient duration and intensity to thoroughly compact the concrete, but not continued

so long as to cause segregation or formation of laitance on the surface. Care must be used not to disturb partially hardened concrete.

The concrete shall be thoroughly worked around all reinforcement and embedded fixtures and into the corners of the forms.

Such spading as is necessary to insure smooth surfaces and dense concrete shall be done along form surfaces and in corners and locations impossible to reach with the vibrators.

Concrete, in items of work that do not lend themselves to mechanical vibration, may be consolidated by puddling, spading, jiggling or other methods acceptable to the Project Manager.

Protection of Newly-Placed Concrete. No concrete shall be laid in water, nor shall the water be permitted to rise on it within twenty-four (24) hours after it is placed, nor shall water be allowed to run over completed masonry in less than four (4) days. The Contractor shall not permit walking over the concrete until it shall have set for a sufficient time as determined by the Project Manager and shall protect the work at all times from trespass and from damage due to rain or frost.

Depositing Continuously. Concrete shall be deposited continuously in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness with the section. Layers of new concrete shall be thoroughly vibrated into the layers below it. The expansion joints of the type shown upon the drawings shall be constructed only at indicated places or as directed and approved in writing by the Project Manager. The work shall, unless otherwise permitted, be so arranged that a section begun on any day shall be finished during daylight of the same day. For the proper bonding of new and old concrete, such provisions shall be made for steps, keyways, or other devices, as shown on the drawings or as prescribed by the Project Manager.

Bonding. When the placing of concrete is suspended for any cause whatsoever, all necessary grooves for jointing future work shall be made before the concrete has had time to set. When work is resumed, concrete previously placed shall be thoroughly cleaned of foreign materials and laitance using wire brushes and brooms and a high-pressure water jet, if necessary. Immediately prior to the placing of new concrete the old surface shall be thinly coated with mortar consisting of one (1) part portland cement and two (2) parts sand.

Curing. All concrete shall be protected from loss of moisture from its surface by keeping its surface continuously wet for a period of seven (7) days during which time the air temperature immediately surrounding the concrete remains above 50 degrees F.

Surface areas of Class "AA" concrete shall be cured by one of the following methods:

1. Ponding
2. Wet coverings of burlap or cotton mats
3. Continuous sprinkling

Architectural and structural concrete shall be cured by leaving the forms in place provided that exposed surfaces are cured as specified above and that, in hot weather, soaker hoses or water sprays are used to supplement the protection afforded by the forms.

Class "A" and "B" concrete may be cured as above or by the use of "Kraft" or equivalent paper, plastic sheeting or liquid curing compound. Details of the proposed curing treatment shall be subject to the approval of the Project Manager.

Cold Weather Concreting. Except by specific written authorization of the Project Manager, concrete shall not be placed when the atmospheric temperature is below 40NF or whenever the predicted temperature will fall below 40NF during the curing period.

When such authorization is given, the water, aggregates or both shall be heated and suitable enclosures and heating devices and/or insulated forms shall be provided. The concrete shall be placed at a temperature between 50NF and 70NF and the surface temperature of the deposited concrete shall be maintained between 50NF and 100NF for a period of not less than seven days. The enclosures and heating devices and/or insulated forms shall not be removed at the end of this period until the temperature of the concrete has been permitted to drop, at a rate not to exceed 20NF per 24 hours to within 20NF of the existing atmospheric temperature.

Mixing water shall be heated under such control and in sufficient quantity to avoid appreciable fluctuations in temperature from batch to batch. Aggregates shall be uniformly heated to eliminate all frozen lumps, ice and snow.

Concrete shall not be placed in contact with materials having a temperature of less than 32NF. If necessary, the forms, reinforcing steel and foundation materials shall be enclosed and heated before the concrete is placed.

The details of the proposed method of meeting the above specifications shall be subject to the approval of the Project Manager.

The authorization of the Project Manager shall, in no way, relieve the Contractor of his responsibility to protect the concrete from damage due to freezing or inadequate curing. Any concrete so damaged will be removed and replaced by the Contractor at his expense.

Notwithstanding the above, the Project Manager may, at any time, prohibit the placing of concrete masonry when, in his judgment, the conditions are unsuitable or proper precautions are not being observed, regardless of the weather or season of the year.

Finishing Concrete

Section 11. Point Up. Immediately after the removal of forms, all cavities produced by form ties and all other holes, honeycomb spots, broken corners or edges and other defects except air bubble holes shall be cleaned, saturated thoroughly with water and completely filled, pointed and trued with a mortar of the same proportions as used in the concrete being finished. On all exposed surfaces all fins and irregular projections shall be removed with a stone or power grinder, care being taken to avoid contrasting surface textures. Sufficient white cement shall be substituted for the regular cement in the filling of holes and other corrective work to produce finished patches of the same color as the surrounding concrete.

Finishes. All exposed surfaces, defined as the surface of any concrete exposed to view upon completion of the work, and including the inside of tanks, down to 18 inches below maximum water level shall be given a rubbed finish as specified below.

The upper surfaces of footings shall be floated smooth but not troweled except that roughened areas for bonding purposes shall be required for those sections underlying future concrete or other masonry construction.

The top (horizontal) surface of walls shall be given a troweled finish.

Exposed surfaces of floors shall be accurately screeded, floated and then troweled to a smooth, hard and dense surface.

Where asphaltic expansion joints are called for, particular care shall be taken to form smooth, even surfaces free from depressions or shoulders.

Rubbed Finish. Immediately upon removal of the forms, the surfaces to be rubbed shall be pointed up, thoroughly wetted and then rubbed with a No. 20 carborundum brick and water so as to produce a true, even, and smooth surface. When necessary to fill pinholes, and upon areas which have been reconstructed, rubbing shall be done by carborundum brick and a thin cement grout composed of one (1) part of cement and two (2) parts of fine washed silicone sand, all of which shall pass a No. 20 sieve. The surfaces finished with grout shall be carefully scraped with a steel edge so as to remove all surplus grout, after which it shall be given a final rub with a wood float until all skin and form marks shall be removed. No "wash" composed of cement and water, or cement, sand and water shall be used in this process.

Architectural Concrete. All concrete surfaces designated on the drawings as "textured concrete" shall be formed using standard form liners similar to Symons Form Liner No. P/C 30918-3 (Sandblast #3) pattern in conjunction with Symons Majic Kote Form Coating in strict accordance with printed instructions from the manufacturer. Refer to drawings for location, size and details of form liner panels. Verify location of all joints with Project Manager prior to the placing of any concrete.

Watertightness

Section 12. Watertight concrete structures are required. Cracks and other imperfections developing at any point in the work shall be repaired in a manner satisfactory to the Project Manager. When concrete work has attained sufficient strength, the Contractor shall fill each basin or tank, or each compartment, with water and shall repair any imperfections which cause the surface of the water to drop more than one-half (1/2) inch in twenty-four (24) hours. All visible leaks shall be made watertight.

All structures such as pits, sumps, building basements, etc., shall be absolutely watertight against ground water.

All vertical joints between new concrete and existing concrete shall be made watertight.

Any work or treatment necessary to fulfill the specifications for watertightness shall be done at the Contractor's own and proper expense.

The Contractor shall use adequate and sufficient water stops to meet the above specification whether shown on the construction drawings or not. Water stops shall be the nine (1) inch rubber dumbbell type. The cost of all water stops used shall be included in the lump sum price for the General Contract.

Miscellaneous Work in Concrete

Section 13. All castings, grating frames, or other metal work, including pipe supports and cast iron pipe sleeves, all electrical conduits and water stops, shall be built into or encased in the masonry by the Contractor as shown on the drawings or directed. All necessary precautions shall be taken to prevent them from being displaced or deformed.

Steps

Section 14. The treads of all concrete, or concrete filled, steps not receiving additional finishes shall be made skid resistant by an application of fine abrasive aggregate. The aggregate shall be approved by the Project Manager.

After screeding and when the concrete has attained sufficient rigidity to support the weight of a workman on boards, the fine abrasive aggregate shall be uniformly distributed by hand over the tread at a rate

of one-quarter (1/4) pound per square foot of surface area (or such other rate as may be applicable) and immediately wood floated into the finished surface.

Epoxy Bond Coat

Section 15. Any epoxy bond coat, where designated on the construction drawings or noted in the specifications, shall be applied to the old concrete surface prior to the placing of new concrete adjacent to this surface. The epoxy bond coat shall be applied in accordance with the manufacturer's specifications. The epoxy bond coat shall be submitted to the Project Manager for review prior to applying.

Grout

Section 16. Grout shall be used to level bed plates for all machinery, plug holes in existing concrete walls, etc., as designated on the construction drawings or noted in the specifications. The grout shall be ASTM C150 Type I or ASTM C91.

Concrete Sealer

Section 17. Exterior concrete slab surfaces, including sidewalks, shall be finished with "Intersect Deep Penetrating Sealer" as manufactured by Internation Thermoset, Inc., or equal. The sealer shall be applied in full conformance with the manufacturer's detailed application instructions.

The sealer shall be capable of penetrating the pore structure of the concrete to provide an effective sub-surface barrier to inhibit moisture migration, corrosive chemical penetration, and to protect the new concrete from the effects of de-icing chemicals, seals, freezing and thawing, efflorescence and petroleum products. The formulation shall not contain plasticizers, flexibilizers, oils, or diluents that remain unreactive in the resin or curing agent. The sealer shall not build up a layer or membranes on the concrete surface that reduces the skid resistance from that of the unsealed concrete surface.

The epoxy penetrating sealer shall be furnished in two (2) components for blending in strict compliance with manufacturers' recommendations. The ingredients shall have the specified mixing ratio by volume of 50% Component "A" (epoxy resin) and 50% Component "B" (curing agent). The color of the blended material shall be clear to amber, and shall not cause uneven discoloration or shading of the finished concrete surface.

Concrete floors shall be cured at least 28 days prior to application of the epoxy sealer. The contractor shall take extreme care to protect the curing concrete from oil or grease stains or other surface damage. Concrete shall not be wet or damp, coated with a curing membrane or sealer, or mixed with a hardener (such as silicate).

Inserts and Fastening Devices For Other Work

Section 18. Accurately install and secure in place all inserts or other fastening devices required for attachment of other work.

Provide dovetail anchor slots in concrete for securing masonry partitions butting to concrete and where concrete surfaces are to be faced with masonry. Slots shall be 16 gauge galvanized steel similar to Type 100 slots as made by Heckman Building Products. The slots shall be placed vertically the full height of concrete space 24" o.c. horizontally, except where otherwise shown.

Flashing reglets shall be provided where shown on the drawings. Reglets shall be 26 gauge galvanized steel similar to Type 230 as made by Heckman Building Products. Reglets shall be placed in a continuous fashion and extend 4" beyond each end of steel lintel where shown on drawings.

CONCRETE

Section 03419

Concrete Encasement and Concrete Cradle

Concrete Encasement

Section 1. Buried pipelines shall be encased in 2,500psi concrete where shown on the construction drawings or to the extent and/or at other locations as determined by the Project Director.

Concrete encasement shall provide a minimum cover of six (6) inches beneath and above the pipe O.D. and shall extend laterally to the undisturbed wall of the pipeline trench. Additional thickness of concrete encasement, if required, shall be shown on the construction drawings. Each pour shall start and stop at a pipe joint.

Concrete Cradle

Section 2. Concrete cradle shall be 2,500 psi concrete where shown on the construction drawing or as directed by the Project Director.

Concrete cradle shall provide a minimum of six (6) inches beneath the pipe and extend to the spring line of the pipe unless otherwise shown on the construction drawings. Each pour shall start and stop at a pipe joint.

Measurement and Payment

Section 3. The payment for concrete encasement shall include furnishing and placing the concrete encasement. The Contractor shall be paid for the number of lineal feet of encasement constructed at the unit price quoted on the Proposal Sheets. (Unit Price Contracts Only.)

The payment for concrete cradle shall include furnishing and placing the concrete encasement. The Contractor shall be paid for the number of lineal feet of cradle at the unit price quoted on the Proposal Sheets. The concrete foundation under tee-based manholes is not considered cradle.

END OF SECTION

SECTION 03900
DUMPED ROCK GUTTER

1.0 GENERAL

1.1 DESCRIPTION

- A. Under this item, the Contractor shall furnish and install dumped rock as described further herein. The Contractor shall provide all labor and equipment for such installation.

1.2 QUALITY ASSURANCE

- A. Thickness shall be as called for on the plans plus or minus 10%.

2.0 PRODUCTS

- A. The material for dumped rock gutter shall be hard sandstone, limestone, or hard shale containing a combined total of not more than 15% earth, sand or soft shale, as determined by visual inspection. Weathered material will not be accepted.
- B. Visual inspection shall be used to determine that the rock will conform to the following weight requirements:

| Thickness of Gutter (Feet) | 70 Percent of the Weight of Material Shall Consist of Stones Weighing Between the Following Limits: |
|-------------------------------|---|
| 1.0 | 50-100 lb. |
| 1.5 | 60-150 lb. |
| 2.0 | 75-200 lb. |
| 2.5 | 100-250 lb. |

3.0 EXECUTION

- A. Dumped rock gutter may be dumped from trucks and bulldozed into place in a manner similar to the placing of rock fill. Hand placement will not be required.
- B. The rock gutter may be obtained from the unclassified excavation.
- C. The rock gutter shall be constructed to the thickness and grade shown on the plans or a minimum uniform thickness of one (1) foot whichever is greater.
- D. If suitable material is not available from unclassified excavation, it shall be the responsibility of the Contractor to furnish this material at no additional cost.

END OF SECTION

SECTION 04200 - PRECAST CONCRETE

1.0 GENERAL

1.1 DESCRIPTION

- A. Section consists of the construction of new precast vaults and catch basins.

2.0 PRODUCTS

2.1 MATERIALS

- A. Materials shall conform to the latest edition of the following specifications:

Brick - A.S.T.M. C-32 Grade MS

Mortar Sand - A.S.T.M. C144

Culvert Pipe - A.S.T.M. C76

Castings - A.S.T.M. A48-64

Cement - A.S.T.M. C150, Type III

Concrete (Ready Mix) - A.S.T.M. C94

Steel Reinforcement

(a) Reinforcing bars shall be billet steel, intermediate or hard grade - A.S.T.M. A-185

(b) Welded wire fabric - A.S.T.M. A-185

(c) Cold-drawn wire - A.S.T.M. A-82

Federal Specification - SS-C-153

O-ring Joint - A.S.T.M. C443

Aggregate - A.S.T.M. C33

Plastic, Reinforced Manhole Steps - Plastic A.S.T.M. 21-46-68, Type II, Grade 49108; Reinforcement Steel A.S.T.M. A165, Grade 60

- B. If concrete is mixed on the job, it shall be designed and proportioned in accordance with the recommendations for controlled concrete in the latest edition of the Portland Cement Association's "Design and Control of Concrete Mixtures". Job Mix or Ready Mix concrete shall be subject to the provisions of the item for Concrete In Place, and the following limitations:

Compressive Strength at 28 Days
Cement Per Cubic Yard
Water Cement Ratio
Aggregate Size

3500 Pounds Min.
6 Bags Min.
6 Gal/Bag Max.
1-1/2 Inch Max.

3.0 EXECUTION

- A. All precast inlets, valve boxes or other in-ground structures shall have walls and floor thick enough to prevent floatation
- B. All concrete shall be placed in accordance with Portland Cement Association's specifications as contained in the latest edition of their "Design and Control of Concrete Mixtures".
- C. Structure bottoms shall be placed on a six inch (6") subgrade of granular material. The invert channels shall be uniform, smooth, and accurately shaped, as shown on the Plans, or as directed by the Engineer. Concrete bottoms shall be formed to fit the ends of the pipe. Branch lines entering above the main lines shall likewise be cut off flush with the structure wall.
- D. Rubber o-ring gasket joints shall conform to ASTM Specification C433; both the tongue and groove of the wall section shall be thoroughly cleaned before placing the o-ring in place. Before placing wall sections above the first, both tongue and groove shall be adequately lubricated with the lubricant compatible with the type o-ring being used. Mastic joint sealant shall be acceptable.
- E. Proper lubrication of the joints is necessary to insure that excessive external force is not necessary to make up the joint. Any wall sections cracked or damaged during installation shall be removed from the project immediately and replaced with undamaged materials.
- F. A short section of precast extension rings, 12" or less, may be required to bring the structure casting to required grade. If additional height is required, a precast concrete section will be used.
- G. Frames shall be set in a full bed of bitumastic joint sealer to the required grade or cast into the top slab of the structure. The frame will then be bolted to the concrete with a minimum of four (4) 1/2 x 6 inch stainless steel expansion anchors. Steps will be required in inlets and junction chambers exceeding four (4) feet in depth.
- H. When grade adjustment of existing structures is specified, the frames, covers, and gratings shall be removed and the walls reconstructed as required. The cleaned frames shall be reset and made firm in place at the required elevation.
- I. Upon completion, each structure shall be cleaned of any accumulations of silt, debris, or foreign matter of any kind and shall be kept clear of such accumulation until final acceptance of the work.
- J. Excavation and backfill shall be done in accordance with the provisions for Division 2.

END OF SECTION 04200

MASONRY

Section 04050

Masonry

1.0 GENERAL

1.1 DESCRIPTION

A. Section covers concrete block foundation and building and related incidentals.

2.0 PRODUCTS

2.1 MATERIALS

A. Materials shall conform to the Requirements of American Society for Testing and Materials specifications listed, and the specifications indicated otherwise on the drawings.

- a. Portland Cement C150, Types I, II, or III as best suited to job conditions.
- b. Hydrated Lime for Masonry Purpose C207, Type S.
- c. Lime putty from quicklime conforming to C5 and Appendix and shall be prepared in a plant specially built to slake and age quicklime for use in masonry mortar.
- d. Aggregate for Masonry Mortar C144.
- e. Water shall be clean and potable.
- f. Hollow load-bearing concrete masonry units C90, Grade A where below grade or exposed to weather, Grade B where above grade and not exposed to weather and shall be 15-5/8 x 7-5/8 inches face dimensions by thickness as required.
- g. Hollow Non-Load-Bearing Concrete Masonry Units C129, lightweight, Grade B for interior partitions and shall be 15-5/8 x 7-5/8 inches face dimensions by 5-5/8" thickness. Grade A shall be used if partitions extend below floor slab to footings.
- h. Solid load-bearing concrete masonry units C145, Grade A where below grade or exposed to weather, Grade B where above grade and not exposed to weather, and shall be of sizes required.
- i. Horizontal masonry joint reinforcing shall be one of the following:

Dur-O-Wall "Truss Masonry Wall Reinforcement"
AA Wire Products Co. - "Block-Trus"

Hohmann & Barnard, Inc. - "Trus-Mesh"

B. EXECUTION

A. Workmanship shall conform to the following: Requirements of local building code and building code requirements for Masonry-American National Standards Institute 41.1; instructions of each material manufacturer applicable published recommendations of the National Concrete Masonry Association and the requirements of these specifications unless specifically indicated otherwise on the drawings.

- a. Handle materials carefully and avoid damaging them. Protect materials from contact with earth and cover with waterproof material until used.
- b. Promptly remove damaged materials from the site or dispose of them otherwise in an approved manner.
- c. Brace walls laterally, and protect against freezing as required by codes.
- d. Where fresh masonry joins masonry that is partially or totally set, remove loose brick and mortar, and clean and lightly wet surfaces of older work so as to obtain the best possible bond with new work.
- e. Cover tops and top 2 feet of each side of all walls with strong waterproof membrane securely anchored, except when masonry work is actually in progress or permanent protection from rain is provided otherwise.
- f. Bond all intersections of masonry walls of all types by laying a true bond at least 50 percent of the units at the intersection or bond with approved anchors.
- g. Lay only surface dry units and stop work and cover walls when it rains, unless work is protected by weathertight floor or roof construction.
- h. Prepare mortar with only materials hereinbefore specified and in conformance with the following proportions:
 1. Mortar shall be composed of one part Portland Cement, one part lime and five parts mason's sand, proportioned by volume.
 2. Mortar shall be mixed in a power driven drum type mixer of approved design. Maintain proportions accurately. Mortar that has been mixed for more than two (2) hours shall not be used.
 3. In lieu of the above, the Contractor may use one of the standard brands of prepared "masonry cement" mixing in proportions of one part masonry cement to three parts of specified sand.

- i. Lay exposed interior masonry in running bond, unless shown otherwise. Bond walls as required by code either with bonding units that match other exposed units or with metal ties.
- j. Tool all exposed joints and those which will be in contact with earth, as initial set takes place, with approved round jointer slightly larger than width of mortar joint, unless indicated otherwise.
- k. All unexposed joints shall be cut flush, except those which will be in contact with earth.
- l. Provide 3/8 inch in diameter open weep holes just above all flashings, about 2 feet apart and where indicated on drawings.
- m. Build-in all items, specified in this and other divisions, as may be necessary to properly complete the work. Some of such items are electrical boxes, chases, grounds, flashings, anchors, inserts, lintels, anchor bolts, caulking and sealing spaces, frames around openings, etc.
- n. Lay all brick, sills, and solid units with full bed and head joints. Fill vertical longitudinal joints with mortar or grout.
- o. Solidly fill metal door frames in masonry walls with mortar as wall is laid unless specifically indicated otherwise.
- p. Lay all hollow units with full mortar coverage on outer and inner shells of bed and head joints except webs also shall be bedded in all courses of piers, columns and pilasters and in starting courses on solid walls and footings, and where adjacent to spaces to be grouted or concreted.
- q. Lay all masonry plumb and true lines. Minimum length of any cut unit in exposed work shall be one half of unit. Cut units requires in exposed work with saws. Tothing is not permitted; racking, one-half unit per course is acceptable; bringing all walls up together is preferred. Exposed surfaces of units shall be free of mortar. Clean equipment used for mixing, moving, or storing mortar at end of each day's work. Properly locate and place metal ties in concrete forms to suit masonry. Tightly fit masonry around sleeves, conduits and to ceilings.
- r. Cut out defective joints; fill joints solidly, and tool to match adjacent work. Fill any holes in mortar joints except required weep holes.
- s. Repair defects in exposed interior masonry and clean with methods recommended by NCMA, and/or manufacturer of unit.

- t. Provide solid bearings or adequate strength for all lintels, beams, joists, rafters, plates, and other load supporting members. Work shall conform to drawings. If not shown, follow codes and advise the Engineer.
- u. Unit masonry reinforcing shall be run continuously every second block joint (16" vertically) in all masonry walls.
- v. All exterior walls to be made and guaranteed watertight.
- w. Apply a coating approximately 1/4 inch thick, of Portland cement mortar, to exterior face of foundation walls below finish grade. Apply mortar with sufficient pressure to bond firmly with masonry units. Form cove between footings and wall with slope to edge of footing. Parget coating shall be smooth, uniform and free of holes, protrusions, etc.
- x. Construct control joints as indicated on the drawings. Control joints material shall be "BLOKJOINT" rubber control joint as made by Carter-Waters Corp., Kansas City, Missouri, or approved equal. Exterior and interior of joint shall be caulked.
- y. Foundation waterproofing shall be a 1/8 inch thick troweled on coat of Hydrocide 700 Mastic, applied in accordance with manufacturer's printed instruction and in such a manner as to produce a continuous coating free from breaks or pin holes. While still tacky, apply a sheet of 6 mil Polyethylene, equal to Visqueen, in vertical strips with joints lapped 6" and sealed.

END OF SECTION

METALS

Section 05510

Cast Iron Work

Work Included

Section 1. The Contractor shall, under this Section, furnish all the materials for and shall properly install, at the locations shown on the drawing or as directed, all miscellaneous iron castings as specified or as shown, which are necessary for the proper completion of the work.

In general, this work shall include pipe sleeves, floor boxes, manhole steps, manhole rims and covers, adjustable valve boxes, sludge shoes, and such other miscellaneous cast iron work as is shown or required.

Quality

Section 2. All castings shall be true and fit properly together; must be smooth and free from blow holes and other defects; must conform to the dimensions given on the drawings; and to the "Standard Specifications for Gray Iron Castings" of the American Society for Testing Materials, Serial Designation A-48-36, and any subsequent amendments thereto, and to the proposed American Standard Specifications for Coal-Tar Dip Coating for Cast Iron Pipe and Fittings.

Erection

Section 3. All castings shall be set to the proper line and grade, and shall be carefully blocked and braced independently of the form and held in correct position until the concrete has been placed and has set.

Pipe Sleeves

Section 4. Pipe sleeves, of the dimensions shown on the drawings, shall be placed in the concrete masonry wherever indicated.

END OF SECTION

METALS

Section 05515

Iron, Steel and Aluminum Work

Work Included

Section 1. In general, this work shall include all structural steel and aluminum required for stairways and stairway supports, stair treads, all lintels, troughs, pipe supports or plates, floor plates, aluminum ladder and supports, valve keys or valve wrenches, lifting hooks, bolts, nuts and washers of wrought iron or steel not included under other items, and such other work of this character shown or required for the proper completion of the contract; together with any structural steel, structural aluminum, and iron pipe which are not included under any other items.

Materials

Section 2. The structural steel shall meet the requirements of ASTM A-36. Structural steel tubing shall meet ASTM A-500. High strength bolts shall meet ASTM A325 or A490. Standard strength bolts shall meet ASTM A307, Grade A.

All wrought iron shall be tough fibrous and uniform in character. It shall be thoroughly welded in rolling and be free from surface defects, conforming to the requirements of the "Standard Specifications for Refined Wrought Iron Bars and Wrought Iron Plats", Serial Designations A-41-18 and A-42-18 ASTM or subsequent revisions thereto.

Toncan iron, wherever specified, shall be equal to that manufactured by the Republic Steel Corporation.

The aluminum shall meet the requirements of the "Specifications for Structures of Moderate Strength Aluminum Alloy of High Resistance to Corrosion" as by the ASCE. These specifications cover allowable stresses, design rules, and fabrication procedures for structures built of aluminum alloy known commercially as 6061-T6 and the "Specification for Heavy-Duty Structures of High Strength Aluminum Alloy" as published in the proceedings of ASCE. These specifications cover allowable stresses, design rules and fabrication procedures for riveted, heavy-duty structures built of the high strength aluminum alloy known commercially as 2014-T6.

Where iron or steel is shown galvanized, or is so ordered, no additional allowance will be made for such galvanizing. After the metal to be galvanized has been thoroughly cleaned by immersion in the pickling liquors, it shall be dipped in a hot zinc bath and shall remain in this bath until the temperature of the metal has attained the same temperature as the bath. Galvanizing shall follow the procedures listed in ASTM A385, ASTM A153 for hardware, and ASTM A123 for steel fabricated products.

Miscellaneous work included under this item shall be constructed of the materials shown on the drawings unless otherwise specified or approved by the Project Manager.

Fabrication and Erection

Section 3. The intent of this specification is to obtain insofar as possible structural steel work ready to

be fitted and erected. Shop and field connections shall be as shown on the Construction Drawings. Procedures for fabricating and erecting the steel shall be as outlined in applicable sections of:

AISC (American Institute of Steel Construction) "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings," most current edition.

AISC "Code of Standard Practice for Steel Buildings and Bridges," most current edition.

AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts," most current edition.

AWS "Code for Welding in Building Construction," AWS D1.0-69.

Pipe Hangers and Supports

Section 4. Pipe hangers, brackets, and supports to be used in the work shall be the equal of the standard pipe hangers, brackets and supports as manufactured by Grinnell, Crane, Elcen, Michigan, Fee and Mason or approved equal.

Lintels and Miscellaneous Steel

Section 5. Lintels and miscellaneous steel shall be of the size and dimension shown on the drawings.

Steel Stairs

Section 6. Any steel stairs shown on the drawings shall be constructed of the structural steel materials shown.

The treads shall be filled with concrete. Those treads not receiving a finish material shall be made non-slippery by using one-fourth (1/4) pound of fine abrasive aggregate, the equal of fin Alundum (C.F.) Aggregate, (Size 1/32 to 1/4 inch) as made by the Norton Company, Worcester, Massachusetts, for each square foot of tread area. The Alundum Aggregate shall be soaked in clear water for ten (10) minutes, then uniformly distributed by hand over the mortar and immediately wood floated into the cement finish.

Ladders

Section 7. Aluminum ladders shall be furnished and erected as shown on the drawings. Unless otherwise shown, side bars shall be two and one-half inches (2-1/2") by one-half inch (1/2") flat bars eighteen inches (18") apart on centers, except that the section above the floor which shall be thirty inches (30") apart, with one inch (1") diameter rods for rungs spaces twelve inches (12") apart on centers, set in holes drilled in the side bars and then welded over. Unless otherwise shown on the drawings, the side bars shall be carried three feet six inches (3'6") above the upper walkway, and fastened to the wall or floor as required to provide grab rails for persons using the ladder.

Roof Access Doors

Section 8. Doors shall be as manufactured by Babcock-Davis Hatchways, Inc., the Bilco Company,

Dur-Red Products, or approved equal, and locks shall be as manufactured by Sargent and Company, Schlage Company, or approved equal.

Doors shall have a four (4) foot square clear opening and be single-leaf operating. Curb and cover shall be aluminum with a minimum thickness of eleven (11) gauge and capable of withstanding a live load of 100 pounds per square foot. Curb shall be twelve (12) inches in height and be formed with a 3-1/2 inch flange with holes provided for securing to the concrete roof curbs. Curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, fully welded at the corners for weathertightness. Door shall be completely assembled with heavy duty pin, hinges, compression spring operators enclosed in telescopic tubes, positive snap latch with turn handles and padlock hasps outside only, and neoprene draft seal. Cover shall be equipped with an automatic hold open arm complete with red vinyl grip handle. All hardware shall be cadmium plated.

Two padlocks shall be supplied, one per door, with keysets alike.

Anchor bolts shall be stainless expansion bolts. Size of bolt shall be as recommended by access door supplier.

Manhole Steps

Section 9. Manhole steps shall be made of aluminum with non-skid treads. They shall be supplied by Price Brothers, or equal. The steps selected will be compatible with the selected precast manholes.

Eyebolts

Section 10. Eyebolts shall be stainless steel, threaded, and meet all of the requirements of ASTM F541. Use shall be as directed on the design plans.

Dissimilar Materials

Section 11. When bronze and aluminum materials come into contact with dissimilar metals, surfaces shall be kept from direct contact by painting in accordance with Section 09900, "Protective Coatings and Painting".

When aluminum materials come in contact with concrete or lime mortar, exposed aluminum surfaces shall be painted with alkaline-resistant coatings such as heavy-bodied bituminous paint or water-white methacrylate lacquer.

END OF SECTION

METALS

Section 05800

Cover Pipe

General

Section 1. The construction drawings show the details of the cover pipe material.

Steel Pipe

Section 2. Where designated on the construction drawings, the steel pipe shall be fusion welded steel pipe, Grade "B" with no coating. It shall conform to the requirements of ASTM 139. The wall thickness shall be Schedule 40 for pipe up to 4-inches in diameter and 0.250 inch wall thickness for larger sizes, unless railroad specification require a greater thickness.

Nestable Corrugated Metal Pipe

Section 3. Where corrugated metal pipe is designated in the construction drawings beneath a highway, it shall be nestable. The gauge shall be as shown on the construction drawings.

Where corrugated metal pipe is designated in the construction drawings beneath the tracks of a railroad, it shall be AREA Specification 146; with bituminous coating, in accordance with AREA Specifications 1413. The gauge shall be as shown on the construction drawings.

Tunnel Liner Plates

Section 4. Tunnel liner plates where shown on the construction drawings shall be hotdripped galvanized steel of the thickness (gage) and section modulus shown on the construction drawings. The plates shall be formed from steel meeting the requirements of ASTM 139, Grade "B". Individual liner plates shall be made of one piece of metal, provided with flanges from both longitudinal and circumferential joints. The joints shall have sufficient bolt holes to fully develop the strength of the individual liner plate and so spaced in each liner plate that liner plates of curvature will be interchangeable and readily handled in the tunnel. Liner plates shall be of a design that when bolted together no opening shall exist large enough to permit inflow of granular material. Liner plates will be accurately curved to suit the tunnel cross section and when bolted together, the finished casing pipe shall be full round with the nominal diameter to the neutral axis as specified on the proposal sheets and/or construction drawings. Grouting plugs shall consist of a 2-inch standard half-pipe couplings welded or tapped into a hole in the liner plate and furnished with a cast iron plug for closure. The will be as the liner plate and furnished with a cast iron plug for closure. The spacing of the grouting plugs will be as specified on construction drawings. Bolts, heads, and nuts shall be square and of the same size.

Installing Cover Pipe

Section 5.

General

Cover Pipe shall be installed by the boring method, the jacking method, by trenching or by tunneling as shown on the construction drawings. The Owner will obtain permits for any railroad, State or Federal Highway crossings. The Owner shall coordinate scheduling of construction of crossings with railroads and highway departments and shall pay any charges established therefore the work accomplished by these outside agencies. Special construction requirements defined by railroads or highway departments will be shown on the construction drawings and shall be adhered to by the Contractor. Installation of cover pipe shall not commence without the express permission of the Project Director.

The annular space between the cover pipe and the contained carrier pipe shall be filled with grout or with granular materials unless otherwise specified on the construction drawings.

Installation by Boring

Steel pipe shall be installed by the boring method utilizing an auger type boring machine or a machine of such design meeting the individual requirements of the railroad, State or Federal Highway System being crossed. The Contractor shall provide an approach pit, completely sheeted and of sufficient size to operate the boring equipment. The operation of the boring equipment shall be subject to continuous checking by the Contractor to insure proper alignment of the cover pipe as installed.

Installation by Jacking

The Contractor will provide an approach pit for the jacking operation, excavated so the jacking face is a minimum of three (3) feet above the pipe. This open face should be shored securely to prevent displacement of the embankment. The pit shall include a backstop of sufficient size to take the thrust of the jack. The guide rails that support the pipe as it enters the bore shall be accurately placed to line and grade. The entire approach pit shall be sheeted.

Hydraulic or mechanical jacks may be used in this operation. The number of jacks and the capacity of the jacks shall be adequate to complete the operation. A jacking head shall be used to transfer the pressure from the jack and the jacking frame to the pipe. If an auger is used, the pipe shall be jacked simultaneously with the augering. The construction work shall be checked by the Contractor at frequent intervals to insure proper line and grade of the installation.

Installation by Tunneling

Care shall be exercised in trimming the surface of the excavated section to a true line and grade with the excavation conforming to the outside of the tunnel as nearly as possible. In the installation of tunnel or shaft liner plates, the amount of unsupported tunnel or shaft wall shall be at a minimum at all times. Excavation ahead of the liner plates will not be permitted. Liner plates shall be placed promptly as excavation permits. Upon completion of any ring of liner plates, bolts shall be retightened in the two (2) rings previously completed. The Project Director may direct that the top half of the tunnel excavation be supported by a cutting

shield and excavation shall not advance ahead of such support.

The vertical face of the excavation shall be supported, as necessary, to prevent sloughing and at any interruption of the tunneling operation, the heading shall be completely bulkheaded.

Grouting shall follow the excavation and lining of the tunnel or shaft as required to fill all voids outside the tunnel liner plates. Grouting shall be performed prior to or upon completion of the installation of a maximum of four (4) rings, unless otherwise directed by the Project Director. Grouting shall start at the lowest hole in each grout panel and proceed upwards progressively and simultaneously, when possible, on both sides of the tunnel. The machine used for grouting shall be capable of forcing grout, under pressure, into all voids.

Measurement and Payment

Section 6. The payment for installation of cover pipe shall be made on the actual number of lineal feet of the various types and sizes of pipes installed. The unit price per foot for cover pipe shall include furnishing the material and installing the pipe by jacking, boring or tunneling, whichever is required, the construction of the approach pits with all necessary sheeting and all other incidentals required to complete the installation as shown on the construction drawings and herein specified. (Unit Price Contracts Only).

END OF SECTION

DOORS AND WINDOWS

Section 08100

Doors and Windows

1.1 GENERAL

1.2 DESCRIPTION

A. This section covers metal doors, frames and hardware and window frames and glazing.

2.0 PRODUCTS

2.1 MATERIALS

A. Metal Door and Frame:

a. Metal door frames shall be as shown on drawings, fabricated from 16 gauge cold rolled steel, reinforced metered corners, welded and welds ground smooth.

b. Hollow metal doors shall be flush panel of multi-rib construction. Face panel of 18 gauge commercial furniture stock steel, reinforced with vertical stiffeners approximately five inches o.d., spot welded to each face panel. Interiors to be sound deadened and face panels free from joints, seams or defects. Reinforce full width top and bottom with 18 gauge channel sections, top of doors flush.

c. Door and frame to receive shop coat of baked-on rust inhibitive paint.

d. Reinforce, drill and tap for finish hardware.

e. (see C. a. below) ¼" minimum glass on interior doors.

f. Manufactured by Steelcraft, Republic Steel or equal.

B. Aluminum Windows:

1. Office windows shall be double hung or horizontal slider type as shown, thermobarrier system manufactured by Anderson, Dapco, Wausau, Kawneer or Bliss.

2. All exposed surfaces and trim shall have factory applied baked enamel finish.

C. Glass shall meet Federal Specification DD-G-451.

a. Insulating glass, 1" thick for windows consisting of 3/16" parallel-o-float with 5/8" air space, on all exterior windows.

b. 1/4" wired plate glass where indicated.

- D. Finish Hardware:
- a. Hardware sets shall be equal to:

| | | |
|---------------|---|----------------------|
| 1. Butts | - | Hager Hinge Company |
| 2. Locksets | - | Schlage Lock Company |
| 3. Stops | - | Russwin |
| 4. Thresholds | - | Pemko |
 - b. Provide all hardware with US26D and US32D.
 - c. Finish (US26D) locks to be Schlage "Ball Design".
 - d. Finish (US26D) all hinges to be 5 knuckle construction with pins and plugs concealed in the barrel.

3.0 EXECUTION

- A. Store metal doors and frames on wood sills or on floors in a manner that will prevent rust or damage.
- B. Except where special settings are shown or specified, all glazing shall be done to conform to recommendations in "Glazing Manual" issued by Flat Glass Jobbers Association and the following:
- a. Glazing work shall be done only when temperature is above 40 degrees F°.
 - b. Surfaces to be glazed and glass shall be thoroughly clean and dry at time glazing is done, wood stops prime painted.
 - c. Remove and replace all glass stop beads then neatly face putty cutting-in neatly at corners and maintaining full straight lines.
 - d. Install buttons or setting blocks under lower edge of large lights of glass.
- C. General Contractor protect all glass and aluminum work from damage by other workmen and harmful materials and at completion of job, clean all work using plain water and soap or household detergent.
- D. All keys to be plain bow type and shall match existing locks.
- a. Furnish: 3 Master keys for each required set.

END OF SECTION

FINISHES

Section 09900

Protective Coatings and Painting

General

Section 1. The Contractor shall furnish all labor and materials to complete preparation of surfaces, protective coating application, painting and complete clean up of all new materials. Included in this work are concrete, masonry, metal and wood as specified herein.

Materials and Application

Section 2. The paint and paint products shall be Tnemec, or equal. Should substitutions be requested; dry millage, system compatibility, number of coats and generic type shall not be less than specified herein. Testing of coating materials at the Owner's expense may be required by the Resident Engineer on the contents of any or all containers.

Colors shall be selected by the Owner.

All paints and coatings shall be brought to the jobsite in the original unopened and labeled container of the paint manufacturer. Paints and coatings shall be applied in accordance with the manufacturer's detailed instructions. All materials required to complete the painting portion of the contract shall be stored in an area where the minimum temperature is 50°F.

If thinning is necessary or desired for any application, the coating applied shall be built up to the same thickness specified with undiluted material. When thinning is desired, approval and inspection by the Project Manager is required. When thinning is approved, only those products of the manufacturer supplying coating, for the particular thinning purpose shall be permitted. Thinning shall be done strictly in accordance with the manufacturer's instruction.

Paint and coating shall be applied to substances with ambient and substrate temperature no less than five (5)° F above those temperatures recommended by the paint manufacturer. Paint and coatings shall not be applied if relative humidity exceeds 85%.

ALL SURFACES SHALL BE PREPARED SO THEY ARE SMOOTH, CLEAN AND DRY. PAINT SHALL NOT BE APPLIED UNTIL THE PREPARED SURFACES ARE APPROVED BY THE KDOH RESIDENT ENGINEER.

Surface preparation methods in the field shall include one or more of the following:

| | |
|---|---------------------|
| Sand Blasting (dry) SSPC-10 | Solvent Cleaning |
| Brush Blasting | Power Tool Cleaning |
| Wet Sand Blasting | |
| Detergent Cleaning | |
| Galvanized Metal - Trisodium phosphate with water | |

Approval of the surface preparation method shall be as directed by the Project Manager subsequent to inspection of such substrate.

All ferrous metal to be primed in the shop shall have all rust, dust and scale, as well as all other foreign substances, removed by sandblasting. Cleaned metal shall be primed immediately after cleaning to prevent

new rusting. All ferrous metals not primed in the shop shall be sandblasted in the field prior to the application of the primer, pre-treatment or paint. Ferrous metal portions of stored equipment shall have all rust, dust and scale, as well as all other foreign substances removed by sandblasting. The aforementioned sandblasting shall be SSPC 10 specification. All metals, whether to be shop or field primed, shall be wiped with a tack rag as required by the Project Manager, prior to the application of the pre-treatment and/or primer.

All concrete surfaces shall be cleaned of all dust, form oil, curing compounds and materials added while rubbing and other foreign matter. Concrete block masonry shall have all efflorescence, dirt, rust, oil and grease removed. Prior to applying the first coat, any nails, wire or other exposed metal shall be cleaned and spot primed.

Wood surfaces shall be thoroughly cleaned and free of all foreign matter with cracks, nail holes and other defects properly filled with putty, colored to match the approved finish and smoothed. Knots and pitch streaks shall be sealed before applying primer. Sanding with the grain of the wood shall be done to effect a finish and then wiped clean with tack rags and thinner.

Exterior wood siding shall be treated with two (2) coats of Imperial Zar water seal/preservative coating. Exterior wood trim shall be stained with two (2) coats of "Olympic" Mahogany Wood Stain, prior to treating with two (2) coats of Imperial Zar water seal coating.

Interior wood shall be stained with two (2) coats of spar varnish or coated with the specified epoxy system.

Drying time between coats shall be in strict accordance with the paint manufacturer's detailed instructions.

Plaster and drywall surfaces shall be sandpapered smooth, and scratches, cracks and abrasions shall be satisfactorily eliminated before priming.

One (1) gallon of coating as originally furnished by the manufacturer, must not cover a greater square meter area than instructed by the manufacturer's label, no matter what method of application is chosen. Deficiencies in film thickness shall be corrected by the application of an additional coat(s) of paint. On masonry, application rates will vary according to the surface texture; however, in no case shall the manufacturer's stated coverage rate be exceeded. On porous surfaces, it shall be the contractor's responsibility to achieve a protection and decorative finish either by decreasing the coverage rate or by applying additional coats of paint. When non-ferrous substrates are coated, the contractor shall inform the Project Director in writing and twenty-four (24) hours in advance to assure the quantity of coating applied to a given substrate.

The Contractor shall paint all new equipment and piping with a finish coat.

All existing structures, equipment, and piping which is to remain on-site will be prepared as stated previously and repainted with new structures, equipment, and piping. Existing paint and rust are to be removed and the surfaces inspected by the Project Director before new primer and paint is applied.

Protection and Cleaning

Section 3. Before painting is started in an area, finish carpentry including corrections and adjustments, shall have been completed, all glazing installed and the building cleaned of all debris, thoroughly broom cleaning and dusted out. All plastering and drywall shall be finished and shall be thoroughly dry.

Door knobs and escutcheons, before painting is begun, shall be protected either by covering them with cloth or by removal from the doors. Electrical switch plates, receptacle covers and thermostat covers shall be removed prior to the application of paint. These covers shall not be replaced until the final coat of paint is thoroughly dry and inspected. All paint spills and splatters shall be wiped off of glass, and care must be exercised to avoid paint splatters on adjoining work and materials. At the completion of the painting, all unpainted work must be left free from paint marks of any kind and any markings or scratches on painted work

must have been retouched.

All abutting joints of dissimilar materials, door frames, window frames, metal and plastic attached to and installed in concrete, as well as other seams and joints selected by the Resident Engineer, shall be caulked.

Workmanship

Section 4. Before commencing work on surfaces of any type, the Contractor shall carefully inspect same and satisfy that they are dry and in all other respects suitable to receive the specified treatment. If the condition of any surface is such that it cannot be made, the Contractor shall not undertake surface preparation until corrections have been made which will provide acceptable surface.

Application of any coating to a surface will constitute acceptance of the surface by the Contractor. If, after treatment, the completed finish (or any portion thereof) blisters, cracks, peels or otherwise shows indication of dampness or other irregular conditions or surface, the Contractor shall, at his own expense, remove the applied treatment and refinish the part affected, to the satisfaction of the Project Manager. The Contractor shall determine dryness of all moisture-holding materials by use of a reliable electronic moisture meter. Moisture test results shall be forwarded to the Project Manager in writing.

Each coat of material applied must be inspected and approved by the Project Manager before the application of the succeeding specified coat; otherwise, no credit for the concealed coat will be given, and the Contractor shall assume the responsibility to re-coat the work in question.

All work shall be done by skilled painters and all workmanship shall be of the highest quality, developing to the fullest the possibility of the materials and the process specified.

Materials shall be thoroughly stirred and evenly spread without runs, skips, sags, streaks, brush marks or other defects. Paint shall be cut sharply to lines. Care shall be exercised to avoid lapping of paint over hardware. Painting around glazed openings shall be done promptly after putty is hard, but before shrinkage cracks occur and shall seal the jointing of putty to glass.

Rebates for glass in wood setting shall be primed before glass is installed.

Tops and bottoms of all wood doors shall have at least three (3) finish coats.

All materials which have been shop-primed shall be properly prepared and spot primed in the field where necessary, before the field prime coat is applied.

All equipment which arrives with a damaged finish coat will be spot primed and then patched, if homogeneity can be achieved, or will be repainted completely. Any like equipment shall also be re-painted to match the newly repainted equipment, as determined by the Project Manager. The color shall be similar to the original color, as determined by the Project Manager.

Masonry and Concrete Sealing

Section 5. After proper surface preparation, all brick work, concrete work, concrete walls, curbs and driveway slabs not painted shall be given two (2) coats of water sealing material. This material shall be Thompson's Water Seal 101 or equal.

Ferrous Metal Primers

Section 6.

A. **Non-submerged** - Ferrous materials other than pipe, valves and appurtenances, but including

structural steel, shall be field shop –primed with Tnemec 90-94 or equal and field coated with Tnemec 66-1211 or equal. Each coating shall be applied with a minimum total dry millage of 3.0. No coating shall be applied until proper surface preparation is completed.

B. Submerged - Ferrous materials, other than pipe, valves and appurtenances, shall be shop primed with Tnemec 90-94 or equal and field coated with Tnemec 66-1211 or equal. Each coating shall be applied with a minimum total dry millage of 3.0. No coating shall be applied until proper surface preparation is completed.

C. Pipe, valves and appurtenances not buried in the ground shall be shop-primed with Tnemec 66-1211 or equal at a minimum rate of .3.0 mils dry film thickness. Field finish coating shall be Tnemec high build epoxy 66 or equal applied at 8 mils dry film thickness. No coating shall be applied until proper surface preparation is completed.

D. Buried pipes, valves and appurtenances shall be shop-primed with Tnemec 46-413 or equal coal tar epoxy, eight (8) mils dry film thickness. No coating shall be applied until proper surface preparation is completed.

Ferrous Metal Finish Coating

Section 7. In addition to the above primers, the Contractor shall complete the following.

A. Non-submerged - Ferrous materials, including structural steel, pipe, valves, and appurtenances, shall be coated with two (2) coats of Tnemec 70 or 71 or equal a minimum of 2.0 mils dry film per coat. Minimum total finish coating shall be 4.0 mils. No coating shall be applied until proper surface preparation is completed. Galvanized metals shall receive prior to the finish coats one (1) intermediate coat of Tnemec 66-Gray epoxy or equal at 4.0 mils dry thickness.

B. Submerged - Ferrous materials, other than pipe, valves and appurtenances, shall be coated with two (2) coats of Tnemec Hi-Build Epoxy 66 or equal at 6 mils dry film thickness. No coating shall be applied until proper surface preparation is completed.

C. Pipe, valves and appurtenances not buried in the ground and not exposed to direct (outdoors) sunlight shall be given a field finish coat of Tnemec high build epoxy 66 or equal system at 6 mils dry film thickness. No coating shall be applied until proper preparation is completed.

Pipes, valves and appurtenances installed outdoors shall be finished as outlined for non-submerged ferrous material.

D. Buried pipes, valves and appurtenances shall be given a field finish coat of Tnemec 46-413 coal tar epoxy or equal at the rate of 8.0 mils dry thickness. No coating shall be applied until proper surface preparation is completed.

Piping Markers and Safety Signs

Section 8. The piping markers shall be formed from laminated plastic capable of withstanding normal washing to remove grease, oil, chemicals, etc. without discoloration, loss of gloss, staining, or other damage. All printing shall be sealed with butyrate plastic film. For pipe smaller than ¾-inch in diameter, provide brass tags 1-1/2-inch in diameter with depressed ¼-inch black-filled letters above ½-inch high black filled letters.

Markers for pipe 3/4-inch to 6 inches in diameter, inclusive, shall be pre-formed to completely wrap around the pipe requiring no adhesives. Markers for pipe larger than 6 inches in diameter shall be pre-formed to the contour of the pipe and held in place with stainless steel spring fasteners. The size of lettering on each marker shall conform to ANSI A13.1. Each marker shall contain a descriptive legend as shown in the Pipe and Size Color Schedule and a flow direction arrow.

The markers shall be located adjacent to each valve and "tee", at each branch and riser takeoff, at each wall, floor and ceiling penetration, and at 25-foot intervals of horizontal piping. Manufacturers shall be the W. H. Brady Company, Seton Name Plate Corporation, or approved equal.

Painting Schedule

Section 9. The following table lists the type of surface, generic coating, type of coating and the minimum coats of paint. The Owner will select all colors to be used on this project. Manufacturer's numbers listed are those of Tnemec Company. "Or equal" manufacturer's shall be considered by the Engineer.

| <u>Type of Surface</u> | <u>Generic Type</u> | <u>Number of Coats</u> | <u>Minimum Dry Mils Thickness Per Coat Reference</u> | <u>Tnemec Paint Number</u> | <u>Tnemec Primer Number</u> |
|--|-----------------------|------------------------|--|----------------------------|--|
| Concrete | Epoxy | 1 | 3.0 | 66 | 54-660 |
| | | 2 | 4.0 | 66 | |
| Concrete Exterior | Epoxy | 1 | 8.0 | 66 | 54-660 |
| | Epoxy | 1 | 8.0 | 66 | |
| | Polyurethane 1 | | 2.570 or 71 | | |
| Concrete Block | Epoxy | 1 | 8.0 | 66 | 54-660 or 54-561 - Block Filler |
| | Epoxy | 1 | 8.0 | 66 | |
| <u>Type of Surface</u> | <u>Generic Type</u> | <u>Number of Coats</u> | <u>Minimum Dry Mils Thickness Coat Reference</u> | <u>Tnemec Paint Number</u> | <u>Tnemec Primer Number</u> |
| Drywall | Epoxy | 1 | 4.0 | 66 | 51-792 PVA Sealer |
| | Epoxy | 1 | 5.0 | 66 | |
| Plywood and other interior surfaces other than masonry | Epoxy | 1 | 4.0 | 66 | See Mfr's Recommend. |
| | Epoxy | 1 | 5.0 | 66 | |
| Submerged or high moisture exposure (nonferrous) | Epoxy | 1 | 5.0 | 66 | See Mfr's Recommend. |
| | Epoxy | 2 | 5.0 | 66 | |
| Outdoor Installations other than concrete | Epoxy Polyurethane | | Re:Sec. 6 & 7 | | |
| Indoor ferrous and other metal | Epoxy Polyurethane | | Re:Sec. 6 & 7 | | |

| | | | | | |
|--|---------------------|---|-----------|----------|-------------------------|
| Non-ferrous Metal interior | Epoxy | 1 | 4.0 | 66 | 66-1211 |
| | Epoxy | 1 | 5.0 | 66 | |
| Non-ferrous Metal exterior | Epoxy | 1 | 4.0 | 66 | 66-1211 |
| | Polyurethane | 2 | 2.0 | 70 or 71 | |
| Galvanized Metal Interior and Exterior | Epoxy | | Re:Sec. | | |
| | Epoxy | | 6 & 7 | | |
| | Polyurethane | | | | |
| Wood - Interior | Epoxy | 1 | 2.5 | 66-Gray | See Mfr's |
| Re:Sec. 2 | Polyurethane | 2 | 2.0 | 70 or 71 | Recommend. |
| Wood - Exterior | | | Re:Sec. 2 | | |
| PVC - Interior | Epoxy/ Polyamide | 1 | 4.0 | 66 | See Mfr's Recommend. |
| PVC - Exterior | Epoxy | 1 | 3.0 | 66 | See Mfr's |
| | Polyurethane | 2 | 2.0 | 70 or 71 | Recommend. |

Pipe and Sign Color Schedule

| <u>Pipe and Descriptive Legend</u> | <u>Color</u> | <u>Lettering Color</u> | <u>Background Color</u> |
|------------------------------------|--------------------------|------------------------|-------------------------|
| Raw Sewage | Dark Grey | Black | Green |
| Natural Gas | Red | Black | Yellow |
| Compressed Air | Green | Black | Yellow |
| Potable Water | Blue | Black | Green |
| Sump Discharge | Grey | Black | Green |
| Vent | Grey | Black | Green |
| Seal Water | Blue | Black | Green |
| Conduit | To Match Wall or Ceiling | N/A | N/A |

END OF SECTION

EQUIPMENT

Section 11010

Vertical Multi-Stage Pumps, VFD Drives (New Dog Fork, Meadwood Heights BPS Sites)

General

Section 1. The vertical in-line multi-stage pumps to be installed in the Pump station shall be multi-stage high pressure centrifugal booster pumps, as manufactured by Grundfos Pump Corporation, or equal. Pump Model No., operating conditions, HP shall be as noted below.

Conditions of Service

Section 2. The booster pump shall be suitable for a maximum working pressure of 362 PSIG and shall be suitable for the following conditions of service.

| | <u>Dog Fk. BPS</u> | <u>Meadwood Hts. BPS</u> |
|---------------------------|--------------------|--------------------------|
| Pump Model No. | CR10-8 | CR10-2 |
| Suction size (Flanged) | 2" | 2" |
| Discharge size (Flanged) | 2" | 2" |
| Primary Service Condition | | |
| Capacity | 55 GPM | 45 GPM |
| Total Head | 282 Feet | 71 Feet |
| Efficiency | 75 Percent | 68 Percent |
| Operating Speed | 3450 RPM | 3450 RPM |
| Maximum Horsepower Rating | 7.5 HP | 1.5 HP |

Protective Coating

Section 3. The pump suction/discharge chamber motor stool and pump shaft coupling shall be constructed of cast iron. The impellers, pump shaft, diffuser chambers, outer discharge sleeve and impeller seal rings or seal ring retainers shall be constructed of stainless steel. The impellers shall be secured directly to the pump shaft by means of a splined shaft arrangement. Intermediate and lower shaft bearings shall be Tungsten Carbide and ceramic or Tungsten Carbide and Bronze. Pumps shall be equipped with a high temperature mechanical seal assembly with Tungsten Carbide/Carbon or Tungsten Carbide/Tungsten Carbide seal faces mounted in stainless steel seal components.

Pump Motor

Section 4. The pump motor shall be sized to ensure the pump is non-overloading when operating on the specified pump curve. The motor shall be of the horsepower shown above, 240/480-volt, TEFC, 3 phase. Motor design shall be of the open drip proof with a NEMA C face design operating at a nominal 3450 RPM with a minimum service factor of 1.15. Lower motor bearings shall be adequately sized to ensure long motor life.

Identification

Section 5. The pump and motor shall each have a stainless steel nameplate securely attached which indicates the manufacturer, model number and operating data to fully identify the equipment supplied.

VFD Drives, Pressure Transducers

Section 5. Furnish, install (2) Goulds/G &L Model 9K391, 0-300 psi rated variable speed smart pump control pressure transducer (1 for suction, 1 for discharge); with 25 feet of cable/connectors for each both pumps. Furnish, install a Goulds Aquavar Centrifugal Pump Control VFD, Model CPC (rated for above motor HP), NEMA 1, 3 phase, 60 Hz., 230-volt drive, or equal for each pump. VFD's to be remote mounted on BPS wall.

Pressure Tank

Section 5. Furnish and install one (1) pressure/expansion tank with each pump station as shown on the plans. Tank shall be Wessells Model FXA 200 with a maximum working pressure of 200 psi and a total volume of 53 gallons.

END OF SECTION

EQUIPMENT

Section 11015

Vertical Multi-Stage Pumps, VFD Drives (Replacement Pumps, New Drives at Existing Tarpin Ridge BPS)

General

Section 1. The vertical in-line multi-stage pumps to be installed in the Pump station shall be multi-stage high pressure centrifugal booster pumps, as manufactured by Grundfos Pump Corporation, or equal. Pump Model No. CR64-3-1, operating conditions, HP shall be as noted below.

Conditions of Service

Section 2. The booster pump shall be suitable for a maximum working pressure of 435 PSIG and shall be suitable for the following conditions of service.

Existing Tarpin Ridge BPS Upgrade

| | |
|---------------------------|------------|
| Suction size (Flanged)) | 4" |
| Discharge size (Flanged) | 4" |
| Primary Service Condition | |
| Capacity | 350 GPM |
| Total Head | 241 Feet |
| Efficiency | 80 Percent |
| Operating Speed | 3450 RPM |
| Maximum Horsepower Rating | 40 HP |

Protective Coating

Section 3. The pump suction/discharge chamber motor stool and pump shaft coupling shall be constructed of cast iron. The impellers, pump shaft, diffuser chambers, outer discharge sleeve and impeller seal rings or seal ring retainers shall be constructed of stainless steel. The impellers shall be secured directly to the pump shaft by means of a splined shaft arrangement. Intermediate and lower shaft bearings shall be Tungsten Carbide and ceramic or Tungsten Carbide and Bronze. Pumps shall be equipped with a high temperature mechanical seal assembly with Tungsten Carbide/Carbon or Tungsten Carbide/Tungsten Carbide seal faces mounted in stainless steel seal components.

Pump Motor

Section 4. The pump motor shall be sized to ensure the pump is non-overloading when operating on the specified pump curve. The motor shall be of the horsepower shown above, 240/480-volt, TEFC, 3 phase. Motor design shall be of the open drip proof with a NEMA C face design operating at a nominal 3450 RPM with a minimum service factor of 1.15. Lower motor bearings shall be adequately sized to ensure long motor life.

Identification

Section 5. The pump and motor shall each have a stainless steel nameplate securely attached which indicates the manufacturer, model number and operating data to fully identify the equipment supplied.

VFD Drives, Pressure Transducers

Section 5. Furnish, install (2) Goulds/G &L Model 9K391, 0-300 psi rated variable speed smart pump control pressure transducer (1 for suction, 1 for discharge); with 25 feet of cable/connectors for each both pumps. Furnish, install a Goulds Aquavar Centrifugal Pump Control VFD, Model CPC21141, NEMA 1, 3 phase, 60 Hz., 230-volt drive, or equal for each pump. VFD's to be remote mounted on BPS wall.

EQUIPMENT
Section 11300

(SCADA RTU's at new Dog Fork and Meadowood Heights BPS Sites)

PART 1- TELEMETRY REQUIREMENTS

1.1 GENERAL

- A. This Specification covers equipment compatible with the Owner's existing SCADA system. The equipment described herein is manufactured by SCADATA. Inc., Ft. Wayne, Indiana, Contact Jeff Stock, Phone 260-410-0872.
- B. A Remote Telemetry Unit (RTU) for the Supervisory Control and Data Acquisition (SCADA) system shall be supplied. The RTU must be capable of communicating with the existing SCADATA system. Alternatives that cannot communicate with the existing system, do not use the existing infrastructure that is already established. The system shall communicate information from all inputs at all sites as required by the Input/output (I/O) list in Table 1 at the end of this specification section to a central location.

1.2 SUBMITTAL REQUIREMENTS

- A. The contractor shall provide to the engineer complete submittal documentation for the products within this section for engineer's approval prior to fabrication. The submittal shall include the following items as well as any additional materials required by the general conditions of this project.
 - 1. Provide product data sheets for each of the principal items listed in this specification. Product information to include delineated catalog cut sheets specific to this project as a minimum.
 - 2. Provide wiring and block layout drawings for each RTU showing the wiring diagrams for control circuits and interconnections of all components. Components shall be clearly labeled on the drawing.
 - 3. A technical description of the system monitoring software. Submittal must include samples of:
 - a. Proposed text screens and menus
 - b. Proposed graphics screens
 - c. Proposed report logs and printed graphs
 - d. Programming instructions suitable for operators use
 - 4. Provide the radio path study specified herein.
 - 5. Complete input / output list for all connected processes at each RTU location.

1.3 RTU REQUIREMENTS

- A. In order to expedite replacement equipment and reduce spare components, RTU's shall be manufactured as a complete unit. RTU's that are assembled by system integrators consisting of various catalog parts as a custom design specific for this project will not be considered equal.
- B. Each RTU shall consist of the minimum following quantities and features for the Input/Output (I/O) at each site.
 - 1. Qty. 4 – Digital / Discretionary Inputs

2. Qty. 4 – Analog Inputs
 3. Qty. 2 – Digital / Discretionary Outputs
 4. Qty. 2 – Analog Outputs
5. RTU to be capable of switching analog inputs to digital inputs in any number combination totaling the total number of inputs per RTU.
 6. Digital Inputs shall be normally open dry contacts.
 7. Analog inputs shall be capable of receiving either 4 – 20 mA, 0 – 5 VDC, or 1 – 5 VDC inputs.
 8. Power failure and low battery must be included on the RTU and will not require the use of any inputs listed above.
- C. While analog and digital outputs are not required for this project, the RTU must be supplied with the quantities noted above for future expansion of the system to include remote control of equipment within the system.
 - D. Each RTU shall be capable of expansion to an unlimited number of inputs and outputs as required by the job site. Expansion of the I/O will be accomplished through the addition of expansion boards with the same number of inputs and outputs as listed above. Designs which limit future expansion without the replacement of major components are not acceptable.
 - E. RTU shall be capable of accepting either 120/1/60 AC or up to 10 – 30 VDC power supply. Within the RTU shall be the capabilities of charging and / or operating off of a stand by battery, in the event of a power outage. The RTU shall also be capable of operating a 12 volt 0.5 amp loop powered device whether on AC, DC, or battery power supply.
 - F. RTU input board shall be equipped with easily visible light emitting diodes (LED's) indicating open or closed contact for all digital connections (input and output) for quick immediate detection of circuit status by operator. LED's shall also be supplied to indicate Communication, Communication Transmit, Communication Receive, and Battery Charge.
 - G. RTU communication shall be via user selectable Modbus, SCIP, or SCIP/Ethernet. Transmission shall be continuous providing operator with real time information of each site. Each over the air transmission between the RTU shall not exceed 41 Bytes per packet. Each packet sent shall include site specific information related to the status of the remote site. Each RTU shall recognize a busy channel and delay broadcast as required. All RTU's within the network will complete the transmission of their data in 30 seconds or less. Systems that require more time will not be considered equal. Each transmission shall require a positive acknowledgement from the recipient or the transmission shall be reinitiated.
 - H. The RTU must have the ability to time and date stamp all collected inputs.
 - I. Communication shall be via non-licensed radio communicating in the FCC Part 90 - 902-928 MHz frequency range with the option of using and Ethernet as an alternative form of communicating to the RTU. Spread spectrum radios shall use frequency hopping using 902-928 MHz range. Communication shall be encrypted either via dynamic key or 256-bit AES. Radios shall broadcast at 1 Watt.
 1. Each radio shall have the capability of acting as a repeating radio creating a mesh network of RTU sites. Effective range with this type of communication system is unlimited.
 2. Physical radio path study must be provided. Information supplied must include proposed radiofrequency that radios will operate at, and the proposed communication scheme. At a minimum, bidders must provide profiles of the system, RTU and CTU location(s), and estimated time to interrogate all sites within

the system, and provide justification for assumptions.

- J. Each RTU shall be supplied with the following accessories:
 - 1. One (1) lightning surge arrestor for antenna connection consisting of N-type male connection to SMA-type female connection. Housing will consist of an aluminum body and a replaceable gas tube insert.
 - 2. One (1) minimum four (4) hour gel cell battery for connection to RTU battery input. Battery to be shipped loose for field installation.

1.4 ANTENNA REQUIREMENTS

- A. Yagi directional type antenna is to be supplied for sites as noted in Table 1 for each site. Minimum gain for antenna shall be 11dBi. Antenna shall be equipped with short pig tail cable and N-style jack connector. Antenna shall be constructed of aluminum and be capable of 120 mph wind loading. Mounting hardware for connection to a 1.25 in. diameter antenna mast shall be included. Supplier shall provide LMR-400 coaxial cable in sufficient length to connect the surge suppressor within the RTU to the antenna in a single piece, no splicing or joints will be allowed. See Table 1 for specific details regarding the antenna to be supplied for each site. Sites that require total antenna cable lengths greater than 50 ft. are required to substitute the LMR-400 cable specified with LMR-600 for reduced signal loss through the coaxial cable. All other requirements remain the same.
- B. (Optional) Omni unidirectional antenna is to be supplied. Minimum gain for antenna shall be 6dBi. Antenna shall be equipped with N-style jack connector. Antenna shall be constructed of fiberglass and shall be capable of 120 mph wind loading. Mounting hardware for connection to a 2 in. diameter antenna mast shall be included. Supplier shall provide sufficient LMR-400 coaxial cable to connect the surge suppressor within the RTU to the antenna. Supplier shall provide LMR-400 coaxial cable in sufficient length to connect the surge suppressor within the RTU to the antenna in a single piece. Splicing or joints will be allowed. See Table 1 for specific details regarding the antenna to be supplied for each site. Sites that require total antenna cable lengths greater than 50 ft. are required to substitute the LMR-400 cable specified with LMR-600 for reduced signal loss through the coaxial cable. All other requirements remain the same.
- C. An antenna mast a minimum of 20 ft. tall shall be supplied per site, as required. Diameter shall be minimum 1.25 in. Mast shall be schedule 40 aluminum minimum.
- D. (Optional) If antenna height is required to be greater than 20 ft., antenna towers shall be provided. Tower shall be assembled from sections built on an equilateral triangle design. Tower sections shall be constructed of 1-1/4" steel tubing with continuous solid steel rod "zigzag" cross bracing electrically welded to the tubing. The entire sections shall be Hot-Dip Galvanized after fabrication for long life. Antenna towers shall be ROHN GT series or self-supporting towers, or Trylon TSF self-supporting towers as recommended by manufacturer and approved by Engineer. No guyed towers will be accepted. Foundation and base plate details shall be constructed according to manufacturer's recommendations. Tower shall be provided with an anti-climb shield, pivoting base assembly when available and there are no space limitations otherwise provide a fall protection system on tower, and any other accessories necessary to provide communications.
- E. (Optional) One (1) NEMA 4X enclosure with back plate is to be supplied. Enclosure shall be capable of housing all items listed above for RTU as well as one expansion board if additional I/O is required.

PART 2- EXECUTION & INSTALLATION

- 2.1 In the installation of an instrument, the various components shall be accessible for efficient

maintenance. Care shall be taken in the installation to ensure sufficient space is provided between instruments and other equipment or piping for ease of removal and servicing. All instruments shall be readily accessible from grade, permanent platforms, or fixed ladders.

- 2.2 The drawings show the operation of panel in a general schematic version. The manufacturer shall submit shop drawings showing the actual methods used to accomplish the control as described herein.
- 2.3 All instrumentation devices shall be installed in accordance with the manufacturer's installation requirements.
- 2.4 Installation shall include all details including special brackets and mounting hardware which may be necessary to properly install the instruments. The special brackets and mounting hardware shall be stainless steel, galvanized, or nonferrous non-corrosive metal.

PART 3- STARTUP AND TRAINING

- 3.1 The manufacturer shall provide the services of an authorized factory representative to inspect the installation, make any necessary adjustments, and place the equipment into operation. The manufacturer's representative shall instruct the operating personnel in the operation and maintenance of the equipment. The manufacturer's representative shall note any deficiencies on the startup report and inform the appropriate party at the time of start up to remedy the deficiency or make the necessary repairs or adjustments as needed. The manufacturer shall provide one trip consisting of one day service to perform the above tasks.
- 3.2 The manufacturer or his representative shall allow time for site check outs and commissioning of the RTU network. It is the installing contractor's responsibility to go to each site, contact the manufacturer, and perform this commissioning together at a time that is convenient to both parties. The manufacturer or his representative may be present or may log into the operating software remotely to perform this commissioning; owner must provide remote access if requested. As a minimum this work will consist of:
 - A. Verifying communication between RTU and CTU
 - B. Verifying all I/O listed in the table within these specifications at each site
 - C. Adjusting all scales for analog inputs at each device
 - D. Verifying output action and scale(analog only) if present

PART 4- WARRANTY

- 4.1 The equipment contained within this specification shall be free of defective materials and/or workmanship for a period of 1 year from date of installation of each unit individually and/or system installation and verification of working order. The manufacturer shall be obligated to furnish replacement materials at no charge to the owner units proven defective within this warranty period. This warranty shall not be construed to cover lights, fuses, or other items normally consumed in service or those items which have been damaged due to outside forces such as vandalism, lightning, operator error, power surges, unauthorized repair or modifications, etc.

HEATING & VENTILATION

Section 12005

Heating and Ventilation Equipment

Ventilator (1 required)

Section 1. Ventilator shall be of direct drive and roof mounted type. Contractor shall furnish and install the unit as shown on the plans in the wall of the existing pump station.

The ventilator shall deliver the specified C.F.M. at static pressures shown without exceeding specified brake H.P. The manufacturer shall certify that the units have been tested and rated in accordance with the applicable A.M.C.A. standards.

The ventilator housing including motor cover, fan hood, and base, shall be of heavy gauge non-corrosive aluminum. Wheels shall be statically and dynamically balanced, and run-tested after final assembly.

Motor and drive components shall be out of the airstream, and the motor shall be ventilated by the drawing and circulation of outside ambient air. A PVC coated insect screen shall be provided as standard.

Ventilator shall be Loren Cook Model 90W-17D or an equivalent ventilator from Jenn-Air Corp. or approved equal by Engineer. A hand-off-automatic switch shall be supplied and interwired with heater and thermostat.

Louvers and Dampers (2 total required)

Section 2. The contractor shall furnish and install extruded aluminum louvers as shown on the plans. The intake louvers shall be sized for the fan installed and shall be furnished with a matching backdraft damper. One louver shall be installed with the fan and separate louver installed for the intake.

Electric Heater (1 required)

Section 3. Furnish and install a 4 KW, 240v, single phase horizontal unit heater with integral thermostat. Furnish wall mounting brackets. Heater shall be equal to Chromolox No. LUH-04-21.

END OF SECTION

SPECIAL CONSTRUCTION
SECTION 11300
WATER STORAGE TANK MIXER

PART 1 GENERAL

1.01 EQUIPMENT OVERVIEW

- A. These specifications provide the requirements to furnish, install and place into operation the number of potable tank mixers as shown on the plan drawings.

1.02 REFERENCES

- A. Occupational Safety and Health Administration, OSHA
- B. Department of Transportation, DOT
- C. NSF / ANSI Standard 61
- D. Underwriters Laboratories Inc., UL 508

1.03 QUALITY ASSURANCE

- A. Continuous Operation Equipment. The mixer shall operate continuously, all day and all night, using 120 VAC as the power source.
- B. No Visual Defects. The mixer shall have no visual defects, and shall have high quality welds, assembly, and corrosion resistant finish.
- C. Qualified US Manufacturer. The manufacturer of the mixer shall have extensive experience in the production of such equipment, and the equipment shall be manufactured in the continental United States.
- D. Factory Startup Services. Delivery, installation and startup services shall be available, but not included in the bid. For factory delivery and installation, services shall be performed by full time factory employees experienced in the operation of this equipment and who have completed OSHA safety trainings applicable to this type of installation.
- E. Warranty. The mixer shall be warranted to be free of defects in materials and workmanship for a period of 5 years.

1.04 SUBMITTALS

- A. The awarded Bidder shall provide [5] copies of the following documents. Upon acceptance of these documents by the Engineer, the Bidder will be issued a Notice to Proceed, and may then proceed to install the equipment.

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1. A qualification statement demonstrating compliance with Section 1.03.
2. Shop drawings for the mixer.
3. Manufacturer's literature, illustrations and specification sheets defining materials of construction, dimensions, and weights.
4. A copy of the warranty statement.

B. Final submittals shall include:

1. A complete installation, operation and maintenance manual.

1.05 FIELD SERVICES (If Required)

- A. Factory Personnel. The installation and startup shall be performed by full time factory employees trained in the operation of the mixer.
- C. Safety. Installation personnel shall have received job-specific safety training on (a) Working over Water, (b) Boating Safety, (c) Disinfecting Procedures, (d) Confined Space Entry, (e) Fall Protection, and (f) DOT Compliance.

PART 2 PRODUCT SPECIFICATIONS

2.01 MANUFACTURER

- A. Specified Equipment. The mixer shall be manufactured by SolarBee, Inc. of Dickinson, ND (Model GS-9), Pax Water Technologies of Richmond, CA (Model PWM 100), or be a pre-approved alternative.
- B. Pre-approved Alternative(s). Alternatives to the specified equipment will be considered on the following basis only.
 1. Seven (7) Days Before Bid. To offer equipment as a pre-approved alternative, written application from the alternative supplier shall be made to the Engineer at least 7 days in advance of the bid opening.
 2. No Material Difference in Quality of Equipment or in Vendor Support. The application should include:
 - a. A brief description of how the offered alternative does or does not meet each of the specifications in this document.

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SECTION 11300
WATER STORAGE TANK MIXER**

- b. An analysis of how acceptance of the alternative equipment would likely affect the overall water quality goals of the project.
 - c. A statement of the science and support background of the supplier of the alternative equipment, so that the benefits and costs of the alternative equipment to the Owner can be estimated by the Engineer.
3. Three (3 Days Notice to Bidders. If the alternative equipment is accepted by the Engineer, an informational addendum to these specifications shall be distributed by the Engineer to plan holders at least 3 days in advance of the bid opening.

2.02 PERFORMANCE AND FEATURES

- A. Number of units required. To meet the project objectives, the following number of machines are required.

| Qty | Model | Tank or Reservoir |
|-----------|---|-------------------|
| See Plans | SolarBee Model GS- 9-120v potable tank mixer, Pax Technologies, Model PWM 100 , or pre-approved equal | See Plan Drawings |

An unobstructed hatch opening of at least 12 Inch diameter (31cm) round is required for installation of the mixer.

- B. Complete mix: The manufacturer guarantees that the subject tank will be completely mixed by the mixer. In continuous operation of the mixer:
 - (1) at least once per 24 hours all water temperatures within the tank shall converge to within 0.8 degrees C, and
 - (2) at least once per 72 hours all chlorine concentrations within the tank shall converge to within 0.18 mg/l.
- C. Continuous Operation with 120VAC Power Supply. The mixer shall operate continuously during day and night while connected to electric grid power.
- D. Stainless Steel Construction. The mixer shall be constructed primarily of Type 316 stainless steel metal for strength and superior corrosion resistance.
- E. Motor. The mixer shall be mechanically operated by a submersible motor that meets the following criteria.

**SPECIAL CONSTRUCTION
SECTION 11300
WATER STORAGE TANK MIXER**

1. Direct Drive, with no gearbox and no lubrication maintenance required.
 2. Designed for submersible operation.
 3. Designed for Continuous Operation without overheating or compromising motor life expectancy.
 4. 120 VAC power source shall be supplied by others and not the mixer manufacturer.
- F. SCADA and Controls. The mixer shall have the option to add an Electric Control Box including a motor current indicator in a 4-20mA analog output and remote on/off control via 24VDC relay.

120 VAC Electrical Control Box

Electrical Control Box. The mixer equipment shall be supplied with a Control Box capable of disconnecting 120 VAC outgoing power to the mixer equipment and meeting the following criteria:

1. NEMA 4X enclosure shall be provided with protection against condensation and moisture in a marine environment.
 2. Control Box shall be UL 508 Listed for sound electrical design and safety.
 3. Control Box shall include exterior mounted HOA switch, definite purpose contactor for mixer control, GFCI, exterior mounted run indicator light, grounding lug, 120 VAC standard three-prong male molded plug, and locking latch for security.
 4. Control Box shall include a 4-20 mAmp current transducer providing analog output for motor current allowing for monitoring proper operation. Control Box shall include a 24 VDC relay to allow for remote on and off control of the mixer. Integration of 4-20 mAmp output and remote on/off relay into site PLC/RTU shall be provided by others and not by the mixer equipment manufacture.
 5. Control Box requires a 120 VAC power source, Minimum 20 Amp rated service required and to be located near the final placement of the Control Box. SCADA and control functions of the Control Box require 24 VDC incoming power for automatic operation and 4-20 mAmp current transducer. The 120 VAC and 24 VDC power source shall be supplied by others and not the mixer equipment manufacture.
- G. Low Elevation Intake: The mixer shall be supplied with an intake capable of being positioned at the lowest elevation of the tank or reservoir floor. The intake level shall bring water into the mixer at horizontal layer within 6 inches (15 cm) of the tank or reservoir floor.

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SECTION 11300
WATER STORAGE TANK MIXER

- I. The complete mixing system shall be NSF / ANSI Standard 61 and NSF Annex G listed for safe contact with potable water.
- J. Maintenance Requirements. The mixer shall operate normally with the following maintenance features.
 - 1. No scheduled lubrication is required of any system components including motor.
 - 2. No spare parts shall be required to be kept on hand.

PART 3 EXECUTION

3.01a CONTRACTOR INSTALLATION

- A. Installation, Startup, and On-Site Water Testing. Shall be provided by others and not the factory equipment manufacturer.

3.01b FACTORY INSTALLATION

For Factory Installation, Startup, and On-Site Water Testing, include the information below:

- A. The mixer manufacturer shall have capability to provide Installation, Startup, and On-Site Water Testing Services to insure (a) proper machine spatial placement in the reservoir, and (b) proper intake depth setting.
- B. The field services shall be performed by full time factory employees experienced in the operation of this equipment, and who have completed safety trainings required for this type of installation in compliance with OSHA regulations including (a) Working over Water, (b) Boating Safety, (c) Disinfecting Procedures, (d) Confined Space Entry, (e) Fall Protection, and (f) DOT Compliance.
- C. Within 30 days following installation, the manufacturer shall provide an installation report detailing as described in submittal section.
- D. The mixer manufacturer shall have the following support team available for full service if ever needed following the installation.
 - 1. A minimum of (10) x (2)-member factory crews.
 - 2. A full customer service staff including engineers and science personnel that are trained for assistance in this application.

SPECIAL CONSTRUCTION
SECTION 11300
WATER STORAGE TANK MIXER

STERILIZATION OF POTABLE WATER LINES AND TANKS

WORK INCLUDED: (Sec. 01) Furnish all materials and equipment necessary to sterilize potable water lines and/or water tanks as specified herein.

REFERENCE ITEMS: (Sec.02) Applicable portions of the latest revision of the following specification shall be included as a part of this specification.

AWWA American Water Works Association

DESCRIPTION: (Sec.03) The sterilization of potable water lines and potable water storage tanks shall have the following designation:

- Item 1700A - Sterilization of Potable Water Lines
- Item 1700B - Sterilization of Potable Water Storage Tanks (Steel)
- Item 1700C - Sterilization of Potable Water Storage Tanks (Concrete)

The Owner will furnish water for initial chlorination. If rechlorination is required the Contractor shall pay the Owner for additional water used at the current rate.

STERILIZATION OF POTABLE WATER LINES: Item 1700A (Sec.04) The method to be used for sterilization shall comply with AWWA C 601, C 651, and the State of Ohio, Department of Health requirements. Use Sec. 5.2, Continuous Feed Method unless other methods are approved by the Owner and the Engineer.

At the time of construction place calcium hypochlorite granules in the pipeline at the upstream end of the first section of pipe, at each branch main and at 500 foot intervals in accordance with Table 1 of AWWA C 601.

TABLE 1

Ounces of Calcium Hypochlorite Granules
To Be Placed At Beginning of Main
and at Each 500-ft Interval

| <u>Pipe Diameter</u> <u>in.</u> | <u>Calcium Hypochlorite</u> <u>Granules</u> <u>oz.</u> |
|------------------------------------|--|
| 4 | 0.5 |
| 6 | 1.0 |
| 8 | 2.0 |
| 12 | 4.0 |
| 16 and Larger | 8.0 |

After the water line or portion thereof is complete and pressure tested, carefully and thoroughly flush the lines with potable water from sources approved by the Resident Representative. The Contractor shall furnish potable water for flushing if no approved source is obtainable from the Owner.

Upon completion of the flushing operation, sterilize the lines using chlorine solution feed machine or other approved equipment to place a hypochlorite solution into the water line and service lines as far as the curb stops. Introduce sufficient chlorine into the lines to produce a chlorine residual of not less than 25 mg/l. Retain this residual in the lines for not less than 24 hours. At the end of the holding period remove the chlorinated water, thoroughly flush the lines and fill with potable water from the distribution system.

Testing: Collect and test water samples from the newly sterilized lines in accordance with the latest edition of standard methods of Examination of Water and Wastewater, for three days for any evidence of contamination. The bacteriological testing of the samples will be arranged and paid for by the Owner.

In the event that the tests show the need for rechlorination, repeat the sterilization procedure as often as may be necessary until satisfactory results are obtained. No additional charge will be approved for rechlorination requirements.

STERILIZATION OF POTABLE WATER STORAGE TANKS (STEEL), Item 1700B, CONCRETE)
ITEM 1700C: (Sec.05) After the testing of the storage facility for leaks has been satisfactorily completed and the inside coating applied, if coating is called for, disinfect the tank and riser (if applicable). Allow at least 24 hours, but not less than paint manufacturer's recommendation, for the coating to dry before disinfection.

Disinfection procedure shall conform to AWWA D 105 and the State of Ohio, Department of Health requirements.

The forms of chlorine which may be used in the disinfecting operations are liquid chlorine, sodium hypochlorite solution and calcium hypochlorite granules or tablets.

The following three methods of chlorination are acceptable :

Method No. 1: Fill storage facility to overflow level with potable water to which enough chlorine has been added to provide a free chlorine residual of not less than 10 mg/1 after six hours if the water has been uniformly chlorinated by gas feed or chemical pump, or 24 hours if chlorinated by sodium hypochlorite or calcium hypochlorite. Drain to waste and refill with potable water and test as specified herein after.

Method No. 2: Apply a solution of 200 mg/1 available chlorine directly to all parts of the storage facility which will be in contact with water when the storage facility is filled to overflow elevation.

The chlorine solution may be applied with suitable brushes or with spray equipment. The solution shall thoroughly coat all surfaces including inlet and outlet piping. Apply to separate drain piping such that when filled, available chlorine shall not be less than 10 mg/1.

Surfaces disinfected shall remain in contact with the strong chlorine solution for at least 30 minutes. Purge drain pipe and fill storage facility to overflow. After successful testing the water may be released to the distribution system.

Method No.3: Add water and chlorine to the storage facility in amounts to provide 50 mg/1 available chlorine when filled to 5% storage volume. Hold in storage facility for not less than six hours. Finish filling to piping. After successful testing water may be released to the distribution system.

Testing: Before the tank is placed in operation, the Contractor shall collect and have tested samples of water therefrom in accordance with the latest edition of Standard Methods of Examination of Water and Waste Water, and secure approval of the State of Ohio Department of Health. The Owner will make the necessary arrangements, transport samples and pay for the bacteriological testing.

In the event that the tests show the need for rechlorination, repeat the sterilization procedure as often as may be necessary until satisfactory results are obtained. No additional charge will be approved for rechlorination requirements.

Method of Payment (Sec. 06) No separate payment will be made.

SECTION 13510

SPECIAL WATER STORAGE TANK REPAINTING COATING

Water Storage Tank Sandblast Cleaning, Priming, Repainting

Part 1: GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

1.02 QUALITY ASSURANCE

A. Workmanship

1. All surface preparation, priming, and painting work covered by this Section shall be performed by a firm having at least five (5) years successful experience in the tank painting field and shall have performed specified type cleaning and painting on at least fifteen (15) tanks of similar design.

2. All work shall be in accordance with the requirements hereinafter specified and the applicable requirements of the latest edition of standards provided by:

- a. ANSI / NSF Std. 61
- b. SSPC
- c. NACE
- d. AWWA D 102
- e. ASTM.

B. Product Labeling

All labels shall include the following:

1. manufacturer's name
2. generic type of paint
3. manufacturer's series number and batch number
4. color of product
5. instructions for thinning and application

C. Sampling of Materials

1. When requested by the ENGINEER, obtain test samples from material stored at project site or source of supply.
2. Select samples at random from sealed containers.

1.03 SUBMITTALS

- A. Submit a copy of each of the following to the ENGINEER for approval prior to start of work at the job site:
1. CONTRACTOR'S purchase order for the specified paint materials.
 2. Shipping list showing types, quantities and batch numbers of all paint materials.
 3. Abrasive blast material type, size and three separate samples for review and approval prior to blast cleaning.
 4. Paint manufacturer's instructions.

1.04 PRODUCTS DELIVERY AND STORAGE

A. Delivery of Materials

1. Store only acceptable project materials on project site.
2. Store in a suitable location.
3. Restrict storage to paint materials and related equipment.
4. Comply with health, NFPA, EPA, and OSHA regulations as regard storage materials.

1.05 JOB CONDITIONS

A. Environmental Requirements

1. Comply with all federal, state and local laws and regulations concerning health, safety, noise, dust, waste storage and disposal and toxic and/or hazardous substance holding, storage and disposal, whether or not listed herein.

2. Absolutely no paint, solvent material, gasoline, oil or other toxic or hazardous material is to be disposed of at or in the vicinity of the tank site.
3. Comply with manufacturer's recommendations as to environmental conditions under which coatings can be applied.
4. Apply coating materials per manufacturer's printed data sheet instructions. Refer to specific product data sheet for minimum surface temperature requirements.
5. Provide for proper ventilation using explosion proof equipment. Allow to run 72 hours after interior coating application.
6. Adequate illumination shall be provided using explosion proof lights and equipment.
7. Atmosphere shall be free of airborne dust.

B. Protection of Property

1. OWNER'S Property

All inlet, outlet and drain pipe openings including meshes if the roof vault and the overflow pipe in the tank shall be covered by the CONTRACTOR with a strong enough cover to keep blasting abrasive and paint material from entering the openings. Any OWNER'S equipment in or around the vicinity of the tank shall be covered to protect it from abrasive and paint damage.

2. Adjacent Property

Special precautions shall be taken by the CONTRACTOR to restrict and control windborne fallout or residue and particulate matter from cleaning operations, and/or paint when the close proximity of adjacent property or vehicles warrants that special precautions are necessary. If needed, the CONTRACTOR shall schedule and coordinate his work to avoid windborne fallout. All damage to existing facilities and adjacent property resulting from the CONTRACTOR'S carelessness or negligence shall be cleaned,

repaired or replaced by the CONTRACTOR at no additional expense to the OWNER.

2.01 MATERIALS

A. Paint Materials

All paint and thinners shall be supplied by the CONTRACTOR. Paint quantities shall be furnished by one paint manufacturer and all thinners and solvents shall be of the same manufacturer as the paint materials. There will be no exceptions to this requirement.

The CONTRACTOR is responsible for determining the amount of paint required to obtain the specified results.

All paints and solvents shall be delivered to the site in factory sealed containers, showing the manufacturer, contents and batch numbers. Only newly purchased paint bought specifically for this job shall be used. Leftover paints from CONTRACTOR'S previous jobs will not be allowed. Documentation of purchase orders and bill of lading will be required.

B. Abrasives

Abrasives used for blast cleaning shall be those mentioned in the specifications of Steel Structures Painting Council. Particular attention shall be given to the maximum particle size requirements. Proprietary abrasive materials may be used only upon written approval of the ENGINEER.

C. Paint Manufacturer & Technical Follow-up

Tnemec Company, Inc.
Rep: Ted Server 812-897-4323

Sherwin Williams Company
Rep: Troy Fraebel 859-552-7027

PART 3: EXECUTION

SURFACE PREPARATION

Sharp edges, weld protrusions and other protrusions shall be removed by grinding. Sharp edges and protrusions shall be ground to at least 1/8 inch radius. Weld spatter shall be completely removed.

The roof vent mushroom cap(s) shall be removed for cleaning, painting, or replacement. The cap and neck interior and both sides of the perforated steel vent plate shall be cleaned and painted using the interior system specified. If complete replacement of tank vent is called for, refer to other Section of the specifications.

In order to avoid condensation, the surface temperature of the steel shall be at least 5 degrees F. higher than the dew point temperature when surfaces are being prepared for painting.

All surfaces shall be cleaned in accordance with the Surface Preparation Specifications, latest edition, of the Steel Structures Painting Council to the degree specified in the tank coating system sections in these specifications.

Surfaces cleaned to bare metal shall be primed the same day and before any corrosion by-products appear on the cleaned steel.

Upon completion of the blast cleaning operations, all abrasives used shall be removed from the OWNER'S property by the CONTRACTOR at the CONTRACTOR'S expense. The CONTRACTOR shall be responsible for making the necessary arrangements for abrasive removal.

Where spot cleaning is specified, the shop paint at the edges of the cleaning pattern shall be feathered and smoothed to permit proper blending of the field priming to the shop coat.

Following blast cleaning operations, surfaces shall be cleaned of all dust by blowing down with dry compressed air and sweeping with bristle broom or by vacuuming.

3.03 COATING SYSTEMS

A. Tank Interior Wet System for all interior surfaces of the tank and riser column (if applicable).

1. Surface Preparation

All interior surfaces shall be cleaned in accordance with SSPC-SP10 "Near White Blast Cleaning". Dust that has settled on any part of the structure as a result of the blast cleaning must be removed before priming.

2. Prime Coat (Immediately after blasting)

Tnemec Series 91 H₂O (Hydro Zinc).

All unprimed or abraded areas shall be spot primed to a dry coating thickness of 2.5 to 3.5 mils.

Or Sherwin Williams 646 PW Macropoxy

All unprimed or abraded areas shall be spot primed to a dry coating thickness of 3.0 to 5.0 mils.

3. Intermediate Coat

Tnemec Series 20 HS Pota-Pox (Epoxy Polyamide). Spray the entire interior surfaces to a dry film thickness of 3.0 to 5.0 mils.

Or Sherwin Williams 646 PW Macropoxy

Spray the entire interior surfaces to a dry film thickness of 4.0 to 6.0 mils.

4. Stripe Coat

Tnemec Series 20 HS Pota-Pox (Epoxy Polyamide). Apply one stripe coat to all weld seams by brush or roller at 3-5 mils D.F.T.

Or Sherwin Williams 646 PW Macropoxy. Apply one stripe coat to all weld seams by brush or roller at 3-5 mils D.F.T.

Allow to cure per data sheet before applying finish coat.

5. Finish Coat

Tnemec Series N140-11WH- Pota-Pox Plus (High Solids Epoxy). Spray entire interior surfaces to a dry film thickness of 4.0-6.0 mils. Allow to cure as per data sheet before filling tank.

Or Sherwin Williams 646 PW Macropoxy . Spray entire interior surfaces to a dry film thickness of 5.0-6.0 mils.

Allow to cure as per data sheet before filling tank.

6. The total minimum dry film thickness for the three coat interior systems shall be 11.0 to 12.0 mils.

C. Tank Exterior

1. Surface Preparation

Blast clean all surfaces in accordance with SSPC-SP6 "Commercial Blast Cleaning".

2. **Prime Coat (Immediately after blasting)**

Tnemec Series 91 H20 (Hydro Zinc). All unprimed or abraded areas shall be spot primed to a dry coating thickness of 2.5 to 3.5 mils.

Or Sherwin Williams Corothane 1 Galvapak (Hydro Zinc). All unprimed or abraded areas shall be spot primed to a dry coating thickness of 3.0 to 4.0 mils.

3. **Intermediate Coat**

Tnemec Series 66 HS (High Build Epoxoline). Spray the entire exterior surfaces to a dry film thickness of 3.0 to 5.0 mils.

Or Sherwin Williams 646 PW Macropoxy Fast Cure Epoxy
Spray the entire exterior surfaces to a dry film thickness of 3.0 to 5.0 mils.

Allow to cure per data sheet before applying finish coat.

4. **Field Finish Coat**

Tnemec Series 740 (Polyurethane), color determined by Owner. Apply to a dry film thickness of 2.0 to 3.0 mils.

Or Sherwin Williams Acrolon Ultra or Hi-Solida Polyurethane. Spray the entire exterior surfaces to a dry film thickness of 2.0 to 3.0 mils.

5. The total minimum dry film thickness for the three coat exterior systems shall be 8.0 mils.

3.04 APPLICATION

Apply all coatings per manufacturer's latest printed technical product data sheets.

A minimum of seven days at 75 degrees F. shall be allowed for curing after application of final coat for the tank interior wet surfaces prior to flushing, sterilizing or filling with water.

A final cure and coating thickness shall be verified by the ENGINEER.

3.05 EXECUTION

A. Field Inspection

1. Examine all surfaces to be coated. All skip weld seams, roof lap plate seams not welded, and gouges in plate steel shall be caulked after priming with Tnemec Series 63-1500 Filler and Surfacer.

2. All wet interior coated steel surfaces shall receive holiday Testing with a Tinker and Razor Model M-1, or equivalent, low voltage holiday detector. **Any areas failing this test shall be marked and receive an additional repair coat in accordance with 3.03 A. 6 Interior Coating System until satisfactory test results are achieved.**

3.06 ACCEPTANCE OF WORK

A. All field surface preparation shall be approved by the Engineer before primer is applied. The Contractor shall request acceptance of each coat before applying the next coat and shall correct work that is not acceptable and request re-inspection. All rigging to remain in place, and Contractor shall aid in use of rigging for all inspections by Engineer.

3.07 CLEANING AND DISINFECTION

A. Cleaning: After painting, remove all materials not part of the structural or operating facilities of the tank.

3.08 CLEAN UP

Remove all debris and leave site in pre-project condition.

3.09 GUARANTEE

A. A. first anniversary inspection shall be conducted with the Contractor present.

B. The Fabricator/Field Painting Contractor shall guarantee their work for a period of one year to the extent that they shall repair any defects due to faulty workmanship or materials which may appear on the structure during this period.

END OF SECTION

SPECIAL CONSTRUCTION
SECTION 13600
AMI Fixed Base Water Meter Reading System with
With Alternate for Vehicle Drive-By Metering Solution

Scope of Work

The Cannonsburg Water District desires to procure an AMI system capable of meeting the current and future needs within our service area. The scope of work involves, but is not limited to, providing and implementing an Advanced Meter Infrastructure (AMI) system which includes software, hardware and all necessary training and installation support.

All components of the proposed system must be provided by the same company and all water meters submitted in this proposal shall be compliant with NSF/ANSI 61, to meet the Safe Drinking Water Act (SDWA) per NSF 372 that became effective in January 2014.

Base system requirements:

1. The District desires an AMI system capable of receiving meter readings via fixed base tower collectors throughout the entire service area.
2. The utility desires a meter data management (MDM) software necessary to download meter readings from collection devices, process meter readings, report usage characteristics, and all potential setting and tamper alarms.
3. The utility requires all meters and software to be compatible with the existing Sensus System

Pricing should be clearly provided for the base system proposal. All proposals shall include a propagation study to illustrate system coverage and read success interval %.

Required capabilities:

1. The District requires an AMI system capable of receiving readings via a fixed base AMI system architecture (two-way communication is required).
2. The District requires the system supplier to have a manufacturer certified support technician based within 75 miles on the water district for project management and technical support.
3. The District desires that complete installation of new metering equipment be included in the agreement such that the system can be fully installed and operational within twelve (12) months of contract execution. All installation providers shall provide written documentation of a minimum of 5 installations using Sensus meters and FlexNet technology to ensure proper communication throughout the network.
4. The supplier must have a manufacturer certified project manager on staff to ensure all network installation, communication and project schedules are maintained.

Submission of detailed product information for the proposed equipment, software and services is required to facilitate review of the proposals.

Part 1 General

1.01 AMI Scope

The Advanced Metering Infrastructure (AMI) system provides the ability to read water meters with a AMI platform. The system shall be designed around the central concepts of simplicity, flexibility, and reliability. The system operates using and supporting two-way radio frequency (RF) transmissions for water meters, including on-demand readings.

The AMI endpoint (meter) data collection begins with the SmartPoint™ Transmitter/Transceiver module. The SmartPoint module shall have a printed circuit board that provides an AMI endpoint with the ability to acquire data from its connected meter and transmit the data to AMI receivers or transceivers. SmartPoint receivers or transceivers are mounted either integral to the meter or remotely depending upon meter type. SmartPoint transceivers provide remote programming and diagnostics without having to visit the meter.

This system achieves reliability by overlapping receiver coverage of end-points (meters), data/message redundancy, and failover backup provisions. The AMI system shall operate on “Primary Use” licensed spectrum, meaning that potential interferers can be legally removed. Unlicensed AMI offerings will not be accepted.

The system shall use (patent pending) modulation and Digital Signal Processor-based (DSP-based) receivers operate reliably over a 15-20 km range, and are specifically designed to address the challenges of AMI deployment in diverse terrains. The same backhaul network supports incremental expansion toward saturation deployments at a pace consistent with a utility’s needs and budget.

1.02 AMI System Architecture

The AMI data collection and command network is comprised of two parts:

- Local RF Network, and
- Regional Network Interface (RNI).

AMI Local RF Network

The Local RF network consists of a SmartPoint modules (transceivers) located at each endpoint, and a network of Base Stations. The SmartPoint modules transmit the meter consumption and status information at regular intervals. These transmissions are received by one or more base stations. The Base Station forwards the data to the Regional Network Interface (RNI) via phone line, ISDN, DSL, or wireless internet links, and also stores the information locally in the event of RNI communications path interruption. The transceiver must provide two-way communication over the AMI network, allowing commands to be issued to two-way SmartPoint modules.

The number of times the SmartPoint module transmits is decoupled from the read rate, allowing for either greater number of transmissions per read, or fewer. In the case of a daily read, the SmartPoint module can be programmed to transmit every six hours—providing the same information four times throughout the day.

The SmartPoint modules provide redundant historical data in each message. To provide RF link redundancy, the AMI Network is configured such that multiple Base Stations receive the SmartPoint module signals and relay them to a central collection system for processing.

Upon reception of the SmartPoint module data at a Base Station, the packet is wrapped with a timestamp associated with the receive time (TOI – Time Of Intercept) and forwarded to the routing site.

The AMI Base Station shall be designed to be as flexible as possible when dealing with backhaul communications. It utilizes standard TCP/IP to forward its data via a standard Ethernet port and employs a Linux computer that is modular by design and currently incorporates a standard TCP/IP stack. The Base Station shall be equipped with a standard 10 Mb Ethernet card. A single T1 backhaul line can support more than 100 AMI Base Stations.

The Regional Network Interface (RNI) shall provide billing and account management, network management functions, data warehousing, and customer hand-off functions to the utility. The RNI provides enough network capacity for all of the base stations in one local RF network. SmartPoint module data transmission packets are routed through the selected backhaul to the appropriate owner RNI. The decision is then made by the RNI's Network Controller (NC) as to where a data packet is to be sent. Each packet is uniquely identified with a customer identification combined with a Base Station identification.

The RNI is interconnected via dedicated switches for both the utility and Sensus to provide monitoring.

1.03 Multiple Applications

The FlexNet Base Stations provide a communications path between the RNI and any FlexNet endpoint in the field. Applications for use include but are not limited to:

- Advanced Meter Infrastructure (AMI)
 - Water
- Distribution Automation (DA)
- Demand Response (DR)
- Home Automation Networks (HAN)
- Street Lighting Control
- North American Two-Way Water

1.04 Data Security

The FlexNet system is designed with total data security in mind. For the protection of customer meter-read data, all meter data can be encrypted at the meter and remains encrypted throughout the entire communications path until it is inserted into the utility database, safely inside the utility customer firewall.

SmartPoint Radio Data Security

The SmartPoint radio module is designed to integrate directly into the registers of the host meter. Register values are read from the meter and encoded into a message inside the SmartPoint radio module. This message is then mangled in a convolution algorithm, and then encrypted with the system AES key, 128 bit, for transmission. In addition, each RF packet is tagged with a sequence number that allows detection of attempted tampering. The proprietary SmartPoint 7-FSK modulation is not public domain. It is not recognizable by a spectrum analyzer and no off-the-shelf equipment can be purchased to demodulate it.

Base Station Data Security

Once data has arrived at the Base Station, additional security measures are added. Data is stored only for the period of time needed to ensure accurate transmission over the backhaul link to the RNI. Data stored in the Base Station remains encrypted, and the encryption keys are never stored on the same device as the data.

All communications between a Base Station and the RNI occurs over encrypted channels. No data is ever sent over any network, public or private, in clear text. All backhaul network interactions are conducted over SSL tunnels using AES-256 encryption.

RNI Data Security

The meter data stream is terminated at the RNI, where it is received via a secure, encrypted tunnel from the Base Station. The actual meter readings are decrypted at this point using the WEP keys, and inserted into the utility customer-controlled meter-read database.

END OF SECTION

ELECTROMAGNETIC FLOW METER

PART 1 GENERAL

SCOPE

The work covered by this Section consists of furnishing all labor, equipment and materials required to install, test and place into satisfactory operation the Electromagnetic Flow Meter as shown on the Drawings and detailed herein.

SUBMITTALS

- A. Submit shop drawings and engineering data with bid documents
- B. Operation and maintenance manuals shall be furnished in accordance with Cannonsburg Water District request prior to the system startup.

STORAGE AND PROTECTION

- A. Flow meter and accessories shall be stored and protected in accordance with the manufacturer's recommendations. Flow meter shall not be stored outside or exposed to the weather.

PRODUCTS

ACCEPTABLE MANUFACTURERS

The electromagnetic flow meter shall be an iPERL Meter as manufactured by Sensus, Inc. or approved equal.

TYPE

Solid state, battery operated electromagnetic flow measurement system with a hermetically sealed, glass covered, electronic register with a programmable 9-digit display.

CONFORMANCE TO STANDARDS

The Meter must conform to American Water Works Standard C-700 and C-710 as most recently revised with respect to accuracy and pressure loss requirements, or other appropriate American Water Works Standard. Meter shall be compliant with ANSI/NSF Standard 61 Annex G.

REGISTER

The register must be an electronic device encapsulated in glass with 9 programmable digits utilizing a liquid crystal display (LCD). It will have indicators for flow direction, empty pipe, battery life and unit of measurement. The register must be hermetically sealed with a heat tempered glass cover and be tamper resistant. The register shall not be removable from the measuring sensor. The register shall utilize a magnetic coupling technology to connect to a touch read, radio read or fixed base meter reading system in either an inside or pit set installation. The electronic register shall have internal data logging capability and alarm status messaging to include reverse flow, tamper detection, empty pipe, leak detections, and battery status.

MEASURING ELEMENT

The measuring element shall be made of a noncorrosive, lead-free glass fiber reinforced, PPS (polyphenylene sulfide) based resin. A battery powered magnetic flow sensor utilizing silver/silver chloride electrodes will be utilized to measure the velocity of the water which is linearly proportional to the volume. The measuring element will have no moving parts and will be specific for each size. The low flow accuracy shall be no more than 0.03 gpm.

EXTERNAL HOUSING

The register and measuring element will be an integrated unit housed within a thermal plastic external casing. This integrated unit will not be removable from the external housing. The systems shall have the size and direction of water flow through the system imprinted on the external housing.

ACCURACY AND HEADLOSS TESTS

Systems shall conform to current AWWA C-700 and C-710, current revision, or other appropriate American Water Works Standard, test flows, head-loss and accuracy standards.

PRESSURE CAPABILITY

System shall operate up to a working pressure of 200 pounds per square inch (psi), without leakage or damage to any parts. The accuracy shall not be affected by variation of pressure up to 200 psi.

Meter Transceiver Unit (MXU)

PART 1 GENERAL

1.01 SCOPE

The work covered by this Section consists of furnishing all labor, equipment and materials required to install, test and place into satisfactory operation the Meter Transceiver Unit for AMR Application as shown on the Drawings and detailed herein.

1.02 SUBMITTALS

- A. Submit shop drawings and engineering data in accordance with the requirements of Section 01340 of these Specifications.
- B. Operation and maintenance manuals shall be furnished in accordance with the requirements of Section 01730 of these Specifications.

1.03 STORAGE AND PROTECTION

- A. The transceiver unit and accessories shall be stored and protected in accordance with the manufacturer's recommendations. The transceiver unit shall not be stored outside or exposed to the weather.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

The meter transceiver unit shall be a radio unit Model 520M as manufactured by Sensus Metering System or approved equal.

2.02 APPLICATION

The radio unit SmartPoint shall be a high-power walk-by/drive-by radio transmitter that provides water meter and ancillary device data from equipment located in meter pit environments. The radio unit shall be submersible and designed to withstand harsh underground environments.

2.03 TOUCH COUPLER DESIGN

The Radio shall utilize a TouchCoupler, communication system, to interface with the meter encoder as well as other devices. With TouchCoupler, the SmartPoint can connect to the meter using existing two wire or 3-wire AMR installations. No field splicing or sealing methods will be allowed for connection from the encoder to the meter transceiver.

2.04 OPERATION

The radio shall be **two-way communication** and receive input from the meter register and store up to 35 days of hourly usage data, while awaiting an interrogation signal from a reading device. When a reading request signal issued by a Vehicle Gateway Basestation (VGB) or Hand-Held

reading unit (HHD), the radio transmits the current meter reading, the meter identification number and any alarms. Detailed hourly usage can be withdrawn from the device using a Hand-Held reading unit. The radio broadcasts at **two full watts** of power on FCC primary licensed, exclusive-use (unshared) radio spectrum. No radios utilizing unlicensed frequency shall be allowed.

2.05 RADIO FEATURES

The radio shall store up to 840 consumption intervals (35 days of hourly consumption), providing the utility with the ability to extract detailed customer usage profiles for reliable information and quick dispute resolution. The Radio shall also incorporate a two port design, allowing the utility to connect multiple registers to a single endpoint for a compact installation that saves space, time and money. Radio units will also be easily configured to accept and transmit data from ancillary devices such as acoustic monitoring applications without reducing system performance.

2.06 OTHER FEATURES

PHYSICAL CHARACTERISTICS Width:4.43" x Height: 5.09"x Depth: 3"

WEIGHT 1.0 lbs/16.0 oz

COLOR Black

FREQUENCY RANGE 900 – 950 MHz, 8000 channels X 6.25 kHz steps

MODULATION Proprietary Narrow Band

MEMORY Non-Volatile

POWER Lithium Thionyl Chloride batteries in conjunction with a hybrid layer capacitor (HLC)

APPROVALS US: FCC CFR 47: Part 90, Part 24D, Part 101C, Part 15 Licensed operation

Canada: Industry Canada (IC) RSS-134, RSS-119, RSS-210

OPERATING TEMPERATURE - 22° F to +185° F - 30° C to + 85° C

OPTIONS: Dual or single port availability; TouchCoupler only, wired only. (TouchCoupler connection available only with Sensus meters)

INSTALLATION ENVIRONMENT 100% condensing, water submersible

COMPATIBILITY TouchCoupler and Wired Version: Sensus ECRII and ICE water registers

Wired

WARRANTY 20 years warranty.10 full, 10 pro-rated

END OF SECTION

METER READING EQUIPMENT

PART 1 GENERAL

1.01 SCOPE

The work covered by this Section consists of furnishing all labor, equipment and materials required to install, test and place into satisfactory operation the Meter Reading Equipment as shown on the Drawings and detailed herein.

1.02 SUBMITTALS

- A. Submit shop drawings and engineering data in accordance with the requirements of Section 01340 of these Specifications.
- B. Operation and maintenance manuals shall be furnished in accordance with the requirements of Section 01730 of these Specifications.

1.03 STORAGE AND PROTECTION

- A. The vehicle-based meter reading equipment and accessories shall be stored and protected in accordance with the manufacturer's recommendations. The transceiver unit shall not be stored outside or exposed to the weather.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

The vehicle transceiver unit shall be the Vehicle Gateway Basestation (VGB) and the Handheld reading device shall be a model AR 5501 as manufactured by Sensus Metering System or approved equal.

2.02 VEHICLE-BASED READING EQUIPMENT

A. General

The vehicle transceiver unit shall be a portable radio-based device used for the acquisition of data from consumer utility meters and other field-based diagnostic instruments. The vehicle unit shall be compact and portable, allowing it to be used in any vehicle providing 12-volt DC power. The operator simply places the unit in the vehicle cabin, loads the desired meter reading route into the laptop computer and drives along the prescribed route. Meter data is collected as the vehicle travels within proximity to the selected meters. The complete VGB package includes everything needed to read meters and ancillary (such as acoustic monitoring) devices that are equipped with meter transceivers.

B. Operation

The vehicle transceiver unit shall send an alert signal to the meter transceiver or ancillary device. Upon receipt of the alert, the transceiver responds by transmitting its most recent reading. Once received, the endpoint returns to a low-power listening mode. The operator has the option of directing the transceiver to signal all endpoints within range (blind reading mode), or to select endpoints (geographic reading mode). The system shall utilize two-way communication.

C. System Reliability

The AMI system shall utilize FCC primary-use radio frequencies to communicate with transceivers. The combination of FCC-protected frequencies and sheer transmission power of the endpoints ensure reliable communication from meters and ancillary devices. What's more the transceivers will provide infrastructure detail by monitoring their operating conditions and reporting meter tamper, continuous flow, leak detection (when equipped), high or low consumption and low battery alarms.

D. Portability

Through the use of advanced design, the radio electronics of the VGB are contained in a portable enclosure about the size of a small briefcase. With the addition of a laptop computer, connecting cables and antenna, the complete VGB package can be set up in any vehicle within minutes.

E. User Friendly Software

The VGB shall utilize a software program especially designed for operating drive-by-meter reading equipment. The software will feature a convenient, user-friendly pull-down menu system for directing the meter reading process. Operators are also able to input information, such as route notes, manually via the PC's keyboard. The meter reader/operator can also easily edit route data configurations when necessary. Back at the office, The system shall process the information gathered by the software and provides the utility's billing software with a simple plug-and-play interface, no matter what reading system is utilized. The reading system shall be compatible with the current Sensus AutoRead Software.

2.03 HANDHELD DEVICE (HHD) METER READING

A. General

The Hand-Held Device (HHD) is primarily designed to collect and store utility meter readings with built-in capability for expanded uses. The HHD interfaces to a personal computer [PC] through a communications/charging stand used for uploading pre-programmed meter reading route information. The computer must be equipped with meter reading software.

B. Programming

The HHDs are designed for collecting meter readings as well as programming meter transceivers and meter registers.

C. Construction

The HHD shall be housed in a weather-resistant, high impact, UV-stabilized plastic. Surface-mounted circuitry in the specially designed, watertight case allows the HHD to be used in rugged field conditions over a wide range of temperatures.

D. Ergonomic Design

The HHD's ergonomic-minded design offers a well-balanced, easy-to handle unit. It includes a graphical liquid crystal display [LCD] for ease of viewing during operation. The contrast value of the LCD automatically adjusts based on the ambient temperature, but can also be easily field adjusted to compensate for use in varying lighting conditions. The HHD can be manually carried during operation, or function in the optional HHD carrier harness.

E. Backlighting

A backlight feature provides illumination to the LCD for convenience in data entry and ease of reading data in areas with insufficient lighting.

F. Flexible Data Entry

The HHD automates the reading process. Reading data from Sensus and compatible absolute encoder equipped meters is obtained and stored in the HHD. Manual entries can also be made using the keypad, which features elastomeric, tactile response keys. Preprogrammed "high" and "low" range limits calculated and passed from the utility billing software, can be sent to alert the user of possible reading errors. In addition, the HHD shall provide expanded features for reading and programming transceivers. This is used in conjunction with a Sensus Command Link and GPS software.

G. Automatic Error-Free Data Collection:

The HHD collects and stores readings automatically from compatible absolute encoders, when properly equipped. Regardless of the route sequence programmed into memory, the HHD software identifies each meter encoder using the encoder's internal identification number. The software then searches the route program and automatically stores the meter

reading in the correct customer account. When the utility's meter readers hear an audible alert tone from the HHD, it is alerting them to a special condition or hazard. They need only refer to instructions on the HHD screen on how to proceed. This process eliminates errors and increases meter reading speed.

H. Audible Verification/Warning

The audible tone confirms completed readings or alerts the user to faulty or out-of-limit readings. Tones can also be programmed with notes to alert the meter reader to hazardous situations or to respond to field survey questions.

I. Comment/Notes

The HHD uses preprogrammed, utility-defined note codes, or free form notes [using the alpha and numeric keypad].

Meter readers can identify accounts requiring special attention, or they can note unusual conditions and account survey information.

J. Replaceable Battery

The rechargeable, self-contained Lithium Ion battery pack is field-replaceable to minimize downtime. The HHD is also equipped with a lithium battery backup to maintain date and time.

K. Productivity Monitoring

The HHD's built-in clock can record the time and day of each meter reading. The software can note and store the type of reading made: manual, automatic, and/or multiple data entry. These reads provide an overview of time spent reading the route and special problems related to readings or equipment use.

L. Service and Warranty

The vendor shall offer a program to extend the protection of HHDs and related equipment beyond the one [1] year warranty covering materials and workmanship. Published warranty and service policy details must be available from the manufacturer or distributor representative.

END OF SECTION

Support Services Requirements

To ensure service after the sale it is a requirement that the selected vendor shall have an on-staff system support specialist within 75 miles or team assigned to the Cannonburg Water District to provide software and technical support regarding the system. This system support specialist shall be listed with all contact information within the bid proposal. A list of minimum required services to be provided includes but is not limited to the following:

- ☒ Answering and resolving hardware/operation/maintenance questions and problems.
- ☒ Answering and resolving software operation questions and problems.
- ☒ Evaluation of information for updates or revisions.
- ☒ Evaluation of personnel for training needs.
- ☒ Additional on-site training or evaluation as needed.

The system support specialist must be available weekday business days between 7:00 a.m. and 5:00 p.m. EST with after-hours numbers available as needed.

Performance Warranties

In evaluating bid submittals, warranty coverage will be considered. The selected vendor shall be required to state its warranty and/or guarantee policy with respect to each item of proposed equipment. The procedure for submitting warranty claims must also be provided.

Experience

The selected manufacturer must have at least 20 years experience manufacturing Absolute Encoder Type Registers and 15 years experience manufacturing the Radio Transmitters. It is further preference that the successful bidder have at minimum 3 million radio water system endpoints installed in North America.

References

The successful bidder must submit full contact information for (1) at minimum ten (10) radio read system customers and at minimum three (3) AMI systems installed within the last 3 years. The proposal shall include brief descriptions and references for a minimum of three AMR/AMI conversion projects performed within the last two years which are most related to requirements of this project. Descriptions shall be limited to those relevant to this project and those that are representative of the firm's capabilities. Reference information must include the name of the client, client website address, name of contact person, contact telephone number and email address, date of installation, software installed, installation issues overcome, and custom features

utilized. References provided should anticipate contact from Cannonsburg Water District, including a possible site visit.

Implementation/Training

The proposal shall include identification of a project manager, team members and key personnel. A brief curriculum vitae should be provided for each project team member.

The proposal shall include an installation plan in which the schedule, approach, and resources needed to implement the proposed software is discussed. The project schedule should include projected milestone dates and payment requirements, including any PUC resources required for successful installation and implementation.

The proposal shall provide the user training approach that will properly prepare staff, supervisors and other personnel on the day to day use of the application, including reporting functions.

Technical Requirements

The proposal shall include data sheets illustrating conformance to these specifications and requirements for any required hardware including, but not limited to, servers, workstations, scanners, card readers, hard disk space, internet access speed, and operating systems. The assumption should be made that the software will be remotely hosted.

Radio Read Meter Installation

The scope of the meter installation will include the following:

1. Record final reading on existing meter.
2. Meter pit must have a working shutoff valve for installer to be able to remove existing meter.
3. Install new AMR meter with new meter gaskets.
4. Record all new meter information to include:
 - (a) Register ID number
 - (b) GPS latitude and Longitude
 - (c) Radio transmitter ID number
 - (d) All data shall be provided on field order (supplied by customer) and electronic excel file for mass upload to customer CIS system (customer responsible for CIS upload)
5. Record new meter reading.
6. Install MXU through hole in lid (drill if needed).
7. Return customer to service, verify no leaks and return lid to meter box.

NOT INCLUDED:

1. Any excavation outside of meter box.
2. Utility to provide any digging outside of meter box that is required.
3. Replacement of any shut off valves that do not operate.
4. Meters that are not accessible due to utility customer blocking access, example: vehicle over meter vault etc..
5. Any data entry into utility billing software.

MECHANICAL

Section 15000

Valves and Gates

General

Section 1. Valves and gates of the sizes and types specified or shown on the construction drawings shall be provided for the proper completion of the work included under the project.

Operating nuts, handwheels, gaskets, bolts and nuts and all necessary appurtenances for a complete installation of the valves and gates shall be furnished with the valves.

All valves, not installed in the ground, shall be cleaned after installation and painted as specified under the Section 09900 - "Protective Coatings and Painting."

Complete details of all valves to be used on the project shall be submitted to the Consulting Engineer for review and contract compliance.

Type of Valve

Section 2. The construction drawings will state which type of valve is to be used.

Valve Boxes

Section 3. A valve box shall be provided for every operating nut of a buried valve with the operating mechanism fully protected with a cast iron grease case.

The valve box shall not transmit shock or stress to the valve. It shall be centered and plumb over the wrench nut of the valve. The box cover shall be flush with the finished pavement or at such other level as may be directed by the Project Manager.

The assembly shall consist of three (3) pieces and a cover. The valve box shall be screw type, cast iron with 5-1/4 inch shaft. A round base which will enclose the valve bonnet shall be furnished with six (6) inch and eight (8) inch valves. An oval base shall be supplied with valves larger than eight (8) inches.

The valve boxes for all buried valves shall be encased in concrete at least six (6) inches outside the diameter of the box at grade. The following information shall be carved into the concrete:

1. Type of service (water, sewage, etc.)
2. Number of turns to open the valve completely
3. The direction of opening the valve

A masonry valve pit shall be provided for every valve which has exposed gearing or operating mechanisms, if that type valve is specified. The details of such an enclosure is shown on the construction drawings.

Operating Nut Location

Section 4. All operating nuts for buried valves covered by valve boxes shall be located within eight (8) inches of the top of the box, and valve wrenches shall be four (4) feet long, sized for two (2) inch square nuts. Four (4) valve wrenches shall be furnished to the Owner by the Contractor.

Extension Stems

Section 5. Wherever extension stems are required for valve operation, the connection between the valve stem and extension stem shall be a pinned coupling to avoid possible disconnection.

Operating Nuts

Section 6. Valves for buried pipe lines shall be furnished with two (2) inch square wrench nuts. Nuts shall have a flanged base upon which shall be cast an arrow two (2) inches long showing the direction of opening, and the word, "OPEN" in one-half (1/2) inch or larger letters, shall be cast on the nut to indicate clearly the direction to turn the wrench when opening the valve.

Handwheels

Section 7. Handwheels may be specified for operating valves in exposed piping on the construction drawings. The handwheels shall have an arrow and the word "OPEN", cast thereon, to clearly indicate the direction the handwheel is to be turned to open the valve. The diameter of the handwheel shall conform to the following dimensions for the various size gate valves.

| Size of Valve | Diameter of Handwheel |
|---------------|-----------------------|
| 4" | 10" |
| 6" | 12" |
| 8" | 14" |
| 10" and 12" | 18" |
| 16" and 18" | 22" |
| 18" and 20" | 24" |
| 24" and 30" | 30" |

Direction of Opening

Section 8. All sewage valves shall open by turning the operator to the RIGHT (clockwise). All water valves shall open by turning the operator to the LEFT (counterclockwise), or as marked on the design plans.

Special Details

Section 9. The details of other valve requirements and valve appurtenances such as special ends and materials, position indicators, floor stands, cylinders, chain operators, and extension stems and guides are described on the construction drawings.

Chain Operators

Section 10. All valves six (6) feet or more above the floor surface shall be equipped with a stainless steel chain operator unless otherwise indicated on the construction drawings.

Valve Stem Packing

Section 11. All valve stem packing shall be die-cut to fit the valve. The material to be used shall be Chesterton Style 324 Super-Lon.

Start-Up Services

Section 12. All butterfly valves, control valves and plug valves, operators and appurtenances installed shall include a thorough two (2) day training program conducted by a factory service representative. This training shall include start-up, operation and maintenance of the valves prior to start-up of the plant.

END OF SECTION

MECHANICAL

Section 15020

Gate Valves

General

Section 1. Gate valves for buried pipelines shall be iron body, bronze mounted, resilient wedge gate valves with non-rising stems having either parallel or inclined seats in accordance with AWWA C509, "Resilient Wedge Gate Valves".

Mechanical joint bell ends will be used in buried pipelines of mechanical joint and rubber seal type joint cast iron. Bell and flange ends will be used in exposed cast iron piping at the locations shown on the construction drawings.

Operating Nuts

Section 2. Gate valves for buried pipelines shall be furnished with two (2) inch square wrench nuts. Nuts shall have a flanged base upon which shall be cast an arrow two (2) inches long showing the direction of opening, and the word "OPEN" in one-half (1/2) inch or larger letters, shall be cast on the nut to indicate clearly the direction to turn the wrench when opening the valve.

Handwheels

Section 3. Handwheels may be specified for operating valves in exposed piping on the construction drawings. The handwheels shall have an arrow and the word "OPEN", cast thereon, to clearly indicate the direction the handwheel is to be turned to open the valve. The diameter of the handwheel shall conform to the following dimensions for the various size gate valves.

| Size of Valve | Dia. of Handwheel |
|---------------|-------------------|
| 4" | 10" |
| 6" | 12" |
| 8" | 14" |
| 10" and 12" | 18" |
| 16" and 18" | 22" |
| 24" and 30" | 30" |

Horizontal Mounting

Section 4. Gate valves in size sixteen (16) inches and larger may be installed in the horizontal position. Bronze tracks, rollers, and scrapers will be provided for valves to be installed in the horizontal position. Horizontal valves for pressure lines shall be furnished with beveled gear operators. The gear cases for buried service shall be totally enclosed, and the gear cases for exposed piping in a vault shall be of the extended type.

Bypass Valves

Section 5. Bypasses shall be furnished on valves when so specified on the proposal sheets or shown on the construction drawings. The bypass valve shall be furnished on the same type as the main line valve to which it is fitted. The size requirements of the bypass shall be as follows:

| Valve Dia. - Inches | Bypass Dia. - Inches |
|---------------------|----------------------|
| 16-20 | 3 |
| 24-30 | 4 |
| 26-42 | 6 |
| 48 | 8 |

Rising Stem Valves

Section 6. Outside screw and yoke rising stem valves shall conform to all of the requirements of AWWA C500 except for the rising stem mechanism. The OS and Y valves shall have a rugged cast iron yoke machined to provide accurate stem alignment. The OS and Y valves shall be furnished with handwheels. OS and Y valves shall only be installed where shown on the drawings.

Low and Medium Pressure valves

Section 7. Low pressure and medium pressure valves, if specified in the "Attention All Bidders" shall be the same design, workmanship, and materials as AWWA C500 valves except that they can be lighter in weight. Medium pressure and low pressure valves shall be tested for performance in operation, watertightness, and resistance to distortion under internal pressure in the manner described in AWWA C500, except that the minimum rated pressure and hydrostatic pressure shall be as follows:

Medium Pressure Valves

| <u>Valve Size</u> | <u>Hydrostatic Test Rated Pressure (p.s.i.)</u> | <u>Pressure (p.s.i.)</u> |
|-------------------|---|--------------------------|
| 4 through 24 | 100 | 200 |
| 30 through 36 | 80 | 150 |
| 42 through 54 | 60 | 120 |

Low Pressure Valves

| <u>Valve Size</u> | <u>Hydrostatic Test Rated Pressure (p.s.i.)</u> | <u>Pressure (p.s.i.)</u> |
|-------------------|---|--------------------------|
| 16 through 24 | 50 | 75 |
| 20 through 36 | 43 | 75 |
| 42 through 48 | 35 | 50 |

Underwriters Valves

Section 8. Gate valves for fire protection systems shall be manufactured in conformance to the requirements of the Underwriters Laboratories, Inc., and the Associated Factory Mutuals Laboratories. Gate valves which support an indicator post shall contain a flange of the indicator post base. Such valves are specified on the construction drawings and shall bear the inspection label of the Underwriters Laboratories, Inc.

Special Details

Section 9. The details of other valve requirements and valve appurtenances such as special ends and materials, position indicators, floor stands, cylinders, chain operators, and extension stems and guides are described on the construction drawings.

Setting Gate Valves

Section 10. Gate valves shall be installed of the size and at the location as shown on the construction drawings. Vertical valves shall be set plumb and horizontal valves installed so that the valve body is level. The valves shall be set to the new pipe in the manner specified for cleaning, laying, and jointing pipe. Mechanical joint, rubber compression seal, or bell and spigot shall be used for buried pipelines. Other types of joints for pipelines within structures will be shown on the construction drawings.

Chain Operators

Section 11. All gate valves six (6) feet or more above the floor surface shall be equipped with a chain operator unless otherwise indicated on the construction drawings.

END OF SECTION

MECHANICAL

Section 15040

Check Valves

Section 1. The check valves shall be cast iron body with a double guided bronze disc seat ring, replaceable bronze bushing machined to a watertight surface. The valve shall be mounted as a center shafted disc closing plate, seat ring, spring loaded to assure tight closing and positive response to the slightest flow in opening. These valves shall be the sizes shown on the construction drawings.

Check valves shall be globe or wafer style (as shown on plans) Silent Check type.

The check valves shall be Class 125 and tested hydrostatically by the manufacturer to 200 p.s.i.. End connections shall be as shown on the plans.

Check valves for installation in pump stations shall be furnished with flanged end or wafer style as shown on the plans connections. Valves shall be as manufactured by Val-Matic, or equal.

Butterfly Valves

Section 1. Butterfly valves shall be cast iron machined to a watertight surface. These valves shall be the sizes shown on the construction drawings.

Butterfly valves shall be and furnished with adjustable throttling handle or hand wheel gear driven operators as shown on the plans.

Butterfly valves shall be Class 150B and tested hydrostatically by the manufacturer to 200 p.s.i. and furnished in accordance with AWWA C504. End connections shall be as shown on the plans.

Butterfly valves shall be wafer style (to replace existing BPS valves). Valves shall be as manufactured by Mueller or equal.

END OF SECTION

MECHANICAL

Section 15060

Air Release Valve Assembly

General

Section 1. A valve designed to allow exhaust of small pockets of air from the water main while in use shall be installed where shown on the plans or where directed by the Engineer.

Design

Section 2. The air release valve shall have a 3/4" iron pipe thread inlet, cast iron body construction, bronze trim, with all internal parts of stainless steel or bronze. The valve shall have an orifice size of 1/16". Valves shall be suitable for a working water pressure of 150 psig. The air release valves shall be a Val-Matic Catalog Number Model 15 or equal as approved by the Engineer.

The air release valve shall be mounted on 3/4", Schedule 40, galvanized steel riser pipe.

The riser pipe shall be connected to the water main by use of a service clamp, Mueller double strap, I.P. thread, neoprene gasket, and a corporation stop having a Mueller thread inlet and inside I.P. thread outlet, Mueller Number H10045 or equal as approved by the Engineer.

The riser shall also have a 3/4", bronze gate valve with a tee-handle, solid wedge type, inside I.P. threads, suitable for a 150 psig working water pressure, Mueller H-10914 or equal as approved by Engineer.

The air release valve enclosure shall be constructed of an 18-inch diameter by 24-inch depth concrete, vitrified clay or ribbed PVC meter box.

The air release valve enclosure cover shall be of one piece flat lid, of cast iron construction, with cast letters "WATER".

END OF SECTION

MECHANICAL

Section 15080

Standard Services Re-Connections

General

Section 1. The work to be performed under this section shall include all labor, materials, equipment, excavation, backfill and testing necessary for the proper installation of all service re-connections. Details of the service installation as shown in the Standard Details Section of these specifications.

No attempt was made to show precise meter setting locations on the plans and the Contractor shall not place any service connection without approval of the location and type by the Engineer. However, in general the meter setting shall be set inside the customer property line and off of State, County Right of Way.

The service shall include: A service clamp, corporation stop, service pipe. These are to be connected to the existing meter setting equipment, meter box and cover.

Service Clamp

Section 2. All service clamps shall be double-strap type for DIP, single strap for PVC, furnished with neoprene gaskets cemented in place. Clamps shall be of the proper size for the pipe with which they are to be used. Clamps shall have a Mueller Corporation stop thread, and shall be suitable for a minimum working water pressure of 200 PSIG. Clamps shall be as manufactured by the Mueller Company or equal as approved by the Engineer.

Corporation Stop

Section 3. All taps for service connections shall be made in the upper half of the main with equipment designed for this purpose. No tap shall be closer than one foot from any joint in the main. Corporation stops shall be of the appropriate size for the service for which they are to become a part. Unless noted otherwise, all services shall be 3/4 inch. Corporation stops shall have a male Mueller thread inlet, and an outlet suitable for connection to the service pipe. Corporation stops shall be Ford Catalog No. F600-3 Flared Joint or equal, if Polyethylene Service Pipe is specified. Insert stiffeners shall be provided with corporation stop if plastic pipe is used.

Service Pipe

Section 4. Service pipe shall be Class 200, polyethylene N.S.F. approved. Service pipe shall run from the corporation stop to the inlet of the meter setting equipment. Service pipe for standard services shall be jacked or drove under paved roads without benefit of steel casing. Open trenches will not be permitted. Should the Contractor chose to use steel casing, it shall be done at no additional cost to the Owner. The jacking, boring, or pushing of service lines under state, county, or private roads or driveways is not a pay item. The unit price bid for service pipe shall include costs for jacking, pushing or boring service pipe as an incidental expense.

END OF SECTION

MECHANICAL

Section 15070

Blow-off Valve Assembly

Section 1. Blow-off valves shall be installed in accordance with the Standard Details and the specifications at locations shown on the plans and in other locations as directed by the Engineer.

In general, blow-off valves are located at the end of mains for the purpose of clearing the main of sediment, obstacles, or impure water.

The pipe from the main to the flush valve shall be of the same material and size as the main and connected to the main by means of a tee, or installed at the end of line.

Do not use a corporation stop for this connection.

The gate valve for the blow-off connection shall be a AWWA type gate valve with adjustable valve box, same size as water line with two inch operating nut, mechanical joint connections Mueller A-2380-8 or equal as approved by the Engineer. The gate valve and the 90° elbow riser fitting must be securely anchored with concrete to prevent movement.

All pipe beyond the gate valve shall be galvanized iron pipe, Schedule 40, with Class 150 maleable iron fittings, with a cap at end of pipe riser. Galvanized pipe and fittings shall be same size as main end of line.

The flush valve enclosure shall be constructed of an 24" diameter by 24" depth concrete, vitrified clay, PVC, or concrete pipe meter box as approved by the Engineer.

The cover shall be one piece cast iron construction, flat lid, with cast letters "WATER" or equal as approved by the Engineer.

The cost for the gate valve supplied with blow-off valve shall be included in unit price of blow-off valve. No separate payment will be made for gate valves used with blow-off valves.

Note: As an option, the Contractor may furnish and install a pre-fabricated blowoff valve equal to Model #78 as manufactured by the Kupferle Foundry. The hydrant shall be installed underground in a 24" x 24" meter box. With this option, furnishing a separate underground gate valve with box is also required.

END OF SECTION

MECHANICAL

Section 15510

Flush Hydrants

General

Section 1. Flush hydrants shall conform to the applicable requirements of AWWA C502, "Dry-Barrel Fire Hydrants". The hydrants shall have a main valve opening, size as designated herein, one pumper connection and two (2) hose connections. All connections shall be furnished with chained caps. The type of tread and sizes of openings shall be as listed in Table No. 1, "Flush Hydrants Details". All bearing points on the hydrants shall be bronze mounted. The size and shape of the caps and operating nuts together with the direction of opening are listed in Table No. 1.

The hydrants shall be supplied with six (6) inch mechanical joint hub inlet normally for four (4) feet burial of the water main. Barrel extension sections complete with stem extensions shall be furnished for flush hydrants which are set with more than four (4) feet cover.

The hydrants shall incorporate a breakable component at the standpipe flange and a breakaway stem coupling so designed that when the hydrant is subject to severe impact, the special component will shear off at the flange without damage to the hydrant barrel. The main valve shall remain closed if the barrel section and upper stem is separated from the remainder of the hydrants.

The flush hydrants shall be furnished with drain valves which will open when the main valve is closed and shall drain the standpipe completely. The drain valves shall close when the hydrant main valve is opened in such a manner that there will be no leakage through the waste outlets.

The manufacturer shall furnish the Project Director with two (2) copies of a certification that the required tests on the various materials and on the completed hydrant have been made and that the results conform to the requirements of AWWA Specifications C502.

The design information on the flush hydrant shall be furnished to the Consulting Engineer for approval prior to shipment of material to the project.

Table No. 1 - Flush Hydrant Details

| | | |
|----|---|----------------------------|
| 1. | Diameter - Main Valve Opening | 5-1/4 Inches |
| 2. | Diameter - Pumper Connection | 4 Inches |
| 3. | Diameter - Hose Connections | 2 - 2-1/2 Inches |
| 4. | Thread Type | National Standard |
| 5. | Shape - Caps and Operating Nut | Pentagon |
| 6. | Dimensions - Operating Nut Top Bottom | 1-inch 1-inch |
| 7. | Direction of Opening | Left (Counterclockwise) |
| 8. | Color to be Painted | Red |
| 9. | Specific Model or Models Required | M & H, Mueller, Eddy, etc. |

Installing Flush Hydrants

Section 2. Flush hydrants shall be set at the locations shown on the construction drawings or as directed by the Project Manager. They shall be installed in such a manner as to provide complete accessibility and also in such a manner that the possibility of damage from vehicles or injury to pedestrians will be minimized.

The hydrant barrel shall be set so that the horizontal centerline of the streamer nozzle is eighteen (18) inches above the top of the curb on the streets with curb, and eighteen (18) inches above the ground in unpaved areas, unless directed otherwise by the Project Manager.

When placed behind the curb, the hydrant barrel shall be set so that the outer end of the streamer nozzle cap shall be from six (6) inches to twelve (12) inches behind the back of the curb.

All hydrants shall stand plumb with the streamer nozzle facing the curb or street. The hydrant shall be placed on a flat stone or concrete slab four (4) inches thick and eighteen (18) inches square.

Hydrants shall be set in relation to the established grade shown on the construction drawings or as directed by the Project Manager. All hydrants, regardless of the depth of cover of the water supply branch, shall be furnished with the basic barrel of four (4) foot of cover over the water supply branch and the balance of the hydrant height, as required, shall be made up of a standard hydrant extension. Stem extensions and drip rod extensions, if necessary, shall be included in the extra length hydrants.

The excavations around each hydrant shall be connected to the main line with anchoring piece or anchoring tee and the hydrant shall be anchored to the valve with anchoring pieces or anchoring pipe.

Measurement and Payment

Section 3. The Contractor shall be paid for the actual number of flush hydrants installed on the project at the unit price quoted on the Proposal Sheets.

The unit price bid for a flush hydrant shall include the cost of furnishing and installing the flush hydrant in accordance with these specifications.

Whenever flush hydrants are a part of a lump sum type item, the price quoted shall include all labor and materials to install the hydrants in accordance with these specifications and no separate payment will be made for hydrants.

END OF SECTION

SECTION 16050 - BASIC ELECTRICAL MATERIALS AND METHODS

PART I - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Raceways.
 - 2. Building wire and connectors.
 - 3. Supporting devices for electrical components.
 - 4. Electrical identification.
 - 5. Concrete equipment bases.
 - 6. Electrical demolition.
 - 7. Cutting and patching for electrical construction.

1.2 SUBMITTALS

- A. Shop Drawings: Equipment specific to this Project.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.4 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings for electrical supports, raceways, and cable with general construction work.
- B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment that requires positioning before closing in the building.
- C. Coordinate electrical service connections to components furnished by utility companies.
 - 1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for service entrances and electricity-metering components.

PART 2 - PRODUCTS

2.1 RACEWAYS

- A. EMT: Electrical metallic tubing; ANSI C80.3, zinc-coated steel, with compression fittings.
- B. FMC: Flexible metal conduit; zinc-coated steel.
- C. IMC: Intermediate metal conduit; ANSI C80.6, zinc-coated steel, with threaded fittings.
- D. LFMC: Liquidtight flexible metal conduit; zinc-coated steel with sunlight-resistant and mineral-oil-resistant plastic jacket.
- E. RMC: Rigid metal conduit; galvanized rigid steel; ANSI C80.1.
- F. RNC: Rigid nonmetallic conduit; NEMA TC 2, Schedule 40 PVC, with NEMA TC3 fittings.
- G. Raceway Fittings: Specifically designed for raceway type with which used.

2.2 WIRES, CABLES, AND CONNECTIONS

- A. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.
- B. Conductors, Larger Than No. 10 AWG: Stranded copper.
- C. Insulation: Thermoplastic, rated 600 V, 75 deg C minimum, Type THW, THHN-THWN, or USE depending on application..
- D. Cable: Type MC with ground wire.
- E. Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

2.3 SUPPORTING DEVICES

- A. Material: Cold-formed steel, with corrosion-resistant coating.
- B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.
- C. Slotted-Steel Channel: Flange edges turned toward web, and 9/16-inch- (14-mm-) diameter slotted holes at a maximum of 2 inches (50 mm) o.c., in webs. Strength rating to suit structural loading.
- D. Nonmetallic Slotted Channel and Angle: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- (14-mm-) diameter holes at a maximum of 8 inches (203 mm) o.c., in at least one surface. Strength rating to suit structural loading.
- E. Slotted Channel Fittings and Accessories: Recommended by the manufacturer for use with the type and size of channel with which used.

1. Materials: Same as channels and angles, except metal items may be stainless steel.
- F. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.
- G. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.
- H. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable-iron casting with hot-dip galvanized finish.
- I. Expansion Anchors: Carbon-steel wedge or sleeve type.
- J. Toggle Bolts: All-steel springhead type.
- K. Powder-Driven Threaded Studs: Heat-treated steel.

2.4 ELECTRICAL IDENTIFICATION

- A. Identification Device Colors: Use those prescribed by ANSI A13.1, NFPA 70, and these Specifications.
- B. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape, not less than 1 inch wide by 3 mils thick (25 mm wide by 0.08 mm thick).
- C. Tape Markers for Conductors: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- D. Color-Coding Cable Ties: Type 6/6 nylon, self-locking type. Colors to suit coding scheme.
- E. Underground Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape compounded for permanent direct-burial service, and with the following features:
 1. Not less than 6 inches wide by 4 mils thick (150 mm wide by 0.102 mm thick).
 2. Embedded continuous metallic strip or core.
 3. Printed legend that indicates type of underground line.
- F. Engraved-Plastic Labels, Signs, and Instruction Plates: Engraving stock, melamine plastic laminate punched or drilled for mechanical fasteners 1/16-inch (1.6-mm) minimum thickness for signs up to 20 sq. in. (129 sq. cm) and 1/8-inch (3.2-mm) minimum thickness for larger sizes. Engraved legend in black letters on white background.
- G. Warning and Caution Signs: Preprinted; comply with 29 CFR 1910.145, Chapter XVII. Colors, legend, and size appropriate to each application.
 1. Interior Units: Aluminum, baked-enamel-finish, punched or drilled for mechanical fasteners.

2. Exterior Units: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate with 0.0396-inch (1-mm), galvanized-steel backing. 1/4-inch (6-mm) grommets in corners for mounting.
- H. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

2.5 EQUIPMENT FOR UTILITY COMPANY'S ELECTRICITY METERING

- A. Comply with requirements of electrical power utility company for current transformer cabinets.

2.6 CONCRETE BASES

- A. Concrete Forms and Reinforcement Materials: As specified in Division 3 Section "Cast-in-Place Concrete."
- B. Concrete: 3000-psi (20.7-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

- A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom.
- B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.
- D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 RACEWAY APPLICATION

- A. Outdoor Installations:
1. Exposed: Aluminum.
 2. Concealed: RMC.
 3. Underground, Single Run: RNC.
 4. Underground, Grouped: RNC.
 5. Connection to Vibrating Equipment: LFMC.
 6. Boxes and Enclosures: NEMA 250, Type 3R or Type 4, unless otherwise indicated.

B. Indoor Installations:

1. Exposed: EMT except in wet or damp locations, use IMC.
2. Concealed in Walls or Ceilings: EMT.
3. In Concrete Slab: RMC.
4. Below Slab on Grade or in Crawlspace: RMC.
5. Connection to Vibrating Equipment: FMC; except in wet or damp locations: LFMC.
6. Boxes and Enclosures: NEMA 250, Type 1, unless otherwise indicated.

3.3 RACEWAY AND CABLE INSTALLATION

- A. Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.
- B. Keep legs of raceway bends in the same plane and keep straight legs of offsets parallel.
- C. Use RMC elbows where RNC turns out of slab.
- D. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or woven polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wires.
- E. Install telephone and signal system raceways, 2-inch trade size (DN 53) and smaller, in maximum lengths of 150 feet (45 m) and with a maximum of two 90-degree bends or equivalent. Add pull boxes where necessary to accomplish this.
- F. Connect motors and equipment subject to vibration, noise transmission, or movement with a maximum of 72-inches (1830-mm) flexible conduit. Install LFMC in wet or damp locations. Install separate ground conductor across flexible connections.
- G. Set floor boxes level and trim after installation to fit flush to finished floor surface.

3.4 WIRING METHODS FOR POWER, LIGHTING, AND CONTROL CIRCUITS

- A. Application: Use wiring methods specified below to the extent permitted by applicable codes as interpreted by authorities having jurisdiction.
- B. Exposed Feeders: Insulated single conductors in raceway.
- C. Concealed Feeders in Ceilings Walls: Insulated single conductors in raceway.
- D. Concealed Feeders: Insulated single conductors in raceway.
- E. Exposed Branch Circuits: Insulated single conductors in raceway.
- F. Concealed Branch Circuits in Ceilings: Insulated single conductors in raceway.
- G. Concealed Branch Circuits: Insulated single conductors in raceway.

- H. Underground Feeders and Branch Circuits: Insulated single conductors in raceway.
- I. Remote-Control Signaling and Power-Limited Circuits, Classes 1, 2, and 3: Insulated conductors in raceway unless otherwise indicated.

3.5 WIRING INSTALLATION

- A. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

3.6 ELECTRICAL SUPPORTING DEVICE APPLICATION

- A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, slotted channel system components.
- B. Dry Locations: Steel materials.
- C. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four with, 200-lb (90-kg) minimum design load for each support element.

3.7 SUPPORT INSTALLATION

- A. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
- B. Size supports for multiple raceway or cable runs so capacity can be increased by a 25 percent minimum in the future.
- C. Support individual horizontal single raceways with separate, malleable-iron pipe hangers or clamps.
- D. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.
- E. Secure electrical items and their supports to building structure, using the following methods unless other fastening methods are indicated:
 - 1. Wood: Wood screws or screw-type nails.
 - 2. Gypsum Board: Toggle bolts. Seal around sleeves with joint compound, both sides of wall.
 - 3. Masonry: Toggle bolts on hollow block and expansion bolts on solid block. Seal around sleeves with mortar, both sides of wall.
 - 4. New Concrete: Concrete inserts with machine screws and bolts.
 - 5. Existing Concrete: Expansion bolts.
 - 6. Structural Steel: Welded threaded studs.
 - a. Comply with AWS D1.1 for field welding.
 - 7. Light Steel Framing: Sheet metal screws.
 - 8. Fasteners for Damp, Wet, or Weather-Exposed Locations: Stainless steel.
 - 9. Light Steel: Sheet-metal screws.

10. Fasteners: Select so load applied to each fastener does not exceed 25 percent of its proof-test load.

3.8 IDENTIFICATION MATERIALS AND DEVICES

- A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.
- C. Self-Adhesive Identification Products: Clean surfaces before applying.
- D. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.
- E. Install continuous underground plastic markers during trench backfilling, for exterior underground power, control, signal, and communication lines located directly above power and communication lines. Locate 6 to 8 inches (150 to 200 mm) below finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches (400 mm), overall, use a single line marker.
- F. Install warning, caution, and instruction signs where required to comply with 29 CFR 1910.145, Chapter XVII, and where needed to ensure safe operation and maintenance of electrical systems and of items to which they connect. Indoors install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
- G. Install engraved-laminated emergency-operating signs with white letters on red background with minimum 3/8-inch- (9-mm-) high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

3.9 ELECTRICITY-METERING EQUIPMENT

- A. Install utility company metering equipment according to utility company's written requirements. Provide grounding and empty conduits as required by utility company.

3.10 FIRESTOPPING

- A. Apply firestopping to cable and raceway sleeves and other penetrations of fire-rated floor and wall assemblies to restore original undisturbed fire-resistance ratings of assemblies. Firestopping installation is specified in Division 7 Section "Through-Penetration Firestop Systems."

3.11 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger, in both directions, than supported unit. Follow supported equipment manufacturer's anchorage recommendations and setting templates for anchor-bolt and tie locations, unless otherwise indicated.

3.12 DEMOLITION

- A. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.
- B. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.
- C. Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches (50 mm) below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.
- D. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

3.13 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair, refinish and touch up disturbed finish materials and other surfaces to match adjacent undisturbed surfaces.

END OF SECTION 16050

SECTION 16120 - CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.2 SUBMITTALS

- A. Shop drawings.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 CONDUCTORS AND CABLES

- A. Manufacturers:
 - 1. Alcan Aluminum Corporation; Alcan Cable Div.
 - 2. American Insulated Wire Corp.; a Leviton Company.
 - 3. General Cable Corporation.
 - 4. Senator Wire & Cable Company.
 - 5. Southwire Company.
- B. Refer to Part 3 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.
- C. Conductor Material: Copper complying with NEMA WC 5; solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

- D. Conductor Insulation Types: Type THHN-THWN and SO complying with NEMA WC 5.
- E. Multiconductor Cable: Nonmetallic-sheathed cable, Type NM and Type SO with ground wire.

2.3 CONNECTORS AND SPLICES

- A. Manufacturers:
 - 1. AFC Cable Systems, Inc.
 - 2. AMP Incorporated/Tyco International.
 - 3. Hubbell/Anderson.
 - 4. O-Z/Gedney; EGS Electrical Group LLC.
 - 5. 3M Company; Electrical Products Division.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR AND INSULATION APPLICATIONS

- A. Service Entrance: Type THHN-THWN, single conductors in raceway.
- B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspace: Type THHN-THWN, single conductors in raceway.
- E. Exposed Branch Circuits, including in Crawlspace: Type THHN-THWN, single conductors in raceway.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- G. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.
- H. Underground Feeders and Branch Circuits: Type UF multiconductor cable.
- I. Cord Drops and Portable Appliance Connections: Type SO, hard service cord.
- J. Fire Alarm Circuits: Type THHN-THWN, in raceway.
- K. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- L. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.2 INSTALLATION

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 16 Section "Basic Electrical Materials and Methods."
- F. Seal around cables penetrating fire-rated elements according to Division 7 Section "Through-Penetration Firestop Systems."
- G. Identify and color-code conductors and cables according to Division 16 Section "Basic Electrical Materials and Methods."
- H. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
- I. Wiring at Outlets: Install conductor at each outlet, with at least [6 inches (150 mm)] [12 inches (300 mm)] of slack.

3.3 FIELD QUALITY CONTROL

- A. Testing: Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.
- B. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION 16120

SECTION 16130 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. See Division 16 Section "Basic Electrical Materials and Methods" for supports, anchors, and identification products.

1.2 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets indicated.
- B. Shop Drawings: Show fabrication and installation details of components for raceways, fittings, boxes, enclosures, and cabinets.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 METAL CONDUIT AND TUBING

- A. Manufacturers:
 - 1. AFC Cable Systems, Inc.
 - 2. Alflex Inc.
 - 3. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 4. Electri-Flex Co.

5. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
 6. LTV Steel Tubular Products Company.
 7. Manhattan/CDT/Cole-Flex.
 8. O-Z Gedney; Unit of General Signal.
 9. Wheatland Tube Co.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. Aluminum Rigid Conduit: ANSI C80.5.
- D. IMC: ANSI C80.6.
- E. EMT and Fittings: ANSI C80.3.
1. Fittings: Compression type.
- F. FMC: Aluminum.
- G. LFMC: Flexible steel conduit with PVC jacket.
- H. Fittings: NEMA FB 1; compatible with conduit and tubing materials.

2.3 NONMETALLIC CONDUIT AND TUBING

- A. Manufacturers:
1. American International.
 2. Anamet Electrical, Inc.; Anaconda Metal Hose.
 3. Arnco Corp.
 4. Cantex Inc.
 5. Certainteed Corp.; Pipe & Plastics Group.
 6. Condux International.
 7. ElecSYS, Inc.
 8. Electri-Flex Co.
 9. Lamson & Sessions; Carlon Electrical Products.
 10. Manhattan/CDT/Cole-Flex.
 11. RACO; Division of Hubbell, Inc.
 12. Spiralduct, Inc./AFC Cable Systems, Inc.
 13. Thomas & Betts Corporation.
- B. ENT: NEMA TC 13.
- C. RNC: NEMA TC 2, Schedule 40 and Schedule 80 PVC.
- D. ENT and RNC Fittings: NEMA TC 3; match to conduit or tubing type and material.
- E. LFNC: UL 1660.

SECTION 16472
LOAD CENTERS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Load centers
- B. Related Sections
 - 1. Panelboards

1.02 SUBMITTALS

- A. Shop Drawings
 - 1. Physical size
 - 2. Type mounting
 - 3. Circuit breaker type

1.03 QUALITY ASSURANCE

- A. Materials shall conform to NEMA Standards.
- B. Materials shall bear UL labels and be UL approved for application to which they are used.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. As manufactured by General Electric, Plaineville, CT.
- B. Other acceptable manufacturers, provided their products can meet these specifications, include: Westinghouse, Beaver, PA; Square "D", Chicago, IL; or ITE, Cleveland, OH.

2.02 MATERIALS

- A. Load centers shall have NEMA 1 general purpose enclosures and shall be flush mounted.
- B. Load centers shall be 208Y/120 volt, 3 phase, 4 wire, 12 circuit, 100 amp main lug only plug-on type construction.
- C. Current carrying parts of bus assembly shall be plated.
- D. Terminals for feeder conductors to mains and branch neutral shall be UL listed as suitable for type conductor specified.

- E. Load center bus assembly shall be enclosed in steel cabinet.
- F. Size of wiring gutters and gauge steel shall be in accordance with UL Standards No. 67 and No. 50.
- G. Panels shall be top fed.
- H. Fronts shall include door and flush tumbler type lock with panels keyed alike and be provided with directory for circuit identification.
- I. Directory shall be mounted in metal frame.
- J. Load center boxes and fronts shall have corrosion resisting phosphate treatment and gray baked enamel finish.
- K. Provide separate neutral and ground bus.
- L. Bus structure shall have short circuit rating of 22,000 amps RMS symmetrical.
- M. Branch circuit breakers up to 70 amperes shall be plug on type, toggle action with quick-make, quick-break mechanism.
- N. Trip indication shall be clearly shown by breaker handle taking position between "ON" and "OFF" when breaker is tripped and by visible indication.
- O. Visible indication consists of highly visible red tripped circuit indicator.
- P. Indicator is to be protected by a window which seals breaker case.
- Q. Visible indicator shall not be visible when breaker is "ON" or "OFF".
- R. Multi-pole breakers shall be single operating handle, common trip variety.
- S. Circuit breakers with ground fault interrupters shall be used in accordance with National Electric Code.
- T. Circuit breakers as specified under Section 16476.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Provide six 20 amp, single pole circuit breakers in each load center.
- B. Contractor shall turn over load centers to Owner to be stored on site for future use.

END OF SECTION

SECTION 16443 - MOTOR-CONTROL CENTERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes motor-control centers for use on ac circuits rated 600 V and less.

1.2 SUBMITTALS

- A. Product Data: For each type of controller and each type of motor-control center indicated.
- B. Shop Drawings: For each motor-control center.
 - 1. Dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:
 - a. Each installed unit's type and details.
 - b. Nameplate legends.
 - c. Short-circuit current ratings of buses and installed units.
 - d. Vertical and horizontal bus capacities.
 - e. UL listing for series rating of overcurrent protective devices in combination controllers.
 - f. Features, characteristics, ratings, and factory settings of each motor-control center unit.
 - 2. Wiring Diagrams: Power, signal, and control wiring.
- C. Field quality-control test reports.
- D. Operation and maintenance data.
- E. Load-Current and Overload-Relay Heater List: Compile after motors have been installed and arrange to demonstrate that selection of heaters suits actual motor nameplate full-load currents.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain controllers of a single type through one source from a single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

- D. Product Selection for Restricted Space: Drawings indicate maximum dimensions for motor-control centers, including clearances between motor-control centers, and for adjacent surfaces and other items. Comply with indicated maximum dimensions.

1.4 COORDINATION

- A. Coordinate features of motor-control centers, installed units, and accessory devices with pilot devices and control circuits to which they connect.
- B. Coordinate features, accessories, and functions of each motor-control center, each controller, and each installed unit with ratings and characteristics of supply circuit, motor, required control sequence, and duty cycle of motor and load.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Corp.; Cutler-Hammer Products.
 - 2. General Electrical Distribution & Control.
 - 3. Square D Co.

2.2 MOTOR-CONTROL CENTERS

- A. Wiring: NEMA ICS 3, Class I, Type B.
- B. Enclosures: Flush- or surface-mounted cabinets as indicated. NEMA 250, Type 1, unless otherwise indicated to comply with environmental conditions at installed location.
 - 1. Outdoor Locations: NEMA 250, Type 3R.
 - 2. Compartments: Modular; individual doors with concealed hinges and quick-captive screw fasteners. Interlocks on combination controller units requiring disconnecting means in off position before door can be opened or closed, except by operating a permissive release device.
 - 3. Interchangeability: Compartments constructed to allow for removal of units without opening adjacent doors, disconnecting adjacent compartments, or disturbing operation of other units in motor-control center. Interchangeability of units requiring the same size compartment and constructed to permit ready rearrangement of units, such as replacing three single units with a unit requiring three spaces, without cutting or welding.
 - 4. Wiring Spaces: Wiring channel in each vertical section for vertical and horizontal wiring to each unit compartment; supports to hold wiring in place.
- C. Short-Circuit Current Rating for Each Section: Equal to or greater than indicated available fault current in symmetrical amperes at motor-control center location.

2.3 BUSES

- A. Material: Plated copper.
- B. Ampacity Ratings: As indicated for horizontal and vertical main buses.
- C. Neutral Buses: Full size.
- D. Equipment Ground Bus: Noninsulated, horizontal copper bus 2 by 1/4 inch (50 by 6 mm), minimum.
- E. Horizontal Bus Arrangement: Main phase, neutral and ground buses extended with same capacity the entire length of motor-control center, with provision for future extension at both ends by bolt holes and captive bus splice sections or equivalent.
- F. Short-Circuit Withstand Rating: Same as short-circuit current rating of section.

2.4 FUNCTIONAL FEATURES

- A. Description: Modular arrangement of controllers, control devices, overcurrent protective devices, transformers, panelboards, instruments, indicating panels, blank panels, and other items mounted in compartments of motor-control center.
- B. Controller Units: Combination controller units of types and with features, ratings, and circuit assignments indicated.
 - 1. Install units with full-voltage, across-the-line, magnetic controllers up to and including Size 3 on drawout mountings with connectors that automatically line up and connect with vertical-section buses while being racked into their normal, energized positions.
 - 2. Provide units with short-circuit current ratings equal to or greater than short-circuit current rating of motor-control center section.
 - 3. Equip units in Type B and Type C motor-control centers with pull-apart terminal strips or drawout terminal boards for external control connections.
- C. Overcurrent Protective Devices: Individual feeder-tap units through 225-A rating shall have drawout mountings with connectors that automatically line up and connect with vertical-section buses while being racked into their normal, energized positions.
- D. Spaces and Blank Units: Compartments fully bused and equipped with guide rails or equivalent, ready for insertion of drawout units.
- E. Spare Units: Type, sizes, and ratings indicated; installed in compartments indicated "spare."

2.5 MAGNETIC MOTOR CONTROLLERS

- A. Description: NEMA ICS 2, Class A, full voltage, nonreversing, across the line, unless otherwise indicated.

- B. Control Circuit: 120 V; obtained from integral control power transformer with a control power transformer of sufficient capacity to operate connected pilot, indicating and control devices, plus 100 percent spare capacity.
- C. Combination Controller: Factory-assembled combination controller and disconnect switch.
 - 1. Circuit-Breaker Disconnecting Means: NEMA AB 1, motor-circuit protector with field-adjustable, short-circuit trip coordinated with motor locked-rotor amperes.
- D. Overload Relay: Ambient-compensated type with inverse-time-current characteristic and NEMA ICS 2, Class 10 tripping characteristic. Provide with heaters or sensors in each phase matched to nameplate full-load current of specific motor to which they connect and with appropriate adjustment for duty cycle.

2.6 FEEDER OVERCURRENT PROTECTION

- A. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - 1. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
- B. Molded-Case, Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.
 - 1. Lugs: Mechanical style, suitable for number, size, trip ratings, and material of conductors.

2.7 MOTOR-CONTROL CENTER ACCESSORIES

- A. Devices shall be factory installed in controller enclosure, unless otherwise indicated. Refer to plans for required accessories.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Select features of each controller to coordinate with ratings and characteristics of supply circuit and motor; required control sequence; duty cycle of motor, drive, and load; and configuration of pilot device and control circuit affecting controller functions.
- B. Select horsepower rating of controllers to suit motor controlled.

3.2 INSTALLATION

- A. See Division 16 Section "Basic Electrical Materials and Methods" for general installation instructions.
- B. Anchor each motor-control center assembly to steel-channel sills arranged and sized according to manufacturer's written instructions. Attach by bolting. Level and grout sills flush with motor-control center mounting surface.
- C. Install motor-control centers on concrete bases complying with Division 3 Section "Cast-in-Place Concrete."
- D. Comply with mounting and anchoring requirements specified in Division 16 Section "Seismic Controls for Electrical Work."

3.3 IDENTIFICATION

- A. Identify motor-control center, motor-control center components, and control wiring according to Division 16 Section "Basic Electrical Materials and Methods."
- B. Operating Instructions: Frame printed operating instructions for motor-control centers, including control sequences and emergency procedures. Fabricate frame of finished metal and cover instructions with clear acrylic plastic. Mount on front of motor-control centers.

3.4 CONTROL WIRING INSTALLATION

- A. Install wiring between motor-control devices according to Division 16 Section "Conductors and Cables."
- B. Bundle, train, and support wiring in enclosures.
- C. Connect hand-off-automatic switch and other automatic-control devices where available.
 - 1. Connect selector switches to bypass only manual- and automatic-control devices that have no safety functions when switch is in hand position.
 - 2. Connect selector switches with motor-control circuit in both hand and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

3.5 FIELD QUALITY CONTROL

- A. Testing: Perform the following field quality-control testing:
 - 1. Perform each electrical test and visual and mechanical inspection indicated in NETA ATS, Sections 7.5, 7.6, and 7.16.
 - 2. Certify compliance with test parameters.
 - 3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- B. Report test results in writing.

SECTION 6
BID DOCUMENTS

INDEX

SECTION 6 - BID & BID BOND FORMS

CANNONSBURG 2015 WATER SYSTEM IMPROVEMENTS PROJECT

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| BID FORM (CONTRACT 3- METER REPLACEMENT)..... | 6-1 THRU 6-6 |
| BID BOND | BB-1 THRU BB-2 |
| EXPERIENCE STATEMENT | ES-1 THRU ES-4 |
| USDA RD FORMS | |
| <u>NOTICE TO CONTRACTORS</u> | |

Forms presented in this Section 6 must be used. No substitutes will be allowed.

All forms should be included with Bid Package submittal.

CANNONSBURG WATER DISTRICT

**CONTRACT 1- BID PROPOSAL
EXISTING WATERLINE, STREAM CROSSINGS REPLACEMENT,
IMPROVEMENTS TO EXISTING MIDLAND TRAIL, TARPIN RIDGE PUMP STATIONS
NEW PUMP STATIONS AT DOG FORK AND MEADEWOOD HEIGHTS ROADS
RD FUNDED WATER STSTEM IMPROVEMENTS**

Bid of _____ (hereinafter
called "BIDDER"), organized and existing under the laws of the State of
_____ doing business as _____ *.
(a corporation, partnership, etc.)

To the Cannonsburg Water District (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes
to perform all WORK for the construction of Water Distribution Improvements
in strict accordance with the CONTRACT DOCUMENTS, within the time set forth
therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of
a joint BID each party thereto certifies as to its own organization, that
this BID has been arrived at independently, without consultation, communication,
or agreement as to any matter relating to this BID with any other BIDDER
or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before
a date to be specified in the NOTICE TO PROCEED and to fully complete the
PROJECT within 180 consecutive calendar days thereafter.

BIDDER further agrees to pay as liquidated damages, the sum of \$50.00
for each consecutive calendar day thereafter if contract is uncompleted.

*Insert "a corporation", "a partnership", or "an individual" as applicable.

BASE BID SCHEDULE
CANNONSBURG WATER DISTRICT

BIDDER acknowledges receipt of the following ADDENDUM:

No. _____ Dated _____

No. _____ Dated _____

No. _____ Dated _____

BIDDER agrees to perform all the work described in the CONTRACT

DOCUMENTS for the following unit prices or lump sum.

NOTES: 1) The State Prevailing Wage Rates apply to this project. See Supplemental Conditions. Bid to include KY State Sales Tax on materials. 2) All unit prices must be "balanced", with mobilization, overhead, profit included. The Owner reserves the right to delete lower priority unit bid items if necessary to award a contract within funds available.

| Item No. | Description w/Unit Price in Words | Estimated Quantities (Units) | Unit Price | Total Amount of Bid |
|----------|-----------------------------------|------------------------------|------------|---------------------|
|----------|-----------------------------------|------------------------------|------------|---------------------|

- 8" W.L. C-900 Class 200/DR 14 PVC, with MJ couplings, fittings required by Plan Sheet 5- McGuire Drive, including furnishing and installation, trenching, bedding, laying, backfilling, testing, clean-up, and sterilization for:

 _____ Dollars
 _____ Cents
 Per Linear Foot

2,200 L.F. \$ _____ \$ _____

- Tie-in at Sta. 0+00-Expose exist. 6" WL. Plan Sheet 5, connect new 8" to existing 6" WL outside existing Pump station outlet, including, trenching, laying, backfilling, testing, clean-up, and sterilization for:

 _____ Dollars
 _____ Cents
 Per Each

1 Ea. \$ _____ \$ _____

**BASE BID SCHEDULE
CANNONBURG WATER DISTRICT**

| Item | Description w/Unit Price in Words | Estimated Quantities (Units) | Unit Price | Total Amount of Bid |
|------|-----------------------------------|------------------------------|------------|---------------------|
|------|-----------------------------------|------------------------------|------------|---------------------|

3. Tie-in at Sta. 20+57, Plan Sheet 5-Expose exist. 6" WL. Hot tap connection w/sleeve, 6" gate valve. ConnectnNew 8" to existing 6" WL. Provide 8" x 6" MJ reducer, including, trenching, laying, backfilling, testing, clean-up, and sterilization for:

_____ Dollars
 _____ Cents

Per Each

1 Ea. \$ _____ \$ _____

4. 6-inch MJ Cap installation, Plan Sheet 5 for abandoning old 6-inch PVC WL, including, trenching, blocking, backfilling, testing, clean-up, and sterilization for:

_____ Dollars
 _____ Cents

Per Each

2 Each \$ _____ \$ _____

5. Reconnect existing customerservices to new 8" WL on Plan Sheet 5, including 8" x 3/4" double strap saddle, 3/4" pack joint corp. stop, 3/4" x 3/4" bronze pack joint coupling for:

_____ Dollars
 _____ Cents

Per Each

6 Each \$ _____ \$ _____

6. 3/4" Service Line, Class 200 Poly. (for Ex. customer re-connects on Plan Sheet 5) including, trenching, bedding, laying, backfilling, testing, clean-up, and sterilization for:

_____ Dollars
 _____ Cents

Per L.F.

125 L.F. \$ _____ \$ _____

BASE BID SCHEDULE

CANNONSBURG WATER DISTRICT

| Item No. | Description w/Unit Price in Words | Estimated Quantities (Units) | Unit Price | Total Amount of Bid |
|----------|---|------------------------------|------------|---------------------|
| 7. | Gravel Surface replacement for stone drive crossings on Plan Sheet 5, including full depth stone trench backfill for: _____ Dollars _____ Cents Per Square Yard | 125 S.Y. | \$ _____ | \$ _____ |
| 8. | 10" W.L. HDPE DR 9 (stream crossing KY 5- Plan Sheet 6) installed by Directional Bore including drilling, reaming pipe pulling, testing, clean-up, and sterilization for: _____ Dollars _____ Cents Per Linear Foot | 225 L.F. | \$ _____ | \$ _____ |
| 9. | Tie-ins #1 and 2(stream crossing KY 5- Plan Sheet 6). Connect new 10" to exist. 8" W/L on each side of stream. Provide all fittings, valves w/boxes as shown for: _____ Dollars _____ Cents Per Lump Sum | 1 L.S. | \$ _____ | \$ _____ |
| 10. | 4" W.L. HDPE DR 9 (stream crossing South-Big/Ellington Run Sheet 6) installed by Directional Bore, including drilling, reaming pipe pulling, testing, clean-up, and sterilization for: _____ Dollars _____ Cents Per Linear Foot | 200 L.F. | \$ _____ | \$ _____ |

CANNONSBURG WATER DISTRICT

| Item No. | Description w/Unit Price in Words | Estimated Quantities (Units) | Unit Price | Total Amount of Bid |
|----------|-----------------------------------|------------------------------|------------|---------------------|
|----------|-----------------------------------|------------------------------|------------|---------------------|

11. Tie-ins #1A and 2A (stream crossing South-Big/Ellington Run- Plan Sheet 6). Connect new 4" to exist. 3" W/L on each side of stream Provide all fittings, valves w/boxes as show for:

_____ Dollars
 _____ Cents
 Per Lump Sum

1 L.S. \$ _____ \$ _____

12. New Hydro-pneumatic Pump Station-Dog Fork Road, including site work, new precast pump house building, concrete block footer, walls, piping, fittings, valves, pressure gauges, pumps, electrical service, VFD controllers, wiring, conduit, lighting, disconnect, panelboard exhaust fan, vents, damper heater, SCADA RTU, pressure tank complete for:

_____ Dollars
 _____ Cents
 Per Lump Sum

1 L.S. \$ _____ \$ _____

13. New Hydro-pneumatic Pump Station-Meadewood Heights Road, including site work, new precast pump house building, piping, fittings, valves, pressure gauges, pumps, electrical service, VFD controllers, wiring, conduit, lighting, disconnect, panelboard, exhaust fan, vents, damper heater, SCADA RTU, pressure tank complete for:

_____ Dollars
 _____ Cents
 Per Lump Sum

1 L.S. \$ _____ \$ _____

BASE BID SCHEDULE

CANNONSBURG WATER DISTRICT

| No. | Description w/Unit Price in Words | Estimated Quantities (Units) | Unit Price | Total Amount of Bid |
|-----|-----------------------------------|------------------------------|------------|---------------------|
|-----|-----------------------------------|------------------------------|------------|---------------------|

- 14. Improvements at existing Tarpin Ridge Pump Station, new pumps/motors, electric work including VFD controllers, pumps/VFD's wiring/conduit, replace existing pump motors circuit breakers complete for:

_____ Dollars
 _____ Cents

Per Lump Sum 1 L.S. \$ _____ \$ _____

Note: Electrical service upgrade at this Station by KY Power Co. Owner to pay all costs assoc. w/upgrade.

- 15. Improvements at existing Midland Trail Pump Station, electrical work including removal of old, install new Motor Control Center panel, Motor Switch Panel, re-connect existing wiring, re-locate existing hypo-chlorinator receptacle complete for:

_____ Dollars
 _____ Cents

Per Lump Sum 1 L.S. \$ _____ \$ _____

TOTAL BASE BID IN NUMBERS (ITEMS 1 – 15) \$ _____

TOTAL BASE BID IN WORDS (ITEMS 1 - 15)

The above unit prices shall include all labor, bailing, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for. Bidder understands that the Owner reserves the right to reject any or all bids.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of 90 calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, bidder will execute the formal contract attached within 10 days and deliver a Surety Bond or bonds as required by the General Conditions. The bid security attached, in the sum of _____ is to become the property of the Owner in the event the contract and bond are not executed within the time above set forth as liquidated damages for the delay and additional expense to the Owner caused thereby.

Respectfully submitted:

(Seal - if bid is by a Corporation).

Name of Bidder

Address

Signed by:

Type Written Name

Title

Date

Telephone Number

CONTRACT 2- PRINCESS AND TARPIN RIDGE TANK IMPROVEMENTS
CANNONSBURG WATER DISTRICT
RD FUNDED EXISTING WATER SYSTEM IMPROVEMENTS

Bid of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of _____ doing business as _____ *.
(a corporation, partnership, etc.)

To the Cannonsburg Water District (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of Water Distribution Improvements in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within 150 consecutive calendar days thereafter.

BIDDER further agrees to pay as liquidated damages, the sum of \$ 250.00 for each consecutive calendar day thereafter.

*Insert "a corporation", "a partnership", or "an individual" as applicable.

CONTRACT 2- BASE BID SCHEDULE
CANNONSBURG WATER DISTRICT

BIDDER acknowledges receipt of the following ADDENDUM:

No. _____ Dated _____

No. _____ Dated _____

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices or lump sum.

NOTES: 1) The State Prevailing Wage Rates apply to this project. See Supplemental Conditions. Bid to include KY State Sales Tax on materials. 2) All unit prices must be "balanced", with mobilization, overhead, profit included. The Owner reserves the right to delete lower priority unit bid items if necessary to award a contract within funds available. Low bidder may thus be determined from either low Base Bid for all Items 1-4; or by deleting lower priority unit items.

| No. | Description w/Unit Price in Words | (Units) | Unit Price | Estimated Quantities | Total Amount of Bid |
|-----|-----------------------------------|---------|------------|----------------------|---------------------|
|-----|-----------------------------------|---------|------------|----------------------|---------------------|

- Sandblast, clean, paint existing 350,000 Gallon Princess Hill tank interior, exterior, accessories complete. Install new level indicator w/float/cable, paint or decal level numbers on tank, rehab. existing roof vent, sterilization, and restore tank back into service for:

 _____ Dollars
 _____ Cents
 Per Lump Sum

1 L.S. \$ _____ \$ _____

- Sandblast, clean, paint existing 50,000 Gallon Tarpin Ridge tank interior, exterior, accessories complete. Install new level indicator w/float/cable, paint or decal level numbers on tank, rehab. existing roof vent, sterilization, and restore tank back into service for:

 _____ Dollars
 _____ Cents
 Per Lump Sum

1 L.S. \$ _____ \$ _____

(SEE NEXT PAGE FOR CONTINUATION)

**CONTRACT 2- BASE BID SCHEDULE
CANNONBURG WATER DISTRICT**

Bid Page 3 of 4

| Item No. | Description w/Unit Price in Words | Estimated Quantities (Units) | Unit Price | Total Amount of Bid |
|----------|-----------------------------------|------------------------------|------------|---------------------|
|----------|-----------------------------------|------------------------------|------------|---------------------|

3. Existing Tarpin Ridge tank electrical improvements, including electric service rack, new service pole, re-install existing electric meter, SCADATA RTU, ground, new electric panel board for:

_____ Dollars
_____ Cents

Per Lump Sum 1 L.S. \$ _____ \$ _____

4. Furnish and install new submersible mixers in existing Tarpin Ridge and Princess Hill tanks, complete including mixer, power cable, retrieval chain, junction box on tank roof, mixer control panel mounted inside oversized enclosure, underground wiring/conduit to power supply existing for:

_____ Dollars
_____ Cents

Per Each 2 Each \$ _____ \$ _____

TOTAL BASE BID IN NUMBERS (ITEMS 1 - 4) \$ _____

TOTAL BASE BID IN WORDS (ITEMS 1 - 4)

The above unit prices shall include all materials, labor, bailing, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for. Bidder understands that the Owner reserves the right to reject any or all bids.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of 90 calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, bidder will execute the formal contract attached within 10 days and deliver a Surety Bond or bonds as required by the General Conditions. The bid security attached, in the sum of _____ is to become the property of the Owner in the event the contract and bond are not executed within the time above set forth as liquidated damages for the delay and additional expense to the Owner caused thereby.

Respectfully submitted:

(Seal - if bid is by a Corporation).

Name of Bidder

Address

Signed by:

Type Written Name

Title

Date

Telephone Number

**CONTRACT 3- RESIDENTIAL WATER METERS REPLACEMENT
CANNONSBURG WATER DISTRICT
RD FUNDED EXISTING WATER SYSTEM IMPROVEMENTS**

Bid of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of _____ doing business as _____ *.
(a corporation, partnership, etc.)

To the Cannonsburg Water District (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of Water Distribution Improvements in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within 180 consecutive calendar days thereafter.

BIDDER further agrees to pay as liquidated damages, the sum of \$250.00 for each consecutive calendar day thereafter.

*Insert "a corporation", "a partnership", or "an individual" as applicable.

CONTRACT 3- BASE BID SCHEDULE
CANNONBURG WATER DISTRICT

BIDDER acknowledges receipt of the following ADDENDUM:

No. _____ Dated _____

No. _____ Dated _____

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices or lump sum.

NOTES: 1) The State Prevailing Wage Rates apply to this project. See Supplemental Conditions. Bid to include KY State Sales Tax on materials. 2) All unit prices must be "balanced", with mobilization, overhead, profit included. The Owner reserves the right to delete lower priority unit bid items if necessary to award a contract within funds available. Low bidder may be determined from either low Base Bid or Low Alternate Bid .

| Item No. | Description w/Unit Price in Words | Estimated Quantities (Units) | Unit Price | Total Amount of Bid |
|----------|-----------------------------------|------------------------------|------------|---------------------|
|----------|-----------------------------------|------------------------------|------------|---------------------|

BASE BID- REPLACE OLD TOUCH READ WITH AUTOMATIC RADIO READ METERS

1. Remove old Touch Read meter (return to Owner) from existing copper-setter. Furnish and install new 5/8" x 3/4" electromagnetic water meter with 6' long cable/transceiver/radio battery, new meter gaskets, return customer back to service for:

 _____ Dollars
 _____ Cents
 Per Each

2,726 Each \$ _____ \$ _____

2. Remove old Touch Read meter (return to Owner) from existing copper-setter. Furnish and install new 1" electromagnetic water meter with 6' long cable/transceiver, radio/battery, new meter gaskets, return customer back to service for:

 _____ Dollars
 _____ Cents
 Per Each

74 Each \$ _____ \$ _____

(SEE NEXT PAGE FOR CONTINUATION)

CONTRACT 3- BASE BID SCHEDULE
CANNONSBURG WATER DISTRICT

| Item No. | Description w/Unit Price in Words | Estimated Quantities (Units) | Unit Price | Total Amount of Bid |
|----------|-----------------------------------|------------------------------|------------|---------------------|
|----------|-----------------------------------|------------------------------|------------|---------------------|

3. Furnish new Vehicle Base Station Transceiver Unit, 2-way communication with operating software, computer for complete for:

_____ Dollars
 _____ Cents

Per Lump Sum 1 L.S. \$ _____ \$ _____

4. Furnish and install Radio Read software Upgrade; or new software in different vendor from existing system complete for:

_____ Dollars
 _____ Cents

Per Lump Sum 1 L.S. \$ _____ \$ _____

5. Furnish (2) new meter read Handheld Units, upgrade of existing handhelds; or furnish (4) new Handheld Units if different vendor from existing system complete for:

_____ Dollars
 _____ Cents

Per Lump Sum 1 L.S. \$ _____ \$ _____

TOTAL BASE BID IN NUMBERS (ITEMS 1 - 5): \$ _____

TOTAL BASEE BID IN WORDS (ITEMS 1 - 5):

(SEE NEXT PAGE FOR CONTINUATION)

**CONTRACT 3- ALTERNATE BID SCHEDULE
CANNONBURG WATER DISTRICT**

| Item No. | Description w/Unit Price in Words | Estimated Quantities (Units) | Unit Price | Total Amount of Bid |
|----------|-----------------------------------|------------------------------|------------|---------------------|
|----------|-----------------------------------|------------------------------|------------|---------------------|

ALTERNATE BID- ADVANCED METER READ (AMR) TOWER/FIXED BASED SYSTEM

1. Remove old meter(return to Owner) from existing copper-setter. Furnish and install new 5/8" x 3/4" electromagnetic water meter with 6' long cable/transceiver/radio/battery,new meter gaskets, return customer back to service for:

_____ Dollars
 _____ Cents
 Per Each

2,726 Each \$ _____ \$ _____

2. Remove old meter(return to Owner) from existing copper-setter. Furnish and install new 1" electromagnetic water meter with 6' long cable transceiver/radio/battery,new meter gaskets, return customer back to service for:

_____ Dollars
 _____ Cents
 Per Each

74 Each \$ _____ \$ _____

3. Furnish and install new AMR Base Station panel/equipment at existing Tarpin Ridge water storage tank site. Mount inside oversized enclosure on electric rack **provided under separate Contract 2**. Include antenna w/mast, coaxial cable from antenna down tank, then underground in conduit from tank to panel (1-1/2"), and conduit for power supply to panel (3/4") complete for:

_____ Dollars
 _____ Cents
 Per Each

1 Each \$ _____ \$ _____

(SEE NEXT PAGE FOR CONTINUATION)

CONTRACT 3- ALTERNATE BID SCHEDULE
CANNONSBURG WATER DISTRICT

| Item No. | Description w/Unit Price in Words | Estimated Quantities (Units) | Unit Price | Total Amount of Bid |
|----------|-----------------------------------|------------------------------|------------|---------------------|
|----------|-----------------------------------|------------------------------|------------|---------------------|

8. Re-install old 5/8" x 3/4" or 1" Touch Read meters (supplied by Owner) with new meter gaskets in existing copper-setter at locations designated by Owner and restore customer back into service:

| | | | |
|----------|---------|----------|-------------------|
| _____ | Dollars | | |
| _____ | Cents | | |
| Per Each | | 900 Each | \$ _____ \$ _____ |

TOTAL ALTERNATE BID IN NUMBERS (ITEMS 1 - 8): \$ _____

TOTAL ALTERNATE BID IN WORDS (ITEMS 1 - 8):

The above unit prices shall include all materials, labor, bailing, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for. Bidder understands that the Owner reserves the right to reject any or all bids.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of 90 calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, bidder will execute the formal contract attached within 10 days and deliver a Surety Bond or bonds as required by the General Conditions. The bid security attached, in the sum of _____ is to become the property of the Owner in the event the contract and bond are not executed within the time above set forth as liquidated damages for the delay and additional expense to the Owner caused thereby.

Respectfully submitted:

(Seal - if bid is by a Corporation).

Name of Bidder _____

Address _____

Signed by: _____

Type Written Name

Title

Date

Telephone Number

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):*

BID

Bid Due Date:

Description *(Project Name and Include Location):*

BOND

Bond Number:

Date *(Not earlier than Bid due date):*

Penal sum _____ \$ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER

SURETY

Bidder's Name and Corporate Seal (Seal) Surety's Name and Corporate Seal (Seal)

By: _____
Signature

By: _____
Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

PENAL SUM FORM

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint venturers, if necessary.

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 Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.
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 of 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.

4. Have you ever failed to complete work awarded to you?

If so, state where and why.

5. Have you or your authorized representative personally inspected the location of the proposed work and do you have a clear understanding of the requirements of the Plans, Specifications, and other Contract Documents?

6. Do you plan to sublet any part of this work? If so, give details.

7. What equipment do you own that is available for this work?

8. What equipment do you plan to rent or purchase for this work?

CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

_____ (name) _____ (date)

_____ (title)

oOo

COMPLIANCE STATEMENT

This statement relates to a proposed contract with _____

(Name of borrower or grantee)

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor, I represent that:

1. I have, have not, participated in a previous contract or subcontract subject to Executive 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.
2. If I have participated in such a contract or subcontract, I have, have not, filed all compliance reports that have been required to file in connection with the contract or subcontract.

If the proposed contract is for \$50,000 or more and I have 50 or more employees, I also represent that:

3. I have, have not previously had contracts subject to the written affirmative action programs requirements of the Secretary of Labor.
4. If I have participated in such a contract or subcontract, I have, have not developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and wash rooms, restaurants and other eating areas time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods): (See Reverse).

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays the valid OMB control number. The valid OMB control number for this information collection is 0575-0018. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

U.S. DEPARTMENT OF AGRICULTURE

**CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY
AND VOLUNTARY EXCLUSION - LOWER TIER COVERED TRANSACTIONS**

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR Part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, Federal Register (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated.

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)

- (1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
- (2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Organization Name

PR/Award Number or Project Name

Name(s) and Title(s) of Authorized Representative(s)

Signature(s)

Date

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR
CERTIFICATIONS OF NON-SEGREGATED FACILITIES**

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding \$ 10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Date _____

(Signature of Bidder or Prospective Contractor)

Address (including Zip Code)