



## CONTRACT DOCUMENTS & TECHNICAL SPECIFICATIONS

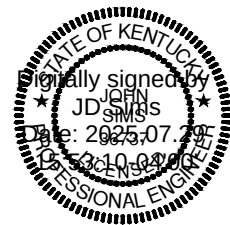
### OLD SALEM RD. / McWHORTER RD. SYSTEM IMPROVEMENTS CONTRACT 2

EAST LAUREL WATER DISTRICT  
LAUREL COUNTY, KENTUCKY

*Prepared By:*

**Kenvirons, LLC**  
**770 WILKINSON BLVD.**  
**FRANKFORT, KENTUCKY 40601**

**PROJECT NO. 2020052**



**JULY 2025**

**Kenvirons, Inc.**

*Civil & Environmental Engineering and Laboratory Services*



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## SECTION 00111

### ADVERTISEMENT FOR BIDS

**East Laurel Water District  
Laurel County, Kentucky  
Old Salem Rd. / McWhorter Rd. System Improvements  
Contract 2 – Waterline Replacement**

#### General Notice

East Laurel Water District (Owner) is requesting Bids for the construction of the following Project:

Contract 2 – Old Salem Rd. / McWhorter Rd. System Improvements

Bids for the construction of the Project will be received at the East Laurel Water District office located at 1670 E. Hal Rogers Parkway, London, KY 40741, until August 13, 2025 at 10:00 A.M. local time. At that time the Bids received will be publicly opened and read.

The Project includes the following Work:

Contract 2 consists of installing approximately 22,500 L.F. of 6", 4", and 3" PVC waterlines and all necessary appurtenances along several roads in Laurel County. This project also includes the construction of one booster pump station along KY 472. If funds remain at the completion of the above project, two alternates may be constructed consisting of the installation of approximately 1,600 L.F. of 3" PVC waterline with all necessary appurtenances along Hodge Road (Alt 1) and the installation of approximately 1,000 L.F. of 16" PVC C900 waterline with all necessary appurtenances near North Laurel High School (Alt 2).

The Contract Documents may be examined at the following locations:

EAST LAUREL WATER DISTRICT, 1670 E. HAL ROGERS PARKWAY, LONDON, KY 40741  
KENVIRONS, LLC, 770 WILKINSON BLVD., FRANKFORT, KY 40601  
ONLINE PLANROOM AT "WWW.LYNNIMAGING.COM"

The Issuing Office for the Bidding Documents is:

Lynn Imaging, 328 Old Vine Street, Lexington, KY 40507  
Online Planroom at "www.lynnimaging.com"

Bidding Documents may be purchased from the Issuing Office. Cost does not include shipping charges. Upon Issuing Office's receipt of payment, printed Bidding Documents or electronic documents will be sent via the prospective Bidder's delivery service. The shipping charge amount will depend on the shipping method chosen. Bidding Documents are available for purchase in the following formats:

| Format                                                                                                     | Cost  |
|------------------------------------------------------------------------------------------------------------|-------|
| Contract 2 Bidding Documents (including Full-Size Drawings)                                                | \$200 |
| Electronic download of Bidding Documents from <a href="http://www.lynnimaging.com">www.lynnimaging.com</a> | \$150 |

#### Instructions to Bidders.

For all further requirements regarding bid submittal, qualifications, procedures, and contract award, refer to the Instructions to Bidders that are included in the Bidding Documents.

## **Domestic Preference**

This project is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act (IIJA), Pub. L. 117-58, §§ 70901-70953. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States.

The following waivers apply to this Contract:

BABAA De Minimis, Small Grants, and Minor Components

### **This Advertisement is issued by:**

Owner: East Laurel Water District

By: Donta Evans

Title: Superintendent

Date: July 30, 2025

**SECTION 00200**  
**INSTRUCTIONS FOR BIDDERS**

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## ARTICLE 1—DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. *Issuing Office*—The office from which the Bidding Documents are to be issued, and which registers plan holders.
  - B. *Domestic Preference* – The Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act (IIJA), Pub. L. 117-58, §§ 70901-70953.

## ARTICLE 2—BIDDING DOCUMENTS

- 2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.
- 2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.
- 2.03 **Deleted**
- 2.04 Bidder may register as a plan holder and obtain complete sets of Bidding Documents, in the number and format stated in the Advertisement or invitation to bid, from the Issuing Office. Bidders may rely that sets of Bidding Documents obtained from the Issuing Office are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.
- 2.05 **Deleted**
- 2.06 *Electronic Documents*
- A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.
    - 1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf). It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.

- B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.06.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

C. **Deleted**

### **ARTICLE 3—QUALIFICATIONS OF BIDDERS**

- 3.01 To demonstrate Bidder's qualifications to perform the Work, after submitting its Bid and within **five (5)** days of Owner's request, Bidder must submit the following information:
  - A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.
  - B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.
  - C. Bidder's state or other contractor license number, if applicable.
  - D. Subcontractor and Supplier qualification information.
  - E. Other required information regarding qualifications.
- 3.02 **Deleted**
- 3.03 **Deleted**
- 3.04 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.05 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

### **ARTICLE 4—PRE-BID CONFERENCE**

- 4.01 A pre-bid conference will not be conducted for this Project.

### **ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE**

#### **5.01 *Site and Other Areas***

- A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

#### **5.02 *Existing Site Conditions***

- A. ***Subsurface and Physical Conditions; Hazardous Environmental Conditions***

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1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:
  - a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.
  - b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.
  - c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
  - d. Technical Data contained in such reports and drawings.
2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.
3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.
4. **Deleted**
- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

#### 5.03 *Other Site-related Documents*

- A. No other Site-related documents are available.

#### 5.04 *Site Visit and Testing by Bidders*

- A. Bidder is required to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site.
- B. Bidders visiting the Site are required to arrange their own transportation to the Site.
- C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding



the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.

- D. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- E. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

#### 5.05 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the Supplementary Conditions.

#### 5.06 *Other Work at the Site*

- A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

### **ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS**

#### 6.01 *Express Representations and Certifications in Bid Form, Agreement*

- A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.
- B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

### **ARTICLE 7—INTERPRETATIONS AND ADDENDA**

- 7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.
- 7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Engineer in writing. Contact information and submittal procedures for such questions are as follows:

**JD Sims, PE**  
**Kenvirons, LLC**  
**jsims@kenvirons.com**

- 7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than seven days prior to the date for opening of Bids may not be answered.
- 7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

#### **ARTICLE 8—BID SECURITY**

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of **five (5)** percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents. Bid security must be at least 5% of the Bidder's maximum Bid price.
- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.
- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.

#### **ARTICLE 9—CONTRACT TIMES**

- 9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.
- 9.02 **Deleted**
- 9.03 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

#### **ARTICLE 10—SUBSTITUTE AND "OR EQUAL" ITEMS**

- 10.01 **Deleted**
- 10.02 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute or materials and equipment subsequently approved by Engineer prior to the submittal of Bids

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and identified by Addendum. No item of material or equipment will be considered by Engineer as an “or-equal” or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer within 10 days of the issuance of the Advertisement for Bids or invitation to Bidders. Each such request must comply with the requirements of Paragraphs 7.05 and 7.06 of the General Conditions, and the review of the request will be governed by the principles in those paragraphs. **Each such request shall include the Manufacturers’ Certification for Compliance with Domestic Preference requirements. Refer to the suggested Manufacturer’s Certification provided in these construction Contract Documents.** The burden of proof of the merit of the proposed item is upon Bidder. Engineer’s decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all registered Bidders. Bidders cannot rely upon approvals made in any other manner. **Substitutes and “or-equal” materials and equipment may be proposed by Contractor in accordance with Paragraphs 7.05 and 7.06 of the General Conditions after the Effective Date of the Contract. Each such request shall include Manufacturer’s Certification letter to document compliance with Domestic Preference requirements. Refer to Manufacturer’s Certification Letter provided in these Contract Documents.**

- 10.03 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.

#### **ARTICLE 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS**

**11.01 Deleted**

- 11.02 The apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of the Subcontractors or Suppliers proposed for any portion of the Work within five days after Bid opening.

- 11.03 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a substitute, Bidder’s Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

- 11.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier, so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

- 11.05 The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 7.07A.**

## ARTICLE 12—PREPARATION OF BID

- 12.01 The Bid Form is included with the Bidding Documents.
- A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
  - B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words “No Bid” or “Not Applicable.”
- 12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.
- 12.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.
- 12.04 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.
- 12.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.
- 12.06 A Bid by an individual must show the Bidder’s name and official address.
- 12.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.
- 12.08 All names must be printed in ink below the signatures.
- 12.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.
- 12.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.
- 12.11 The Bid must contain evidence of Bidder’s authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.
- 12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder’s licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and

attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

## **ARTICLE 13—BASIS OF BID**

### **13.01 *Lump Sum***

- A. Bidders must submit a Bid on a lump sum basis as set forth in the Bid Form.

### **13.02 *Base Bid with Alternates***

- A. Bidders must submit a Bid on a lump sum basis for the base Bid and include a separate price for each alternate described in the Bidding Documents and as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.
- B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form.

### **13.03 *Deleted***

### **13.04 *Deleted***

### **13.05 *Unit Price***

- A. Bidders must submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.
- B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity", which Owner or its representative has set forth in the Bid Form, for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.
- C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

### **13.06 *Allowances***

- A. For cash allowances the Bid price must include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

### **13.07 *Deleted***

## **ARTICLE 14—SUBMITTAL OF BID**

- 14.01 The Bidding Documents include one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 2 of the Bid Form.

- 14.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, and, if applicable, the designated portion of the Project for which the Bid is submitted, the name and address of Bidder, and must be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid must be addressed to the location designated in the Advertisement.
- 14.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

#### **ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID**

- 15.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 15.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, the Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, the Bidder will be disqualified from further bidding on the Work.

#### **ARTICLE 16—OPENING OF BIDS**

- 16.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.
- 16.02 **Deleted**

#### **ARTICLE 17—BIDS TO REMAIN SUBJECT TO ACCEPTANCE**

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

#### **ARTICLE 18—EVALUATION OF BIDS AND AWARD OF CONTRACT**

- 18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.

- 18.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.
- 18.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.
- 18.04 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid.
- 18.05 *Evaluation of Bids*
- A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.
  - B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. To determine the Bid prices for purposes of comparison, Owner will announce to all bidders a "Base Bid plus alternates" budget after receiving all Bids, but prior to opening them. For comparison purposes alternates will be accepted, following the order of priority established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.
  - C. **Deleted**
  - D. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.
  - E. **Deleted**
  - F. **Deleted**

- 18.06 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.
- 18.07 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

#### **ARTICLE 19—BONDS AND INSURANCE**

- 19.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds, other required bonds (if any), and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by required bonds and insurance documentation.
- 19.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

#### **ARTICLE 20—SIGNING OF AGREEMENT**

- 20.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within 10 days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

#### **ARTICLE 21—SALES AND USE TAXES**

- 21.01 Deleted

#### **ARTICLE 22—CONTRACTS TO BE ASSIGNED (NOT APPLICABLE TO THIS PROJECT)**

#### **ARTICLE 23 – FEDERAL REQUIREMENTS**

- 23.01 If the contract price is in excess of \$100,000, provisions of the Contract Work Hours and Safety Standards Act at 29 CFR 5.5(b) apply.
- 23.02 Federal requirements at Article 19 of the Supplementary Conditions apply to this Contract.







# BID FORM FOR CONSTRUCTION CONTRACT

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

## ARTICLE 1—OWNER AND BIDDER

- 1.01 This Bid is submitted to: **East Laurel Water District, 1670 E. Hal Rogers Parkway, London, KY 40741**
- 1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

## ARTICLE 2—ATTACHMENTS TO THIS BID

- 2.01 The following documents are submitted with and made a condition of this Bid:
  - A. Required Bid security;
  - ~~B. List of Proposed Subcontractors;~~
  - ~~C. List of Proposed Suppliers;~~
  - D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
  - ~~E. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;~~
  - F. Required Bidder Qualification Statement with supporting data; and
  - ~~G. [List other documents and edit above as pertinent].~~
  - G. If Bid amount exceeds \$10,000, signed Compliance Statement (RD 400-6). Refer to specific equal opportunity requirements set forth in the Supplementary Conditions of the Construction Contract (EJCDC C-800);
  - H. If Bid amount exceeds \$25,000, signed Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions (AD-1048);
  - I. If Bid amount exceeds \$100,000, signed RD Instruction 1940-Q Exhibit A-1, Certification for Contracts, Grants, and Loans.

### ARTICLE 3—BASIS OF BID

- 3.01 This project consists of the Base Project and two Alternates. The Contractor shall complete the Bid Schedules for both the Base Project and all Alternates. The same unit price shall be used for each Alternate, if applicable.

Note: Bids shall include all applicable taxes.

- 3.02 The low bid determination will be based on the Total Base Bid. The Total Base Bid will be determined by adding together the bid prices for the Base Project and Alternate Nos. 1 & 2. If funds remain at the completion of the Base Project, with the Owner's approval, any or all Alternates may be added to the project.

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

#### Base Project:

| No. | Item Description                         | Unit | Quantity | Unit Price | Item Price |
|-----|------------------------------------------|------|----------|------------|------------|
| 1   | 6" PVC SDR 17 Pipe                       | LF   | 22,300   |            |            |
| 2   | 4" PVC SDR 17 Pipe                       | LF   | 115      |            |            |
| 3   | 3" PVC SDR 17 Pipe                       | LF   | 60       |            |            |
| 4   | Bored Encasement for 6" Pipe (14" Steel) | LF   | 120      |            |            |
| 5   | Bored Encasement for 4" Pipe (12" Steel) | LF   | 60       |            |            |
| 6   | 6" Gate Valve                            | EA   | 24       |            |            |
| 7   | 3" Gate Valve                            | EA   | 3        |            |            |
| 8   | Little Laurel River Directional Bore     | LS   | 1        |            |            |
| 9   | Creek Crossing, Type "A"                 | LF   | 85       |            |            |
| 10  | Creek Crossing, Type "B"                 | LF   | 70       |            |            |
| 11  | Tie-In to Existing 3" Water Line         | EA   | 3        |            |            |
| 12  | 6"x6" Tapping Sleeve & Valve             | EA   | 6        |            |            |
| 13  | 4"x4" Tapping Sleeve & Valve             | EA   | 4        |            |            |
| 14  | Cut & Cap                                | EA   | 6        |            |            |
| 15  | Free Bore                                | LF   | 385      |            |            |

- CONTINUE TO NEXT PAGE -

|                           |                               |    |       |             |             |
|---------------------------|-------------------------------|----|-------|-------------|-------------|
| 16                        | Customer Reconnection         | EA | 55    |             |             |
| 17                        | ¾" Service Tubing             | LF | 1,650 |             |             |
| 18                        | Fire Hydrant                  | EA | 13    |             |             |
| 19                        | Air Release Valve             | EA | 4     |             |             |
| 20                        | Leak Detection Meter          | EA | 1     |             |             |
| 21                        | KY 492 Pump Station           | LS | 1     |             |             |
| 22                        | Telemetry Equipment Allowance | LS | 1     | \$20,000.00 | \$20,000.00 |
| 23                        | Telemetry Installation        | LS | 1     |             |             |
| 24                        | Crushed Stone                 | LF | 425   |             |             |
| 25                        | Light Duty Bituminous         | LF | 120   |             |             |
| <b>Total Base Project</b> |                               |    |       | <b>\$</b>   |             |

#### Alternate No. 1

| No.                          | Item Description             | Unit | Quantity | Unit Price | Item Price |
|------------------------------|------------------------------|------|----------|------------|------------|
| 3                            | 3" PVC SDR 17 Pipe           | LF   | 1,640    |            |            |
| 17                           | ¾" Service Tubing            | LF   | 200      |            |            |
| 24                           | Crushed Stone                | LF   | 30       |            |            |
| 25                           | Light Duty Bituminous        | LF   | 25       |            |            |
| 26                           | 6"x3" Tapping Sleeve & Valve | EA   | 1        |            |            |
| 27                           | New Meter Service            | EA   | 4        |            |            |
| 28                           | 3" Blowoff Assembly          | EA   | 1        |            |            |
| <b>Total Alternate No. 1</b> |                              |      |          | <b>\$</b>  |            |

- CONTINUE TO NEXT PAGE -

**Alternate No. 2**

| No. | Item Description               | Unit | Quantity | Unit Price | Item Price |
|-----|--------------------------------|------|----------|------------|------------|
| 1   | 6" PVC SDR 17 Pipe             | LF   | 20       |            |            |
| 6   | 6" Gate Valve                  | EA   | 1        |            |            |
| 12  | 6"x6" Tapping Sleeve & Valve   | EA   | 1        |            |            |
| 14  | Cut & Cap                      | EA   | 4        |            |            |
| 15  | Free Bore                      | LF   | 10       |            |            |
| 18  | Fire Hydrant                   | EA   | 1        |            |            |
| 29  | 16" PVC C900 DR 18 Pipe        | LF   | 975      |            |            |
| 30  | 8" PVC C900 DR 18 Pipe         | LF   | 10       |            |            |
| 31  | Bored Encasement for 16" Pipe  | LF   | 30       |            |            |
| 32  | 16" Gate Valve                 | EA   | 1        |            |            |
| 33  | 16"x16" Tapping Sleeve & Valve | EA   | 2        |            |            |
| 34  | 16"x8" Tapping Sleeve & Valve  | EA   | 1        |            |            |
| 35  | 8"x8" Tapping Sleeve & Valve   | EA   | 1        |            |            |

**Total Alternate No. 2** \$ \_\_\_\_\_

**Total Base Project** \$ \_\_\_\_\_

**Total Alternate No. 1** \$ \_\_\_\_\_

**Total Alternate No. 2** \$ \_\_\_\_\_

**TOTAL BASE BID** \$ \_\_\_\_\_

**B. Bidder acknowledges that:**

1. each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and
2. estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Work will be based on actual quantities, determined as provided in the Contract Documents.

## ARTICLE 4—DELETED

## ARTICLE 5—DELETED

## ARTICLE 6—TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 6.02 **Deleted**
- 6.03 **Deleted**
- 6.04 Bidder accepts the provisions of the Agreement as to liquidated damages.

## ARTICLE 7—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

### 7.01 *Bid Acceptance Period*

- A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

### 7.02 *Instructions to Bidders*

- A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

### 7.03 *Receipt of Addenda*

- A. Bidder hereby acknowledges receipt of the following Addenda:

| Addendum Number | Addendum Date |
|-----------------|---------------|
|                 |               |
|                 |               |
|                 |               |

## ARTICLE 8—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

### 8.01 *Bidder's Representations*

- A. In submitting this Bid, Bidder represents the following:
1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
  2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
  3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work, **including all Domestic Preference requirements.**
  4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating

to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

#### 8.02 *Bidder's Certifications*

##### A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:



- a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
- b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.
- c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
- d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

BIDDER hereby submits this Bid as set forth above:

Bidder:

\_\_\_\_\_  
(typed or printed name of organization)

By:

\_\_\_\_\_  
(individual's signature)

Name:

\_\_\_\_\_  
(typed or printed)

Title:

\_\_\_\_\_  
(typed or printed)

Date:

\_\_\_\_\_  
(typed or printed)

*If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.*

Attest:

\_\_\_\_\_  
(individual's signature)

Name:

\_\_\_\_\_  
(typed or printed)

Title:

\_\_\_\_\_  
(typed or printed)

Date:

\_\_\_\_\_  
(typed or printed)

Address for giving notices:

\_\_\_\_\_  
\_\_\_\_\_

Bidder's Contact:

Name:

\_\_\_\_\_  
(typed or printed)

Title:

\_\_\_\_\_  
(typed or printed)

Phone:

Email:

Address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Bidder's Contractor License No.:  
(if applicable)

\_\_\_\_\_

## BID BOND (PENAL SUM FORM)

|                                                                                                                                                                                                               |                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Bidder</b><br>Name:<br>Address <i>(principal place of business)</i> :                                                                                                                                      | <b>Surety</b><br>Name:<br>Address <i>(principal place of business)</i> :                                                                                                   |
| <b>Owner</b><br>Name: <b>East Laurel Water District</b><br>Address <i>(principal place of business)</i> :<br><b>1670 E. Hal Rogers Parkway</b><br><b>London, KY 40741</b>                                     | <b>Bid</b><br>Project <i>(name and location)</i> :<br><b>Old Salem Rd./McWhorter Rd. System Improvements – Contract 2</b><br><b>Laurel County, KY</b><br><br>Bid Due Date: |
| <b>Bond</b><br>Penal Sum:<br>Date of Bond:                                                                                                                                                                    |                                                                                                                                                                            |
| Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative. |                                                                                                                                                                            |
| Bidder                                                                                                                                                                                                        | Surety                                                                                                                                                                     |
| _____<br><i>(Full formal name of Bidder)</i>                                                                                                                                                                  | _____<br><i>(Full formal name of Surety) (corporate seal)</i>                                                                                                              |
| By: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                        | By: _____<br><div style="text-align: center;"><i>(Signature) (Attach Power of Attorney)</i></div>                                                                          |
| Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                               | Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                            |
| Title: _____                                                                                                                                                                                                  | Title: _____                                                                                                                                                               |
| Attest: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                    | Attest: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                 |
| Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                               | Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                            |
| Title: _____                                                                                                                                                                                                  | Title: _____                                                                                                                                                               |
| <i>Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.</i>                                      |                                                                                                                                                                            |

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 will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs 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 will 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 does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will 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 the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must 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 Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will 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 will 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 governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

**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).

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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.

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**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)*

## U.S. DEPARTMENT OF AGRICULTURE

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### CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION - LOWER TIER COVERED TRANSACTIONS

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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

## **Instructions for Certification**

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the reverse side in accordance with these instructions.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later than determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms “covered transactions,” “debarred,” “suspended,” “ineligible,” “lower tier covered transactions,” “participant,” “person,” “primary covered transaction,” “principal,” “proposal,” and “voluntarily excluded,” as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled “Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions,” without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.



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



# QUALIFICATIONS STATEMENT

## ARTICLE 1—GENERAL INFORMATION

1.01 Provide contact information for the Business:

|                                       |  |                |  |
|---------------------------------------|--|----------------|--|
| Legal Name of Business:               |  |                |  |
| Corporate Office                      |  |                |  |
| Name:                                 |  | Phone number:  |  |
| Title:                                |  | Email address: |  |
| Business address of corporate office: |  |                |  |
|                                       |  |                |  |
|                                       |  |                |  |
| Local Office                          |  |                |  |
| Name:                                 |  | Phone number:  |  |
| Title:                                |  | Email address: |  |
| Business address of local office:     |  |                |  |
|                                       |  |                |  |
|                                       |  |                |  |

1.02 Provide information on the Business's organizational structure:

|                                                                                                                                 |                                                                                                                        |                                                                                           |  |
|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--|
| Form of Business:                                                                                                               | <input type="checkbox"/> Sole Proprietorship <input type="checkbox"/> Partnership <input type="checkbox"/> Corporation |                                                                                           |  |
| <input type="checkbox"/> Limited Liability Company <input type="checkbox"/> Joint Venture comprised of the following companies: |                                                                                                                        |                                                                                           |  |
| 1.                                                                                                                              |                                                                                                                        |                                                                                           |  |
| 2.                                                                                                                              |                                                                                                                        |                                                                                           |  |
| 3.                                                                                                                              |                                                                                                                        |                                                                                           |  |
| Provide a separate Qualification Statement for each Joint Venturer.                                                             |                                                                                                                        |                                                                                           |  |
| Date Business was formed:                                                                                                       |                                                                                                                        | State in which Business was formed:                                                       |  |
| Is this Business authorized to operate in the Project location?                                                                 |                                                                                                                        | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Pending |  |

1.03 Identify all businesses that own Business in whole or in part (25% or greater), or that are wholly or partly (25% or greater) owned by Business:

|                   |  |              |  |
|-------------------|--|--------------|--|
| Name of business: |  | Affiliation: |  |
| Address:          |  |              |  |
| Name of business: |  | Affiliation: |  |
| Address:          |  |              |  |

|                   |  |              |  |
|-------------------|--|--------------|--|
| Name of business: |  | Affiliation: |  |
| Address:          |  |              |  |

1.04 Provide information regarding the Business's officers, partners, and limits of authority.

|                               |                                                          |                     |    |
|-------------------------------|----------------------------------------------------------|---------------------|----|
| Name:                         |                                                          | Title:              |    |
| Authorized to sign contracts: | <input type="checkbox"/> Yes <input type="checkbox"/> No | Limit of Authority: | \$ |
| Name:                         |                                                          | Title:              |    |
| Authorized to sign contracts: | <input type="checkbox"/> Yes <input type="checkbox"/> No | Limit of Authority: | \$ |
| Name:                         |                                                          | Title:              |    |
| Authorized to sign contracts: | <input type="checkbox"/> Yes <input type="checkbox"/> No | Limit of Authority: | \$ |
| Name:                         |                                                          | Title:              |    |

## ARTICLE 2—LICENSING

2.01 Provide information regarding licensure for Business:

|                   |  |                  |  |
|-------------------|--|------------------|--|
| Name of License:  |  |                  |  |
| Licensing Agency: |  |                  |  |
| License No:       |  | Expiration Date: |  |
| Name of License:  |  |                  |  |
| Licensing Agency: |  |                  |  |
| License No:       |  | Expiration Date: |  |

## ARTICLE 3—DIVERSE BUSINESS CERTIFICATIONS

3.01 Provide information regarding Business's Diverse Business Certification, if any. Provide evidence of current certification.

| Certification                                                                   | Certifying Agency | Certification Date |
|---------------------------------------------------------------------------------|-------------------|--------------------|
| <input type="checkbox"/> Disadvantaged Business Enterprise                      |                   |                    |
| <input type="checkbox"/> Minority Business Enterprise                           |                   |                    |
| <input type="checkbox"/> Woman-Owned Business Enterprise                        |                   |                    |
| <input type="checkbox"/> Small Business Enterprise                              |                   |                    |
| <input type="checkbox"/> Disabled Business Enterprise                           |                   |                    |
| <input type="checkbox"/> Veteran-Owned Business Enterprise                      |                   |                    |
| <input type="checkbox"/> Service-Disabled Veteran-Owned Business                |                   |                    |
| <input type="checkbox"/> HUBZone Business (Historically Underutilized) Business |                   |                    |

|                                |  |  |  |
|--------------------------------|--|--|--|
| <input type="checkbox"/> Other |  |  |  |
| <input type="checkbox"/> None  |  |  |  |

#### ARTICLE 4—SAFETY

4.01 Provide information regarding Business's safety organization and safety performance.

|                                    |                |            |
|------------------------------------|----------------|------------|
| Name of Business's Safety Officer: |                |            |
| Safety Certifications              |                |            |
| Certification Name                 | Issuing Agency | Expiration |
|                                    |                |            |
|                                    |                |            |

4.02 Provide Worker's Compensation Insurance Experience Modification Rate (EMR), Total Recordable Frequency Rate (TRFR) for incidents, and Total Number of Recorded Manhours (MH) for the last 3 years and the EMR, TRFR, and MH history for the last 3 years of any proposed Subcontractor(s) that will provide Work valued at 10% or more of the Contract Price. Provide documentation of the EMR history for Business and Subcontractor(s).

| Year    |     |      |    |     |      |    |     |      |    |
|---------|-----|------|----|-----|------|----|-----|------|----|
| Company | EMR | TRFR | MH | EMR | TRFR | MH | EMR | TRFR | MH |
|         |     |      |    |     |      |    |     |      |    |
|         |     |      |    |     |      |    |     |      |    |

#### ARTICLE 5—FINANCIAL

5.01 Provide information regarding the Business's financial stability. Provide the most recent audited financial statement, and if such audited financial statement is not current, also provide the most current financial statement.

|                                                                                                                             |  |                                   |  |
|-----------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------|--|
| Financial Institution:                                                                                                      |  |                                   |  |
| Business address:                                                                                                           |  |                                   |  |
| Date of Business's most recent financial statement:                                                                         |  | <input type="checkbox"/> Attached |  |
| Date of Business's most recent audited financial statement:                                                                 |  | <input type="checkbox"/> Attached |  |
| Financial indicators from the most recent financial statement                                                               |  |                                   |  |
| Contractor's Current Ratio (Current Assets ÷ Current Liabilities)                                                           |  |                                   |  |
| Contractor's Quick Ratio ((Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) ÷ Current Liabilities) |  |                                   |  |

## ARTICLE 6—SURETY INFORMATION

- 6.01 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to performance and payment bonds.

|                                                                                                                                                                                                                                                                                                                                      |                                                          |                 |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------|--|
| Surety Name:                                                                                                                                                                                                                                                                                                                         |                                                          |                 |  |
| Surety is a corporation organized and existing under the laws of the state of:                                                                                                                                                                                                                                                       |                                                          |                 |  |
| Is surety authorized to provide surety bonds in the Project location?                                                                                                                                                                                                                                                                | <input type="checkbox"/> Yes <input type="checkbox"/> No |                 |  |
| Is surety listed in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury?<br><input type="checkbox"/> Yes <input type="checkbox"/> No |                                                          |                 |  |
| Mailing Address<br>(principal place of business):                                                                                                                                                                                                                                                                                    |                                                          |                 |  |
|                                                                                                                                                                                                                                                                                                                                      |                                                          |                 |  |
|                                                                                                                                                                                                                                                                                                                                      |                                                          |                 |  |
| Physical Address<br>(principal place of business):                                                                                                                                                                                                                                                                                   |                                                          |                 |  |
|                                                                                                                                                                                                                                                                                                                                      |                                                          |                 |  |
|                                                                                                                                                                                                                                                                                                                                      |                                                          |                 |  |
| Phone (main):                                                                                                                                                                                                                                                                                                                        |                                                          | Phone (claims): |  |

## ARTICLE 7—INSURANCE

- 7.01 Provide information regarding Business's insurance company(s), including but not limited to its Commercial General Liability carrier. Provide information for each provider.

|                                                                                 |  |                                                          |  |
|---------------------------------------------------------------------------------|--|----------------------------------------------------------|--|
| Name of insurance provider, and type of policy (CLE, auto, etc.):               |  |                                                          |  |
| Insurance Provider                                                              |  | Type of Policy (Coverage Provided)                       |  |
|                                                                                 |  |                                                          |  |
|                                                                                 |  |                                                          |  |
|                                                                                 |  |                                                          |  |
|                                                                                 |  |                                                          |  |
| Are providers licensed or authorized to issue policies in the Project location? |  | <input type="checkbox"/> Yes <input type="checkbox"/> No |  |
| Does provider have an A.M. Best Rating of A-VII or better?                      |  | <input type="checkbox"/> Yes <input type="checkbox"/> No |  |
| Mailing Address<br>(principal place of business):                               |  |                                                          |  |
|                                                                                 |  |                                                          |  |
|                                                                                 |  |                                                          |  |
| Physical Address<br>(principal place of business):                              |  |                                                          |  |
|                                                                                 |  |                                                          |  |
|                                                                                 |  |                                                          |  |
| Phone (main):                                                                   |  | Phone (claims):                                          |  |

## ARTICLE 8—CONSTRUCTION EXPERIENCE

8.01 Provide information that will identify the overall size and capacity of the Business.

|                                                |  |
|------------------------------------------------|--|
| Average number of current full-time employees: |  |
| Estimate of revenue for the current year:      |  |
| Estimate of revenue for the previous year:     |  |

8.02 Provide information regarding the Business's previous contracting experience.

|                                                                                                                                                                       |  |                      |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------|--|--|
| Years of experience with projects like the proposed project:                                                                                                          |  |                      |  |  |
| As a general contractor:                                                                                                                                              |  | As a joint venturer: |  |  |
| Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03:                                                                             |  |                      |  |  |
| Been disqualified as a bidder by any local, state, or federal agency within the last 5 years?<br><input type="checkbox"/> Yes <input type="checkbox"/> No             |  |                      |  |  |
| Been barred from contracting by any local, state, or federal agency within the last 5 years?<br><input type="checkbox"/> Yes <input type="checkbox"/> No              |  |                      |  |  |
| Been released from a bid in the past 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No                                                                |  |                      |  |  |
| Defaulted on a project or failed to complete any contract awarded to it? <input type="checkbox"/> Yes <input type="checkbox"/> No                                     |  |                      |  |  |
| Refused to construct or refused to provide materials defined in the contract documents or in a change order? <input type="checkbox"/> Yes <input type="checkbox"/> No |  |                      |  |  |
| Been a party to any currently pending litigation or arbitration? <input type="checkbox"/> Yes <input type="checkbox"/> No                                             |  |                      |  |  |
| Provide full details in a separate attachment if the response to any of these questions is Yes.                                                                       |  |                      |  |  |

8.03 List all projects currently under contract in Schedule A and provide indicated information.

8.04 List a minimum of three and a maximum of six projects completed in the last 5 years in Schedule B and provide indicated information to demonstrate the Business's experience with projects similar in type and cost of construction.

8.05 In Schedule C, provide information on key individuals whom Business intends to assign to the Project. Provide resumes for those individuals included in Schedule C. Key individuals include the Project Manager, Project Superintendent, Quality Manager, and Safety Manager. Resumes may be provided for Business's key leaders as well.

## ARTICLE 9—REQUIRED ATTACHMENTS

9.01 Provide the following information with the Statement of Qualifications:

- A. If Business is a Joint Venture, separate Qualifications Statements for each Joint Venturer, as required in Paragraph 1.02.
- B. Diverse Business Certifications if required by Paragraph 3.01.
- C. Certification of Business's safety performance if required by Paragraph 4.02.
- D. Financial statements as required by Paragraph 5.01.

- E. Attachments providing additional information as required by Paragraph 8.02.
- F. Schedule A (Current Projects) as required by Paragraph 8.03.
- G. Schedule B (Previous Experience with Similar Projects) as required by Paragraph 8.04.
- H. Schedule C (Key Individuals) and resumes for the key individuals listed, as required by Paragraph 8.05.
- I. Additional items as pertinent.



This Statement of Qualifications is offered by:

Business:

\_\_\_\_\_  
*(typed or printed name of organization)*

By:

\_\_\_\_\_  
*(individual's signature)*

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Date:

\_\_\_\_\_  
*(date signed)*

*(If Business is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest:

\_\_\_\_\_  
*(individual's signature)*

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Address for giving notices:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Designated Representative:

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Phone:

\_\_\_\_\_  
\_\_\_\_\_

Email:



**Schedule A—Current Projects**

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Name of Organization                                                                                                |                 |                        |                |                         |       |
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |



**Schedule B—Previous Experience with Similar Projects**

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Name of Organization                                                                                                |                 |                        |                |                         |       |
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

**Schedule B—Previous Experience with Similar Projects**

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Name of Organization                                                                                                |                 |                        |                |                         |       |
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

**Schedule C—Key Individuals**

|                                                                                                              |  |                                       |                                   |
|--------------------------------------------------------------------------------------------------------------|--|---------------------------------------|-----------------------------------|
| <b>Project Manager</b>                                                                                       |  |                                       |                                   |
| Name of individual                                                                                           |  |                                       |                                   |
| Years of experience as project manager                                                                       |  |                                       |                                   |
| Years of experience with this organization                                                                   |  |                                       |                                   |
| Number of similar projects as project manager                                                                |  |                                       |                                   |
| Number of similar projects in other positions                                                                |  |                                       |                                   |
| Current Project Assignments                                                                                  |  |                                       |                                   |
| Name of assignment                                                                                           |  | Percent of time used for this project | Estimated project completion date |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
| Reference Contact Information (listing names indicates approval to contact named individuals as a reference) |  |                                       |                                   |
| Name                                                                                                         |  | Name                                  |                                   |
| Title/Position                                                                                               |  | Title/Position                        |                                   |
| Organization                                                                                                 |  | Organization                          |                                   |
| Telephone                                                                                                    |  | Telephone                             |                                   |
| Email                                                                                                        |  | Email                                 |                                   |
| Project                                                                                                      |  | Project                               |                                   |
| Candidate's role on project                                                                                  |  | Candidate's role on project           |                                   |
| <b>Project Superintendent</b>                                                                                |  |                                       |                                   |
| Name of individual                                                                                           |  |                                       |                                   |
| Years of experience as project superintendent                                                                |  |                                       |                                   |
| Years of experience with this organization                                                                   |  |                                       |                                   |
| Number of similar projects as project superintendent                                                         |  |                                       |                                   |
| Number of similar projects in other positions                                                                |  |                                       |                                   |
| Current Project Assignments                                                                                  |  |                                       |                                   |
| Name of assignment                                                                                           |  | Percent of time used for this project | Estimated project completion date |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
| Reference Contact Information (listing names indicates approval to contact named individuals as a reference) |  |                                       |                                   |
| Name                                                                                                         |  | Name                                  |                                   |
| Title/Position                                                                                               |  | Title/Position                        |                                   |
| Organization                                                                                                 |  | Organization                          |                                   |
| Telephone                                                                                                    |  | Telephone                             |                                   |
| Email                                                                                                        |  | Email                                 |                                   |
| Project                                                                                                      |  | Project                               |                                   |
| Candidate's role on project                                                                                  |  | Candidate's role on project           |                                   |

|                                                                                                              |  |                                       |                                   |
|--------------------------------------------------------------------------------------------------------------|--|---------------------------------------|-----------------------------------|
| <b>Safety Manager</b>                                                                                        |  |                                       |                                   |
| Name of individual                                                                                           |  |                                       |                                   |
| Years of experience as project manager                                                                       |  |                                       |                                   |
| Years of experience with this organization                                                                   |  |                                       |                                   |
| Number of similar projects as project manager                                                                |  |                                       |                                   |
| Number of similar projects in other positions                                                                |  |                                       |                                   |
| Current Project Assignments                                                                                  |  |                                       |                                   |
| Name of assignment                                                                                           |  | Percent of time used for this project | Estimated project completion date |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
| Reference Contact Information (listing names indicates approval to contact named individuals as a reference) |  |                                       |                                   |
| Name                                                                                                         |  | Name                                  |                                   |
| Title/Position                                                                                               |  | Title/Position                        |                                   |
| Organization                                                                                                 |  | Organization                          |                                   |
| Telephone                                                                                                    |  | Telephone                             |                                   |
| Email                                                                                                        |  | Email                                 |                                   |
| Project                                                                                                      |  | Project                               |                                   |
| Candidate's role on project                                                                                  |  | Candidate's role on project           |                                   |
| <b>Quality Control Manager</b>                                                                               |  |                                       |                                   |
| Name of individual                                                                                           |  |                                       |                                   |
| Years of experience as project superintendent                                                                |  |                                       |                                   |
| Years of experience with this organization                                                                   |  |                                       |                                   |
| Number of similar projects as project superintendent                                                         |  |                                       |                                   |
| Number of similar projects in other positions                                                                |  |                                       |                                   |
| Current Project Assignments                                                                                  |  |                                       |                                   |
| Name of assignment                                                                                           |  | Percent of time used for this project | Estimated project completion date |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
| Reference Contact Information (listing names indicates approval to contact named individuals as a reference) |  |                                       |                                   |
| Name                                                                                                         |  | Name                                  |                                   |
| Title/Position                                                                                               |  | Title/Position                        |                                   |
| Organization                                                                                                 |  | Organization                          |                                   |
| Telephone                                                                                                    |  | Telephone                             |                                   |
| Email                                                                                                        |  | Email                                 |                                   |
| Project                                                                                                      |  | Project                               |                                   |
| Candidate's role on project                                                                                  |  | Candidate's role on project           |                                   |



## NOTICE OF AWARD

Date of Issuance:

Owner: East Laurel Water District

Owner's Project No.:

Engineer: Kenvirons, LLC

Engineer's Project No.: 2020052

Project: Old Salem Rd./McWhorter Rd. System Improvements – Contract 2

Contract Name:

Bidder:

Bidder's Address:

You are notified that Owner has accepted your Bid dated \_\_\_\_\_, 2025 for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

**Installation of approx. 22,500 L.F. of 6", 4", and 3" PVC waterlines, one booster pump station, and all necessary appurtenances. The installation of approx. 1,600 L.F. of 3" PVC waterline with all necessary appurtenances (Alt 1) and the installation of approx. 1,000 L.F. of 16" PVC C900 waterline with all necessary appurtenances (Alt 2).**

The Contract Price of the awarded Contract is \$\_\_\_\_\_. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, Unit Price Work, and Work performed on a cost-plus-fee basis, as applicable.

**One** unexecuted counterpart of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

☐ Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.
3. ~~Other conditions precedent (if any):~~ **[Describe other conditions that require Successful Bidder's compliance]**

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

Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: **East Laurel Water District**

By (signature): \_\_\_\_\_

Name (printed): \_\_\_\_\_

Title: Chairman

Copy: Engineer



# AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

This Agreement is by and between **East Laurel Water District** ("Owner") and \_\_\_\_\_ ("Contractor").

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

Owner and Contractor hereby agree as follows:

## ARTICLE 1—WORK

- 1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: **Old Salem Rd./McWhorter Rd. System Improvements – Contract 2**

## ARTICLE 2—THE PROJECT

- 2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: **Old Salem Rd./McWhorter Rd. System Improvements – Contract 2**

## ARTICLE 3—ENGINEER

- 3.01 The Owner has retained **Kenvirons, LLC** ("Engineer") to act as Owner's representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.
- 3.02 The part of the Project that pertains to the Work has been designed by Kenvirons, LLC.

## ARTICLE 4—CONTRACT TIMES

### 4.01 *Time is of the Essence*

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

### 4.02 *Contract Times: Dates*

- ~~A. The Work will be substantially complete on or before [date], and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before [date].~~

### 4.03 *Contract Times: Days*

- A. The Work will be substantially complete within **240** days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within **240** days after the date when the Contract Times commence to run.

#### 4.04 *Milestones*

A. ~~Parts of the Work must be substantially completed on or before the following Milestone(s):~~

- ~~1. Milestone 1 [event & date/days]~~
- ~~2. Milestone 2 [event & date/days]~~
- ~~3. Milestone 3 [event & date/days]~~

#### 4.05 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. The parties also recognize the delays, expense, and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. *Substantial Completion:* Contractor shall pay Owner **\$1,000** for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.
2. *Completion of Remaining Work:* After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner **\$1,000** for each day that expires after such time until the Work is completed and ready for final payment.
3. ~~*Milestones:* Contractor shall pay Owner **\$[number]** for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for achievement of Milestone 1, until Milestone 1 is achieved, or until the time specified for Substantial Completion is reached, at which time the rate indicated in Paragraph 4.05.A.1 will apply, rather than the Milestone rate.~~
4. Liquidated damages for failing to timely attain Milestones, Substantial Completion, and final completion are not additive, and will not be imposed concurrently.

B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

C. **Deleted**

#### 4.06 *Special Damages*

A. Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.

- B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.
- C. The special damages imposed in this paragraph are supplemental to any liquidated damages for delayed completion established in this Agreement.

## ARTICLE 5—CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:

~~A. For all Work other than Unit Price Work, a lump sum of \$[number].~~

~~All specific cash allowances are included in the above price in accordance with Paragraph 13.02 of the General Conditions.~~

B. For all Unit Price Work, an amount equal to the sum of the extended prices (established for each separately identified item of Unit Price Work by multiplying the unit price times the ~~actual~~ **estimated** quantity of that item).

The extended prices for Unit Price Work set forth as of the Effective Date of the Contract are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer.

~~C. Total of Lump Sum Amount and Unit Price Work (subject to final Unit Price adjustment)~~  
~~\$\_\_\_\_\_.~~

~~D. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.~~

## ARTICLE 6—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the **25th** day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.
    - a. **95** percent of the value of the Work completed (with the balance being retainage).
      - 1) ~~If 50 percent or more of the Work has been completed, as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and~~
    - b. **95** percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
  - B. Upon Substantial Completion **of the entire construction to be provided under the construction Contract Documents**, Owner shall pay an amount sufficient to increase total payments to Contractor to **100** percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less **200** percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.
- 6.03 *Final Payment*
- A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.
- 6.04 *Consent of Surety*
- A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.
- 6.05 *Interest*
- A. All amounts not paid when due will bear interest at the rate of **0.00** percent per annum.

## ARTICLE 7—CONTRACT DOCUMENTS

### 7.01 *Contents*

- A. The Contract Documents consist of all of the following:
  1. This Agreement.
  2. Bonds:
    - a. Performance bond (together with power of attorney).
    - b. Payment bond (together with power of attorney).
  3. General Conditions.
  4. Supplementary Conditions.
  5. Specifications as listed in the table of contents of the project manual (copy of list attached).

6. Drawings (not attached but incorporated by reference) consisting of **28** sheets with each sheet bearing the following general title: **Old Salem Rd./McWhorter Rd. System Improvements – Contract 2.**
7. ~~Drawings listed on the attached sheet index.~~
8. Addenda (numbers \_\_\_\_ to \_\_\_\_, inclusive).
9. Exhibits to this Agreement (enumerated as follows):
  - a. **Contractor's Bid**
10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
  - a. Notice to Proceed.
  - b. Work Change Directives.
  - c. Change Orders.
  - d. Field Orders.
  - e. Warranty Bond, if any.
- B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

## **ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS**

### **8.01 Contractor's Representations**

- A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:
  1. Contractor has examined and carefully studied the Contract Documents, including Addenda.
  2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
  3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
  4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
  5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.

6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
9. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

#### 8.02 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:
  1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
  2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
  3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
  4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.



### 8.03 *Standard General Conditions*

- A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or “track changes” (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on \_\_\_\_\_, **2025** (which is the Effective Date of the Contract).

Owner:

East Laurel Water District

(typed or printed name of organization)

By:

(individual's signature)

Date:

(date signed)

Name:

(typed or printed)

Title:

Chairman

(typed or printed)

Attest:

(individual's signature)

Title:

(typed or printed)

Address for giving notices:

1670 E. Hal Rogers Parkway

London, KY 40741

Designated Representative:

Name:

(typed or printed)

Title:

(typed or printed)

Address:

Phone:

Email:

(If **[Type of Entity]** is a corporation, attach evidence of authority to sign. If **[Type of Entity]** is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

Contractor:

(typed or printed name of organization)

By:

(individual's signature)

Date:

(date signed)

Name:

(typed or printed)

Title:

(typed or printed)

(If **[Type of Entity]** is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:

(individual's signature)

Title:

(typed or printed)

Address for giving notices:

Designated Representative:

Name:

(typed or printed)

Title:

(typed or printed)

Address:

Phone:

Email:

License No.:

(where applicable)

State:

# NOTICE TO PROCEED

Owner: East Laurel Water District Owner's Project No.: \_\_\_\_\_  
Engineer: Kenvirons, LLC Engineer's Project No.: 2020052  
Contractor: \_\_\_\_\_ Contractor's Project No.: \_\_\_\_\_  
Project: Old Salem Rd./McWhorter Rd. System Improvements – Contract 2  
Contract Name: \_\_\_\_\_  
Effective Date of Contract \_\_\_\_\_

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on \_\_\_\_\_, **2025** pursuant to Paragraph 4.01 of the General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement:

~~The date by which Substantial Completion must be achieved is [date for Substantial Completion, from Agreement], and the date by which readiness for final payment must be achieved is [date for readiness, from Agreement].~~

**[or]**

The number of days to achieve Substantial Completion is **240** from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of \_\_\_\_\_, **2026**; and the number of days to achieve readiness for final payment is **240** from the commencement date of the Contract Times, resulting in a date for readiness for final payment of \_\_\_\_\_, **2026**.

Before starting any Work at the Site, Contractor must comply with the following:

**None**

Owner: East Laurel Water District  
By (signature): \_\_\_\_\_  
Name (printed): \_\_\_\_\_  
Title: Chairman  
Date Issued: \_\_\_\_\_  
Copy: Engineer



## PERFORMANCE BOND

|                                                                                                                                                                                                                                        |                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contractor</b><br>Name:<br>Address <i>(principal place of business)</i> :                                                                                                                                                           | <b>Surety</b><br>Name:<br>Address <i>(principal place of business)</i> :                                                                                                                                         |
| <b>Owner</b><br>Name: <b>East Laurel Water District</b><br>Mailing address <i>(principal place of business)</i> :<br><b>1670 E. Hal Rogers Parkway</b><br><b>London, KY 40741</b>                                                      | <b>Contract</b><br>Description <i>(name and location)</i> :<br><b>Old Salem Rd./McWhorter Rd. System Improvements – Contract 2</b><br><b>Laurel County, KY</b><br>Contract Price:<br>Effective Date of Contract: |
| <b>Bond</b><br>Bond Amount:<br>Date of Bond:<br><i>(Date of Bond cannot be earlier than Effective Date of Contract)</i><br>Modifications to this Bond form:<br><input type="checkbox"/> None <input type="checkbox"/> See Paragraph 16 |                                                                                                                                                                                                                  |
| Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.      |                                                                                                                                                                                                                  |
| Contractor as Principal                                                                                                                                                                                                                | Surety                                                                                                                                                                                                           |
| <i>(Full formal name of Contractor)</i>                                                                                                                                                                                                | <i>(Full formal name of Surety) (corporate seal)</i>                                                                                                                                                             |
| By: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                                                 | By: _____<br><div style="text-align: center;"><i>(Signature)(Attach Power of Attorney)</i></div>                                                                                                                 |
| Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                                        | Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                  |
| Title: _____                                                                                                                                                                                                                           | Title: _____                                                                                                                                                                                                     |
| Attest: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                                             | Attest: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                       |
| Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                                        | Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                  |
| Title: _____                                                                                                                                                                                                                           | Title: _____                                                                                                                                                                                                     |
| <i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>                    |                                                                                                                                                                                                                  |

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:
  - 3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;
  - 3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
  - 3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.
4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
  - 5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;
  - 5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;
  - 5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or
  - 5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

- 5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
  - 5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.
- 6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.
- 7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
  - 7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
  - 7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and
  - 7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
- 8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.
- 9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
- 10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
- 11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.
- 12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.
- 13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting

with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

- 14.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
  - 14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.
  - 14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.
  - 14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
  - 14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
16. Modifications to this Bond are as follows: **None**



## PAYMENT BOND

|                                                                                                                                                                                                                                        |                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contractor</b><br>Name:<br>Address <i>(principal place of business)</i> :                                                                                                                                                           | <b>Surety</b><br>Name:<br>Address <i>(principal place of business)</i> :                                                                                                                                                   |
| <b>Owner</b><br>Name: <b>East Laurel Water District</b><br>Mailing address <i>(principal place of business)</i> :<br><b>1670 E. Hal Rogers Parkway</b><br><b>London, KY 40741</b>                                                      | <b>Contract</b><br>Description <i>(name and location)</i> :<br><b>Old Salem Rd./McWhorter Rd. System</b><br><b>Improvements – Contract 2</b><br><b>Laurel County, KY</b><br>Contract Price:<br>Effective Date of Contract: |
| <b>Bond</b><br>Bond Amount:<br>Date of Bond:<br><i>(Date of Bond cannot be earlier than Effective Date of Contract)</i><br>Modifications to this Bond form:<br><input type="checkbox"/> None <input type="checkbox"/> See Paragraph 18 |                                                                                                                                                                                                                            |
| Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.              |                                                                                                                                                                                                                            |
| Contractor as Principal                                                                                                                                                                                                                | Surety                                                                                                                                                                                                                     |
| <i>(Full formal name of Contractor)</i>                                                                                                                                                                                                | <i>(Full formal name of Surety) (corporate seal)</i>                                                                                                                                                                       |
| By: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                                                 | By: _____<br><div style="text-align: center;"><i>(Signature)(Attach Power of Attorney)</i></div>                                                                                                                           |
| Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                                        | Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                            |
| Title: _____                                                                                                                                                                                                                           | Title: _____                                                                                                                                                                                                               |
| Attest: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                                             | Attest: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                                 |
| Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                                        | Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                            |
| Title: _____                                                                                                                                                                                                                           | Title: _____                                                                                                                                                                                                               |
| <i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>                    |                                                                                                                                                                                                                            |

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond will arise after the following:
  - 5.1. Claimants who do not have a direct contract with the Contractor
    - 5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
    - 5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).
  - 5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
  - 7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
  - 7.2. Pay or arrange for payment of any undisputed amounts.
  - 7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable

attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. Definitions
  - 16.1. *Claim*—A written statement by the Claimant including at a minimum:
    - 16.1.1. The name of the Claimant;
    - 16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;

- 16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
  - 16.1.4. A brief description of the labor, materials, or equipment furnished;
  - 16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
  - 16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
  - 16.1.7. The total amount of previous payments received by the Claimant; and
  - 16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
- 16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
- 16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
- 16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
18. Modifications to this Bond are as follows: **None**

**Contractor's Application for Payment**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                       |                            |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------|----|---|--------------------------------|----|---|---------------------------------------------|----|---|------------------------------------------------------------------------------------------------------------------------|----|---|--------------|--|--|--------------------------------|----|---|----------------------------------|----|---|------------------------------------------|----|---|------------------------------------------------|----|---|-----------------------------------------------------------|--|--|--------------------------------|----|---|-------------------------------------------------------------|----|---|
| <b>Owner:</b> East Laurel Water District<br><b>Engineer:</b> Kenvirons, LLC<br><b>Contractor:</b> _____<br><b>Project:</b> Old Salem Rd./McWhorter Rd. System Improvements - Contract 2<br><b>Contract:</b> 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Owner's Project No.:</b> _____<br><b>Engineer's Project No.:</b> 2020052<br><b>Contractor's Project No.:</b> _____ |                            |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| <b>Application No.:</b> _____ <b>Application Date:</b> _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                       |                            |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| <b>Application Period:</b> From _____ to _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                       |                            |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| <table style="width: 100%; border-collapse: collapse;"><tr><td style="width: 70%;">1. Original Contract Price</td><td style="width: 10%; text-align: center;">\$</td><td style="width: 20%; text-align: right;">-</td></tr><tr><td>2. Net change by Change Orders</td><td style="text-align: center;">\$</td><td style="text-align: right;">-</td></tr><tr><td>3. Current Contract Price (Line 1 + Line 2)</td><td style="text-align: center;">\$</td><td style="text-align: right;">-</td></tr><tr><td>4. Total Work completed and materials stored to date<br/>(Sum of Column G Lump Sum Total and Column J Unit Price Total)</td><td style="text-align: center;">\$</td><td style="text-align: right;">-</td></tr><tr><td>5. Retainage</td><td></td><td></td></tr><tr><td>    a. _____ X \$ - Work Completed</td><td style="text-align: center;">\$</td><td style="text-align: right;">-</td></tr><tr><td>    b. _____ X \$ - Stored Materials</td><td style="text-align: center;">\$</td><td style="text-align: right;">-</td></tr><tr><td>    c. Total Retainage (Line 5.a + Line 5.b)</td><td style="text-align: center;">\$</td><td style="text-align: right;">-</td></tr><tr><td>6. Amount eligible to date (Line 4 - Line 5.c)</td><td style="text-align: center;">\$</td><td style="text-align: right;">-</td></tr><tr><td>7. Less previous payments (Line 6 from prior application)</td><td></td><td></td></tr><tr><td>8. Amount due this application</td><td style="text-align: center;">\$</td><td style="text-align: right;">-</td></tr><tr><td>9. Balance to finish, including retainage (Line 3 - Line 4)</td><td style="text-align: center;">\$</td><td style="text-align: right;">-</td></tr></table> |                                                                                                                       | 1. Original Contract Price | \$ | - | 2. Net change by Change Orders | \$ | - | 3. Current Contract Price (Line 1 + Line 2) | \$ | - | 4. Total Work completed and materials stored to date<br>(Sum of Column G Lump Sum Total and Column J Unit Price Total) | \$ | - | 5. Retainage |  |  | a. _____ X \$ - Work Completed | \$ | - | b. _____ X \$ - Stored Materials | \$ | - | c. Total Retainage (Line 5.a + Line 5.b) | \$ | - | 6. Amount eligible to date (Line 4 - Line 5.c) | \$ | - | 7. Less previous payments (Line 6 from prior application) |  |  | 8. Amount due this application | \$ | - | 9. Balance to finish, including retainage (Line 3 - Line 4) | \$ | - |
| 1. Original Contract Price                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | \$                                                                                                                    | -                          |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| 2. Net change by Change Orders                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | \$                                                                                                                    | -                          |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| 3. Current Contract Price (Line 1 + Line 2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | \$                                                                                                                    | -                          |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| 4. Total Work completed and materials stored to date<br>(Sum of Column G Lump Sum Total and Column J Unit Price Total)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | \$                                                                                                                    | -                          |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| 5. Retainage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                       |                            |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| a. _____ X \$ - Work Completed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | \$                                                                                                                    | -                          |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| b. _____ X \$ - Stored Materials                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | \$                                                                                                                    | -                          |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| c. Total Retainage (Line 5.a + Line 5.b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | \$                                                                                                                    | -                          |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| 6. Amount eligible to date (Line 4 - Line 5.c)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | \$                                                                                                                    | -                          |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| 7. Less previous payments (Line 6 from prior application)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                       |                            |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| 8. Amount due this application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | \$                                                                                                                    | -                          |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| 9. Balance to finish, including retainage (Line 3 - Line 4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | \$                                                                                                                    | -                          |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| <b>Contractor's Certification</b><br>The undersigned Contractor certifies, to the best of its knowledge, the following:<br>(1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment;<br>(2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such liens, security interest, or encumbrances); and<br>(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                       |                            |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| <b>Contractor:</b> _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                       |                            |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| <b>Signature:</b> _____ <b>Date:</b> _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                       |                            |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| <b>Recommended by Engineer</b><br><br><b>By:</b> _____<br><b>Title:</b> _____<br><b>Date:</b> _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Approved by Owner</b><br><br><b>By:</b> _____<br><b>Title:</b> _____<br><b>Date:</b> _____                         |                            |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |
| <b>Approved by Funding Agency</b><br><br><b>By:</b> _____<br><b>Title:</b> _____<br><b>Date:</b> _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>By:</b> _____<br><b>Title:</b> _____<br><b>Date:</b> _____                                                         |                            |    |   |                                |    |   |                                             |    |   |                                                                                                                        |    |   |              |  |  |                                |    |   |                                  |    |   |                                          |    |   |                                                |    |   |                                                           |  |  |                                |    |   |                                                             |    |   |



**Progress Estimate - Lump Sum Work**

**Contractor's Application for Payment**

|                    |                                                              |                                  |         |
|--------------------|--------------------------------------------------------------|----------------------------------|---------|
| <b>Owner:</b>      | East Laurel Water District                                   | <b>Owner's Project No.:</b>      |         |
| <b>Engineer:</b>   | Kenvirons, LLC                                               | <b>Engineer's Project No.:</b>   | 2020052 |
| <b>Contractor:</b> |                                                              | <b>Contractor's Project No.:</b> |         |
| <b>Project:</b>    | Old Salem Rd./McWhorter Rd. System Improvements - Contract 2 |                                  |         |
| <b>Contract:</b>   | 2                                                            |                                  |         |

| Application No.:  |             | Application Period:  |                                                 | From                |                                                          | to                                                                       |                                        | Application Date:                    |  |
|-------------------|-------------|----------------------|-------------------------------------------------|---------------------|----------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------|--------------------------------------|--|
| A                 | B           | C                    | D                                               | E                   | F                                                        | G                                                                        | H                                      | I                                    |  |
|                   |             |                      | Work Completed                                  |                     | Materials Currently<br>Stored (not in D or<br>E)<br>(\$) | Work Completed<br>and Materials<br>Stored to Date<br>(D + E + F)<br>(\$) | % of Scheduled<br>Value (G / C)<br>(%) | Balance to Finish (C<br>- G)<br>(\$) |  |
|                   |             |                      | (D + E) From<br>Previous<br>Application<br>(\$) | This Period<br>(\$) |                                                          |                                                                          |                                        |                                      |  |
| Item No.          | Description | Scheduled Value (\$) |                                                 |                     |                                                          |                                                                          |                                        |                                      |  |
| Original Contract |             |                      |                                                 |                     |                                                          |                                                                          |                                        |                                      |  |
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**Progress Estimate - Lump Sum Work**

**Contractor's Application for Payment**

|                    |                                                              |                                  |         |
|--------------------|--------------------------------------------------------------|----------------------------------|---------|
| <b>Owner:</b>      | East Laurel Water District                                   | <b>Owner's Project No.:</b>      |         |
| <b>Engineer:</b>   | Kenvirons, LLC                                               | <b>Engineer's Project No.:</b>   | 2020052 |
| <b>Contractor:</b> |                                                              | <b>Contractor's Project No.:</b> |         |
| <b>Project:</b>    | Old Salem Rd./McWhorter Rd. System Improvements - Contract 2 |                                  |         |
| <b>Contract:</b>   | 2                                                            |                                  |         |

| Application No.: | Application Period: |                      | From                                   |                  | to                                              |                                                              | Application Date:                |                                |
|------------------|---------------------|----------------------|----------------------------------------|------------------|-------------------------------------------------|--------------------------------------------------------------|----------------------------------|--------------------------------|
| A                | B                   | C                    | D                                      | E                | F                                               | G                                                            | H                                | I                              |
|                  |                     |                      | Work Completed                         |                  |                                                 |                                                              |                                  |                                |
|                  |                     |                      | (D + E) From Previous Application (\$) | This Period (\$) |                                                 |                                                              |                                  |                                |
| Item No.         | Description         | Scheduled Value (\$) |                                        |                  | Materials Currently Stored (not in D or E) (\$) | Work Completed and Materials Stored to Date (D + E + F) (\$) | % of Scheduled Value (G / C) (%) | Balance to Finish (C - G) (\$) |
| Change Orders    |                     |                      |                                        |                  |                                                 |                                                              |                                  |                                |
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**Progress Estimate - Unit Price Work**

**Contractor's Application for Payment**

|                                                                              |  |                             |  |  |  |  |  |                                        |  |  |  |
|------------------------------------------------------------------------------|--|-----------------------------|--|--|--|--|--|----------------------------------------|--|--|--|
| <b>Owner:</b> East Laurel Water District                                     |  | <b>Owner's Project No.:</b> |  |  |  |  |  | <b>Engineer's Project No.:</b> 2020052 |  |  |  |
| <b>Engineer:</b> Kenvirons, LLC                                              |  |                             |  |  |  |  |  | <b>Contractor's Project No.:</b>       |  |  |  |
| <b>Contractor:</b>                                                           |  |                             |  |  |  |  |  |                                        |  |  |  |
| <b>Project:</b> Old Salem Rd./McWhorter Rd. System Improvements - Contract 2 |  |                             |  |  |  |  |  |                                        |  |  |  |
| <b>Contract:</b> 2                                                           |  |                             |  |  |  |  |  |                                        |  |  |  |

|                         |  |                            |  |             |  |           |  |                          |  |  |  |
|-------------------------|--|----------------------------|--|-------------|--|-----------|--|--------------------------|--|--|--|
| <b>Application No.:</b> |  | <b>Application Period:</b> |  | <b>From</b> |  | <b>to</b> |  | <b>Application Date:</b> |  |  |  |
|-------------------------|--|----------------------------|--|-------------|--|-----------|--|--------------------------|--|--|--|

| A                        | B           | C                    | D     | E               | F                                 | G                                           | H                                               | I                                             | J                                                           | K                                 | L                                 |   |
|--------------------------|-------------|----------------------|-------|-----------------|-----------------------------------|---------------------------------------------|-------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|-----------------------------------|-----------------------------------|---|
| Bid Item No.             | Description | Contract Information |       |                 |                                   | Work Completed                              |                                                 | Materials Currently Stored (not in G)<br>(\$) | Work Completed and Materials Stored to Date (H + I)<br>(\$) | % of Value of Item (J / F)<br>(%) | Balance to Finish (F - J)<br>(\$) |   |
|                          |             | Item Quantity        | Units | Unit Price (\$) | Value of Bid Item (C X E)<br>(\$) | Estimated Quantity Incorporated in the Work | Value of Work Completed to Date (E X G)<br>(\$) |                                               |                                                             |                                   |                                   |   |
| Original Contract        |             |                      |       |                 |                                   |                                             |                                                 |                                               |                                                             |                                   |                                   |   |
|                          |             |                      |       |                 | -                                 |                                             | -                                               |                                               | -                                                           |                                   | -                                 |   |
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|                          |             |                      |       |                 | -                                 |                                             | -                                               |                                               | -                                                           |                                   | -                                 |   |
| Original Contract Totals |             |                      |       |                 | \$                                | -                                           | \$                                              | -                                             | \$                                                          | -                                 | \$                                | - |

**Progress Estimate - Unit Price Work**

**Contractor's Application for Payment**

|                                                                              |  |                             |  |  |  |  |  |                                        |  |  |  |
|------------------------------------------------------------------------------|--|-----------------------------|--|--|--|--|--|----------------------------------------|--|--|--|
| <b>Owner:</b> East Laurel Water District                                     |  | <b>Owner's Project No.:</b> |  |  |  |  |  | <b>Engineer's Project No.:</b> 2020052 |  |  |  |
| <b>Engineer:</b> Kenvirons, LLC                                              |  |                             |  |  |  |  |  | <b>Contractor's Project No.:</b>       |  |  |  |
| <b>Contractor:</b>                                                           |  |                             |  |  |  |  |  |                                        |  |  |  |
| <b>Project:</b> Old Salem Rd./McWhorter Rd. System Improvements - Contract 2 |  |                             |  |  |  |  |  |                                        |  |  |  |
| <b>Contract:</b> 2                                                           |  |                             |  |  |  |  |  |                                        |  |  |  |

|                         |  |                            |  |             |  |           |  |                          |  |  |  |
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| <b>Application No.:</b> |  | <b>Application Period:</b> |  | <b>From</b> |  | <b>to</b> |  | <b>Application Date:</b> |  |  |  |
|-------------------------|--|----------------------------|--|-------------|--|-----------|--|--------------------------|--|--|--|

| A                                          | B           | C                    | D     | E               | F                                 | G                                           | H                                               | I                                             | J                                                           | K                                 | L                                 |   |
|--------------------------------------------|-------------|----------------------|-------|-----------------|-----------------------------------|---------------------------------------------|-------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|-----------------------------------|-----------------------------------|---|
| Bid Item No.                               | Description | Contract Information |       |                 |                                   | Work Completed                              |                                                 | Materials Currently Stored (not in G)<br>(\$) | Work Completed and Materials Stored to Date (H + I)<br>(\$) | % of Value of Item (J / F)<br>(%) | Balance to Finish (F - J)<br>(\$) |   |
|                                            |             | Item Quantity        | Units | Unit Price (\$) | Value of Bid Item (C X E)<br>(\$) | Estimated Quantity Incorporated in the Work | Value of Work Completed to Date (E X G)<br>(\$) |                                               |                                                             |                                   |                                   |   |
| <b>Change Orders</b>                       |             |                      |       |                 |                                   |                                             |                                                 |                                               |                                                             |                                   |                                   |   |
|                                            |             |                      |       |                 | -                                 |                                             | -                                               |                                               | -                                                           |                                   | -                                 |   |
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|                                            |             |                      |       |                 | -                                 |                                             | -                                               |                                               | -                                                           |                                   | -                                 |   |
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|                                            |             |                      |       |                 | -                                 |                                             | -                                               |                                               | -                                                           |                                   | -                                 |   |
|                                            |             |                      |       |                 | -                                 |                                             | -                                               |                                               | -                                                           |                                   | -                                 |   |
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|                                            |             |                      |       |                 | -                                 |                                             | -                                               |                                               | -                                                           |                                   | -                                 |   |
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|                                            |             |                      |       |                 | -                                 |                                             | -                                               |                                               | -                                                           |                                   | -                                 |   |
|                                            |             |                      |       |                 | -                                 |                                             | -                                               |                                               | -                                                           |                                   | -                                 |   |
| <b>Change Order Totals</b>                 |             |                      |       |                 | \$                                | -                                           | \$                                              | -                                             | \$                                                          | -                                 | \$                                | - |
| <b>Original Contract and Change Orders</b> |             |                      |       |                 |                                   |                                             |                                                 |                                               |                                                             |                                   |                                   |   |
| <b>Project Totals</b>                      |             |                      |       |                 | \$                                | -                                           | \$                                              | -                                             | \$                                                          | -                                 | \$                                | - |

**Stored Materials Summary**

**Contractor's Application for Payment**

|                                                                                                                                                                                                         |                                       |                                                                |                                                               |                         |                                                                                                 |                                                                                                           |                                                           |                                                             |                                                                                      |                                                                                       |                                                                                                 |                                                                                          |   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|---|
| <b>Owner:</b> East Laurel Water District<br><b>Engineer:</b> Kenvirons, LLC<br><b>Contractor:</b><br><b>Project:</b> Old Salem Rd./McWhorter Rd. System Improvements - Contract 2<br><b>Contract:</b> 2 |                                       |                                                                |                                                               |                         |                                                                                                 | <b>Owner's Project No.:</b><br><b>Engineer's Project No.:</b> 2020052<br><b>Contractor's Project No.:</b> |                                                           |                                                             |                                                                                      |                                                                                       |                                                                                                 |                                                                                          |   |
| <b>Application No.:</b> <b>Application Period:</b> <b>From</b> <b>to</b> <b>Application Date:</b>                                                                                                       |                                       |                                                                |                                                               |                         |                                                                                                 |                                                                                                           |                                                           |                                                             |                                                                                      |                                                                                       |                                                                                                 |                                                                                          |   |
| <b>A</b>                                                                                                                                                                                                | <b>B</b>                              | <b>C</b>                                                       | <b>D</b>                                                      | <b>E</b>                | <b>F</b>                                                                                        | <b>G</b>                                                                                                  | <b>H</b>                                                  | <b>I</b>                                                    | <b>J</b>                                                                             | <b>K</b>                                                                              | <b>L</b>                                                                                        | <b>M</b>                                                                                 |   |
| <b>Item No.</b><br>(Lump Sum Tab) or<br><b>Bid Item No.</b><br>(Unit Price Tab)                                                                                                                         | <b>Supplier</b><br><b>Invoice No.</b> | <b>Submittal No.</b><br>(with<br>Specification<br>Section No.) | <b>Description of Materials or</b><br><b>Equipment Stored</b> | <b>Storage Location</b> | <b>Application</b><br><b>No. When</b><br><b>Materials</b><br><b>Placed in</b><br><b>Storage</b> | <b>Materials Stored</b>                                                                                   |                                                           |                                                             | <b>Incorporated in Work</b>                                                          |                                                                                       |                                                                                                 | <b>Materials</b><br><b>Remaining in</b><br><b>Storage</b><br><b>(I-L)</b><br><b>(\$)</b> |   |
|                                                                                                                                                                                                         |                                       |                                                                |                                                               |                         |                                                                                                 | <b>Previous Amount</b><br><b>Stored</b><br><b>(\$)</b>                                                    | <b>Amount Stored this</b><br><b>Period</b><br><b>(\$)</b> | <b>Amount Stored to</b><br><b>Date (G+H)</b><br><b>(\$)</b> | <b>Amount Previously</b><br><b>Incorporated in the</b><br><b>Work</b><br><b>(\$)</b> | <b>Amount</b><br><b>Incorporated in the</b><br><b>Work this Period</b><br><b>(\$)</b> | <b>Total Amount</b><br><b>Incorporated in the</b><br><b>Work</b><br><b>(J+K)</b><br><b>(\$)</b> |                                                                                          |   |
|                                                                                                                                                                                                         |                                       |                                                                |                                                               |                         |                                                                                                 |                                                                                                           |                                                           | -                                                           |                                                                                      |                                                                                       | -                                                                                               | -                                                                                        |   |
|                                                                                                                                                                                                         |                                       |                                                                |                                                               |                         |                                                                                                 |                                                                                                           |                                                           | -                                                           |                                                                                      |                                                                                       | -                                                                                               | -                                                                                        |   |
|                                                                                                                                                                                                         |                                       |                                                                |                                                               |                         |                                                                                                 |                                                                                                           |                                                           | -                                                           |                                                                                      |                                                                                       | -                                                                                               | -                                                                                        |   |
|                                                                                                                                                                                                         |                                       |                                                                |                                                               |                         |                                                                                                 |                                                                                                           |                                                           | -                                                           |                                                                                      |                                                                                       | -                                                                                               | -                                                                                        |   |
|                                                                                                                                                                                                         |                                       |                                                                |                                                               |                         |                                                                                                 |                                                                                                           |                                                           | -                                                           |                                                                                      |                                                                                       | -                                                                                               | -                                                                                        |   |
|                                                                                                                                                                                                         |                                       |                                                                |                                                               |                         |                                                                                                 |                                                                                                           |                                                           | -                                                           |                                                                                      |                                                                                       | -                                                                                               | -                                                                                        |   |
|                                                                                                                                                                                                         |                                       |                                                                |                                                               |                         |                                                                                                 |                                                                                                           |                                                           | -                                                           |                                                                                      |                                                                                       | -                                                                                               | -                                                                                        |   |
|                                                                                                                                                                                                         |                                       |                                                                |                                                               |                         |                                                                                                 |                                                                                                           |                                                           | -                                                           |                                                                                      |                                                                                       | -                                                                                               | -                                                                                        |   |
|                                                                                                                                                                                                         |                                       |                                                                |                                                               |                         |                                                                                                 |                                                                                                           |                                                           | -                                                           |                                                                                      |                                                                                       | -                                                                                               | -                                                                                        |   |
|                                                                                                                                                                                                         |                                       |                                                                |                                                               |                         |                                                                                                 |                                                                                                           |                                                           | -                                                           |                                                                                      |                                                                                       | -                                                                                               | -                                                                                        |   |
|                                                                                                                                                                                                         |                                       |                                                                |                                                               |                         |                                                                                                 |                                                                                                           |                                                           | -                                                           |                                                                                      |                                                                                       | -                                                                                               | -                                                                                        |   |
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# CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner: East Laurel Water District  
Engineer: Kenvirons, LLC  
Contractor:  
Project: Old Salem Rd./McWhorter Rd. System Improvements – Contract 2  
Contract Name:

Owner's Project No.:  
Engineer's Project No.: 2020052  
Contractor's Project No.:

This ☐ Preliminary ☐ Final Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

Date of Substantial Completion: \_\_\_\_\_

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work must be as provided in the Contract, except as amended as follows:

Amendments to Owner's Responsibilities: ☐ None ☐ As follows:

Amendments to Contractor's Responsibilities: ☐ None ☐ As follows:

The following documents are attached to and made a part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Engineer

By (*signature*): \_\_\_\_\_

Name (*printed*): \_\_\_\_\_

Title: \_\_\_\_\_



## NOTICE OF ACCEPTABILITY OF WORK

Owner: East Laurel Water District

Engineer: Kenvirons, LLC

Contractor:

Project: Old Salem Rd./McWhorter Rd. System Improvements – Contract 2

Contract Name:

Notice Date:

Owner's Project No.:

Engineer's Project No.: 2020052

Contractor's Project No.:

Effective Date of the Construction Contract:

The Engineer hereby gives notice to the Owner and Contractor that Engineer recommends final payment to Contractor, and that the Work furnished and performed by Contractor under the Construction Contract is acceptable, expressly subject to the provisions of the Construction Contract's Contract Documents ("Contract Documents") and of the Agreement between Owner and Engineer for Professional Services dated **[date of professional services agreement]** ("Owner-Engineer Agreement"). This Notice of Acceptability of Work (Notice) is made expressly subject to the following terms and conditions to which all who receive and rely on said Notice agree:

1. This Notice has been prepared with the skill and care ordinarily used by members of the engineering profession practicing under similar conditions at the same time and in the same locality.
2. This Notice reflects and is an expression of the Engineer's professional opinion.
3. This Notice has been prepared to the best of Engineer's knowledge, information, and belief as of the Notice Date.
4. This Notice is based entirely on and expressly limited by the scope of services Engineer has been employed by Owner to perform or furnish during construction of the Project (including observation of the Contractor's Work) under the Owner-Engineer Agreement, and applies only to facts that are within Engineer's knowledge or could reasonably have been ascertained by Engineer as a result of carrying out the responsibilities specifically assigned to Engineer under such Owner-Engineer Agreement.
5. This Notice is not a guarantee or warranty of Contractor's performance under the Construction Contract, an acceptance of Work that is not in accordance with the Contract Documents, including but not limited to defective Work discovered after final inspection, nor an assumption of responsibility for any failure of Contractor to furnish and perform the Work thereunder in accordance with the Contract Documents, or to otherwise comply with the Contract Documents or the terms of any special guarantees specified therein.
6. This Notice does not relieve Contractor of any surviving obligations under the Construction Contract, and is subject to Owner's reservations of rights with respect to completion and final payment.

Engineer

By *(signature)*: \_\_\_\_\_

Name *(printed)*: JD Sims, P.E. \_\_\_\_\_

Title: Project Engineer \_\_\_\_\_





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



Endorsed By



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# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

## ARTICLE 1—DEFINITIONS AND TERMINOLOGY

### 1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. 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, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
  3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
  4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
  5. *Bidder*—An individual or entity that submits a Bid to Owner.
  6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
  7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
  8. *Change Order*—A document 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, or other revision to the Contract, issued on or after the Effective Date of the Contract.
  9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
  10. *Claim*
    - a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision



by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.

- b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.
  - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
  - d. A demand for money or services by a third party is not a Claim.
11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.
13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.
15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
17. *Cost of the Work*—See Paragraph 13.01 for definition.
18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions,

including sending and receipt; (c) printing of the transmitted Electronic Document by the recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.
23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.
- a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
  - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
  - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
29. *Notice to Proceed*—A written notice 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.
30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing,

commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.
36. *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.
37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
38. *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, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
40. *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.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
42. *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 of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
45. *Supplier*—A manufacturer, fabricator, supplier, distributor, 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 a Subcontractor.
46. *Technical Data*
- a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
  - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
  - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
48. *Unit Price Work*—Work to be paid for on the basis of unit prices.
49. *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; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

## 1.02 Terminology

- A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives*: 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 Article 10 or any other provision of the Contract Documents.
- C. *Day*: The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective*: The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
  - 1. does not conform to the Contract Documents;
  - 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
  - 3. 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 15.03 or Paragraph 15.04).
- E. *Furnish, Install, Perform, Provide*
  - 1. The word “furnish,” when used in connection with services, materials, or equipment, means 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, means 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, means to furnish and install said services, materials, or equipment complete and ready for intended use.
  - 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four

words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

- F. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. 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 Performance and Payment Bonds; Evidence of Insurance***

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.
- C. *Evidence of Owner’s Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

### **2.02 *Copies of Documents***

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

### **2.03 *Before Starting Construction***

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), 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;
  - 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.

#### 2.04 *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 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, 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 and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

#### 2.05 *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 the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will 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 the component parts of the Work.
  4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

#### 2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.
- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems,

or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

## **ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE**

### **3.01 *Intent***

- A. The Contract Documents are complementary; what is required by one Contract Document 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.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.
- G. Nothing in the Contract Documents creates:
  - 1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
  - 2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

### **3.02 *Reference Standards***

- A. *Standards Specifications, Codes, Laws and Regulations*
  - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract 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, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or



instruction shall be effective to assign to Owner or Engineer 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 part of the Contract Documents prepared by or for Engineer.

### 3.03 *Reporting and Resolving Discrepancies*

#### A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
2. *Contractor's Review of Contract Documents:* If, before or 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) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) 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 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
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 part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
  - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); 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 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will

be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

### 3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers 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 versions, or 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; or
  - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

## **ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK**

### 4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract 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 Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

### 4.02 *Starting the Work*

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

### 4.03 *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.

#### 4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 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 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
  - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

#### 4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, 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 Contract Price or Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
  - 1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
  - 2. Abnormal weather conditions;
  - 3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
  - 4. Acts of war or terrorism.

- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
  2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
  3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.
- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
1. The circumstances that form the basis for the requested adjustment;
  2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
  3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
  4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
  5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.
- Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.
- G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

## **ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS**

### **5.01 *Availability of Lands***

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing 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.
- 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 permanent improvements are to be made 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.

### **5.02 *Use of Site and Other Areas***

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

- 1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
- 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, 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 any such claim, and against all 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 directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the

Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will 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 and adjacent areas 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 of 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 structures or land to stresses or pressures that will endanger them.

#### 5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
  - 1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
  - 2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
  - 3. Technical Data contained in such reports and drawings.
- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.
- C. *Reliance by Contractor on Technical Data:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.
- D. *Limitations of Other Data and Documents:* Except for such reliance on 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;
  - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;

3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

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

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;
2. is of such a nature as to require a change in the Drawings or Specifications;
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 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

**E. Possible Price and Times Adjustments**

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, 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 fall within any one or more of the categories described in Paragraph 5.04.A;
  - 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 Paragraph 13.03; and,
  - c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
  - a. Contractor knew of the existence of such condition at the time Contractor made a 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 otherwise;
  - b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
  - c. Contractor failed to give the written notice required by Paragraph 5.04.A.
3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

**F. Underground Facilities; Hazardous Environmental Conditions:** Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

**5.05 Underground Facilities**

- A. Contractor's Responsibilities:** Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:
1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;



2. complying with applicable state and local utility damage prevention Laws and Regulations;
  3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
  4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
  5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then 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 7.15), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
  2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
  3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
  4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

**F. Possible Price and Times Adjustments**

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
  - a. 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 Paragraph 13.03;
  - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
  - c. Contractor gave the notice required in Paragraph 5.05.B.
2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

**5.06 Hazardous Environmental Conditions at Site**

**A. Reports and Drawings:** The Supplementary Conditions identify:

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
3. Technical Data contained in such reports and drawings.

**B. Reliance by Contractor on Technical Data Authorized:** Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on 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;
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 removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) 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 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. 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, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- H. 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, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

- I. 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, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. 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 failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

## **ARTICLE 6—BONDS AND INSURANCE**

### **6.01 *Performance, Payment, and Other Bonds***

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.
- B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

- Regulations, and must be issued and signed by a surety named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond 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 must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
  - E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
  - F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner’s termination rights under Article 16.
  - G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
  - H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

## 6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Alternative forms of insurance coverage, including but not limited to self-insurance and “Occupational Accident and Excess Employer’s Indemnity Policies,” are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be

purchased and maintained by Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.
- H. Contractor shall require:
  - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
  - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
- I. If either party does not purchase or maintain the insurance required of such party by the Contract, 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.
- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent

insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

#### 6.03 Contractor's Insurance

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 as supplemented must:
  - 1. include at least the specific coverages required;
  - 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
  - 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;
  - 4. apply with respect to the performance of the Work, whether such performance is 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; and
  - 5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds:* The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
  - 1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
  - 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;

3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);
4. not seek contribution from insurance maintained by the additional insured; and
5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

#### 6.04 *Builder's Risk and Other Property Insurance*

- A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.
- C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.
- D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.
- E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

#### 6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any



loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the 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, risks, 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 Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, 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.
  2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.
1. 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 all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.
- C. The waivers in this Paragraph 6.05 include the waiver of rights 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 insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, 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 fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

#### 6.06 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

### **ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES**

#### 7.01 *Contractor's Means and Methods of Construction*

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

#### 7.02 *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.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

#### 7.03 *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 maintain good discipline and order at the Site.

- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. 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 will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

#### 7.04 *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, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will 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 must 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.

#### 7.05 *"Or Equals"*

- A. *Contractor's Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item 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 is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.
  - 1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
    - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
      - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
  - 3) has a proven record of performance and availability of responsive service; and
  - 4) is not objectionable to Owner.
- b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
  - 2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
- D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

#### 7.06 Substitutes

- A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.
1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.
3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:
  - a. will certify that the proposed substitute item will:
    - 1) perform adequately the functions and achieve the results called for by the general design;
    - 2) be similar in substance to the item specified; and
    - 3) be suited to the same use as the item specified.
  - b. will state:
    - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;
    - 2) 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
    - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
  - c. will identify:
    - 1) all variations of the proposed substitute item from the item specified; and
    - 2) available engineering, sales, maintenance, repair, and replacement services.
  - d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. 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.

- E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

#### 7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

- G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

#### **7.08 *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 an 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 will be disclosed 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.

#### 7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. 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 the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

#### 7.10 *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.

#### 7.11 *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. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and 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 such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

#### 7.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all



approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

**7.13 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.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. 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, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.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 at its expense (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).
- E. 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.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.

- H. 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.
- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

#### 7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as 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.

#### 7.15 *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 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 by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

#### 7.16 *Submittals*

##### A. *Shop Drawing and Sample Requirements*

1. Before submitting a Shop Drawing or Sample, Contractor shall:
  - a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
  - b. determine and verify:
    - 1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;
    - 2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
    - 3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
  - c. confirm that the Submittal is complete with respect to all related data included in the Submittal.

2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.
  3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. *Shop Drawings*
    - a. Contractor shall submit the number of copies required in the Specifications.
    - b. Data shown on the Shop Drawings must 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 7.16.C.
  2. *Samples*
    - a. Contractor shall submit the number of Samples required in the Specifications.
    - b. Contractor shall 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 7.16.C.
  3. 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. *Engineer's Review of Shop Drawings and Samples*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. 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, comply with the requirements of 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, or to safety precautions or programs incident thereto.
  3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
  4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of

Paragraph 7.16.A.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 will document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

*D. Resubmittal Procedures for Shop Drawings and Samples*

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.
2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

*E. Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs*

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
  - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
  - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.

- c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.
  - d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

**7.17 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 is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
  - 1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
  - 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
  - 1. abuse, or improper modification, 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.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
  - 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;
  6. The issuance of a notice of acceptability by Engineer;
  7. The end of the correction period established in Paragraph 15.08;
  8. Any inspection, test, or approval by others; or
  9. Any correction of defective Work by Owner.
- E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

#### 7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, 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 losses, damages, costs, and judgments (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 from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage 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 7.18.A will 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.

#### 7.19 *Delegation of Professional Design Services*

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional.

Such design professional must issue all certifications of design required by Laws and Regulations.

- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.
- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
  - 1. Checking for conformance with the requirements of this Paragraph 7.19;
  - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
  - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

## **ARTICLE 8—OTHER WORK AT THE SITE**

### **8.01 *Other Work***

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. 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.

- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, 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.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

#### 8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
  - 1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
  - 2. An itemization of the specific matters to be covered by such authority and responsibility; and
  - 3. The extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

#### 8.03 *Legal Relationships*

- A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or



interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.
  - 1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.
  - 2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) 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 any such claims, and against all 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 damage, delay, disruption, or interference.

## **ARTICLE 9—OWNER'S RESPONSIBILITIES**

### **9.01   *Communications to Contractor***

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

### **9.02   *Replacement of Engineer***

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

9.03 *Furnish Data*

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

9.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *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.

9.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *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 (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

- 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.

- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

## **ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION**

### **10.01 *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.

### **10.02 *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 10.07. 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.

### **10.03 *Resident Project Representative***

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.
- B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

### **10.04 *Engineer's Authority***

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.

- D. Engineer's authority as to changes in the Work is set forth in Article 11.
- E. Engineer's authority as to Applications for Payment is set forth in Article 15.

**10.05 *Determinations for Unit Price Work***

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

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

- A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

**10.07 *Limitations on Engineer's Authority and Responsibilities***

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, 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, will 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 Contractor under Paragraph 15.06.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 10.07 also apply to the Resident Project Representative, if any.

**10.08 *Compliance with Safety Program***

- A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

## ARTICLE 11—CHANGES TO THE CONTRACT

### 11.01 *Amending and Supplementing the Contract*

- A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
- B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.
- C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

### 11.02 *Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
  - 1. Changes in 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;
  - 2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
  - 3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and
  - 4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

### 11.03 *Work Change Directives*

- A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

- B. If Owner has issued a Work Change Directive and:
  - 1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
  - 2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

#### 11.04 *Field Orders*

- A. Engineer may authorize minor changes in the Work if the changes 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. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

#### 11.05 *Owner-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. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

#### 11.06 *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, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

#### 11.07 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of

Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.

B. 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, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit will 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 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
  - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 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 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
  - d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
  - e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and

- f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

#### 11.08 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.
- B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

#### 11.09 *Change Proposals*

- A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

- B. *Change Proposal Procedures*

- 1. *Submittal:* Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
- 2. *Supporting Data:* The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.
  - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.
  - b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

- 3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding



the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.

4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
  5. *Binding Decision:* Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion:* Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

#### 11.10 *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.

## ARTICLE 12—CLAIMS

### 12.01 *Claims*

- A. *Claims Process:* The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:
1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
  2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;
  3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and

4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation*
  1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.
  2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.
  3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

## ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

### 13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work:* The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
  2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included:* Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will 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 in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will 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 accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will 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, which 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 will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.
5. Other costs consisting of 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, 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.
    - 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.
  - c. *Construction Equipment Rental*
    - 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.
    - 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
    - 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed 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 builder's risk or other property insurance established in accordance with Paragraph 6.04), 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 include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will 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 communication 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 that Contractor is required by the Contract Documents to purchase and maintain.

**C. *Costs Excluded:*** The term Cost of the Work does not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals, general 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 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
- 2. The cost of purchasing, renting, or furnishing small tools and hand tools.
- 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 5. 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.
- 6. Expenses incurred in preparing and advancing Claims.
- 7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

**D. *Contractor's Fee***

- 1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
  - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.

- b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
    - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
    - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
  - 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.
- E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

### 13.02 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*: Contractor agrees that:
  - 1. 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
  - 2. 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 for any of the foregoing will be valid.
- C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's 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 for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

### 13.03 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. Payments to Contractor for Unit Price Work will be based on actual quantities.
- 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. 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, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

- 1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
  - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
  - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
- 2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
- 3. Adjusted unit prices will apply to all units of that item.

## **ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK**

### **14.01 *Access to Work***

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction 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 with such procedures and programs as applicable.

### **14.02 *Tests, Inspections, and Approvals***

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.
- 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, obtaining, and paying for all inspections and tests required:
  - 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
  - 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
  - 3. by manufacturers of equipment furnished under the Contract Documents;
  - 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
  - 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.
- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. 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. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

#### 14.03 Defective Work

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not



fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

- E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

#### 14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages 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. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

#### 14.05 *Uncovering Work*

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then 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, and provide all necessary labor, material, and equipment.
  - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages 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 pending Contractor's full discharge of this

responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. 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, 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, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

#### 14.06 *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, then 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 will 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.

#### 14.07 *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 defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, 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, 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 incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. 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 14.07.

## **ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD**

### **15.01 *Progress Payments***

A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *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.
2. 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 must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, 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 13.03, 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; 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;
  - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
  - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
  - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; 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 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
  - a. the Work is defective, requiring correction or replacement;

- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
- d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
- e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

**D. *Payment Becomes Due***

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

**E. *Reductions in Payment by Owner***

- 1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
  - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
  - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
  - c. Contractor has failed to provide and maintain required bonds or insurance;
  - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
  - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
  - f. The Work is defective, requiring correction or replacement;
  - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
  - h. The Contract Price has been reduced by Change Orders;
  - i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
  - j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

- k. 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; or
  - l. Other items entitle Owner to a set-off against the amount recommended.
- 2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, 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, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
  - 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

#### 15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

#### 15.03 *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 and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- 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 preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting

such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. 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 punch list.

#### 15.04 *Partial Use or Occupancy*

- 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. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be 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 15.03.A through 15.03.E for that part of the Work.
  - 2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work 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 15.03 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 6.04 regarding builder's risk or other property insurance.

#### 15.05 *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, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### 15.06 *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, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.
  2. The final Application for Payment must be accompanied (except as previously delivered) by:
    - a. all documentation called for in the Contract Documents;
    - b. consent of the surety, if any, to final payment;
    - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
    - d. a list of all duly pending Change Proposals and Claims; and
    - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
  3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) 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, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. *Engineer's Review of Final Application and Recommendation of Payment:* 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 have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present



the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. 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. *Notice of Acceptability*: In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due*: Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

#### 15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim, appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.
- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

#### 15.08 *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 Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
  - 1. correct the defective repairs to the Site or such adjacent areas;
  - 2. correct such defective Work;
  - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
  - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.

- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.
- C. If, after receipt of a notice of defect within 60 days and within the correction period, 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. Contractor shall pay all 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). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. 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.
- E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, 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.
- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

## **ARTICLE 16—SUSPENSION OF WORK AND TERMINATION**

### **16.01 *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 written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

### **16.02 *Owner May Terminate for Cause***

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and 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);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
  3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
  4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:
1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
  2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, 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 complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.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 the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds 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.
- F. 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, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

#### 16.03 *Owner May Terminate for Convenience*

- A. Upon 7 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; and
  - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

#### 16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 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 16.03.
- 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, 7 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 are not intended to preclude Contractor from submitting a Change Proposal 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 17—FINAL RESOLUTION OF DISPUTES**

#### 17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this article:
  - 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and
  - 2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.

- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this article, Owner or Contractor may:
1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;
  2. agree with the other party to submit the dispute to another dispute resolution process; or
  3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

## **ARTICLE 18—MISCELLANEOUS**

### **18.01 *Giving Notice***

- A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
  2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
  3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

### **18.02 *Computation of Times***

- A. When any period of time is referred to in the Contract 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.

### **18.03 *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. 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.

### **18.04 *Limitation of Damages***

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Assignment of Contract*

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

18.09 *Successors and Assigns*

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

18.10 *Headings*

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

# **SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT**

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# **SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT**

These Supplementary Conditions amend or supplement EJCDC® C-700, Standard General Conditions of the Construction Contract (2018). The General Conditions remain in full force and effect except as amended.

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—for example, "Paragraph SC-4.05."

## **ARTICLE 1—DEFINITIONS AND TERMINOLOGY**

### **1.01 Defined Terms**

#### **SC-1.01.A.8 – Add the following at the end of the Paragraph:**

**The Change Order form to be used on this Project is EJCDC C-941 (2018). Agency approval is required before Change Orders are effective.**

#### **SC-1.01.A.30 – Add the following at the end of the Paragraph:**

**For the purposes of Rural Development, this term is synonymous with the term “applicant” as defined in 7 CFR 1780.7 (a) (1), (2) and (3) and is an entity receiving financial assistance from the federal programs.**

#### **SC-1.01.A.50 – Add the following at the end of the Paragraph:**

**The Work Change Directive form to be used on this Project is EJCDC C-940 (2018). Agency approval is required before a Work Change Directive is issued.**

#### **SC-1.01.A.51 – Add the following new paragraph immediately after Paragraph 1.01.A.50:**

**51. 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-1.01.A.52 – Add the following new paragraph with the title “Domestic Preference Definitions” immediately after Paragraph 1.01.A.51:**

**52.a *Build America, Buy America Act (BABAA)* – Requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (IIJA), Pub. L. 117-58, §§ 70901- 70953-58 mandating domestic preference that all iron and steel, manufactured products, and construction materials are produced in the United States, in accordance with 2 CFR part 184.**

**52.b *Construction Materials* – Those articles, materials, or supplies — other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives— that are or consist primarily of: non-ferrous metals, plastic and polymerbased products, glass, lumber or drywall.**

**52.c *Contractor’s Certification* – A certification submitted by Contractor that, to the best of the Contractor’s knowledge and belief, all Work complies with Domestic Preference requirements.**

**52.d *De Minimis* – Materials and products that represent a small portion of an infrastructure project, specifically no more than 5% of the project costs up to a maximum of \$1,000,000,**

**52.e *Domestic Preference* – The Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act (IIJA), Pub. L. 117-58, §§ 70901-70953.**

**52.f *Engineer’s Certification* – Documentation submitted by the Engineer that Drawings, Specifications, and Bidding Documents comply with Domestic Preference requirements.**

**52.g *Manufactured Product* – Items assembled out of components, or otherwise made or processed from raw materials into finished products. Manufactured products must be manufactured (assembled) in the United States, and the cost of components that were mined, produced, or manufactured in the United States must be greater than 55 percent of the total cost of all components of the product.**

**52.h *Manufacturer’s Certification* – Documentation provided by the Manufacturer stating that Domestic Preference requirements have been satisfied for all provided items. Manufacturers’ Certifications must include (at a minimum): specific list of products (using common names) associated with the certificate, location of the final manufacturing, signature of the manufacturer’s representative, and a reference to the Domestic Preference statute. If items are purchased via a Supplier, distributor, vendor, etc. from the**

Manufacturer directly, then the Supplier, distributor, vendor, etc. will be responsible for obtaining and providing these certifications to the parties purchasing the products.

**52.i Minor Components** - Components within an iron and/or steel product otherwise compliant with the Domestic Preference requirements. This waiver, typically used by Manufacturers, allows use of non-domestically produced miscellaneous Minor Components comprising up to five percent of the total material cost of an otherwise domestically produced iron and steel product. However, unless a separate waiver for a product has been approved, all other iron and steel components in said product must still meet the Domestic Preference requirements. This waiver does not exempt the whole product from the Domestic Preference requirements only Minor Components within said product and the iron or steel components of the product must be produced domestically.

**52.j Primarily Iron or Steel** - A product is made of greater than 50 percent iron or Steel on a materials cost basis.

## ARTICLE 2—PRELIMINARY MATTERS

### 2.01 *Delivery of Bonds and Evidence of Insurance*

SC-2.01 Delete Paragraphs 2.01.B. and C. in their entirety and insert the following in their place:

- B. *Evidence of Contractor's Insurance:* When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner copies of the policies (including all endorsements, and identification of applicable self-insured retentions and deductibles) of insurance required to be provided by Contractor in this Contract. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- C. *Evidence of Owner's Insurance:* After receipt from Contractor of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor copies of the policies of insurance to be provided by Owner in this Contract (if any). Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

### 2.02 *Copies of Documents*

~~SC 2.02 Amend the first sentence of Paragraph 2.02.A. to read as follows:~~

~~Owner shall furnish to Contractor [number]five printed copies of the Contract Documents (including one fully signed counterpart of the Agreement), and [one copy] [none] in electronic portable document format (PDF).~~

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

- A. Owner shall furnish to Contractor **five (5)** printed copies of conformed Contract Documents incorporating and integrating all Addenda and any amendments negotiated prior to the Effective Date of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies of the conformed Contract Documents will be furnished upon request at the cost of reproduction.

~~2.06—Electronic Transmittals~~

SC-2.06 Delete Paragraphs 2.06.B and 2.06.C in their entirety and insert the following in their place:

- B. ~~Electronic Documents Protocol:~~ The parties shall conform to the following provisions in Paragraphs 2.06.B and 2.06.C, together referred to as the Electronic Documents Protocol (“EDP” or “Protocol”) for exchange of electronic transmittals.

~~1.—Basic Requirements~~

- a. ~~To the fullest extent practical, the parties agree to and will transmit and accept Electronic Documents in an electronic or digital format using the procedures described in this Protocol. Use of the Electronic Documents and any information contained therein is subject to the requirements of this Protocol and other provisions of the Contract.~~
- b. ~~The contents of the information in any Electronic Document will be the responsibility of the transmitting party.~~
- c. ~~Electronic Documents as exchanged by this Protocol may be used in the same manner as the printed versions of the same documents that are exchanged using non-electronic format and methods, subject to the same governing requirements, limitations, and restrictions, set forth in the Contract Documents.~~
- d. ~~Except as otherwise explicitly stated herein, the terms of this Protocol will be incorporated into any other agreement or subcontract between a party and any third party for any portion of the Work on the Project, or any Project-related services, where that third party is, either directly or indirectly, required to exchange Electronic Documents with a party or with Engineer. Nothing herein will modify the requirements of the Contract regarding communications between and among the parties and their subcontractors and consultants.~~
- e. ~~When transmitting Electronic Documents, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the receiving party’s use of software application packages, operating systems, or computer hardware differing from those established in this Protocol.~~
- f. ~~Nothing herein negates any obligation 1) in the Contract to create, provide, or maintain an original printed record version of Drawings and Specifications,~~

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EJCDC® C-800, Supplementary Conditions of the Construction Contract.

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Modified to include RD edits from RUS Bulletin 1780-26 (6/16/2020).

~~signed and sealed according to applicable Laws and Regulations; 2) to comply with any applicable Law or Regulation governing the signing and sealing of design documents or the signing and electronic transmission of any other documents; or 3) to comply with the notice requirements of Paragraph 18.01 of the General Conditions.~~

~~2. System Infrastructure for Electronic Document Exchange~~

- ~~a. Each party will provide hardware, operating system(s) software, internet, e-mail, and large file transfer functions ("System Infrastructure") at its own cost and sufficient for complying with the EDP requirements. With the exception of minimum standards set forth in this EDP, and any explicit system requirements specified by attachment to this EDP, it is the obligation of each party to determine, for itself, its own System Infrastructure.~~
  - ~~1) The maximum size of an email attachment for exchange of Electronic Documents under this EDP is [number] MB. Attachments larger than that may be exchanged using large file transfer functions or physical media.~~
  - ~~2) Each Party assumes full and complete responsibility for any and all of its own costs, delays, deficiencies, and errors associated with converting, translating, updating, verifying, licensing, or otherwise enabling its System Infrastructure, including operating systems and software, for use with respect to this EDP.~~
- ~~b. Each party is responsible for its own system operations, security, back-up, archiving, audits, printing resources, and other Information Technology ("IT") for maintaining operations of its System Infrastructure during the Project, including coordination with the party's individual(s) or entity responsible for managing its System Infrastructure and capable of addressing routine communications and other IT issues affecting the exchange of Electronic Documents.~~
- ~~c. Each party will operate and maintain industry standard, industry accepted, ISO standard, commercial grade security software and systems that are intended to protect the other party from: software viruses and other malicious software like worms, trojans, adware; data breaches; loss of confidentiality; and other threats in the transmission to or storage of information from the other parties, including transmission of Electronic Documents by physical media such as CD/DVD/flash drive/hard drive. To the extent that a party maintains and operates such security software and systems, it shall not be liable to the other party for any breach of system security.~~
- ~~d. In the case of disputes, conflicts, or modifications to the EDP required to address issues affecting System Infrastructure, the parties shall cooperatively resolve the issues; but, failing resolution, the Owner is authorized to make and require reasonable and necessary changes to the EDP to effectuate its original intent. If the changes cause additional cost or time to Contractor, not reasonably anticipated under the original EDP, Contractor may seek an adjustment in price or time under the appropriate process in the Contract.~~

- e. ~~Each party is responsible for its own back-up and archive of documents sent and received during the term of the contract under this EDP, unless this EDP establishes a Project document archive, either as part of a mandatory Project website or other communications protocol, upon which the parties may rely for document archiving during the specified term of operation of such Project document archive. Further, each party remains solely responsible for its own post-Project back-up and archive of Project documents after the term of the Contract, or after termination of the Project document archive, if one is established, for as long as required by the Contract and as each party deems necessary for its own purposes.~~
- f. ~~If a receiving party receives an obviously corrupted, damaged, or unreadable Electronic Document, the receiving party will advise the sending party of the incomplete transmission.~~
- g. ~~The parties will bring any non-conforming Electronic Documents into compliance with the EDP. The parties will attempt to complete a successful transmission of the Electronic Document or use an alternative delivery method to complete the communication.~~
- h. ~~The Owner will operate a Project information management system (also referred to in this EDP as "Project Website") for use of Owner, Engineer and Contractor during the Project for exchange and storage of Project-related communications and information. Except as otherwise provided in this EDP or the General Conditions, use of the Project Website by the parties as described in this Paragraph will be mandatory for exchange of Project documents, communications, submittals, and other Project-related information. The following conditions and standards will govern use of the Project Website:~~
  - 1) ~~Describe the period of time during which the Project Website will be operated and be available for reliance by the parties;~~
  - 2) ~~Provide any minimum system infrastructure, software licensing and security standards for access to and use of the Project Website;~~
  - 3) ~~Describe the types and extent of services to be provided at the Project Website (such as large file transfer, email, communication and document archives, etc.); and~~
  - 4) ~~Include any other Project Website attributes that may be pertinent to Contractor's use of the facility and pricing of such use.~~

~~G. Software Requirements for Electronic Document Exchange; Limitations~~

- 1. ~~Each party will acquire the software and software licenses necessary to create and transmit Electronic Documents and to read and to use any Electronic Documents received from the other party (and if relevant from third parties), using the software formats required in this section of the EDP.~~
  - a. ~~Prior to using any updated version of the software required in this section for sending Electronic Documents to the other party, the originating party will first notify and receive concurrence from the other party for use of the updated version or adjust its transmission to comply with this EDP.~~

- ~~2. The parties agree not to intentionally edit, reverse engineer, decrypt, remove security or encryption features, or convert to another format for modification purposes any Electronic Document or information contained therein that was transmitted in a software data format, including Portable Document Format (PDF), intended by sender not to be modified, unless the receiving party obtains the permission of the sending party or is citing or quoting excerpts of the Electronic Document for Project purposes.~~
- ~~3. Software and data formats for exchange of Electronic Documents will conform to the requirements set forth in Exhibit A to this EDP, including software versions, if listed.~~

~~SC-2.06 Supplement Paragraph 2.06 of the General Conditions by adding the following paragraph:~~

~~D. *Requests by Contractor for Electronic Documents in Other Formats*~~

- ~~1. Release of any Electronic Document versions of the Project documents in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be at the sole discretion of the Owner.~~
- ~~2. To extent determined by Owner, in its sole discretion, to be prudent and necessary, release of Electronic Documents versions of Project documents and other Project information requested by Contractor ("Request") in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be subject to the provisions of the Owner's response to the Request, and to the following conditions to which Contractor agrees:~~
  - ~~a. The content included in the Electronic Documents created by Engineer and covered by the Request was prepared by Engineer as an internal working document for Engineer's purposes solely, and is being provided to Contractor on an "AS IS" basis without any warranties of any kind, including, but not limited to any implied warranties of fitness for any purpose. As such, Contractor is advised and acknowledges that the content may not be suitable for Contractor's application, or may require substantial modification and independent verification by Contractor. The content may include limited resolution of models, not to scale schematic representations and symbols, use of notes to convey design concepts in lieu of accurate graphics, approximations, graphical simplifications, undocumented intermediate revisions, and other devices that may affect subsequent reuse.~~
  - ~~b. Electronic Documents containing text, graphics, metadata, or other types of data that are provided by Engineer to Contractor under the request are only for convenience of Contractor. Any conclusion or information obtained or derived from such data will be at the Contractor's sole risk and the Contractor waives any claims against Engineer or Owner arising from use of data in Electronic Documents covered by the Request.~~
  - ~~c. Contractor shall indemnify and hold harmless Owner and Engineer and their subconsultants from all claims, damages, losses, and expenses, including attorneys' fees and defense costs arising out of or resulting from Contractor's~~

~~use, adaptation, or distribution of any Electronic Documents provided under the Request.~~

- ~~d. Contractor agrees not to sell, copy, transfer, forward, give away or otherwise distribute this information (in source or modified file format) to any third party without the direct written authorization of Engineer, unless such distribution is specifically identified in the Request and is limited to Contractor's subcontractors. Contractor warrants that subsequent use by Contractor's subcontractors complies with all terms of the Contract Documents and Owner's response to Request.~~
- ~~3. In the event that Owner elects to provide or directs the Engineer to provide to Contractor any Contractor requested Electronic Document versions of Project information that is not explicitly identified in the Contract Documents as being available to Contractor, the Owner shall be reimbursed by Contractor on an hourly basis (at \$[number] per hour) for any engineering costs necessary to create or otherwise prepare the data in a manner deemed appropriate by Engineer.~~

### **ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE**

#### **3.01 *Intent***

SC-3.01 Delete Paragraph 3.01.C in its entirety.

### **ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK**

#### **4.01 *Commencement of Contract Times; Notice to Proceed***

**SC-4.01.A – Delete the paragraph, and replace with:**

- A. The Contract Times will commence on the day indicated in the Notice to Proceed. The Notice to Proceed date must be no later than 30 days after the Effective Date of the Contract. The Owner must issue a Notice to Proceed”.**

#### **4.05 *Delays in Contractor's Progress***

**SC-4.05.C.5 Paragraph is mandatory for WWD projects.**

SC-4.05.C.5 Amend Paragraph 4.05.C by adding the following subparagraphs:

- 5. *Weather-Related Delays***

- a. If “abnormal weather conditions” as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract Times, such request must be documented by data substantiating each of the following: 1) that weather conditions were abnormal for the period of time in which the delay occurred, 2) that such weather conditions could not have been reasonably anticipated, and 3) that such weather conditions had an adverse effect on the Work as scheduled. **Extreme or unusual weather that is typical for a given region, elevation, or season should not be considered abnormal weather conditions. Requests for time extensions due to abnormal weather conditions will be submitted to the Engineer within five days of the end of the abnormal weather condition event. It is the responsibility of the Contractor to provide the information listed in SC 4.05.C.5.b.**
- b. The existence of abnormal weather conditions will be determined on a month-by-month basis in accordance with the following:
- 1) Every workday on which one or more of the following conditions exist will be considered a “bad weather day”:
    - i) Total precipitation (as rain equivalent) occurring between 7:00 p.m. on the preceding day (regardless of whether such preceding day is a workday) through 7:00 p.m. on the workday in question equals or exceeds **1 inch** of precipitation (as rain equivalent, based on the snow/rain conversion indicated in the table entitled Foreseeable Bad Weather Days; such table is hereby incorporated in this SC-4.05.C by reference.
    - ii) Ambient outdoor air temperature at 11:00 a.m. is equal to or less than the following low temperature threshold: **32** degrees Fahrenheit; or, at 3:00 p.m. the ambient outdoor temperature is equal to or greater than the following high temperature threshold: **100** degrees Fahrenheit.
  - 2) Determination of actual bad weather days during performance of the Work will be based on the weather records measured and recorded by **the National Weather Service.**
  - 3) Contractor shall anticipate the number of foreseeable bad weather days per month indicated in the table in **Exhibit B — Foreseeable Bad Weather Days.**
  - 4) In each month, every bad weather day exceeding the number of foreseeable bad weather days established in the table in **Exhibit B — Foreseeable Bad Weather Days** will be considered as “abnormal weather conditions.” The existence of abnormal weather conditions will not relieve Contractor of the obligation to demonstrate and document that delays caused by abnormal weather are specific to the planned work activities or that such activities thus delayed were on Contractor’s then-current Progress Schedule’s critical path for the Project.



## ARTICLE 5—SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS

### 5.03 Subsurface and Physical Conditions

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

- E. The following table lists the reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data, and specifically identifies the Technical Data in the report upon which Contractor may rely:

| Report Title | Date of Report | Technical Data |
|--------------|----------------|----------------|
| N/A          |                |                |
|              |                |                |
|              |                |                |

- F. The following table lists the drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data, and specifically identifies the Technical Data upon which Contractor may rely:

| Drawings Title | Date of Drawings | Technical Data |
|----------------|------------------|----------------|
| N/A            |                  |                |
|                |                  |                |
|                |                  |                |

- ~~G. Contractor may examine copies of reports and drawings identified in SC 5.03.E and SC 5.03.F that were not included with the Bidding Documents at [location] during regular business hours, or may request copies from Engineer.~~

### 5.06 Hazardous Environmental Conditions

SC-5.06 Add the following new paragraphs immediately after Paragraph 5.06.A.3:

4. The following table lists the reports known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and the Technical Data (if any) upon which Contractor may rely:

| Report Title | Date of Report | Technical Data |
|--------------|----------------|----------------|
| N/A          |                |                |
|              |                |                |
|              |                |                |

5. The following table lists the drawings known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and Technical Data (if any) contained in such Drawings upon which Contractor may rely:

| Drawings Title | Date of Drawings | Technical Data |
|----------------|------------------|----------------|
| N/A            |                  |                |
|                |                  |                |
|                |                  |                |

## ARTICLE 6—BONDS AND INSURANCE

### 6.01 *Performance, Payment, and Other Bonds*

#### **SC-6.01 – Disregard EJCDC Guidance Notes – Performance and Payment Bonds, Note 1. Performance and Payment Bonds are required for WWD projects.**

SC-6.01 Add the following paragraphs immediately after Paragraph 6.01.A:

1. *Required Performance Bond Form:* The performance bond that Contractor furnishes will be in the form of EJCDC® C-610, Performance Bond (2010, 2013, or 2018 edition).
2. *Required Payment Bond Form:* The payment bond that Contractor furnishes will be in the form of EJCDC® C-615, Payment Bond (2010, 2013, or 2018 edition).

**SC-6.01 – EJCDC Guidance Notes – “Other Bonds,” Warranty Bond, Note 1. RD does not require a Warranty Bond, and RD will not accept a Warranty Bond in place of a Performance and Payment Bond. The decision to include a Warranty Bond is made by the Owner and their counsel. Please refer to EJCDC for guidance.**

~~SC-6.01 Add the following paragraphs immediately after Paragraph 6.01.B:~~

- ~~1. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be [number—either 2, 3, or other] years after Substantial Completion.~~
- ~~2. After Substantial Completion, Contractor shall furnish a warranty bond issued in the form of EJCDC® C-612, Warranty Bond (2018). The warranty bond must be in a bond amount of [number—either 10, 15, or other] percent of the final Contract Price. The warranty bond period will extend to a date [number—either 2, 3, or other] years after Substantial Completion of the Work. Contractor shall deliver the fully executed warranty bond to Owner prior to or with the final application for payment, and in any event no later than 11 months after Substantial Completion.~~
- ~~3. The warranty bond must be issued by the same surety that issues the performance bond required under Paragraph 6.01.A of the General Conditions.~~

## 6.02 Insurance—General Provisions

SC-6.02 Add the following paragraph immediately after Paragraph 6.02.B:

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the Project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

~~SC 6.02 Add the following paragraph immediately after Paragraph 6.02.H.2 of the General Conditions:~~

- ~~3. For the following Subcontractors, Suppliers, or categories of Subcontractor or Supplier, Contractor shall require the following specified insurance, with policy limits as stated: **[Identify Subcontractors, Suppliers, or categories of same, and insert specific insurance requirements and policy limits]**~~

## 6.03 Contractor's Insurance

SC 6.03 Add the following new paragraph immediately after Paragraph 6.03.C:

D. The limits of liability for insurance required by Paragraph 6.03 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 6.03.A.1 and A.2 of the General Conditions:

|                                                     |            |
|-----------------------------------------------------|------------|
| a. State:                                           | Statutory  |
| b. Federal, if applicable<br>(e.g., Longshoremen's) | Statutory  |
| c. Employer's Liability                             | \$ 500,000 |

2. Contractor's General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody, and control of the Contractor:

|                                                              |              |
|--------------------------------------------------------------|--------------|
| a. General Aggregate                                         | \$ 2,000,000 |
| b. Products - Completed<br>Operations Aggregate              | \$ 1,000,000 |
| c. Personal and Advertising<br>Injury                        | \$ 1,000,000 |
| d. Each Occurrence<br>(Bodily Injury and<br>Property Damage) | \$ 1,000,000 |

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EJCDC® C-800, Supplementary Conditions of the Construction Contract.

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Modified to include RD edits from RUS Bulletin 1780-26 (6/16/2020).

- e. Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where applicable.
  - f. Excess or Umbrella Liability
    - 1) General Aggregate \$ 5,000,000
    - 2) Each Occurrence \$ 5,000,000
3. Automobile Liability under Paragraph 6.03.D of the General Conditions:
- a. Bodily Injury:
    - Each Person \$ 1,000,000
    - Each Accident \$ 1,000,000
  - b. Property Damage:
    - Each Accident \$ 1,000,000
  - c. Combined Single Limit of \$ 1,000,000
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 \$ 2,000,000
    - Each Accident \$ 2,000,000
  - b. Property Damage:
    - Each Accident \$ 2,000,000
    - Annual Aggregate \$ 2,000,000

#### ~~6.04 Builder's Risk and Other Property Insurance~~

~~SC 6.04 Delete Paragraph 6.04.A and insert the following in its place:~~

- ~~A. Owner shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.~~

~~SC 6.04 Supplement Paragraph 6.04 of the General Conditions with the following provisions:~~

- ~~F. **Builder's Risk Requirements:** The builder's risk insurance must:~~
  - ~~1. be written on a builder's risk "all risk" policy form that at a minimum includes insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment stored and in transit, and must not exclude the coverage of the following risks: fire; windstorm; hail; flood; earthquake, volcanic activity, and other earth movement; lightning; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; and water damage (other than that caused by flood).~~

- a. ~~Such policy will include an exception that results in coverage for ensuing losses from physical damage or loss with respect to any defective workmanship, methods, design, or materials exclusions.~~
- b. ~~If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake, volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance will be provided through other insurance policies acceptable to Owner and Contractor.~~
- 2. ~~cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.~~
- 3. ~~cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of contractors, engineers, and architects).~~
- 4. ~~extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier). If this coverage is subject to a sublimit, such sublimit will be a minimum of \$[amount].~~
- 5. ~~extend to cover damage or loss to insured property while in transit. If this coverage is subject to a sublimit, such sublimit will be a minimum of \$[amount].~~
- 6. ~~allow for the waiver of the insurer's subrogation rights, as set forth in this Contract.~~
- 7. ~~allow for partial occupancy or use by Owner by endorsement, and without cancellation or lapse of coverage.~~
- 8. ~~include performance/hot testing and start up, if applicable.~~
- 9. ~~be maintained in effect until the Work is complete, as set forth in Paragraph 15.06.D of the General Conditions, or until written confirmation of Owner's procurement of property insurance following Substantial Completion, whichever occurs first.~~
- 10. ~~include as named insureds the Owner, Contractor, Subcontractors (of every tier), and any other individuals or entities required by this Contract to be insured under such builder's risk policy. For purposes of Paragraphs 6.04, 6.05, and 6.06 of the General Conditions, and this and all other corresponding Supplementary Conditions, the parties required to be insured will be referred to collectively as "insureds." In addition to Owner, Contractor, and Subcontractors of every tier, include as insureds the following:~~

- a. ~~[Here list by legal name (not category, role, or classification) other persons or entities to be included on the builder's risk policy as named insureds. It is generally recommended to list the insured's full legal/contractual name, address, contact person, telephone, and e-mail address. Include only persons or entities that have property at the Site that is to be insured by the builder's risk insurance. If applicable, separately identify any mortgagee or lender required to be named as a loss payee.]~~
- 11. ~~include, in addition to the Contract Price amount, the value of the following equipment and materials to be installed by the Contractor but furnished by the Owner or third parties:~~
  - a. ~~[Here list or provide cross-reference to specific items of Owner-furnished (or third-party furnished) equipment, and purchase value; do not list items whose value is already included in the Contract Price.]~~
- 12. ~~If debris removal in connection with repair or replacement of insured property is subject to a coverage sublimit, such sublimit will be a minimum of \$[amount].~~
- 13. ~~In addition to the coverage sublimits stated above, the following coverages are also subject to sublimits, as follows:~~
  - a. ~~[Here list a specific coverage, or cause of loss, that has been determined to be likely to be subject to a sublimit. If not applicable, then delete Paragraph SC-6.04.F.13 in its entirety.] If this coverage is subject to a sublimit, such sublimit will be a minimum of \$[amount].~~

SC-6.04 — Supplement Paragraph 6.04 of the General Conditions with the following provision:

- G. ~~Coverage for Completion Delays:~~ The builder's risk policy will include, for the benefit of Owner, loss of revenue and soft cost coverage for losses arising from delays in completion that result from covered physical losses or damage. Such coverage will include, without limitation, fixed expenses and debt service for a minimum of 12 months with a maximum deductible of 30 days, compensation for loss of net revenues, rental costs, and attorneys' fees and engineering or other consultants' fees, if not otherwise covered.

SC-6.04 — Supplement Paragraph 6.04 of the General Conditions with the following provisions:

- H. ~~Builder's Risk and Other Property Insurance Deductibles:~~ The purchaser of any required builder's risk, installation floater, or other property insurance will be responsible for costs not covered because of the application of a policy deductible.
  - 1. ~~The builder's risk policy (or if applicable the installation floater) will be subject to a deductible amount of no more than \$[number] for direct physical loss in any one occurrence.~~

SC-6.04 — Delete Paragraph 6.04.A of the General Conditions and substitute the following in its place:

A. *Installation Floater*

- ~~1. Contractor shall provide and maintain installation floater insurance on a broad form or "all risk" policy providing coverage for materials, supplies, machinery, fixtures, and equipment that will be incorporated into the Work ("Covered Property"). Coverage under the Contractor's installation floater will include loss from covered "all risk" causes (perils) to Covered Property:~~
  - ~~a. of the Contractor, and Covered Property of others that is in Contractor's care, custody, and control;~~
  - ~~b. while in transit to the Site, including while at temporary storage sites;~~
  - ~~c. while at the Site awaiting and during installation, erection, and testing;~~
  - ~~d. continuing at least until the installation or erection of the Covered Property is completed, and the Work into which it is incorporated is accepted by Owner.~~
- ~~2. The installation floater coverage cannot be contingent on an external cause or risk, or limited to property for which the Contractor is legally liable.~~
- ~~3. The installation floater coverage will be in an amount sufficient to protect Contractor's interest in the Covered Property. The Contractor will be solely responsible for any deductible carried under this coverage.~~
- ~~4. This policy will include a waiver of subrogation applicable to Owner, Contractor, Engineer, all Subcontractors, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them.~~

## ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

### ~~7.03 Labor; Working Hours~~

~~SC 7.03 Add the following new subparagraphs immediately after Paragraph 7.03.C:~~

- ~~1. Regular working hours will be [Here insert schedule of regular working hours].~~
- ~~2. Owner's legal holidays are [Here insert list of legal holidays].~~

~~SC 7.03 Amend the first and second sentences of Paragraph 7.03.C to state "...all Work at the Site must be performed during regular working hours, [day of the week] through [day of the week]. Contractor will not perform Work on a [day of the week], [day of the week], or any legal holiday."~~

~~SC 7.03 Delete Paragraph 7.03.C in its entirety, and insert the following:~~

- ~~C. In the absence of any Laws or Regulations to the contrary, Contractor may perform the Work on holidays, during any or all hours of the day, and on any or all days of the week, at Contractor's sole discretion.~~

~~SC-7.03 – Add the following new paragraph immediately after Paragraph 7.03.C:~~

~~D. **[Contractor] [Owner] [choose one and delete the other]** shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.~~

~~SC-7.03 – Add the following new subparagraph immediately after Paragraph SC-7.03.D:~~

~~1. For purposes of administering the foregoing requirement, additional overtime costs are defined as **[Here insert parameters for compensated overtime hours]**.~~

#### 7.04 *Services, Materials, and Equipment*

**SC-7.04.D – Add the following new paragraph immediately after Paragraph 7.04.C:**

**D. All products must meet Domestic Preference requirements.**

**SC-7.04.E – Add the following new paragraph immediately after Paragraph 7.04.D:**

**E. For projects utilizing a *De Minimis* waiver, Contractor shall maintain an itemized list of non-domestically produced components and ensure that the cost is less than 5% of total project cost for project up to a maximum of \$1,000,000.**

#### 7.05 *“Or Equals”*

**SC-7.05.A – Amend the third sentence of paragraph by striking out the following words:**

**Unless the specification or description contains or is followed by words reading that no like, equivalent, or “or-equal” item is permitted,**

**SC-7.05.A.1.a.3 – Amend the last sentence of Paragraph a.3 by striking out “and;” and adding a period at the end of Paragraph a.3.**

**SC-7.05.A.1.a.4 – Delete paragraph in its entirety and insert “Deleted.”**

**SC-7.05.B – Add the following at the end of paragraph:**

**Contractor shall include a Manufacturer's Certification letter for compliance with Domestic Preference requirements and supporting data, as applicable.**



**Refer to Sample Language for Manufacturer's Certification provided in these Contract Documents.**

**7.06**   *Substitutes*

**SC-7.06.A.3.a.2 – Remove “and” from the end of paragraph.**

**SC-7.06.A.3.a.3 – Add “; and” to the end of paragraph.**

**SC-7.06.A.3.a.4 – Add the following new paragraph immediately after Paragraph 7.06.A.3.a.3:**

**4. Comply with Domestic Preference requirements by providing Manufacturer's Certification or waiver, as applicable. Refer to Sample Language for Manufacturers' Certification provided in these Contract Documents.**

**7.07**   *Concerning Subcontractors and Suppliers*

**SC-7.07.A – Amend by adding the following to the end of the paragraph:**

**The total amount of work subcontracted by the Contractor shall not exceed fifty percent of the Contract price without prior approval from the Owner, Engineer and Agency.**

**SC-7.07.B – Delete paragraph in its entirety and insert "Deleted".**

**SC-7.07.E – Delete the second sentence of paragraph and insert the following in its place:  
Owner may not require that Contractor use a specific replacement.**

**7.10**   ~~*Taxes*~~

~~**SC 7.10 – Add a new paragraph immediately after Paragraph 7.10.A:**~~

- ~~A. Owner is exempt from payment of sales and compensating use taxes of the State of [name of state where Project is located] and of cities and counties thereof on all materials to be incorporated into the Work.~~
- ~~1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.~~
  - ~~2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.~~

## 7.12 *Record Documents*

**SC-7.12.A** Amend paragraph by adding the following after “written interpretations and clarifications,”:

**Manufacturers’ Certifications,**

## ~~7.13 *Safety and Protection*~~

~~SC-7.13~~ Insert the following after the second sentence of Paragraph 7.13.G:

~~The following Owner safety programs are applicable to the Work: [Here expressly identify by title and/or date, any such Owner safety programs. If Owner’s safety programs are included in or addressed in the Specifications, SC-7.13 may be used to provide a cross-reference to the Specification section].~~

## 7.16 *Submittals*

**SC-7.16.A.1.c** – Amend paragraph by deleting the last period and adding:

**, including Manufacturer’s Certification or waiver for any item in the submittal subject to Domestic Preference requirements. Refer to the Sample Language for Manufacturers’ Certification provided in these Contract Documents.**

**SC-7.16.C.9** – Add new paragraph immediately after Paragraph 7.16.C.8:

**9. Engineer’s review and approval of a Shop Drawing or Sample shall include review of Manufacturers’ Certifications and any waivers in order to document compliance with Domestic Preference requirements, as applicable.**

## 7.17 *Contractor’s General Warranty and Guarantee*

**SC-7.17.F** – Add new paragraph immediately after Paragraph 7.17.E:

**F. Contractor shall certify prior to final payment that all Work and Materials have complied with Domestic Preference requirements. Contractor shall provide Certification to Owner and Engineer. Refer to the Sample Language for Contractor’s Certification provided in these Contract Documents.**

## **ARTICLE 8—OTHER WORK AT THE SITE**

### ~~8.02 *Coordination*~~

~~SC 8.02 Add the following new Paragraph 8.02.C immediately after Paragraph 8.02.B:~~

- ~~C. Owner intends to contract with others for the performance of other work at or adjacent to the Site.~~
- ~~1. **[Here identify individual or entirety]** shall have authority and responsibility for coordination of the various contractors and work forces at the Site;~~
  - ~~2. The following specific matters are to be covered by such authority and responsibility: **[Here itemize such matters];**~~
  - ~~3. The extent of such authority and responsibilities is: **[Here provide the extent].**~~

## **ARTICLE 9—OWNER’S RESPONSIBILITIES**

### ~~9.13 Owner’s Site Representative~~

~~SC 9.13 Add the following new paragraph immediately after Paragraph 9.12 of the General Conditions:~~

### ~~9.13 Owner’s Site Representative~~

- ~~A. Owner will furnish an “Owner’s Site Representative” to represent Owner at the Site and assist Owner in observing the progress and quality of the Work. The Owner’s Site Representative is not Engineer’s consultant, agent, or employee. Owner’s Site Representative will be **[here identify individual or entity]**. The authority and responsibilities of Owner’s Site Representative follow: **[Here describe the duties and activities of the Owner’s Site Representative.]**~~

## **ARTICLE 10—ENGINEER’S STATUS DURING CONSTRUCTION**

### *10.03 Resident Project Representative*

~~SC-10.03 Add the following new subparagraph immediately after Paragraph 10.03.A:~~

- ~~1. On this Project, by agreement with the Owner, the Engineer will not furnish a Resident Project Representative to represent Engineer at the Site or assist Engineer in observing the progress and quality of the Work.~~

~~SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.B:~~

- ~~C. The Resident Project Representative (RPR) will be Engineer's representative at the Site. RPR's dealings in matters pertaining to the Work in general will be with Engineer and Contractor. RPR's dealings with Subcontractors will only be through or with the full knowledge or approval of Contractor. The RPR will:~~
- ~~1. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings (but not including Contractor’s safety meetings), and as appropriate prepare and circulate copies of minutes thereof.~~

2. *Safety Compliance:* Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.
  3. *Liaison*
    - a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.
    - b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.
    - c. Assist in obtaining from Owner additional details or information, when required for Contractor's proper execution of the Work.
  4. *Review of Work; Defective Work*
    - a. Conduct on-Site observations of the Work to assist Engineer in determining, to the extent set forth in Paragraph 10.02, if the Work is in general proceeding in accordance with the Contract Documents.
    - b. Observe whether any Work in place appears to be defective.
    - c. Observe whether any Work in place should be uncovered for observation, or requires special testing, inspection or approval.
  5. *Inspections and Tests*
    - a. Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to those performed by public or other agencies having jurisdiction over the Work.
    - b. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Work.
  6. *Payment Requests:* Review Applications for Payment with Contractor.
  7. *Completion*
    - a. Participate in Engineer's visits regarding Substantial Completion.
    - b. Assist in the preparation of a punch list of items to be completed or corrected.
    - c. Participate in Engineer's visit to the Site in the company of Owner and Contractor regarding completion of the Work, and prepare a final punch list of items to be completed or corrected by Contractor.
    - d. Observe whether items on the final punch list have been completed or corrected.
- D. The RPR will not:
1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
  2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
  3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction.
- 5 Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
7. Authorize Owner to occupy the Project in whole or in part.

## **ARTICLE 11—CHANGES TO THE CONTRACT**

ARTICLE 11 – Delete the sentence “No suggested Supplementary Conditions in this Article.”

### *11.02 Change Orders*

**SC-11.02.C – Add new paragraph immediately after Paragraph 11.02.B:**

**C. The Engineer or Owner shall contact the Agency for concurrence on each Change Order prior to issuance. All Contract Change Orders must be concurred on (signed) by Agency before they are effective.**

### *11.03 Work Change Directives*

**SC-11.03.A.2 - Add new Paragraph 11.03.A.2 immediately after Paragraph 11.03.A, which shall be renamed Paragraph 11.03.A.1:**

**2. The Engineer or Owner shall contact the Agency for concurrence on each Work Change Directive prior to issuance. Once authorized by Owner, a copy of each Work Change Directive shall be provided by Engineer to the Agency.**

### *11.05 Owner Authorized Changes in the Work*

**SC-11.05.B – Add the following at the end of this paragraph:**

**For Owner-authorized changes in the Work, the Contractor will provide the Manufacturer’s Certification, or waiver, for materials subject to Domestic Preference requirements except when sole-source is specified, in which case the Engineer will provide the Manufacturer’s Certification, or waiver.**

### *11.09 Change Proposals*

**SC-11.09.B.2.c – Add new paragraph immediately after Paragraph 11.09.B.2.b:**

c. For change orders involving materials subject to Domestic Preference requirements, Contractor shall include a Manufacturer's Certification or waiver, as applicable. Refer to the Sample Language for Manufacturer's Certification provided in these Contract Documents.

## ARTICLE 12—CLAIMS

No suggested Supplementary Conditions in this Article.

## ARTICLE 13—COST OF WORK; ALLOWANCES, UNIT PRICE WORK

### 13.01 *Cost of the Work*

~~SC-13.01 Supplement Paragraph 13.01.B.5.c.(2) by adding the following sentence:~~

~~The equipment rental rate book that governs the included costs for the rental of machinery and equipment owned by Contractor (or a related entity) under the Cost of the Work provisions of this Contract is the most current edition of [name of equipment rental rate book].~~

SC-13.01 Supplement Paragraph 13.01.C.2 by adding the following definition of small tools and hand tools:

- a. For purposes of this paragraph, "small tools and hand tools" means any tool or equipment whose current price if it were purchased new at retail would be less than \$500.

### 13.02 *Allowances*

**SC-13.02.C – Delete paragraph in its entirety and insert "Deleted".**

### 13.03 *Unit Price Work*

**SC-13.03 Delete Paragraph 13.03.E in its entirety and insert the following in its place:**

**E. *Adjustments in Unit Price***

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
  - a. the extended price of a particular item of Unit Price Work amounts to [number] percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than [number] percent from the estimated quantity of such item indicated in the Agreement; and

- b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

#### **ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK**

ARTICLE 14 – Delete the sentence “No suggested Supplementary Conditions in this Article.”

##### **14.03 *Defective Work***

**SC-14.03.G – Add new paragraph immediately after Paragraph 14.03.F:**

**G. Installation of materials that are non-compliant with Domestic Preference requirements shall be considered defective work. Contractor should ensure that Engineer has an approved Manufacturer's Certification, or waiver, prior to any domestic preference compliant item being delivered to the project site.**

#### **ARTICLE 15—PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD**

##### **15.01 *Progress Payments***

**SC-15.01.B.4 – Add the following language at the end of 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-15.01.B.5 – Add new paragraph immediately after Paragraph 15.01.B.4:**

**5. The Application for Payment form to be used on this Project is EJCDC® C-620. The Agency must approve all Applications for Payment before payment is made.**

**SC-15.01.B.6 – Add new paragraph immediately after Paragraph 15.01.B.5:**

**6. By submitting an Application for Payment, based in whole or in part on furnishing equipment or materials, Contractor certifies that such equipment and materials are compliant with Domestic Preference requirements. Manufacturer's Certification for material(s) satisfy these requirements. Refer to**

**the Sample Language for Manufacturer's Certification provided in these Contract Documents.**

**SC-15.01.C.2.d – Add the following new paragraph immediately after Paragraph 15.01.C.2.c:**

**d. The materials presented for payment in an Application for Payment comply with Domestic Preference requirements.**

**SC-15.01.D.1 – Delete paragraph in its entirety and insert the following in its place:**

**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.**

**SC-15.01** Add the following new Paragraph 15.01.F:

- F. For contracts in which the Contract Price is based on the Cost of Work, if Owner determines that progress payments made to date substantially exceed the actual progress of the Work (as measured by reference to the Schedule of Values), or present a potential conflict with the Guaranteed Maximum Price, then Owner may require that Contractor prepare and submit a plan for the remaining anticipated Applications for Payment that will bring payments and progress into closer alignment and take into account the Guaranteed Maximum Price (if any), through reductions in billings, increases in retainage, or other equitable measures. Owner will review the plan, discuss any necessary modifications, and implement the plan as modified for all remaining Applications for Payment.

**15.02** *Contractor's Warranty of Title*

**SC-15.02.A – Amend paragraph by striking out the following text: "7 days after".**

**15.03** *Substantial Completion*

**SC-15.03.A – Modify by adding the following after the last sentence:**

**Contractor shall also submit the Contractor's Certification of Compliance certifying that to the best of the Contractor's knowledge and belief all Iron and Steel products, Manufactured Products, and Construction Materials proposed**



**in the Shop Drawings, Change Orders, and Partial Payment Estimates, and those installed for the Project, comply with Domestic Preference requirements.**

SC-15.03 Add the following new subparagraph to Paragraph 15.03.B:

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, will be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under this Article 15.

~~15.08 *Correction Period*~~

~~SC-15.08 Add the following new Paragraph 15.08.G:~~

- ~~G. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be the number of years set forth in SC-6.01.B.1; or if no such revision has been made in SC-6.01.B, then the correction period is hereby specified to be [number] years after Substantial Completion.~~

**ARTICLE 16—SUSPENSION OF WORK AND TERMINATION**

No suggested Supplementary Conditions in this Article.

**ARTICLE 17—FINAL RESOLUTIONS OF DISPUTES**

*17.02 Arbitration*

SC-17.02 Add the following new paragraph immediately after Paragraph 17.01.

*17.02 Arbitration*

- A. All matters subject to final resolution under this Article will be settled by arbitration administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules (subject to the conditions and limitations of this Paragraph SC-17.02). Any controversy or claim in the amount of \$100,000 or less will be settled in accordance with the American Arbitration Association's supplemental rules for Fixed Time and Cost Construction Arbitration. This agreement to arbitrate will be specifically enforceable under the prevailing law of any court having jurisdiction.
- B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitration administrator, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the specific time required in Article 17, or if no specified time is applicable within a reasonable time after the matter in question has arisen, and in no event will any such demand be made after

the date when institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations.

- C. The arbitrator(s) must be licensed engineers, contractors, attorneys, or construction managers. Hearings will take place pursuant to the standard procedures of the Construction Arbitration Rules that contemplate in-person hearings. The arbitrators will have no authority to award punitive or other damages not measured by the prevailing party's actual damages, except as may be required by statute or the Contract. Any award in an arbitration initiated under this clause will be limited to monetary damages and include no injunction or direction to any party other than the direction to pay a monetary amount.
- D. The Arbitrators will have the authority to allocate the costs of the arbitration process among the parties, but will only have the authority to allocate attorneys' fees if a specific Law or Regulation or this Contract permits them to do so.
- E. The award of the arbitrators must be accompanied by a reasoned written opinion and a concise breakdown of the award. The written opinion will cite the Contract provisions deemed applicable and relied on in making the award.
- F. The parties agree that failure or refusal of a party to pay its required share of the deposits for arbitrator compensation or administrative charges will constitute a waiver by that party to present evidence or cross-examine witness. In such event, the other party shall be required to present evidence and legal argument as the arbitrator(s) may require for the making of an award. Such waiver will not allow for a default judgment against the non-paying party in the absence of evidence presented as provided for above.
- G. No arbitration arising out of or relating to the Contract will include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:
  - 1. the inclusion of such other individual or entity will allow complete relief to be afforded among those who are already parties to the arbitration;
  - 2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration, and which will arise in such proceedings;
  - 3. such other individual or entity is subject to arbitration under a contract with either Owner or Contractor, or consents to being joined in the arbitration; and
  - 4. the consolidation or joinder is in compliance with the arbitration administrator's procedural rules.
- H. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.
- I. Except as may be required by Laws or Regulations, neither party nor an arbitrator may disclose the existence, content, or results of any arbitration hereunder without the prior written consent of both parties, with the exception of any disclosure required by Laws and Regulations or the Contract. To the extent any disclosure is allowed

pursuant to the exception, the disclosure must be strictly and narrowly limited to maintain confidentiality to the extent possible.

### 17.03 Attorneys' Fees

SC-17.03 Add the following new paragraph immediately after Paragraph 17.02. [Note: If there is no Paragraph 17.02, because neither arbitration nor any other dispute resolution process has been specified here in the Supplementary Conditions, then revise this to state "Add the following new Paragraph immediately after Paragraph 17.01" and revise the numbering accordingly].

### 17.03 Attorneys' Fees

- A. For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings, in an equitable amount to be determined in the discretion of the court, arbitrator, arbitration panel, or other arbiter of the matter subject to final resolution, taking into account the parties' initial demand or defense positions in comparison with the final result.

## ARTICLE 18—MISCELLANEOUS

### ~~18.08 Assignment of Contract~~

~~SC 18.08 Add the following new paragraph immediately after Paragraph 18.08.A:~~

- ~~B. The contract dated **[date]** between Owner as "buyer" and **[identify seller]** as "seller" for procurement of goods and special services ("procurement contract") **[is hereby]** **[will be]** assigned to Contractor by Owner, and Contractor **[accepts]** **[will accept]** such assignment. A form documenting the assignment is attached as an exhibit to this Contract.~~
  - ~~1. This assignment will occur on the **[Effective Date of the Contract]**, and will relieve the Owner as "buyer" from all further obligations and liabilities under the procurement contract.~~
  - ~~2. Upon assignment, the "seller" will be a Subcontractor or Supplier of the Contractor, and Contractor will be responsible for seller's performance, acts, and omissions, as set forth in Paragraph 7.07 of the General Conditions just as Contractor is responsible for all other Subcontractors and Suppliers.~~
  - ~~3. Notwithstanding this assignment, all performance guarantees and warranties required by the procurement contract will continue to run for the benefit of the Owner and, in addition, for the benefit of the Contractor.~~
  - ~~4. Except as noted in the procurement contract, all rights, duties and obligations of Engineer to "buyer" and "seller" under the procurement contract will cease **[upon the assignment to Contractor]**.~~

**SC-18.11 – Add new paragraph immediately after Paragraph 18.10:**

**18.11      *Tribal Sovereignty***

**A. No provision of this Agreement will be construed by any of the signatories as abridging or debilitating any sovereign powers of the East Band of Cherokee Indians and Cherokee Nation Tribes; affecting the trust-beneficiary relationship between the Secretary of the Interior, Tribe, and Indian landowner(s); or interfering with the government-to-government relationship between the United States and the Tribe.**

**SC-19 – Add the following new Article 19 immediately after Article 18:**

**Article 19 - FEDERAL REQUIREMENTS**

**19.01      *Agency Not a Party***

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

**19.02      *Contract Approval***

**A. Owner and Contractor will furnish Owner's attorney such evidence as required so that Owner's attorney can complete and execute the "Certificate of Owner's Attorney" before Owner submits the executed Contract Documents to Agency for approval. Refer to Certificate of Owner's Attorney and Agency Concurrence provided in these Contract Documents. B. Agency concurrence is required on both the Bid and the Contract before the Contract is effective.**

**19.03      *Conflict of Interest***

**A. Contractor may not knowingly contract with a Supplier or Manufacturer if the individual or entity who prepared the Drawings 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 or other interest in or a tangible personal benefit from the Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.**

#### **19.04     *Gratuities***

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

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

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.

#### **19.05 *Small, Minority and Women's Businesses***

A. If Contractor intends to let any subcontracts for a portion of the work, Contractor will take all necessary affirmative steps to assure that minority businesses, women's business enterprises, and labor surplus area firms are used when possible. Affirmative steps will include:

1. Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
2. Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;
3. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises;
4. Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises;
5. Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.

#### **19.06     *Anti-Kickback***

A. Contractor shall comply with the Copeland Anti-Kickback Act (40 U.S.C. 3145) as supplemented by Department of Labor regulations (29 CFR part 3, "Contractors and Subcontractors on Public Buildings or Public Works

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EJCDC® C-800, Supplementary Conditions of the Construction Contract.

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Modified to include RD edits from RUS Bulletin 1780-26 (6/16/2020).

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.

**19.07      *Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended***

A. Contractor to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251- 1387). Violations must be reported to the federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

**19.08      *Equal Employment Opportunity***

A. The Contract is considered a federally assisted construction contract. Except as otherwise provided under 41 CFR part 60, all contracts that meet the definition of “federally assisted construction contract” in 41 CFR part 60-1.3 must include the equal opportunity clause provided under 41 CFR 60-1.4(b), in accordance with Executive Order 11246, “Equal Employment Opportunity” (30 FR 12319, 12935, 3 CFR part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, “Amending Executive Order 11246 Relating to Equal Employment Opportunity,” and implementing regulations at 41 CFR part 60, “Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor.”

**19.09      *Byrd Anti-Lobbying Amendment (31 U.S.C. 1352)***

A. Contractors that apply or bid for an award exceeding \$100,000 must file the required certification (RD Instruction 1940-Q Exhibit A-1). The Contractor certifies to the Owner and every subcontractor certifies to the Contractor 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, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining the Contract if it is covered by 31 U.S.C. 1352. The Contractor and every subcontractor must also disclose any lobbying with non-federal funds that takes place in connection with obtaining any federal award. Such disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.

## **19.10 Environmental Requirements**

**A. 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 - Applicants shall ensure that Contractors maintain a copy of the following inadvertent discovery plan onsite for review:**

**a. If during the course of any ground disturbance related to any Project, any post review discovery, including but not limited to, any artifacts, foundations, or other indications of past human occupation of the area are uncovered, shall be protected by complying with 36 CFR § 800.13(b)(3) and (c) and shall include the following:**

**i. All Work, including vehicular traffic, shall immediately stop within a 50 ft. radius around the area of discovery. The Contractor shall ensure barriers are established to protect the area of discovery and notify the Engineer to contact the appropriate RD personnel. The Engineer shall engage a Secretary of the Interior (SOI) qualified professional archeologist to quickly assess the nature and scope of the discovery; implement interim measures to protect the discovery from looting and vandalism; and establish broader barriers if further historic and/or precontact properties, can reasonably be expected to occur.**

**ii. The RD personnel shall notify the appropriate RD environmental staff member, the Federal Preservation Officer (FPO), and State Historic Preservation Office (SHPO) immediately. Indian tribe(s) or Native Hawaiian Organization (NHOs) that have an interest in the area of discovery shall be contacted immediately. The SHPO may require additional tribes or NHOs who may have an interest in the area of discovery also be contacted. The notification shall include an assessment of the discovery provided by the SOI qualified professional archeologist.**

iii. When the discovery contains burial sites or human remains, the Contractor shall immediately notify the appropriate RD personnel who will contact the RD environmental staff member, FPO, and the SHPO. The relevant law enforcement authorities shall be immediately contacted by onsite personnel to reduce delay times, in accordance with tribal, state, or local laws including 36 CFR Part 800.13; 43 CFR Part 10, Subpart B; and the Advisory Council on Historic Preservation's Policy Statement Regarding treatment of Burial Sites, Human Remains, or Funerary Objects (February 23, 2007).

iv. When the discovery contains burial sites or human remains, all construction activities, including vehicular traffic shall stop within a 100 ft. radius of the discovery and barriers shall be established. The evaluation of human remains shall be conducted at the site of discovery by a SOI qualified professional. Remains that have been removed from their primary context and where that context may be in question may be retained in a secure location, pending further decisions on treatment and disposition. RD may expand this radius based on the SOI professional's assessment of the discovery and establish broader barriers if further subsurface burial sites, or human remains can reasonably be expected to occur. RD, in consultation with the SHPO and interested tribes or NHOs, shall develop a plan for the treatment of native human remains.

v. Work may continue in other areas of the undertaking where no historic properties, burial sites, or human remains are present. If the inadvertent discovery appears to be a consequence of illegal activity such as looting, the onsite personnel shall contact the appropriate legal authorities immediately if the landowner has not already done so.

vi. Work may not resume in the area of the discovery until a notice to proceed has been issued by RD. RD shall not issue the notice to proceed until it has determined that the appropriate local protocols and consulting parties have been consulted.

vii. Inadvertent discoveries on federal and tribal land shall follow the processes required by the federal or tribal entity.

**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:**

The project shall be in compliance with all requirements noted in the Governor's Office for Local Development letter dated 10/27/2023, from Ms. Lee Nalley.

The design and construction shall be in compliance with the requirements of the U.S. Fish and Wildlife Service as requested by letter dated 09/19/2022, and signed by Jennifer Garland, Field Supervisor.

The line design and construction shall be accomplished in a way that will leave flood plains and farmland without effect after construction is complete. The Army Corps of Engineers Nationwide Permit No. 58 applies to all floodplain and wetland utility line construction.

Any excavation by Contractor that uncovers a historical or archaeological artifact shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Office (SHPO).

The design and construction shall be in compliance with all local, state and federal environmental statutes, regulations and executive orders applicable to the project.

The following best management practices will be implemented during the construction of the project. This list is not exhaustive, but covers commonly implemented practices, especially when working in close proximity to a river or stream:

- Perform equipment maintenance away from streams, water bodies, and ditch lines whenever possible. Fuel storage shall be contained in an area away from the river bank and above the Ordinary High Water mark.
- Minimize the area to be disturbed.
- Seed and mulch disturbed areas in a timely manner.
- Install silt fences/straw bales to contain sediment transport.
- Install riprap and/or erosion control blankets on steep slopes.
- Construct diversion ditches, silt checks, check dams, and/or sediment traps where needed to minimize the transport of sediment into water bodies.

- Stabilize soil embankments using vegetative cover or riprap.

The project, as proposed, has been evaluated to be consistent with the National Environmental Policy Act. Other Federal, State, tribal, and local laws, regulations and/or permits may apply or be required. If the project or any project element deviates from or is modified from the originally approved project, additional environmental review may be required.

#### **19.11      *Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708)***

A. Where applicable, for contracts awarded by the Owner in excess of \$100,000 that involve the employment of mechanics or laborers, the Contractor will comply with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, the Contractor will compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic will be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

#### **19.12      *Debarment and Suspension (Executive Orders 12549 and 12689)***

A. A contract award (see 2 CFR 180.220) must not be made to parties listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), "Debarment and Suspension." SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

#### **19.13      *Procurement of recovered materials***

A. The Contractor will comply with 2 CFR Part 200.322, "Procurement of recovered materials."

#### **19.14      *Domestic Preference***

A. Build America, Buy America Act (BABAA). All Iron and Steel Products, Manufactured Products, and Construction Materials used in this project must comply with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (IIJA), Pub.

**L. 117-58, §§ 70901-70953. Aggregates such as stone, sand, or gravel do not apply to BABAA**

**B. The following waivers apply to this Contract:**

- 1. BABAA *De Minimis*, Small Grants and Minor Components**
- 2. [add project specific waivers as applicable].**

**19.15 Telecommunications and Video Surveillance Services or Equipment Prohibitions**

**A. The telecommunication and video surveillance services and equipment prohibitions under 2 CFR 200.216 apply to this contract. This contract may not be used to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. Covered telecommunications equipment is:**

- 1. Telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).**
- 2. Video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).**
- 3. Telecommunications or video surveillance services provided by such entities or using such equipment.**
- 4. Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.**

**EXHIBIT A—SOFTWARE REQUIREMENTS FOR ELECTRONIC DOCUMENT EXCHANGE**

| Item  | Electronic Documents                                                                                                                                                                                                                                                                                       | Transmittal Means             | Data Format | Note (1) |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------|----------|
| a-1   | General communications, transmittal covers, meeting notices and responses to general information requests for which there is no specific prescribed form.                                                                                                                                                  | Email                         | Email       |          |
| a-2   | Meeting agendas, meeting minutes, RFI's and responses to RFI's, and Contract forms.                                                                                                                                                                                                                        | Email w/<br>Attachment        | PDF         | (2)      |
| a-3   | Contractors Submittals (Shop Drawings, "or equal" requests, substitution requests, documentation accompanying Sample submittals and other submittals) to Owner and Engineer, and Owner's and Engineer's responses to Contractor's Submittals, Shop Drawings, correspondence, and Applications for Payment. | Email w/<br>Attachment        | PDF         |          |
| a-4   | Correspondence; milestone and final version Submittals of reports, layouts, Drawings, maps, calculations and spreadsheets, Specifications, Drawings and other Submittals from Contractor to Owner or Engineer and for responses from Engineer and Owner to Contractor regarding Submittals.                | Email w/<br>Attachment or LFE | PDF         |          |
| a-5   | Layouts and drawings to be submitted to Owner for future use and modification.                                                                                                                                                                                                                             | Email w/<br>Attachment or LFE | DWG         |          |
| a-6   | Correspondence, reports and Specifications to be submitted to Owner for future word processing use and modification.                                                                                                                                                                                       | Email w/<br>Attachment or LFE | DOC         |          |
| a-7   | Spreadsheets and data to be submitted to Owner for future data processing use and modification.                                                                                                                                                                                                            | Email w/<br>Attachment or LFE | EXC         |          |
| a-8   | Database files and data to be submitted to Owner for future data processing use and modification.                                                                                                                                                                                                          | Email w/<br>Attachment or LFE | DB          |          |
| Notes |                                                                                                                                                                                                                                                                                                            |                               |             |          |
| (1)   | All exchanges and uses of transmitted data are subject to the appropriate provisions of Contract Documents.                                                                                                                                                                                                |                               |             |          |
| (2)   | Transmittal of written notices is governed by Paragraph 18.01 of the General Conditions.                                                                                                                                                                                                                   |                               |             |          |
| Key   |                                                                                                                                                                                                                                                                                                            |                               |             |          |
| Email | Standard Email formats (.htm, .rtf, or .txt). Do not use stationery formatting or other features that impair legibility of content on screen or in printed copies                                                                                                                                          |                               |             |          |
| LFE   | Agreed upon Large File Exchange method (FTP, CD, DVD, hard drive)                                                                                                                                                                                                                                          |                               |             |          |
| PDF   | Portable Document Format readable by Adobe® Acrobat Reader Version [number] or later                                                                                                                                                                                                                       |                               |             |          |
| DWG   | Autodesk® AutoCAD .dwg format Version [number]                                                                                                                                                                                                                                                             |                               |             |          |
| DOC   | Microsoft® Word .docx format Version [number]                                                                                                                                                                                                                                                              |                               |             |          |
| EXC   | Microsoft® Excel .xls or .xml format Version [number]                                                                                                                                                                                                                                                      |                               |             |          |
| DB    | Microsoft® Access .mdb format Version [number]                                                                                                                                                                                                                                                             |                               |             |          |

**EXHIBIT B—FORESEEABLE BAD WEATHER DAYS**

| Month                                                                                                                                                              | Number of Foreseeable Bad Weather Days in Month Based on Precipitation as Rain Equivalent (inches) (1) | Ambient Outdoor Air Temperature (degrees F)                                              |                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
|                                                                                                                                                                    |                                                                                                        | Number of Foreseeable Bad Weather Days in Month Based on Low Temperature (at 11:00 a.m.) | Number of Foreseeable Bad Weather Days in Month Based on High Temperature (at 3:00 p.m.) |
| January                                                                                                                                                            | 3                                                                                                      | 20                                                                                       | -                                                                                        |
| February                                                                                                                                                           | 6                                                                                                      | 7                                                                                        | -                                                                                        |
| March                                                                                                                                                              | -                                                                                                      | 3                                                                                        | -                                                                                        |
| April                                                                                                                                                              | 1                                                                                                      | -                                                                                        | -                                                                                        |
| May                                                                                                                                                                | -                                                                                                      | -                                                                                        | -                                                                                        |
| June                                                                                                                                                               | 2                                                                                                      | -                                                                                        | 1                                                                                        |
| July                                                                                                                                                               | -                                                                                                      | -                                                                                        | 1                                                                                        |
| August                                                                                                                                                             | 1                                                                                                      | -                                                                                        | 1                                                                                        |
| September                                                                                                                                                          | 2                                                                                                      | -                                                                                        | -                                                                                        |
| October                                                                                                                                                            | -                                                                                                      | -                                                                                        | -                                                                                        |
| November                                                                                                                                                           | 1                                                                                                      | 2                                                                                        | -                                                                                        |
| December                                                                                                                                                           | -                                                                                                      | 16                                                                                       | -                                                                                        |
| Notes:                                                                                                                                                             |                                                                                                        |                                                                                          |                                                                                          |
| 1. Two inches of sleet equal one inch of rain. Five inches of wet, heavy snow equal one inch of rain. Fifteen inches of “dry” powder snow equals one inch of rain. |                                                                                                        |                                                                                          |                                                                                          |

## **~~EXHIBIT C—GEOTECHNICAL BASELINE REPORT SUPPLEMENT TO THE SUPPLEMENTARY CONDITIONS~~**

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### ~~1.01—Definitions~~

~~SC 1.01—Add to the list of definitions in Paragraph 1.01.A by inserting the following as numbered items in their proper alphabetical positions:~~

- ~~1.—*Geotechnical Baseline Report (GBR)*—The interpretive report prepared by or for Owner regarding subsurface conditions at the Site, and containing specific baseline geotechnical conditions that may be anticipated or relied upon for bidding and contract administration purposes, subject to the controlling provisions of the Contract, including the GBR’s own terms. The GBR is a Contract Document.~~
- ~~2.—*Geotechnical Data Report (GDR)*—The factual report that collects and presents data regarding actual subsurface conditions at or adjacent to the Site, including Technical Data and other geotechnical data, prepared by or for Owner in support of the Geotechnical Baseline Report. The GDR’s content may include logs of borings, trenches, and other site investigations, recorded measurements of subsurface water levels, the results of field and laboratory testing, and descriptions of the investigative and testing programs. The GDR does not include an interpretation of the data. If opinions, or interpretive or speculative non-factual comments or statements appear in a document that is labeled a GDR, such opinions, comments, or statements are not operative parts of the GDR and do not have contractual standing. Subject to that exception, the GDR is a Contract Document.~~

### ~~5.03—Subsurface and Physical Conditions~~

~~SC 5.03—Delete Paragraph 5.03 in its entirety and replace with the following:~~

### ~~5.03—Subsurface and Physical Conditions~~

~~A.—*Reports and Drawings:* The Supplementary Conditions hereby identify:~~

- ~~1.—those reports of explorations and tests of subsurface conditions at or adjacent to the Site (other than any Geotechnical Data Report or Geotechnical Baseline Report) that contain Technical Data. Such reports are as follows:~~
  - ~~a.—*Report Title:* **[Exact title of the document]**~~
  - ~~b.—*Date of Report:* **[Date report was issued]**~~
  - ~~c.—*Technical Data in report upon which Contractor may rely:* **[Identify Technical Data (for example, “Boring Log, Test Site 3”) and specify page number or other reference where Technical Data is located within the report. List multiple Technical Data line items per entry when appropriate.]**~~
- ~~2.—those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data. Such drawings are as follows:~~
  - ~~a.—*Drawings Title:* **[Exact title of the drawings]**~~
  - ~~b.—*Date of Drawings:* **[Date drawings were issued]**~~

- ~~c. *Technical Data in drawings upon which Contractor may rely:* [Identify Technical Data (for example, "Plan View of Rock Outcroppings") in drawings, or state "All information in drawing" if entire content is Technical Data entitled to reliance; and specify drawing number, page number, or other reference where the Technical Data is located. List multiple Technical Data line items per entry when appropriate.]~~
- ~~3. Contractor may examine copies of reports and drawings identified immediately above that were not included with the Bidding Documents at [location] during regular business hours, or may request copies from Engineer, at the cost of reproduction.~~
- ~~B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph SC 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.~~
- ~~C. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.~~
- ~~D. *Limitations of Other Data and Documents:* Except for such reliance on 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. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or~~
  - ~~4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.~~
- ~~E. *Geotechnical Baseline Report*~~
- ~~1. This Contract contains a Geotechnical Baseline Report ("GBR"), identified as follows: **[Example: Geotechnical Baseline Report for Northwest Interceptor, dated February 12, 2013, prepared by ABC Geotechnical Engineers, Inc., Sacramento, California]**. This Contract also contains a Geotechnical Data Report (GDR), identified as follows: **[Example: Geotechnical Data Report for Northwest Interceptor, dated June 15, 2012, prepared by ABC Geotechnical Engineers, Inc., Sacramento, California]**.~~

- ~~2. The GBR and GDR are incorporated as Contract Documents. The GBR and GDR are to be used in conjunction with other Contract Documents, including the Drawings and Specifications. If there is a conflict between the terms of the GBR and the GDR, the GBR's terms prevail.~~
- ~~3. The GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations (referred to here in the Supplementary Conditions as "Baseline Conditions"). These may include ground, geological, groundwater, and other subsurface geotechnical conditions, and baselines of anticipated Underground Facilities or subsurface structures.~~
- ~~4. The Baseline Conditions will be used to assist in the administration of the Contract's differing site conditions clause at locations where subsurface conditions have been baselined. If a condition is baselined in the GBR, then only the pertinent Baseline Conditions will be used to determine whether there is a differing site condition; and no other indication of that condition in the Contract Documents or Technical Data, or of a condition that describes, quantifies, or measures a similar characteristic of the subsurface, will be used for the differing site condition determination.~~
- ~~5. The Baseline Conditions will not be used to make differing site conditions determinations at locations that have not been baselined in the GBR, or at any location with respect to subsurface conditions that the Baseline Conditions do not address. If Underground Facilities or Hazardous Environmental Conditions are expressly addressed in the Baseline Conditions, then comparison to such Baseline Conditions will be the primary means of determining (a) whether an Underground Facility was shown or indicated with reasonable accuracy, as provided in Paragraph 5.05 of the General Conditions, or (b) whether a Hazardous Environmental Condition was shown or indicated in the Contract Documents as indicated in Paragraph 5.06.H of the General Conditions. As indicated in Paragraph SC 5.04 below, the GDR will be the primary resource for differing site conditions determinations in cases in which the GBR is inapplicable.~~
- ~~6. The descriptions of subsurface conditions provided in the GBR are based on geotechnical investigations, laboratory tests, interpretation, interpolation, extrapolation, and analyses. Neither Owner, Engineer, nor any geotechnical or other consultant warrants or guarantees that actual subsurface conditions will be as described in the GBR, nor is the GBR intended to warrant or guarantee the use of specific means or methods of construction.~~
- ~~7. The behavior of the ground during construction depends substantially upon the Contractor's selected means, methods, techniques, sequences, and procedures of construction. If ground behavior conditions are baselined in the GBR, they are based on stated assumptions regarding construction means and methods.~~
- ~~8. The GBR will not reduce or relieve Contractor of its responsibility for the planning, selection, and implementation of safety precautions and programs incident to Contractor's means, methods, techniques, sequences, and procedures of construction, or to the Work.~~



#### ~~5.04 Differing Subsurface or Physical Conditions~~

~~SC 5.04 Delete Paragraph 5.04 in its entirety and replace with the following:~~

#### ~~5.04 Differing Subsurface or Physical Conditions~~

~~A. Notice: If Contractor believes that any subsurface condition that is uncovered or revealed at the Site:~~

- ~~1. differs materially from conditions shown or indicated in the GBR; or~~
- ~~2. differs materially from conditions shown or indicated in the GDR, to the extent the GBR is inapplicable; or~~
- ~~3. differs materially from conditions shown or indicated in Contract Documents other than the GBR or GDR, to the extent the GBR and GDR are inapplicable; or~~
- ~~4. to the extent the GBR and GDR are inapplicable, is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or~~
- ~~5. to the extent the GBR and GDR are inapplicable, is of such a nature as to require a change in the Drawings or Specifications; or~~
- ~~6. to the extent the GBR and GDR are inapplicable, 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 conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.~~

~~B. Engineer's Review: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph SC 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption or continuation of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.~~

~~C. Owner's Statement to Contractor Regarding Site Condition: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption or continuation of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.~~

~~D. Early Resumption of Work: If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion~~

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EJCDC® C-800, Supplementary Conditions of the Construction Contract.

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Modified to include RD edits from RUS Bulletin 1780-26 (6/16/2020).

of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

~~E. Possible Price and Times Adjustments~~

- ~~1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, 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 fall within any one or more of the categories described in Paragraph SC-5.04.A;~~
  - ~~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 Paragraph 13.03 of the General Conditions; and~~
  - ~~c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.~~
- ~~2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:~~
  - ~~a. Contractor knew of the existence of such condition at the time Contractor made a 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 otherwise; or~~
  - ~~b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or~~
  - ~~c. Contractor failed to give the written notice as required by Paragraph SC-5.04.A.~~
- ~~3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment must be set forth in a Change Order.~~
- ~~4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.~~

~~F. Underground Facilities; Hazardous Environmental Conditions: Paragraph 5.05 of the General Conditions governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 of the General Conditions governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs SC-5.03 and SC-5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.~~

**WORK CHANGE DIRECTIVE NO.: [Number of Work Change Directive]**

Owner: East Laurel Water District

Engineer: Kenvirons, LLC

Contractor:

Project: Old Salem Rd./McWhorter Rd. System Improvements – Contract 2

Contract Name:

Date Issued:

Owner's Project No.:

Engineer's Project No.: 2020052

Contractor's Project No.:

Effective Date of Work Change Directive:

Contractor is directed to proceed promptly with the following change(s):

Description:

**[Description of the change to the Work]**

Attachments:

**[List documents related to the change to the Work]**

Purpose for the Work Change Directive:

**[Describe the purpose for the change to the Work]**

Directive to proceed promptly with the Work described herein, prior to agreeing to change in Contract Price and Contract Time, is issued due to:

**Notes to User—Check one or both of the following**

☐ Non-agreement on pricing of proposed change. ☐ Necessity to proceed for schedule or other reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price: \$ \_\_\_\_\_ **[increase] [decrease] [not yet estimated].**

Contract Time: \_\_\_\_\_ days **[increase] [decrease] [not yet estimated].**

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price ☐ Cost of the Work ☐ Other

Recommended by Engineer

Authorized by Owner

By:

\_\_\_\_\_

\_\_\_\_\_

Title:

\_\_\_\_\_

\_\_\_\_\_

Date:

\_\_\_\_\_

\_\_\_\_\_



## CHANGE ORDER NO.: [Number of Change Order]

Owner: East Laurel Water District

Engineer: Kenvirons, LLC

Contractor:

Project: Old Salem Rd./McWhorter Rd. System Improvements – Contract 2

Contract Name:

Date Issued:

Owner's Project No.:

Engineer's Project No.: 2020052

Contractor's Project No.:

Effective Date of Change Order:

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

Description:

Attachments:

| Change in Contract Price                                                                                                                | Change in Contract Times                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Original Contract Price:<br>\$ _____                                                                                                    | Original Contract Times:<br>Substantial Completion: _____<br>Ready for final payment: _____                                                                                                   |
| <b>[Increase] [Decrease]</b> from previously approved Change Orders No. 1 to No. <b>[Number of previous Change Order]</b> :<br>\$ _____ | <b>[Increase] [Decrease]</b> from previously approved Change Orders No.1 to No. <b>[Number of previous Change Order]</b> :<br>Substantial Completion: _____<br>Ready for final payment: _____ |
| Contract Price prior to this Change Order:<br>\$ _____                                                                                  | Contract Times prior to this Change Order:<br>Substantial Completion: _____<br>Ready for final payment: _____                                                                                 |
| <b>[Increase] [Decrease]</b> this Change Order:<br>\$ _____                                                                             | <b>[Increase] [Decrease]</b> this Change Order:<br>Substantial Completion: _____<br>Ready for final payment: _____                                                                            |
| Contract Price incorporating this Change Order:<br>\$ _____                                                                             | Contract Times with all approved Change Orders:<br>Substantial Completion: _____<br>Ready for final payment: _____                                                                            |

Recommended by Engineer (if required)

Accepted by Contractor

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Authorized by Owner

Approved by Funding Agency (if applicable)

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_



**FIELD ORDER NO.: [Number of Field Order]**

Owner: East Laurel Water District

Engineer: Kenvirons, LLC

Contractor:

Project: Old Salem Rd./McWhorter Rd. System Improvements – Contract 2

Contract Name:

Date Issued:

Owner's Project No.:

Engineer's Project No.: 2020052

Contractor's Project No.:

Effective Date of Field Order:

Contractor is hereby directed to promptly perform the Work described in this Field Order, issued in accordance with Paragraph 11.04 of the General Conditions, for minor changes in the Work without changes in Contract Price or Contract Times. If Contractor considers that a change in Contract Price or Contract Times is required, submit a Change Proposal before proceeding with this Work.

**Reference:**

Specification Section(s):

Drawing(s) / Details (s):

**Description:**

**[Description of the change to the Work]**

**Attachments:**

**[List documents supporting change]**

**Issued by Engineer**

By: \_\_\_\_\_

Title: \_\_\_\_\_

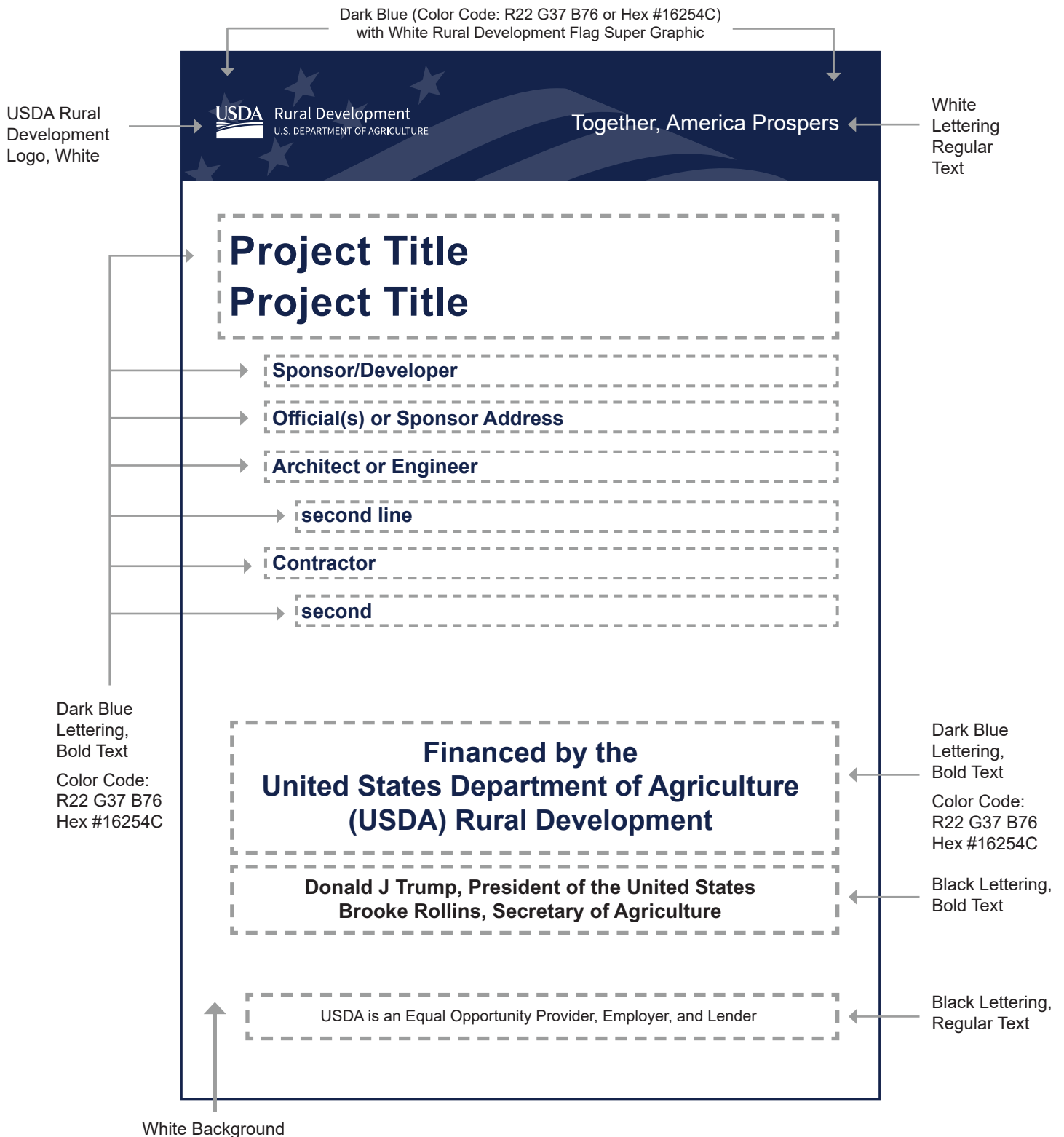
Date: \_\_\_\_\_





# Temporary Construction Sign for Rural Development Projects

Recommended Font: Arial

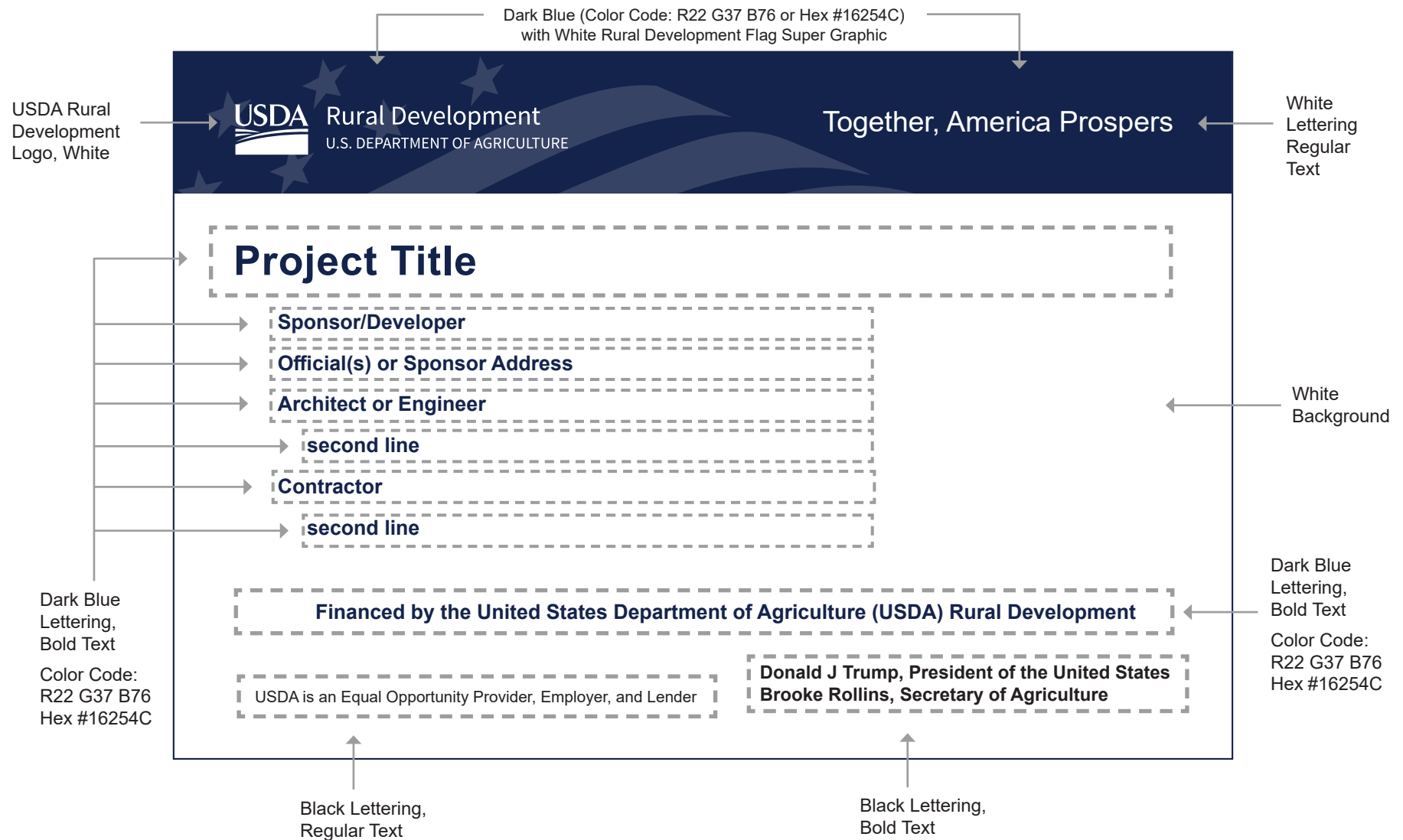


**SIGN DIMENSIONS:** 2400mm x 1200mm x 19mm (approx. 8' x 4' x 3/4")  
PLYWOOD PANEL (APA RATED A+B GRADE-EXTERIOR)



# Temporary Construction Sign for Rural Development Projects

Recommended Font: Arial



**SIGN DIMENSIONS:** 1200mm x 2400mm x 19mm (approx. 4' x 8' x 3/4")  
PLYWOOD PANEL (APA RATED A+B GRADE-EXTERIOR)



# **TECHNICAL SPECIFICATIONS**

## **OLD SALEM RD. / McWHORTER RD. SYSTEM IMPROVEMENTS CONTRACT 2**

**EAST LAUREL WATER DISTRICT  
LAUREL COUNTY, KENTUCKY**

*PREPARED BY:*

**KENVIRONS, LLC  
770 WILKINSON BLVD.  
FRANKFORT, KENTUCKY 40601**

**PROJECT No. 2020052**

**JUNE 2025**



## **DIVISION 1: GENERAL REQUIREMENTS**





## **SECTION 01001**

### **SPECIAL CONDITIONS**

#### **1.0 DESCRIPTION OF THE WORK AND DESIGNATION OF OWNER**

These Specifications and accompanying Drawings describe the work to be done and the materials to be furnished for the construction of the project entitled Old Salem Rd. / McWhorter Rd. System Improvements – Contract 2.

All references to the Owner in these Specifications, Contract Documents and plans shall mean the East Laurel Water District.

#### **2.0 AVAILABLE FUNDS**

The attention of all Bidders is directed to the fact that funds will be made available for the award of the contract through Rural Development.

#### **3.0 TIME OF COMPLETION**

The time allowed for the completion of this project is 240 calendar days. The time allowed for completion shall begin at midnight, local time, on the date which the Owner, or his authorized representative, the Engineer, shall instruct the Contractor in writing to start work, but no later than 30 days after Notice to Proceed.

Additional time will be allowed the Contractor to cover approved over-runs or additions to the contract in the same proportion that the said over-run or addition in net monetary value bears to the original amount; the total of said additional time to be computed to the nearest whole calendar day.

#### **4.0 LIQUIDATED DAMAGES**

It is understood that time is the essence of this contract and that the Owner will sustain damages, monetary and otherwise, in the event of delay in completion of the work hereby contracted.

Therefore, if the said Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part of the consideration for the awarding of these contracts, to pay to the Owner the amount specified in the contract, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the work. The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and

ascertaining the actual damages the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be retained from time to time by the Owner from current periodical estimates.

Liquidated damages are fixed at \$1,000 per calendar day of over-run beyond the date set for completion or authorized extension thereof.

## **5.0 INSURANCE**

See Section 00800, Supplementary Conditions SC-5.04 for the minimum amounts of insurance coverage to be furnished under these contracts.

## **6.0 PERFORMANCE AND PAYMENT BOND**

The Contractor shall furnish separate performance and payment bonds issued by an approved bonding company in an amount at least equal to one hundred percent (100%) of the contract price, as security for the faithful performance of this contract and for the payment of persons performing labor and furnishing materials in connection with this contract. These bonds shall be executed by a company authorized to do business in the State of Kentucky and shall be signed or countersigned by a Kentucky resident agent. Bonds shall remain in effect for one year after date of final acceptance of the work.

## **7.0 SITE DIMENSIONS**

All Contractors furnishing materials and equipment for this contract shall obtain exact dimensions at the site. Scale or figure dimensions on the drawings and details show the correct size under ideal conditions and shall not, under any circumstances, be so construed as to relieve the Contractor from responsibility for taking measurements at the site and furnishing materials or equipment of the correct size.

## **8.0 DAMAGE TO EQUIPMENT STORED AND/OR IN PLACE PRIOR TO INITIAL OPERATION**

Any equipment damaged or which has been subjected to possible damage by reason of inundation, improper storage and/or protection during the construction period of project, shall be handled only as follows:

- a) Be replaced with new equipment.
- b) With approval of the Engineer, be returned to the manufacturer of the equipment, or his authorized repair agency, for inspection and repair provided, however, that such repair after inspection will place

the equipment in new condition, and restore the manufacturer's guarantee the same as for new equipment.

## **9.0 SALVAGED MATERIALS AND EQUIPMENT**

All materials and/or equipment to be removed from existing structures and not specifically specified to be re-used shall remain the property of the Owner. Such materials and/or equipment shall be stored on sites by the Contractor as directed by the Owner.

The use of second hand and/or salvaged materials will not be permitted, unless specifically provided for in the detailed specifications. Materials and equipment shall be new when turned over to the Owner.

## **10.0 TEMPORARY FACILITIES**

- a) Build and maintain temporary offices and storage sheds as necessary for the work. Location of temporary buildings shall be subject to the approval of the Engineer.
- b) Provide temporary heat, light and power required by the work. Temporary telephone service shall be provided in the job office paid for by the General Contractor, except that the party placing a long distance call shall pay the toll charge.
- c) Each Contractor shall construct and maintain, in a sanitary condition, sanitary facilities for his employees and also employees of his subcontractors. At completion of the contract work, these sanitary facilities shall be properly disposed of as directed by the Engineer.
- d) Temporary construction for safety measures, hoists and scaffolds shall be erected in accordance with the General Conditions.
- e) Construction yard shall be located on job site. Provide security and safety protection.
- f) The obtaining of all utilities for construction, including power and water, shall be the responsibility of the Contractor, and he shall bear the cost of all utilities used for construction. Cost of all connections and facilities for use of utilities shall be borne by the Contractor.

## **11.0 PROPERTY PROTECTION**

Care is to be exercised by the Contractor in all phases of construction to prevent damage and injury to the Owner's or other property.

In connection with work performed on "private property" (property other than that belonging to the Owner), the Contractor shall confine his equipment, the storage of materials, and the operation of his workmen to the limits indicated on the plans, or to lands and right-of-way provided for the project by the Owner, and shall take every precaution to avoid damage to the private property Owner's buildings, grounds and facilities.

Fences, hedges, shrubs, etc. within the construction limits shall be carefully removed, preserved, and replaced when the construction is completed. Where ditches or excavations cross lawns, the sod shall be removed carefully and replaced when the backfilling has been completed. If sod is damaged or not handled properly, it shall be replaced with new sod equal to existing sod at the Contractor's expense. Grassed areas, other than lawns, shall be graded, fertilized and seeded when construction is completed. When construction is completed the private property Owner's facilities and grounds shall be restored to as good or better condition than found as quickly as possible at the Contractor's expense. All disturbed areas shall be re-vegetated (permanently or temporarily) within 14 days.

## **12.0 CONFLICT WITH OR DAMAGE TO EXISTING UTILITIES AND FACILITIES**

Insofar as location data is available to the Engineers, existing underground utilities (such as waterlines, sewer lines, gas lines, telephone conduits, etc.) are accurately located on the drawings. Due, however, to the approximate nature of much of this data, the location of any particular facility cannot be certified to be correct. In general, locations and elevations shown are approximate only.

Before proceeding with the work, the Contractor shall confer with all public or private companies, agencies, or departments that own and operate utilities in the vicinity of the construction work. The purpose of the conference is to verify the location of, and possible interference with, the existing utilities that are shown on the Plans, arrange for necessary suspension of service, and make arrangements to locate and avoid interference with all utilities that are not shown on the Plans.

## **13.0 CONTROL OF EROSION**

The Contractor shall be responsible for control of siltation and erosion from the project work. Control shall include all necessary ditching, check dams, mulching, etc. to prevent deposition of materials in roadside ditches. The Owner shall incur no extra costs from such work.

The Contractor shall obtain and pay for all grading, storm water, etc. permits, if any are required to complete the work. The Contractor shall maintain compliance with all conditions, limitations and stipulations of all permits. The Contractor shall not commence work, except mobilization, until he has obtained all required permits for said work. The Contractor shall supply the Owner with copies of all

permits within 24 hours of receipt. A KPDES Storm Water Discharge Permit will be required for this project. The Contractor shall fill out, sign and submit the Notice of Intent (NOI) and the Notice of Termination (NOT). The notice to proceed will not be issued until the permit has been provided. The Kentucky Pollution Discharge Elimination System (KPDES) Form NOI-SWCA is included in these Specifications. The preferred electronic Notice of Intent (eNOI) for Stormwater Discharges Associated with Construction Activity (KPDES Form NOI-SWCA) under the KPDES General Permit is available on the Web.

For the eNOI, visit: <https://dep.gateway.ky.gov/eForms/default.aspx?FormID=48>.

## **14.0 MEASUREMENT AND PAYMENT**

### **14.1 MEASUREMENT OF QUANTITIES**

All Work completed under the Agreement will be measured by the Engineer according to United States standard measure.

14.1.1: Unless otherwise specified, measurement of concrete quantities will include only that volume within the neat lines as shown on the Plans or as altered by the Engineer to fit field conditions. The prismatic formula will be used in computing the volumes of structures, or portions of structures, having end sections of unequal areas.

14.1.2: All items which are measured by the linear foot, such as pipe, will be measured along the centerline distance of the installed item with no allowance for connections, fittings or laps at connections.

14.1.3: In computing volumes of excavation, borrow and embankments, the average end-area method will be used. For the purpose of ascertaining quantities, it is agreed that the planimeter shall be considered an instrument of precision adapted to the measurement of areas.

### **14.2 LUMP SUM**

When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

### **14.3 PLAN QUANTITIES**

When the plan quantities for a specific portion of the Work are designated as the pay quantities in the Contract Documents, they shall be the final quantities for which payment for such specific portion of the Work will be made, unless the dimensions of said portions of the Work shown on the plans are revised by the Engineer. When revised dimensions result in an increase or decrease in the

quantities of such Work, the final quantities for payment will be revised in the amount represented by the authorized changes in dimensions.

#### 14.4 ACTUAL QUANTITIES

When actual quantities for a specific portion of the Work are designated as the pay quantities in the Contract Documents, they shall be the final quantities for which payment for such specific portion of the Work will be made. The actual quantities will be determined by the difference in field measurements and cross sections before and after construction.

#### 14.5 SCOPE OF PAYMENT

The contract unit prices whether based on lump sum, plan quantities or actual quantities for the various bid items of the Contract Documents shall be considered full compensation for all labor, materials, supplies, equipment, tools, and all things of whatever nature required for the complete incorporation of the item into the Work the same as though the items were to read "in Plan" unless the Contract Documents provide otherwise.

#### 14.6 PAYMENTS

Estimates for payment, partial payments and final payments shall be in accordance with and follow procedures set forth in the General Conditions and Supplementary Conditions.

### **15.0 ACCESS ROADS**

The Contractor, Contractor's employees and all trucks delivering equipment, supplies or materials to the project shall use the access roads shown in the Plans for entering and leaving the project sites.

### **16.0 TESTING LABORATORY SERVICES**

#### 16.1 GENERAL

16.1.1 Work Included. From time to time during progress of the Work, the Owner may require that testing be performed to determine that materials provided for the Work meet the specified requirements; such testing includes, but is not necessarily limited to:

- 1) Material Compaction
- 2) Cast-In-Place Concrete

16.1.2 Related Work Described Elsewhere. Requirements for testing may be described in various Sections of these Specifications; where no testing

requirements are described, but the Owner decides that testing is required, the Owner may require testing to be performed under current pertinent standards for testing.

16.1.3 Selection of Testing Laboratory. The Owner will select a testing laboratory.

16.1.4 Codes and Standards. Testing, when required, will be in accordance with all pertinent codes and regulations and with selected standards of the American Society for Testing and Materials.

16.1.5 Product Handling. The Contractor shall promptly process and distribute all required copies of test reports for which he is responsible and related instructions to ensure all necessary retesting and/or replacement of materials with the least possible delay in progress of the Work.

## 16.2 PAYMENT FOR TESTING SERVICES

16.2.1 Initial Services. The Contractor will pay for all initial testing services required by the Owner.

16.2.2 Retesting. When initial tests indicate non-compliance with the Contract Documents, all subsequent retesting made necessary by the non-compliance shall be performed by a testing laboratory selected by the Contractor and approved by the Engineer and the costs thereof will be paid directly by the Contractor.

16.2.3 Contractor's Convenience Testing. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

## 16.3 EXECUTION

16.3.1 Cooperation with Testing Laboratory. Representatives of the testing laboratory shall have access to the Work at all times. The Contractor shall provide facilities for such access in order that the laboratory may properly perform its functions.

### 16.3.2 SCHEDULES FOR TESTING

16.3.2.1 Establishing Schedule. By advance discussion with the testing laboratory selected by the Owner, the Contractor shall allow for the time required for the laboratory to perform its tests and to issue each of its findings. The Contractor shall allow for this time within the construction schedule.

**16.3.2.2 Revising Schedule.** When changes of construction schedule are necessary during construction, the Contractor shall coordinate all such changes of schedule with the testing laboratory as required.

**16.3.2.3 Adherence to Schedule.** When the testing laboratory is ready to test according to the determined schedule but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributed to the delay may be back-charged to the Contractor and shall not be borne by the Owner.

**16.3.3 Taking Specimens.** All specimens and samples for testing, unless otherwise provided in these Contract Documents, will be taken by the testing laboratory; all sampling equipment and personnel will be provided by the testing laboratory; and all deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

## **17.0 SUBMITTALS AND SUBSTITUTIONS**

### **17.1 GENERAL**

**17.1.1 Work Included.** Wherever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined either by manufacturer's name and catalog number or by reference to recognized industry standards. To ensure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for its review and approval or rejection by the Engineer.

#### **17.1.2 RELATED WORK DESCRIBED ELSEWHERE.**

**17.1.2.1** Contractual requirements for submittals are described in the General Conditions and Supplementary Conditions.

**17.1.2.2** Individual submittals required are described in the pertinent sections of these Specifications.

### **17.2 SUBSTITUTIONS**

**17.2.1 Engineer's Approval Required.** The Agreement is based on the materials, equipment, and methods described in the Contract Documents. The Engineer will consider proposals for substitution of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Engineer to evaluate the proposed substitution. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this Work by the Engineer.



17.2.2 "Or Equal". Where the phrase "or equal" occurs in the Contract Documents, do not assume that material, equipment, or methods will be approved as equal by the Engineer unless the item has been specifically approved for this Work. The decision of the Engineer shall be final.

17.2.3 Availability of Specified Items. The Contractor shall verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the Work. In the event the specified item or items will not be so available, the Contractor shall notify the Engineer prior to receipt of Bids.

### 17.3 IDENTIFICATION OF SUBMITTALS

The Contractor shall completely identify each submittal and resubmittal by showing at least the following information:

- 1) Name and address of submitter, plus name and telephone number of the individual who may be contacted for further information.
- 2) Name of project as it appears in these Specifications.
- 3) Drawing number and Specifications Section number to which the submittal applies.
- 4) Whether this is an original submittal or resubmittal.

### 17.4 COORDINATION OF SUBMITTALS

17.4.1 General. Prior to submittal for Engineer's review, the Contractor shall use all means necessary to fully coordinate all material, including the following procedures:

- 1) Determine and verify all field dimensions and conditions, materials, catalog numbers, and similar data.
- 2) Coordinate as required with all trades and with all public agencies involved.
- 3) Secure all necessary approvals from public agencies and others and signify by stamp, or other means, that they have been secured.
- 4) Clearly indicate all deviations from the Contract Documents.

**17.4.2 Grouping of Submittals.** Unless otherwise specifically permitted by the Engineer, the Contractor shall make all submittals in groups containing all associated items; the Engineer may reject partial submittals as not complying with the provisions of the Contract Documents. The Contractor shall submit all submittals to the Engineer in digital PDF format.

## **17.5 TIMING OF SUBMITTALS**

The Contractor shall make all submittals far enough in advance of schedule dates of installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery. In scheduling, allow at least five full working days for the Engineer's review following his receipt of the submittal. All submittals shall be submitted in digital PDF format to Engineer.

## **18.0 INSTALLATION REQUIREMENTS**

Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the respective manufacturers, unless otherwise specified.

## **19.0 PROOF OF COMPLIANCE**

Whenever the Contract Documents require that a product be in accordance with Federal specification, ASTM designation, ANSI specification, or other association standard, the Contractor shall present an affidavit from the manufacturer certifying that the product complies therewith. Where requested or specified, the Contractor shall submit supporting test data to substantiate compliance.

## **20.0 PROJECT RECORD DOCUMENTS**

**20.1** As the Work progress, the Contractor shall keep a complete and accurate record of changes or deviations from the Contract Documents and the Shop Drawings, indicating the Work as actually installed. Changes shall be neatly and correctly shown on the respective portion of the affected document, using black line prints of the Drawings affected, or the Specifications, with appropriate supplementary notes. This record set of Drawings, Shop Drawings, and Specifications shall be kept at the job site for inspection by the Engineer.

**20.2** The records above shall be arranged in order, in accordance with the various sections of the Specifications, and properly indexed. Prior to application for final payment, and as a condition to its approval by the Engineer, deliver the record Drawings and Specifications, arranged in proper order, indexed, and endorsed as hereinbefore specified.

20.3 No review or receipt of such records by the Engineer or Owner shall be a waiver of any deviation from the Contract Documents or the Shop Drawings or in any way relieve the Contractor from his responsibility to perform the Work in accordance with the Contract Documents and the Shop Drawings to the extent they are in accordance with the Contract Documents.

## **21.0 PROJECT MEETINGS**

The Contractor's Superintendent for the Work shall attend project meetings as required by either the Owner or Engineer.

## **22.0 VIDEO TAPE**

The Contractor, before proceeding with any work, shall make or have made a video of all areas where work is to be performed and a copy of this video shall be furnished to the Engineer to review for completeness. This video shall be utilized as backup and reference for claims and cleanup.

## **23.0 DAILY REPORTS**

The project inspector, as designated by the Owner and/or Engineer, will keep a daily record of materials installed. This daily report will be used by the Owner and the Engineer to determine the payments due to the Contractor. The Contractor shall sign the inspector's daily report each day. Should the Contractor disagree with the inspector's report, the differences shall be resolved before the end of the next day, with the Contractor signing the daily report.

## **24.0 FINAL ADJUSTMENT OF QUANTITIES**

Upon completion of the project, a final adjusting change order will be written to reconcile the differences between the bid quantities and the actual quantities installed. This final adjusting change order will be determined based on the inspector's daily reports.

**END OF SECTION 01001**



## **SECTION 01002**

### **SPECIAL CONSTRUCTION CONSIDERATIONS**

#### **1.0 CONSTRUCTION SEQUENCE**

It shall be the sole responsibility of the Contractor to plan and implement construction sequences, to follow the Plans and Specifications and to protect any portions of the Work already completed.

#### **2.0 CLEAN-UP**

The Work will not be considered as complete, and final payment will not be made, until all areas in connection with the Work have been cleared of all rubbish, equipment, excess materials and temporary structures.

#### **3.0 SECURITY BY CONTRACTOR**

In addition to the other provisions of the Contract Documents, the Contractor shall be responsible for providing security as he deems necessary for his work areas, storage areas, office areas, equipment, and any other item or area that he is using. The Owner will not be responsible for any damages due to insufficient site security.

#### **4.0 BID SCHEDULE QUANTITIES**

The material quantities shown in the bid schedule are not guaranteed and should not be used indiscriminately when ordering materials. The Contractor shall be responsible for ordering material quantities necessary for installation to the limits as shown on the drawings unless otherwise instructed. Any left-over quantities shall be the property of the Contractor unless other arrangements are made. The Owner shall not be responsible for re-stocking or other charges associated with left-over materials or increased costs associated with increases in price for materials needed to complete the project as shown on the drawings.

#### **5.0 PERMITS**

The Contractor shall obtain and pay for all grading, storm water, etc. permits, if any are required to complete the work. The Contractor shall maintain compliance with all conditions, limitations and stipulations of all permits. The Contractor shall not commence work, except mobilization, until he has obtained all required permits for said work. The Contractor shall supply the owner with copies of all permits within 24 hours of receipt. A KPDES Storm Water Discharge Permit will be required for this project. The Contractor shall fill out, sign and submit the Notice of Intent (NOI) and the Notice of Termination (NOT).

## **6.0 GENERAL CERTIFICATION – NATIONWIDE #12 REQUIREMENTS**

The Contractor will be required to comply with the requirements of the General Certification – Nationwide Permit #58 contained in Appendix A to these Specifications.

**END OF SECTION 01002**

## **SECTION 01453**

### **TESTING AND INSPECTIONS, INCLUDING SPECIAL INSPECTION**

#### **PART 1 - GENERAL**

##### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### **1.02 SUMMARY**

- A. This Section includes administrative and procedural requirements for Special Inspection as defined in Chapter 17 of the Kentucky Building Code.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
- C. Perform Tests & Inspections as specified. Inspector personnel shall be in addition to the quality control inspections and inspectors required elsewhere in other Specifications.
- D. The Owner will contract with an inspection company to provide Inspections including soils construction, concrete construction, masonry construction, steel construction, and wood construction.

##### **1.03 SUBMITTALS**

- A. Overall:
  - 1. Prepare and submit certifications:
    - a. Contractor's Statement of Responsibility: Submit before the start of construction, acknowledging the following:
      - 1) Awareness of the special requirements contained in the statement of special inspections.
      - 2) Acknowledgement that control will be exercised by the contractor to ensure conformance with the construction documents.
      - 3) Description of the procedures within the contractor's organization to exercise such control.
      - 4) The method by and frequency of which reports are distributed to the persons in the contractor's organization exercising the control.

5) Identification and qualifications of the persons in the contractor's organization exercising such control and their positions within the organization.

b. Inspector's Qualifications: Inspection Agency shall submit before the start of construction.

c. Inspector's Final Certification: Inspection Agency shall submit after completion of inspections.

B. Fabricators:

1. Prepare and submit inspection reports:

a. Inspection of Fabricator's Quality Control Procedures

2. Prepare and submit certifications:

a. Quality Control Certification

b. Fabrication Quality Control Procedures

c. Fabricators Certificate of Compliance: stating that the work was performed in accordance with the approved construction documents (submitted at the completion of such work).

C. Soils Construction:

1. Prepare and submit test reports:

a. Soil bearing capacity at foundations.

b. Controlled fill density at controlled fill for the structure.

c. Prepare and submit inspection reports:

1) Inspection of Placement of Controlled Fill: Prior to each placement of footing concrete.

D. Concrete Construction:

1. Prepare and submit test reports:

a. Compressive strength, slump, and air content. Concrete shall be tested once per day that concrete is placed plus once for every 100 yards of concrete placed thereafter for each structure.

2. Prepare and submit inspection reports:

a. Inspection of forms, installation of reinforcement and delivery tickets prior to each placement of concrete.

3. Prepare and submit certifications:

a. Cement

b. Aggregate



- c. Admixtures
- d. Reinforcement

E. Masonry Construction:

1. Prepare and submit test reports:
  - a. Mortar aggregate ratio and mortar air content: Test each once at beginning of project and once for each 5,000 s.f. of masonry thereafter.
2. Prepare and submit inspection reports:
  - a. Inspection of mortar proportioning once at beginning of projects and once for each 5,000 s.f. of masonry thereafter.
  - b. Inspection of placement of masonry, reinforcement, and grout prior to and during each placement of grout.
3. Prepare and submit certifications:
  - a. Masonry Units
  - b. Cement for Mortar
  - c. Sand for Mortar
  - d. Grout
  - e. Reinforcement

F. Steel Construction:

1. Prepare and submit inspection reports:
  - a. Inspection of marking and connection details for all members and connections – verify all steel members are installed in the correct locations and are connected in accordance with the construction documents and approved erection drawings.
  - b. Inspection of bolt pretensioning for each fully-pretensioned bolted connection.
  - c. Visual inspection of all non-pretensioned bolted connection.
  - d. Visual inspection of all field welds.
2. Prepare and submit certifications:
  - a. Certified Mill Test Reports (MTRs) for steel, bolts, nuts, washers and weld filler metal (for field welds).

G. Wood Construction: (Note: Refer to “Inspection of Fabricators” for wood truss fabrication inspection.)

1. Prepare and submit inspection reports:
  - a. Inspection of connection of roof trusses to structure.
  - b. Inspection of all wood framing members for correct size, species, grade, location and connections.

- c. Inspection of thickness, grade and fastening of all sheathing.
- 2. Prepare and submit certifications:
  - a. Product data with certifications for all wood, sheathing and fasteners.

#### 1.04 QUALIFICATIONS

- A. Use a qualified Inspector to perform all Inspections required by this Section.
- B. Inspector's qualifications shall include information which provides evidence of the knowledge and experience necessary to qualify a person as a Inspector for the category of work being certified.
- C. The Inspector is a person employed by the Owner.
- D. Inspectors perform their duties independent from the construction quality control staff employed by the Contractor.
- E. More than one Inspector may be required to provide the varied knowledge and experience necessary to adequately inspect all the categories of work requiring Inspection.

### **PART 2 - PRODUCTS (Not Applicable)**

### **PART 3 - EXECUTION**

#### 3.01 DUTIES AND RESPONSIBILITIES OF THE INSPECTOR

- A. The Inspector shall observe the Work and perform tests to ensure conformance with the design drawings and specifications, and the applicable workmanship provisions of the Kentucky Building Code:
  - 1. Reviewed shop drawings may be used only as an aid to inspection.
    - a. The Inspector shall observe activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
    - b. The Special Inspector shall submit timely inspection reports; weekly at a maximum.
- B. The Special Inspector shall obtain from the contractor all certifications required to be submitted as part of the inspection requirements (e.g. Contractor's Statement of Responsibility, Fabricators' Quality Control Plans, Material Certifications, etc.) and submit them along with the field inspections and tests that the Inspector performs.

Inspection submittals by the Inspector include ALL items included above, not just the ones that the Inspector prepares.

- C. The Inspector shall cooperate with the Contractor and provide timely service, keep records of all inspections, and furnish them in a timely manner to the Engineer, and Contractor as construction progresses.
- D. Discrepancies shall be brought to the immediate attention of the Contractor for correction. If discrepancies are not corrected, the discrepancies shall be brought to the attention of the Engineer prior to the completion of that phase of work.
- E. Inspection Reports shall include the following:
  - 1. Name, address, and telephone number of Inspector performing the inspection and making the report.
  - 2. Qualifications and Certifications of the Inspector performing the inspection and making the report.
  - 3. Dates and locations of samples and tests or inspections, date of report.
  - 4. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  - 5. Description of the Work, identification of products, Specification Section, tests, and inspection methods.
  - 6. Complete test or inspection data.
  - 7. Test and inspection results and an interpretation of test results.
  - 8. Statement on condition of substrates and their acceptability for installation of the the next phase of work – according to the Construction Documents.
  - 9. Statement that products being installed at site comply with requirements.
  - 10. Comments and professional opinion on whether tested, inspected, or installed Work complies with the Contract Document requirements.
  - 11. Statement whether conditions, products, and installation may affect warranty of any products installed, according to the Construction Documents.
  - 12. Other required inspections and/or tests indicated in individual Specification Sections.
- F. Inspector's Final Certificates shall state that all items requiring Inspection and Testing were fulfilled and are in conformance with the approved design and shop drawings, specifications, approved change orders, and the applicable provisions of the Kentucky Building Code.
  - 1. Items that were not in conformance and any unresolved discrepancies shall be itemized in the report.
    - a. Final report shall be bound, divided by construction type, and in chronological order.
    - b. Final Report shall be prepared by, sealed, and signed by the Inspector.

### 3.02 DUTIES AND RESPONSIBILITIES OF THE CONTRACTOR

- A. Notify the Inspector with adequate advance notice when construction is ready to be inspected.

- B. Provide Inspector access to plans, specifications, shop drawings, and change orders at the jobsite.
- C. Submit required certifications (e.g. Contractor's Statement of Responsibility, Fabricators' Quality Control Plans, Material Certifications, etc.) to Inspector.
- D. Provide Inspector access to work, including equipment with operator when necessary. Access to equipment includes, but is not limited to, man lifts, excavation equipment, etc.
- E. Provide samples of materials to be tested in required quantities.
- F. Provide storage space for Structural Testing/Inspection Agency's exclusive use, such as for storing and curing concrete testing samples. If required by the Inspector, Contractor shall provide cure box with electricity, water, and blankets for curing concrete specimens.
- G. Provide labor to assist the Structural Testing/Inspection Agency in performing tests/inspections.
- H. Retain at the jobsite all Inspection records submitted by the Inspector and provide these records for review by the Engineer and Building Inspector upon request.
- I. Maintain a discrepancy log on site. Log shall list each discrepancy documented by the Inspector, state the date of discovery and Inspector's report number. Provide room for the Inspector to sign and date when said discrepancy is corrected. No work containing discrepancy shall be covered prior to having reinspection and approval by the Inspector.
- J. Cooperate with the Inspector, Engineer, and Building Inspector in resolving any Inspection related coordination or quality problems.
- K. Resolve non-conforming work before additional work is done that would make it difficult to resolve non-conforming work.
- L. Costs of additional retesting that are required due to non-conforming work may be charged to the Contractor.
- M. Neither the observation of the Engineer in the administration of the contract, nor tests/inspections by the Testing/Inspection Agency, nor approvals by persons other than the Engineer shall relieve the Contractor from his obligation to perform the work in accordance with the Contract Documents.

**END OF SECTION 01453**

## **DIVISION 2: SITE WORK**



## **SECTION 02001**

### **EARTHWORK**

#### **1.0 SCOPE**

This section covers the required topsoil removal, excavation, the removal and proper utilization or disposal of all excavated materials, necessary borrow, fill requirements, and the shaping and finishing of all excavation work to the required lines and grades.

#### **2.0 TOPSOIL REMOVAL**

All topsoil on areas to receive fill shall be stripped and stockpiled at an approved location.

#### **3.0 CLEARING AND GRUBBING**

Work shall consist of cutting and removing designated trees, stumps, brush, logs, removal of fences, or other loose and projecting material. Unless otherwise specified, it shall also include the grubbing of stumps, roots and other natural obstructions which, in the opinion of the Engineer, must be removed to prosecute properly the construction work and operate properly the facility upon the completion of construction.

No cleared or grubbed materials shall be used in backfills or embankment fills.

All stumps, roots and other objectionable material shall be grubbed up so that no roots larger than 3 inches in diameter remain less than 18 inches below the ground surface.

All holes and depressions left by grubbing operations shall be filled with suitable material and compacted to grade.

Disposal shall be by burning or other methods satisfactory to the Engineer; however, burning will be permitted only when the Contractor has obtained written permission from the local regulatory agency.

The Contractor shall also remove from the site and satisfactorily dispose of all miscellaneous rubbish including, but not limited to, masonry, scrap metal, rock, pavement, etc., that is under the fill or to be removed as shown on the Drawings, specified herein, or directed by the Engineer.

Existing improvements, adjacent property, utility and other facilities, and trees, plants and brush that are not to be removed shall be protected from injury or damage resulting from the Contractor's operations.

Trees and shrubs, designated to remain or that are beyond the clearing and grubbing limits, which are injured or damaged during construction operations shall be treated at the Contractor's expense by experienced tree surgery personnel.

### **3.1 EROSION CONTROL**

Temporary measures shall be applied throughout the construction permit to control and to minimize siltation to adjacent properties and waterways. Such measures shall include, but not be limited to, the use of berms, baled straw silt barriers, gravel or crushed stone, mulch, slope drains and other methods. These temporary measures shall be applied to erodible material exposed by any activity associated with the construction of this project.

## **4.0 STRUCTURAL EXCAVATION**

Structural excavation shall consist of and include the removal of all materials encountered or involved in the excavation and subgrade preparation for the placing of structures. The final depths and extent of structural excavation will be determined by the nature of the material encountered; however, after excavation to the limits as shown on the drawings, the Engineer shall inspect the Work and determine if additional excavation is required.

## **5.0 EXCAVATION CONSTRUCTION METHODS**

### **5.1 OPEN-CUT EXCAVATION - GENERAL**

All open cut excavation shall be performed in accordance with this section to the lines, grades, and dimensions shown on the drawings or established by the Engineer.

All necessary precautions shall be taken to preserve the material below and beyond the lines of all excavation in the soundest possible condition. Any damage to the Work due to the Contractor's operations, including shattering of the material beyond the required excavation lines, shall be repaired at the expense of and by the Contractor. Any and all excess excavation for the convenience of the Contractor for any purpose or reason, except as may be ordered in writing by the Engineer and whether or not due to the fault of the Contractor, shall be at the expense of the Contractor. Where required to complete the work, all such excess excavation and over-excavation shall be refilled with materials furnished and placed at the expense of and by the Contractor. Slopes shattered or loosened by blasting shall be taken down at the expense of and by the Contractor.

All excavation for embankment and structure foundations shall be performed in the dry. No excavation shall be made in frozen materials without written approval.



The bottom and side slope of rock or shale upon or against which concrete or pervious blanket material is to be placed shall be excavated to the required dimensions as shown on the drawings or established by the Engineer. No material will be permitted to extend within the neat lines of the structure. If, at any point in rock or shale upon written orders from the Engineer, material is excavated beyond the limits required to receive the structure, the additional excavation shall be filled solidly with concrete. If material is excavated beyond the limits required to receive the structure without written orders from the Engineer, the additional excavation shall be brought back to grade with "Class A" concrete at the Contractor's expense.

## 5.2 UTILIZATION OF EXCAVATED MATERIAL

All suitable material removed from the excavations shall be used insofar as practicable, in constructing the permanent works and at such other places as directed. The Contractor shall not waste materials removed from excavations and suitable for use in the construction of the permanent works, without a written application to do so and a written approval from the Engineer.

## 5.3 DISPOSAL OF SURPLUS AND/OR WASTE MATERIAL

All surplus excavated material and/or all waste materials shall be disposed of outside of the floodplain in an area provided by the Contractor and approved by the Engineer.

The surfaces thereof shall be left in a neat and sightly condition and sloped to provide positive drainage. Compaction of the waste materials shall be required.

## 5.4 BLASTING FOR EXCAVATION

### A. General

Blasting may be done only to the depth, amount, and extent, and in such locations approved by the Engineer. Approval of the methods of blasting by the Engineer will not relieve the Contractor of his responsibility in blasting operation, and no payment will be made for any necessary extra excavation below or outside of the limit lines indicated on the drawings, or modifications thereof, due solely to injury caused by over-shooting, improper blasting, or carelessness on the part of the Contractor. All material thus removed shall be replaced by concrete when a concrete structure is to be placed upon or against such surface, or by compacted fill material when fill is to be placed thereon, at the expense of the Contractor and in a manner satisfactory to the Engineer. Extra fill is to be of the same type as that to be placed directly above it.

## B. Blasting Trench and/or Structure Excavation

The use of explosives or blasting material of any kind in trench excavation and/or the structure excavation shall be carried out by using not over one-half (1/2) pound of explosives (equivalent in strength to 40 percent dynamite) per cubic yard of material to be blasted and by shooting only a few holes simultaneously.

## C. Use of Explosives

The transportation, handling, storage, and use of dynamite and other explosives shall be directed and supervised by a person of proven experience and ability in blasting operation. All blasting operations shall be in accordance with applicable local, state, and federal laws. Before any explosives are brought on the job, permission to do so shall be obtained from the Engineer. All blasts shall be fired electrically with an electric blasting machine. Where detonating cord is used as a detonating agent, the detonation cord shall be fired with an electric blasting cap. Delay electric detonators shall be used for all delayed blasts. Blasting machines used for firing shall be known to be in good condition and of sufficient capacity to fire all charges. Rubber-covered or other adequately insulated copper wires in good condition shall be used for firing lines and shall have solid cores of appropriate gage. Sufficient firing lines shall be provided to permit the blaster to be located at a safe distance from the blast. Single conductor lead lines shall be used. All operations involving the handling or use of explosives shall be discontinued during approach of a thunderstorm or while it is in progress. Blasting operations in the proximity of overhead power lines, communication lines, or other structures shall not be carried on until the operator and/or Owner of such lines has been notified and precautionary measures deemed necessary have been taken. All holes loaded on a shift shall be fired on the same shift. The use of black powder is prohibited. Before any drilling operations in preparation for blasting are started, the Contractor shall furnish the Engineer a detailed plan of operations showing the method proposed for the prevention of damage. In order to assure adequate protection, such plan may be modified to meet the conditions that may develop.

## 5.5 SHEETING AND BRACING

Sheeting and bracing as may be required to safely support the sides of excavations while maintaining the required side slopes shall comply with the safety precautions as outlined in current and accepted safety manuals, such as "Associated General Contractors Manual of Accident Prevention in Construction". Where sheeting and bracing are necessary to prevent caving of the walls of excavations and to safeguard the workmen, the excavations shall be dug to such widths that proper allowance is made for the space occupied by the sheeting and bracing. The Contractor shall perform the additional excavation

required and furnish and put in place the necessary sheeting and bracing and shall remove the same as the excavation is filled, at his own expense.

#### **5.6 REMOVAL OF WATER**

The Contractor shall construct and maintain all necessary channels, flumes, and/or other temporary diversion and protective works; shall furnish all materials required therefore; and shall furnish, install, maintain and operate all well points, casings, pumps and other equipment for dewatering the various parts of the work and for maintaining the foundations, trenches and other parts of the work free from water as required for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed, or leveled, to give a pleasing appearance and so as not to interfere in any way with the operation, usefulness or stability of the permanent structures.

#### **5.7 PROTECTION OF FINISHED STRUCTURE EXCAVATIONS**

It shall be the Contractor's responsibility to maintain finished excavated foundation surfaces for the works in good condition until such time as the structures are placed on or against the surfaces.

#### **5.8 BORROW**

Borrow excavation shall consist of and include the required excavation and proper utilization of approved materials obtained from designated areas when sufficient quantities of suitable materials are not available from other required excavation.

The control of excavation in any borrow area and the selection of materials therefrom shall at all times be as directed by the Engineer. On completion of excavation, all borrow pits shall be left in a neat and sightly condition. Unless otherwise approved by the Engineer, all borrow pits shall be so graded and dressed that water will readily drain therefrom, and away from all embankments, berms and structures. When shown on the drawings, terraces, or diversions shall be constructed to protect the slopes of the borrow areas from erosion and shall be considered a subsidiary of this specification.

### **6.0 STRUCTURE FOUNDATION FILL**

After clearing and stripping operations have been completed, all structure locations shall be proofrolled with a loaded pan or heavy pneumatic tired vehicle to densify upper soils and to locate possible areas which will require undercutting, removal and/or re-compaction. This operation shall be conducted under the surveillance of the Engineer.

## 6.1 FILL MATERIAL APPROVAL

Before initiating filling operations, the Contractor shall receive approval of fill material by the Engineer. Several laboratory Proctor density tests shall be run on representative samples obtained from the proposed borrow material.

## 6.2 PLACEMENT OF FILLS

Where structures or other appurtenances are constructed on fill, the fill shall be placed in layers not over six (6") inches deep, as measured before compaction and be thoroughly compacted.

## 6.3 COMPACTION

Compaction may be obtained by use of a sheepfoot roller or pneumatic-tired roller. Water shall be applied as directed to obtain close adhesion between layers and all parts of the material. Fill shall be compacted to a minimum of 95% of the Standard Proctor maximum dry density (ASTM Specifications D- 698). A minimum of two (2) compaction tests per each two (2') feet of fill on a structure location shall be run by an experienced soils engineering technician.

In order to prevent damage to existing structures, heavy construction equipment shall not be allowed to operate within approximately 8 feet horizontally of the existing structure exterior wall.

## **7.0 BACKFILLING AROUND STRUCTURES**

Only suitable material approved by the Engineer shall be used for backfilling around structures.

Backfilling around structures shall have material placed in layers of six (6") inch depth and compacted by pneumatic tools or other small equipment operated by hand. In no case shall the backfilling be allowed to obtain an elevation of one (1') foot above any other area. It shall be uniformly compacted throughout the structure depth. Any deviation shall be cause for the Engineer to require the material deposited to be removed and re-compacted at the Contractor's expense.

All backfilling shall be done in such a manner that the pipe or structure over or against which it is being placed will not be disturbed or injured. Any pipe or structure injured, damaged or moved from its proper line or grade during backfilling operations shall be removed or repaired to the satisfaction of the Engineer and then re-backfilled.

## **8.0 DAM EMBANKMENT – N/A**

~~One foot of material shall be stripped from the top of the existing embankment. This material shall be stockpiled for use as final cover. The surface of the embankment shall then be moistened and/or worked with a harrow, scarifier, or other suitable equipment to provide a satisfactory bonding surface for the additional fill. The surface condition must be approved by the Engineer prior to any fill being placed.~~

~~No fill material used in raising the embankment shall be dumped in place, but shall be distributed by blading or dozing in a manner that will insure placement so that voids, pockets, and bridging are held to a minimum. The hauling and placement equipment shall be routed over the area such that all areas receive approximately the same compactive effort. The fill shall be compacted such that in-place density checks indicate a soil dry density of at least 90 percent of the maximum value as determined by the standard Proctor density test. The embankment shall be raised in approximately horizontal lifts extending the entire length and width of the embankment. The thickness of the lifts before compaction shall not be more than eight (8) inches.~~

~~The stockpiled topsoil shall be uniformly spread over the raised embankment to insure that the final surface is capable of being vegetated.~~

~~It is anticipated that sufficient material to reach the designated elevations and grades will be generated from the excavation necessary to construct the principal spillway and the cleaning of the emergency spillway. Should an insufficient supply of material be available from these two sources, the needed additional material will be obtained from the borrow area below the toe of the embankment designated on the Drawings. Borrow operations shall be conducted in accordance with 4.08 BORROW.~~

## **9.0 PRELOADING OF STRUCTURES**

All tanks shall be preloaded with water prior to making final pipe connections. Elevations of structures shall be monitored until settlement has virtually ceased.

## **10.0 BACKFILLING TRENCHES**

The backfill shall be in accordance with other applicable sections of these specifications.

## **11.0 FINISH GRADING**

Finish grading shall be to the finished elevations and grades shown, and shall be made to blend into conformation with remaining natural ground surfaces. All finish graded surfaces shall be left smooth and free to drain. Areas to be sown in grasses shall be prepared according to Section 02003. Excess materials shall

be spread and compacted as directed. Grading within the construction area and around the outside of building and structure lines shall be performed in a manner which will prevent accumulation of water within the area. Where necessary, or where shown, finish grading shall be extended to insure that water will be directed to drainage ditches, and the site area left smooth and free from depressions holding water.

## **12.0 MAINTENANCE**

All excavated and filled areas for structures, trenches, fills, topsoil areas, embankments and channels shall be maintained by the Contractor in good condition at all times until final acceptance by the Owner. The Contractor shall maintain trench backfill at the original ground surface by periodically adding specified backfill material as necessary or when directed by the Engineer. Such maintenance shall be continued until final acceptance of the project.

## **13.0 PAYMENT**

Payment for all excavation and fill work shown on the Drawings and herein specified, that is required to complete the clearing, grubbing, site grading, roads, structural excavation, trench excavation, borrow excavation, backfill, sheeting, shoring, topsoil, crushed stone or gravel, drainage, pumping, embankment fills and any other excavation and fills required to complete the work as shown on the Drawings shall be included in the work to which it is subsidiary in the Bid Schedule and no measurement of the quantities will be made. The contours and elevations of the present ground are believed to be reasonably correct but are not guaranteed. The Contractor shall satisfy himself by actual examination of the site of work as to the existing elevations and contours and the amount of work required under this Section.

The cost of all initial soils inspections and testing shall be paid by the Owner. If compaction tests do not meet required values, the cost of additional testing as required by the Engineer shall be paid by the Contractor.

**END OF SECTION 02001**

## **SECTION 02072**

### **HORIZONTAL DIRECTIONAL DRILLING**

#### **1.0 GENERAL**

##### **1.1 WORK INCLUDED**

The work specified in this section consists of furnishing and installing underground utilities using the directional boring (horizontal directional drilling, HDD) method of installation, also commonly referred to as guided horizontal boring. This work shall include all services, equipment, materials, and labor for the complete and proper installation, testing, restoration of underground utilities and environmental protection and restoration.

##### **1.2 QUALITY ASSURANCE**

The requirements set forth in this document specify a wide range of procedural precautions necessary to ensure that the very basic, essential aspects of a proper directional bore installation are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this specification. Adherence to the specifications contained herein, or the Engineer's approval of any aspect of any directional bore operation covered by this specification, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the work authorized under the Contract.

##### **1.3 SUBMITTALS**

- A. **WORK PLAN:** Prior to beginning work, the Contractor must submit to the Engineer a general work plan outlining the procedure and schedule to be used to execute the project. Plan should document the thoughtful planning required to successfully complete the project. At a minimum, the Plan shall cover general construction activities, job safety, emergency response, and scheduling.
- B. **EQUIPMENT:** Contractor will submit specifications on directional boring equipment to be used to ensure that the equipment will be adequate to complete the project. Spares inventory shall be included.
- C. **MATERIAL:** Specifications on material to be used shall be submitted to Engineer. Material shall include the pipe, fittings and any other item which is to be an installed component of the project.
- D. **PERSONNEL:** Documentation of training and relevant experience of personnel shall be submitted.

## **2.0 EQUIPMENT REQUIREMENTS**

### **2.1 GENERAL**

The directional boring equipment shall consist of a directional boring rig of sufficient capacity to perform the bore and pullback the pipe, a boring fluid mixing and delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide boring operations and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.

### **2.2 BORING SYSTEM**

- A. BORING RIG: The directional boring machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power boring operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations. The rig shall be grounded during boring and pull-back operations. Sufficient spares shall be kept on hand for any break-downs which can be reasonably anticipated.
- B. BORE HEAD: The bore head shall be steerable by changing its rotation and shall provide the necessary cutting surfaces and boring fluid jets.
- C. MUD MOTORS (if required): Mud motors shall be of adequate power to turn the required boring tools.
- D. DRILL PIPE: Shall be constructed of high quality 4130 seamless tubing, grade D or better, with threaded box and pins. Tool joints should be hardened to 32-36 RC.

### **2.3 GUIDANCE SYSTEM**

The Guidance System shall be of a proven type and shall be setup and operated by personnel trained and experienced with this system. The Operator shall be aware of any magnetic anomalies and shall consider such influences in the operation of the guidance system if using a magnetic system.



## 2.4 BORING FLUID (MUD) SYSTEM

- A. MIXING SYSTEM: A self-contained, closed, boring fluid mixing system shall be of sufficient size to mix and deliver boring fluid composed of bentonite clay, water and appropriate additives. Mixing system shall be able to molecularly shear individual bentonite particles from the dry powder to avoid clumping and ensure thorough mixing. Mixing system shall continually agitate the boring fluid during boring operations.
- B. BORING FLUIDS: Drilling fluid shall be composed of clean water and an appropriate additive. Water shall be from a clean source with a pH of 8.5 - 10. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and additives shall be mixed thoroughly and be absent of any clumps or clods. No hazardous additives may be used. Boring fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of bore wall.
- C. DELIVERY SYSTEM: The mud pumping system shall have an adequate flow and pressure for the directional bore. The delivery system shall have filters in-line to prevent solids from being pumped into the drill pipe. Connections between the pump and drill pipe shall be relatively leak-free. Used boring fluid and boring fluid spilled during boring operations shall be contained and properly disposed of. A berm, minimum of 12" high, shall be maintained around boring equipment, boring fluid mixing system, entry and exit pits and boring fluid recycling system (if used) to prevent spills into the surrounding environment. Pumps of sufficient size shall be in place to convey excess boring fluid from containment areas to storage facilities.

## 2.5 OTHER EQUIPMENT

- A. PIPE ROLLERS: Pipe rollers, if required, shall be of sufficient size to fully support the weight of the pipe while being tested and during pull-back operations. Sufficient number of rollers shall be used to prevent excess sagging of pipe.
- B. PIPE RAMMERS/PULLERS: Hydraulic or pneumatic pipe rammers or pullers may only be used if necessary and with the authorization of Engineer.

### **3.0 OPERATIONS**

#### **3.1 GENERAL**

The Engineer shall be notified 7 days in advance of starting work. The Directional Bore shall not begin until the Engineer is present at the job site and agrees that proper preparations for the operation have been made. The Engineer approval for beginning the installation shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as authorized under the Contract. It shall be the responsibility of Engineer to provide inspection personnel at such times as appropriate without causing undue hardship by reason of delay to the Contractor.

#### **3.2 PERSONNEL REQUIREMENTS**

All personnel shall be fully trained in their respective duties as part of the directional boring crew and in safety. Training shall be provided specific to the project if any potential hazards may be encountered which has not already been included in personnel's training.

#### **3.3 BORING PROCEDURE**

- A. **SITE PREPARATION:** Prior to any alterations to work-site, Contractor shall photograph or video tape entire work area, including entry and exit points. One copy of which shall be given to the Engineer and one copy to remain with Contractor for a period of one year following the completion of the project. Work site, as indicated on drawings and within right-of-way, shall be graded or filled to provide a level working area. No alterations beyond what is required for operations are to be made. Contractor shall confine all activities to designated work areas.
- B. **BORE PATH SURVEY:** Entire drill path shall be accurately surveyed with entry and exit stakes placed in the appropriate locations within the areas indicated on drawings. If Contractor is using a magnetic guidance system, drill path will be surveyed for any surface geo-magnetic variations or anomalies.
- C. **ENVIRONMENTAL PROTECTION:** Contractor shall place silt fence between all boring operations and any drainage, wetland, waterway or other area designated for such protection by Contract Documents, state, federal, and local regulations. Additional environmental protection necessary to contain any hydraulic or boring fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations. Fuel or oil may not be stored in bulk containers within 200' of any water-body or wetland.

- D. **UTILITY LOCATES:** Contactor shall notify all companies with underground utilities in the work area via the state or local “one-call” (BUD) to obtain utility locates. Once the utilities have been located Contractor shall physically identify the exact location of the utilities by vacuum or hand excavation, when possible, in order to determine the actual location and path of any underground utilities which might be within 20 feet of the bore path. Contractor shall not commence boring operations until the location of all underground utilities within the work area have been verified.
- E. **SAFETY:** Contractor shall adhere to all applicable state, federal, and local safety regulations and all operations shall be conducted in a safe manner. Safety meetings shall be conducted at least weekly with a written record of attendance and topic submitted to Engineer. The Contractor shall implement the safety guidelines and practices established by:
1. Occupational Safety and Health Act (OSHA).
    - (a) In particular, Subpart P, Excavations of 29 CFR 1926.650, .651, .652, and OSHA Publication 2226, “Excavation, Trenching & Shoring”
- F. **BORE PIT:** The boring pit shall be solid sheeted, braced, and shored as necessary to provide a safe work environment. The Contractor shall take all precautions, and comply with all requirements as may be necessary to protect employees, and private and public property. As required by federal and/or state regulations, bore pit excavation and shoring shall be designed by a professional engineer registered in Kentucky. Tabulated data, calculations, and/or drawings shall be signed and sealed by the bore pit design professional engineer and submitted for review.
- G. **PIPE:** Pipe shall be connected together in one length prior to pull-back operations, if space permits. Steel pipe welds will be X-rayed prior to being placed in bore hole. Pipe will be placed on pipe rollers before pulling into bore hole with rollers spaced close enough to prevent excessive sagging of pipe.
- H. **PILOT HOLE:** Pilot hole shall be drilled on bore path with no deviations greater than 5% of depth over a length of 100’. In the event that pilot does deviate from bore path more than 5% of depth in 100’, Contractor will notify Engineer and Engineer may require Contractor to pull-back and re-drill from the location along bore path before the deviation.

In the event that a boring fluid fracture, inadvertent returns or returns loss occurs during pilot hole boring operations, Contractor shall cease boring, wait at least 30 minutes, inject a quantity of boring fluid with a viscosity exceeding 120 seconds as measured by a Marsh funnel and then wait another 30 minutes. If mud fracture or returns loss continues, Contractor will cease operations and notify Engineer. Engineer and Contractor will discuss additional options and work will then proceed accordingly.

- I. REAMING: Upon successful completion of pilot hole, Contractor will ream bore hole to a minimum of 25% greater than outside diameter of pipe using the appropriate tools. Contractor will not attempt to ream at one time more than the boring equipment and mud system are designed to safely handle.
- J. PULL-BACK: After successfully reaming bore hole to the required diameter, Contractor will pull the pipe through the bore hole. In front of the pipe will be a swivel. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations Contractor will not apply more than the maximum safe pipe pull pressure at any time.

In the event that pipe becomes stuck, Contractor will cease pulling operations to allow any potential hydro-lock to subside and will commence pulling operations. If pipe remains stuck, Contractor will notify Engineer. Engineer and Contractor will discuss options and then work will proceed accordingly.

### 3.4 PIPE TESTING

The pipe will be pressure tested as required in the Section 15103 – Pressure Testing and Sterilization

### 3.5 SITE RESTORATION

Following boring operations, Contractor will de-mobilize equipment and restore the work-site to original condition. All excavations will be backfilled and compacted to 95% of original density. Landscaping will be restored to original.

### 3.6 RECORD KEEPING, AS-BUILTS

Contractor shall maintain a daily project log of boring operations and a guidance system log with a copy given to Engineer at completion of project. As-built drawings shall be certified as to accuracy by the Contractor. Third-party verification of as-built drawings may be done at Owner's expense.

#### **4.0 PAYMENT**

The unit price bid for directional drilling shall be full compensation for supplying the casing and carrier pipe, and all material, labor, equipment, and tools for the construction of the waterline by directional drilling. Payment will be made by the unit price bid for each Directional Bore Crossing entered on the Bid Schedule.

**END OF SECTION 02072**



## **SECTION 02271**

### **RIPRAP**

#### **1.0 GENERAL**

##### **1.01 DESCRIPTION OF WORK**

- A. The Contractor shall furnish all labor, materials, tools, supervision, transportation, installation equipment, and incidentals required to provide rubble stone riprap meeting Class II and Class III requirements set forth by the Kentucky Transportation Cabinet.
- B. The Contractor shall be prepared to install the riprap in conjunction with other construction activities and subcontractors at the site.

##### **1.02 RELATED SECTIONS**

- A. Section 02200 – EARTHWORK
- B. ~~Section 02205 – MATERIAL EXCAVATION~~
- C. ~~Section 02210 – EMBANKMENT~~

##### **1.03 SUBMITTALS**

The Contractor shall submit the following to the Engineer for inspection and acceptance at least seven (7) days prior to starting the Work of this Section:

- A. Source of rip-rap stone material - supplier
- B. Gradation analysis
- C. Certification of compliance with Kentucky Department of Highways material specifications.

#### **2.0 PRODUCTS**

##### **2.01 STONE RIPRAP**

- A. Stone used for riprap shall consist of field stone, rough unhewn quarry stone or excavated rock with angular or fractured faces meeting Class II and Class III requirements. The stone used for riprap shall consist of sandstone, limestone, or other hard, sound and durable material that shall be resistant to the action of air, temperature changes, and water;

and shall be sound, dense and suitable in all respects for the prevention of scour. The stone used for riprap purposes shall be approved by the Engineer as to source, size and quality prior to its delivery to the site.

- B. Stone used for riprap shall be reasonably free of fines and reasonably well graded between the maximum and minimum rock sizes so as to produce a minimum of voids.

### **3.0 EXECUTION**

#### **3.01 SUBGRADE PREPARATION**

- A. Riprap of the required type shall be placed to the lines, grades, thickness, and location shown on the Drawings or as directed by the Engineer.
- B. The subgrade shall be prepared as shown on the Drawings and specified in Section 02200.
- C. Riprap shall be placed immediately following completion of subgrade preparation and approval by the Engineer.
- D. Unless otherwise shown and/or specified elsewhere in the Contract Documents, stone riprap shall be placed to a consolidated depth of not less than twelve (12) inches.

#### **3.02 RIPRAP PLACEMENT**

- A. Riprap shall be carefully placed to avoid segregation or disturbing of the underlying material. The material shall be placed in such a manner as to produce a well graded mass of riprap with the minimum practicable percentage of voids. The larger pieces shall be well distributed throughout the entire mass and the finished riprap shall be free from objectionable pockets of small or large pieces. Hand placing, to a limited extent, may be required, but only to the extent necessary to obtain the results specified above.
- B. Placing riprap by dumping into chutes or by similar methods likely to cause segregation of various sizes shall not be permitted.
- C. At the discretion of the Owner or Engineer, a geotextile filter/separator may be placed on the subgrade prior to placement of riprap. Riprap shall not be placed in a manner that shall cause damage to the underlying geotextile filter/separator. Any damage to geotextile during placement of riprap shall be repaired by placing a piece of geotextile



large enough to cover the damaged area and overlapping and seaming. All repair costs shall be the responsibility of the Contractor.

### **3.03 PRODUCT PROTECTION**

- A. The Contractor shall use all means necessary to protect all prior Work and materials, and completed Work of other Sections.
- B. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary, to the approval of the Owner or Engineer and at no cost to the Owner.

### **4.0 MEASUREMENT AND PAYMENT**

Payment for riprap will be made in accordance with the Bid Schedule and shall include all necessary foundation preparation, shaping, underlayment, placing and finishing in accordance with the Drawings and Specifications.

Unless riprap is specified to be measured and paid as a separate Bid Item, full payment shall be included in the Bid Price of the completed Bid Item to which it is most subsidiary and no measure of the quantities will be made.

Payment as specified above shall be considered as full compensation for all labor, materials, equipment and incidentals necessary to perform the Work as required.

**END OF SECTION 02271**



## **DIVISION 3: CONCRETE**



**SECTION 03310**  
**CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

**1.01 SCOPE OF WORK**

- A. Provide all labor, materials, equipment and services required to furnish and install all cast-in-place concrete as indicated on the Drawings and specified herein.
- B. All concrete construction shall conform to all applicable requirements of ACI 301 (latest), Specifications for Structural Concrete for Buildings, except as modified by the supplemental requirements specified herein.
- C. All water holding structures shall be tested for leakage by the Contractor. The Contractor shall provide at his own expense all labor, material, temporary bulkheads, pumps, water measuring devices, etc.; necessary to perform the required tests. Each unit shall be tested separately, and the leakage tests shall be made prior to backfilling and before equipment is installed. Testing water shall be from any potable, non-potable, or natural moving source such as a river or stream, but not from any still water source such as a lake or pond, and not from any wastewater source.

**1.02 ACTION SUBMITTALS**

The Contractor shall submit the following data for Engineer's review in accordance with Section 01340.

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternative design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at the Project site.
  - 2. Submit copies of laboratory test reports showing that the mix has been successfully tested to produce concrete with the properties specified and that mix must be suitable for the job conditions. This shall include at least 3 tests each for 7 day and 28 day compressive strengths for test cylinders made and cured in accordance with ASTM C192/C192M and tested in accordance with ASTM C39/C39M. Include mill test and all other tests for cement, fly ash, aggregates, and admixtures in the laboratory test reports. Provide maximum nominal aggregate size, gradation analysis, percentage retained and passing sieve, and a graph of percentage

retained versus sieve size. Submit test reports along with the concrete mix design. Obtain approval before concrete placement.

3. Use a qualified independent testing agency for testing for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- C. Slab and Wall Construction Joint Layout Drawings: The Contractor shall submit for review drawings, separate from the steel reinforcing drawings, showing the location of all proposed construction joints and the sequence of concrete placements. Layout plans shall specifically detail methods and sequences of concrete placements for concrete slabs and walls. Include proposed concrete screed equipment, location of waterstops, and/or any proposed deviations from joints indicated on the contract drawings. Indicate all proposed construction joints required to construct the structure. Location of construction joints is subject to approval of the Engineer.
- D. Form Ties: Submit product data and dimensions and details of form ties for approval.
- E. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement. Shop drawings shall conform to the latest edition ACI detail manual SP-66. Shop drawings shall be prepared under the direct supervision of a professional engineer licensed in the state in which the project is located and shall include plans, elevations, sections, details, and attachments to other work. Laps of reinforcement at joints shall be coordinated with the Construction Joint Layout Drawings above.
- F. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements.
1. Cementitious materials.
  2. Aggregates: Test results showing compliance with required standards, i.e. sieve analysis, aggregate soundness tests, petrographic analysis per ASTM C295/C295M, alkali-aggregate reactivity per ASTM C1260, mortar bar expansion testing per ASTM C1567, etc. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity. Submit Certification of Compliance for freeze-thaw resistant concrete aggregate.
  3. Admixtures: Include the chloride ion content of each admixture and certification from the admixture manufacturer that all admixtures utilized in the design mix are compatible with one another and properly proportioned prior to mix design review by the Engineer. Include certification that admixtures meet the requirements of NSF / ANSI 61.

- a. Fly Ash: Submit test results in accordance with ASTM C618 for fly ash. Submit test results performed within 6 months of submittal date. Submit manufacturer's policy statement on fly ash use in concrete.
- 4. Curing Compounds.
- 5. Trial Batches: For each of the preliminary concrete mix designs and shall include slump per ASTM C143, air content per ASTM C231, unit weight per ASTM C138 and compressive strength tests.
- 6. Steel Reinforcement: Submit material test results.
- 7. Field Test of Fresh Concrete: Obtain at least one composite sample for each 50 cubic yd, or fraction thereof, of each concrete mixture placed in any one day. Test fresh concrete in accordance with ACI 301 for compressive strength, slump, and air content.
- 8. Submit copies of Delivery Tickets of concrete with field test reports. All field test reports and tickets shall be referenced in writing to the location that the subject concrete was placed.
- G. Leakage Test Reports: All water holding structures shall be tested separately for leakage by Contractor.
- H. Field Quality-Control Reports. Contractor shall submit a signed, dated checklist for each concrete placement that indicates that the forms, reinforcement, and embedded items were independently checked by his quality control person for proper installation prior to placing concrete.
- I. Manufacturer Certification: Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities".
- J. Testing Reports: For all required tests.

### 1.03 QUALITY ASSURANCE

- A. Qualification Data: Comply with the following including all sub-references contained herein unless modified by requirements in the Contract Documents:
  - 1. ACI 301, "Specifications for Structural Concrete".
  - 2. ACI 318, "Building Code Requirements for Structural Concrete".
  - 3. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials".
  - 4. CRSI 10MSP, "Manual of Standard Practice"

5. ASTM E329, "Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction".
6. NSF / ANSI 61 "Drinking Water System Components."
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products that complies with ASTM C94/C94M requirements for production facilities and equipment and is certified according to NRMCA CPMB 100.
- C. Welding Procedure Qualifications: Must be in accordance with AWS D1.4/D1.4M.
- D. Welder Qualifications: Provide certificates in accordance with AWS D1.4/D1.4M or under an equivalent qualification test approved in advance. Welders are permitted to do only the type of welding for which each is specifically qualified.
- E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from a single source, and obtain admixtures from single source from single manufacturer.

#### 1.04 DELIVERY, STORAGE, AND HANDLING/PROJECT CONDITIONS

##### A. Reinforcing Steel:

1. All reinforcing shall be neatly bundled and tagged for placement when delivered to the job site. Bundles shall be properly identified for coordination with mill test reports.
2. Reinforcing steel shall be stored above ground on platforms or other supports and shall be protected from the weather at all times by suitable covering. It shall be stored in an orderly manner and plainly marked to facilitate identification.
3. Reinforcing steel shall at all times be protected from conditions conducive to corrosion until concrete is placed around it.
4. The surfaces of all reinforcing steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed. Where there is a delay in depositing concrete, reinforcing shall be reinspected and, if necessary, recleaned.

##### B. Joint Sealers:

1. Do not proceed with installation of joint sealers when ambient and substrate temperature conditions are outside the limits permitted by the joint sealer manufacturer. Do not install joint sealers when joint substrates are wet due to rain, frost, condensation or other causes.



2. Do not proceed with installation of joint sealers when joint widths are less than allowed by joint sealer manufacturer for application indicated.

## **PART 2 - PRODUCTS**

### **2.01 STEEL REINFORCEMENT**

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed, ASTM A706 Grade 60 where required to be welded.
- B. All bar reinforcing shall be from domestic mills and shall have the manufacturer's mill marking rolled into the bar which shall indicate the producer, size, type, and grade.
- C. Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs. Dowels shall be installed at right angles to construction joints and expansion joints. Dowels shall be accurately aligned parallel to the finished surface and shall be rigidly held in place and supported during placing of the concrete. One end of dowels shall be oiled or greased or dowels shall be coated with high density polyethylene with a minimum thickness of 14 mils.

### **2.02 ANCHOR RODS**

- A. Unheaded Anchor Rods: ASTM F1554, Grade 36.
  1. Configuration: Straight, threaded each end with three sets nut and washer each as indicated.
  2. Nuts: ASTM A563 heavy-hex carbon steel.
  3. Washers: ASTM F436, Type 1, hardened carbon steel plus A 36 plate washers where indicated.
  4. Finish: As indicated.

### **2.03 REINFORCEMENT ACCESSORIES**

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice", of greater compressive strength than concrete and as follows:
  1. Reinforcement supports and other accessories in contact with the forms for members which will be exposed to view in the finished work shall be of stainless steel or shall be plastic. Supports for reinforcement, when in contact with the ground or stone fill, shall be precast stone concrete blocks or plastic. Particular attention is directed to the requirement of

Paragraph 3.3.2.4 of ACI Standard 301. These requirements apply to all reinforcement, whether in walls or other vertical elements, inclined elements or flatwork.

2. Particular care shall be taken to bend tie wire ends away from exposed faces of beams, slabs and columns. In no case shall ends of tie wires project toward or touch formwork.
- B. Concrete blocks (dobies), used to support and position bottom reinforcing steel shall have the same or higher compressive strength as specified for the concrete in which it is located.
  - C. Mechanical couplers shall develop a tensile strength which exceeds 125 percent of the yield strength of the reinforcing bars being spliced at each splice. The reinforcing steel and coupler used shall be compatible for obtaining the required strength of the connection.

## 2.04 FORMWORK

- A. Formwork shall conform to ACI SP-4.
- B. Forms for exposed concrete surfaces shall be exterior grade, high-density overlay plywood, steel, or wood forms with smooth tempered hard-board form-liners.
- C. All forms shall be smooth surface forms unless otherwise specified.
- D. Forms and falsework shall be designed for total dead load, plus all construction live loads as outlined in ACI 347. Design and engineering of formwork and safety considerations during construction shall be the responsibility of the Contractor.
- E. Forms shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete. The maximum deflection of facing materials reflected in concrete surfaces exposed to view shall be 1/600 of the span between structural members.
- F. Form-Release Agents: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- G. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- H. Form Ties: Shall be one of the following:
  1. Taper ties that can be removed from the concrete wall after the forms have been stripped, and that have an elastomeric plug seal to place in the hole after the tie is removed.

2. Snap ties that remain in the wall and the ends can be snapped off at least 1½ inches below the surface of the concrete. Snap ties shall have integral water stops.
  3. She-bolts with ends at least 1½ inches below the surface of the concrete.
  4. Coil ties with ends at least 1½ inches below the surface of the concrete.
- I. Form Ties for water-retaining structures shall have integral waterstops.
- J. Flat or strap ties are not permitted.

## 2.05 HYDRAULIC CEMENT

- A. Portland Cement: ASTM C150, Type I/II. Type III may only be used with Engineer's written approval.
- B. When potentially reactive aggregates are to be used in the concrete mix, cement shall meet the following requirements:
1. For concrete mixed with only Portland Cement, the total alkalis in the cement (calculated as the percentage of  $\text{Na}_2\text{O}$  plus 0.658 times the percentage of  $\text{K}_2\text{O}$ ) shall not exceed 0.40%.
  2. For concrete mixed with Portland Cement and an appropriate amount of fly ash the total alkalis in the Portland Cement (calculated as the percentage of  $\text{Na}_2\text{O}$  plus 0.658 times the percentage of  $\text{K}_2\text{O}$ ) shall not exceed 0.85%.
  3. When non-reactive are used in the concrete mix, total alkalis in the cement shall not exceed 1.0%.
  4. The proposed Portland Cement shall not contain more than 8% tricalcium aluminate and more than 12% tetracalcium aluminoferrite.
- C. Different types of cement shall not be mixed nor shall they be used alternately except when authorized in writing by the Engineer. Different brands of cement or the same brand from different mills may be used alternately. A resubmittal will be required if different cements are proposed during the Project.
- D. Cement shall be stored in a suitable weather-tight building so as to prevent deterioration or contamination. Cement which has become caked, partially hydrated, or otherwise damaged will be rejected.

## 2.06 FLY ASH

- A. Fly Ash: ASTM C618, Class F with a maximum LOI of 6%, a maximum free carbon content of 3.0% and a maximum available alkali content (as  $\text{Na}_2\text{O}$ ) of 1.5%.

- B. Where reactive aggregates are used in concrete mix, the fly ash constituent shall be between 15% and 25% of the total weight of the combined Portland Cement and fly ash.
- C. For concrete to be used in environmental concrete structures, i.e. process structures or fluid containing structures, the inclusion of fly ash in the concrete mix is mandatory.

## 2.07 WATER

- A. Water: ASTM C94/C94M
- B. Water used for mixing concrete shall be clear, potable, and free from deleterious substances such as objectionable quantities of silty organic matter, alkali, salts, and other impurities.

## 2.08 AGGREGATES

- A. Normal-Weight Aggregates: ASTM C33.
- B. Fine aggregate (sand) in the various concrete mixes shall consist of natural or manufactured sand, clean and free of deleterious substances, and conforming to ASTM C33.
- C. Coarse aggregates shall consist of hard, clean, durable gravel, crushed gravel or crushed rock. Coarse aggregate shall be size #57 or #67 conforming to ASTM C33.
  - 1. Supplier shall certify that coarse aggregate source has a demonstrated history of not causing alkali silica reaction in concrete.
- D. Provide aggregates from a single source.
- E. Aggregates shall be tested for gradation by sieve analysis tests in conformance with ASTM C136.
- F. Aggregates shall be tested for soundness in accordance with ASTM C88. The loss resulting after five cycles shall not exceed 10 percent for fine or coarse aggregate when using magnesium sulfate.
- G. Non-reactive aggregates shall meet the following requirements:
  - 1. Fine and coarse aggregates shall be tested and evaluated for alkali-aggregate reactivity in accordance with ASTM C1260. The fine and coarse aggregates shall be evaluated separately and in combination, which matches the Contractor's proposed mix design proportioning. All results for the separate and combination testing shall have a measured expansion less than 0.008 percent at 16 days after casting. Should the test data indicate an expansion of 0.08 percent or greater, the aggregate

shall be rejected or additional testing using ASTM C1260 and ASTM C1567 shall be performed. The additional testing using ASTM C1260 and ASTM C1567 shall be performed using the low alkali Portland cement in combination with Class F fly ash. Class F fly ash shall be used in the range of 25 to 40 percent of the total cementitious material by mass.

2. A petrographic analysis in accordance with ASTM C295 shall be performed to identify the constituents for the fine and coarse aggregate. Non-reactive aggregates shall meet the following limitations:
    - a. Optically strained, microfractured, or microcrystalline quartz, 5.0% maximum.
    - b. Chert or chalcedony, 3.0% maximum.
    - c. Tridymite or cristobalite, 1.0% maximum.
    - d. Opal, 0.5% maximum.
    - e. Natural volcanic glass in volcanic rocks, 3.0% maximum.
  3. Proposed concrete mix including proposed aggregates shall be evaluated by ASTM C1567. Mean mortar bar expansions at 16 days shall be less than 0.08%. Tests shall be made using exact proportion of all materials proposed for use on the job in design mix submitted.
- H. All aggregates shall be considered reactive unless they meet the requirements above for non-reactive aggregates. Aggregates with a lithology essentially similar to sources in the same region found to be reactive in service shall be considered reactive regardless of the results of the tests above.
- I. Contractor shall submit form TC 64-764 certifying that all aggregates used for this Project meet the Kentucky Department of Highways' requirements for freeze-thaw resistance.
- J. Contractor shall submit a new trial mix to the Engineer for approval whenever a different aggregate or gradation is proposed.

## 2.09 ADMIXTURES

- A. General: All admixtures shall conform to NSF / ANSI 61.
- B. Air-Entraining Admixture: ASTM C260.
- C. Air entraining agent shall be added to all concrete unless noted otherwise. Air content of concrete, when placed, shall be within the ranges given in the concrete mix design.

- D. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete.
1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
  2. Retarding Admixture: ASTM C494/C494M, Type B.
  3. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D.
  4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
  5. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G.
  6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
- E. The admixture manufacturer, when requested, shall provide a qualified concrete technician employed by the manufacturer to assist in proportioning concrete for optimum use. He shall also be available when requested to advise on proper addition of the admixture to the concrete and on adjustment of the concrete mix proportions to meet changing job conditions.
- F. Admixtures containing calcium chloride, thiocyanate or more than 0.05 percent chloride ions are not permitted.
- G. The addition of admixtures to prevent freezing is not permitted.
- H. The use of admixtures to retard setting of the concrete during hot weather, to accelerate setting during cold weather, and to reduce water content without impairing workability will be permitted if the following conditions are met:
1. The admixture shall conform to ASTM C494, except that the durability factor for concrete containing the admixture shall be at least 100 percent of control, the water content a maximum of 90 percent of control and length change shall not be greater than control, as defined in ASTM C 494.
  2. Where the Contractor finds it impractical to employ fully the recommended procedures for hot weather concreting, the Engineer may at his discretion, require the use of a set retarding admixture for mass concrete 2.5 feet or more thick for all concrete whenever the temperature at the time concrete is cast exceeds 80°F. The admixture shall be selected by the Contractor subject to the review of the Engineer. The admixture and concrete containing the admixture shall meet all the requirements of these Specifications. Preliminary tests of this concrete shall be required at the Contractor's expense.

## 2.10 CLASSES OF CONCRETE AND USAGE

A. Structural concrete of the various classes required shall be proportioned by either Method 1 or Method 2 of ACI 301 to produce the following 28-day compressive strengths:

1. Selection of Proportions for Class A Concrete:

- a. 4,500 psi compressive for strength at 28 days.
- b. Type I/II cement plus supplementary cementitious materials.
- c. Maximum water-cementitious materials ratio = 0.45.
- d. Min. cement content = 564 lbs.
- e. Nominal max. size coarse aggregate = No. 67 (3/4" max.) or No. 57 (1" max.). Walls with architectural treatment shall use #67 stone.
- f. Air content = 6% plus or minus 1% by volume for exterior concrete, except interior smooth finished slabs shall have 2% plus or minus 1% by volume.
- g. Fly Ash = 25% maximum.
- h. Slump = 3" - 4" when tested in accordance with ASTM C 143/C 143M. Slump shall not exceed 8 inches when high-range water-reducers are used.

2. Selection of Proportions for Class B Concrete:

- a. 3,500 psi compressive strength at 28 days.
- b. Type I/II cement plus supplementary cementitious materials.
- c. Max. water-cementitious materials ratio = 0.50.
- d. Min. cement content = 470 lbs. (5.0 bags)/cu. yd. concrete.
- e. Nominal max. size coarse aggregate = No. 67 (3/4" max.) or No. 57 (1" max.). Walls with architectural treatment shall use No. 67 (3/4" max.).
- f. Air content = 6% plus or minus 1% by volume if exposed to freezing and thawing.
- g. Slump = 3" - 4" when tested in accordance with ASTM C 143/C 143M. Slump shall not exceed 8 inches when high-range water-reducers are used.

- B. Concrete shall be used as follows:
  - 1. Class A concrete for all concrete work except as noted below.
  - 2. Class B non-structural concrete for fill concrete, thrust blocks, and where indicated on the Drawings.

## 2.11 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C309, Type I, Class B, dissipating.

## 2.12 RELATED MATERIALS

- A. Bonding Agents: ASTM C1059-C1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- B. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements.
- C. Expansion Joint Filler: Preformed, compressible, resilient, non-waxing, non-extruding strips of plastic foam of material and size, shape and density to control sealant depth and otherwise contribute to producing optimum sealant performance. Provide either flexible, open cell polyurethane foam or non-gassing, closed-cell polyethylene foam, unless otherwise indicated, subject to approval of sealant manufacturer.
- D. Joint Sealants: ASTM C920, Type M, Class 25, Use T, M, A, I. Use non-sag type on vertical surfaces.
- E. Polyvinyl Chloride (PVC) Waterstops:
  - 1. PVC waterstops for construction joints shall have width and shape as indicated on the drawings with a minimum thickness at any point of 3/8 inches.



2. Waterstops for expansion joints shall have width and shape as indicated on the drawings with a minimum thickness at any point of 3/8 inches.
  3. The required minimum physical characteristics for this material are:
    - a. Tensile Strength = 1750 psi (ASTM D638)
    - b. Ultimate Elongation = not less than 280% (ASTM D638)
  4. No reclaimed PVC shall be used for the manufacturing of the waterstops. The Contractor shall furnish certification that the proposed waterstops meet the above requirements.
  5. Waterstops shall be securely wired into place to maintain proper position during placement of fresh concrete, as shown on the Drawings. Care shall be taken in the installation of the waterstop and the placing of the concrete to avoid "folding" while concrete is being placed, and to prevent voids in the concrete surrounding the waterstop.
- F. Chamfer strips shall be one (1) inch radius with leg, polyvinyl chloride strips by Gateway Building Products, Saf-T-Grip Specialties Corp., Vinylex Corp., or equal.

## **PART 3 - EXECUTION**

### **3.01 STEEL REINFORCEMENT**

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Reinforcement bars shall not be straightened or rebent in a manner that will injure the material. Heating of bars is not permitted.
- E. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.

### 3.02 FORMWORK

- A. No falsework or forms shall be used which are not clean and suitable. Deformed, broken or defective falsework and forms shall be removed from the work.
- B. Forms shall be smooth and free from surface irregularities. Joints between the forms shall be sealed to eliminate any irregularities. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to a practical minimum.
- C. Forms shall be true to line and grade, and shall be sufficiently rigid to prevent displacement and sagging between supports. Forms shall be properly braced or tied together to maintain their position and shape under a load of freshly-placed concrete.
- D. Forms shall be mortar tight so as to prevent the loss of water, cement and fines during placing and vibrating of the concrete.
- E. All forms shall be constructed in such a manner that they can be removed without hammering or prying against the concrete. Forms shall not be disturbed until the concrete has attained sufficient strength. Forms shall be removed in such manner as not to impair safety and serviceability of the structure. Care shall be taken to prevent chipping of corners or other damage to concrete when forms are removed. Exposed corners and other surfaces which may be damaged by ensuing operations shall be protected from damage by boxing, corner boards or other approved means until construction is completed.
- F. Forms shall be coated with an approved release agent before initial pour and between subsequent pours, in accordance with the manufacturer's printed instructions. Form boards shall not be wet prior to placing concrete.

### 3.03 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  - 3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

4. Construction joints shall be positioned so as not to adversely affect the structural performance.
  5. All joints in water bearing structures shall have a waterstop. All joints below grade in walls or slabs which enclose an accessible area shall have a waterstop.
- C. Expansion Joints: All expansion joints in water-bearing structures shall have a center-bulb type waterstop. All expansion joints below grade in walls or slabs which enclose an accessible area shall have a center-bulb type waterstop.
- D. Contraction Joints in Slabs: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- E. Isolation Joints in Slabs: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated:
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
  2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- F. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

### 3.04 CONCRETE MIXING

- A. All concrete shall be machine mixed. Hand mixing of concrete will not be permitted. The Contractor may supply concrete from a ready-mix plant or from a site mixed plant. In selecting the source for concrete production, the Contractor shall carefully consider its capability for providing quality concrete at a rate commensurate with the requirements of the placements so that well bonded, homogenous concrete, free of cold joints, is assured.
- B. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94, and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

2. Any truck delivering concrete to the job site, which is not accompanied by a delivery ticket showing the following information will be rejected and such truck shall immediately depart from the job site:
  - a. Date and truck number
  - b. Ticket number
  - c. Mix designation of concrete
  - d. Cubic yards of concrete
  - e. Cement brand, type, and weight in pounds
  - f. Weight in pounds of fine aggregate
  - g. Weight in pounds of coarse aggregate
  - h. Air entraining agent, brand, and weight in pounds and ounces
  - i. Admixtures, brand and weight in pounds and ounces
  - j. Water, in gallons, stored in attached tank
  - k. Water, in gallons, maximum that can be added without exceeding design water/cement ratio
  - l. Time of loading
  - m. Time of delivery to job (by truck driver)
- C. Project Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C94. Mix concrete materials in appropriate drum-type batch machine mixer.
  1. Scales for weighing concrete ingredients shall be accurate when in use within +/- 0.04 percent of their total capacities. Standard test weights shall be available to permit checking scale accuracy.
  2. The concrete shall be mixed in a batch mixer capable of thoroughly combining the aggregates, cement, and water into a uniform mass within the specified mixing time, and of discharging the concrete without harmful segregation. The mixer shall bear a manufacturer's rating plate indicating the rated capacity and the recommended revolutions per minute and shall be operated in accordance with.
  3. The interior of the mixer shall be free of accumulations that will interfere with mixing action. Mixing blades shall be replaced when they have lost 10% of their original height.

4. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
5. For mixer capacity larger than 1 cu. Yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd.
6. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.
7. Concrete shall be mixed only in quantities for immediate use and within the time and mixing requirements of ASTM C94.

### 3.05 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. If concrete is placed by pumping, no aluminum shall be used in any parts of the pumping system which contact or might contaminate the concrete. Aluminum chutes and conveyors shall not be used.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer.
- D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation:
  1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- F. All construction joints shall be prepared for bonding by roughening the surface of the concrete in an acceptable manner which will expose the aggregate uniformly and will not leave laitance, loosened particles of aggregate or damaged concrete at the surface. Joints in walls and columns shall be maintained level. Concrete shall be placed in layers not over 18 inches deep and each layer shall be compacted by mechanical internal-vibrating equipment supplemented by hand spading, rodding and tamping as directed. Vibrators shall not be inserted into lower courses that have begun to set.
- G. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- I. All construction joints shall be prepared for bonding by roughening the surface of the concrete in an acceptable manner which will expose the aggregate uniformly and will not leave laitance, loosened particles of aggregate or damaged concrete at the surface. Horizontal joints in walls and columns shall be maintained level. Concrete shall be placed in layers not over 18 inches deep and each layer shall be compacted by mechanical internal vibrating equipment supplemented by hand spading, rodding and tamping as directed. Vibrators shall not be inserted into lower courses that have begun to set.

### 3.06 FINISHES

- A. Exposed to Public View Concrete Surfaces:
  - 1. For all exterior exposed to public view concrete surfaces, including the outside surfaces of tanks, form faces shall be smooth and forms shall be true-to-line and grade. Surfaces produced by forms shall require only minor dressing to arrive at true surfaces. Do not reuse forms with surface wear, tears, or defects that lessen the quality of the surface. Thoroughly clean and properly coat forms before reuse.
  - 2. All formed exposed to view concrete surfaces shall have a "smooth rubbed finish". Exterior vertical surfaces shall be rubbed to one foot below grade. Interior exposed to public view vertical surfaces of liquid containers

shall be rubbed to one (1) foot below the minimum liquid level that will occur during normal operations.

- B. All vertical surfaces in liquid containing structures shall have a "smooth form" finish.
  - 1. All "smooth form" concrete vertical surfaces shall be a true plane within 1/4 inch in ten (10) feet as determined by a ten (10) foot straightedge placed anywhere on the surface in any direction. Abrupt irregularities shall not exceed 1/8 inch.
- C. Basin, flume, conduit and tank floors shall have a "smooth troweled" finish unless shown otherwise on Drawings.
- D. Weirs and overflow surfaces shall be given a hard "smooth troweled" finish.
- E. Exterior platforms, steps and landings, shall be given a "broom" finish. "Broom" finish shall be applied to surfaces which have been steel-troweled to an even, smooth finish. The troweled surface shall then be broomed with a fiber-bristle brush in the direction transverse to that of the main traffic.

### 3.07 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Foundations: Provide foundations as shown on Drawings.
  - 1. Unless otherwise directed by the Engineer, the vertical surfaces of footings shall be formed. Excavations and reinforcement for all footings shall have been inspected by the Engineer before any concrete is placed.
- D. The installation of underground and embedded items shall be inspected before slabs are placed. Pipes and conduits shall be installed below the concrete unless otherwise indicated. Fill required to raise the subgrade shall be placed as specified in Section 02300 "Earthwork". Porous fill not less than 6 inches in compacted thickness shall be installed under all slabs, tank bottoms, and foundations. The fill shall be leveled and uniformly compacted to a reasonably true and even surface. The surfaces shall be clean, free from frost, ice, mud and water. Waterproof paper, polyethylene sheeting of nominal 4-mil minimum thickness, or polyethylene-coated burlap shall be laid over all surfaces receiving concrete.
- E. Concrete Walks and Curbs:

1. Subgrade shall be true and well compacted at the required grades. Spongy and otherwise unsuitable material shall have been removed and replaced with approved material. Concrete walks shall be placed upon porous fill covered with waterproof paper, polyethylene sheeting of nominal 4-mil minimum thickness or polyethylene-coated burlap.
  2. Concrete walks shall be not less than 4 inches in thickness. Walks shall have contraction joints every 5 linear feet in each groove in the top surface of the slab to a depth of at least one-fourth the slab thickness with a jointing tool. Transverse expansion joints shall be installed at all returns, driveways, and opposite expansion joints in adjacent curbs. Where curbs are not adjacent, transverse expansion joints shall be installed at intervals of approximately forty (40) feet. Sidewalks shall receive a "broomed" finish. Scoring shall be in a transverse direction. Edges of the sidewalks and joints shall be edged with a tool having a radius not greater than 1/6 inch. Sidewalks adjacent to curbs shall have a slope of 1/4 inch per foot toward the curb. Sidewalks not adjacent to curbs shall have a slope of 1/4 inch per foot. The surface of the concrete shall show no variation in cross section in excess of 1/4 inch in 5 feet. Concrete walks shall be reinforced with 6 x 6-W1.4xW1.4 welded wire reinforcement.
  3. Concrete curbs shall be constructed to the section indicated on the Standard Detail, and all horizontal and vertical curves shall be incorporated as indicated or required. Forms shall be steel as approved by the Engineer. At the option of the Contractor, the curbs may be precast or cast-in-place. Cast-in-place curbs shall be divided into sections 8 to 10 feet in length using steel divider plates. The divider plates shall extend completely through the concrete and shall be removed. Precast curbs shall be cast in lengths of 4 to 5 feet. All exposed surfaces of concrete shall be finished smooth. All sharp edges and the edges of joints and divisions shall be tooled to 1/4 inch radius. Steel reinforcement shall be installed where the curb crosses pipe trenches or other insecure foundations. Such reinforcement shall consist of two (2) No. 4 deformed bars near the bottom of the curb and shall extend at least 24 inches beyond the insecure area. Transverse expansion joints shall be installed at all curb returns and at intervals of approximately 40 feet.
- F. Column base plates, bearing plates for beams and similar structural members, machinery and equipment bases shall, after being plumbed and properly positioned, be provided with full bearing with nonshrink grout. Concrete surfaces shall be rough, clean, free of oil, grease, and laitance and shall be moistened thoroughly immediately before grout is placed. Metal surfaces shall be clean and free of oil, grease and rust. Mixing and placing shall be in conformance with the material manufacturer's printed instructions. After the grout has set, exposed surfaces shall be cut back one (1) inch and covered with a parge coat of mortar consisting of one (1) part Portland cement, two (2) parts sand and sufficient water to make the mixture placeable. Parge coat shall have a smooth dense finish. Exposed surfaces of grout and parge coat shall be water cured with wet burlap for seven (7) days.



- G. Grout fill which is formed in place by using rotating equipment as a screen, such as clarifiers and similar types of equipment, shall be mixed in proportions and consistencies as required by the manufacturer or supplier of the equipment.
- H. Unless otherwise shown or directed, all pumps, other equipment, and items such as lockers, motor control centers and the like, shall be installed on concrete bases. The bases shall be constructed to the dimensions shown on the plans or as required to meet plan elevations. Where no specific plan elevations are required, the bases shall be 6 inches thick and shall extend 3 inches outside the metal equipment base. In general, the concrete bases shall be placed up to 2 inches below the metal base. The equipment shall then be properly shimmed to grade and the 2- inch void filled with nonshrink grout.
- I. Manhole or access steps shall be plastic, constructed of copolymer polypropylene meeting the requirements of ASTM D2146 for Type II, Grade 16906 material. Step shall be reinforced with ASTM A615, Grade 60, #4 deformed steel reinforcing bar, be 9" deep, 14" wide, provided with notched tread ridge, foot retainer lugs on each side of tread and penetration stops for press fit installation. Plastic steps shall be PS2-PF as manufactured by M.A. industries, Inc., Peachtree City, Georgia, or approved equal. Steps shall be installed by drilling 1" diameter holes, minimum 3-3/4 inches deep into the wall and then driving steps into hole to the penetration stop, resulting in a press fit condition.
- J. All existing contact surfaces with new patch shall be coated with moisture insensitive epoxy bonding adhesive, Sikadur Hi-Mod, Concrevic LPL Liquid by BASF Construction Chemicals, or approved equal. Patch shall consist of base pour of 4,000 psi structural concrete, then a topping of non-shrink natural aggregate grout, Masterflow 713, SonogROUT by BASF Construction Chemicals, or approved equal, mixed and placed in accordance with manufacturer's instructions, to the thicknesses shown on Drawings. Coat base pour with epoxy bonding adhesive prior to placing grout course.

### 3.08 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
  - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
    - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

### 3.09 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

### 3.10 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  2. Repair defects on surfaces exposed to view by blending white portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.03 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  2. After concrete has cured at least 14 days, correct high areas by grinding.
  3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
  5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish blending with adjacent finished concrete. Cure in same manner as adjacent concrete.
  7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of damaged or defective concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used subject to Engineer's approval.

**END OF SECTION 03310**

## SECTION 03400

### PRECAST CONCRETE

#### 1.0 GENERAL

##### 1.01 REFERENCES

A. The following is a list of standards, which may be referenced in this Section:

1. American Concrete Institute (ACI): 304R, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
2. American Society for Testing and Materials (ASTM):
  - a. A36, Standard Specification for Structural Steel.
  - b. A416, Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete.
  - c. C3 1, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
3. Precast/Prestressed Concrete Institute (PCI):
  - a. MNL-117, Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.
  - b. MNL- 120, Design Handbook for Precast and Prestressed Concrete, Third Edition.

##### 1.02 SUBMITTALS

A. Shop Drawings:

1. Sealer for Exterior Surfaces: Product data with mixing/application instructions.
2. Calculations and Technical Data: Proposed details and design calculations for stresses in all critical sections of precast members for all loading conditions including transportation, handling, and erection.

B. Quality Control Submittals:

1. For Precasting Manufacturers Not Listed in Article 1.03 QUALITY ASSURANCE, below:
  - a. Experience record on production of precast concrete as shown, with information on precasting plant that will indicate capability to satisfactorily perform the Work.
  - b. Evidence of current PCI plant certification.

- c. Complete list of precast prestressed structural work accomplished in past two (2) years, including:
  - 1) Type of structure.
  - 2) Name of owner.
  - 3) Address of completed work.
- 2. Certificate of Compliance: Certify admixtures and concrete do not contain calcium chloride.
- 3. Test Reports:
  - a. For precast manufacturer's concrete test cylinders.
  - b. Inspection of installed elements.

C. Erector Certification:

- 1. The precast erector shall be certified by a nationally recognized institute based on the quality control records of the erector in the categories suitable this particular application. Submit a copy of the current certification for Engineer's review and approval. At the completion of erection of precast elements, the erector shall submit to the Engineer, a certificate of compliance addressed to the building official stating that the work was performed in accordance with the approved construction documents and Change/Field Orders.

### 1.03 QUALITY ASSURANCE

A. Qualifications of Precasting Manufacturers:

- 1. Precast Concrete and Precast Prestressed Concrete: Product of manufacturer with three (3) years of experience producing precast concrete products of quality specified.
- 2. Precast Plant: PCI certified plant with current certification.
- 3. Precast Concrete Manufacturers with Apparent Capability to Meet These Specifications:
  - a. De-Am-Ron Building Systems, Owensboro, Kentucky.
  - b. Kentucky Precast of Lexington, Inc, Lexington, Kentucky.
  - c. Flexicore Systems, Inc., Huber Heights, Ohio.
  - d. Or approved equal
- 4. Calculations signed and sealed by a Structural Engineer licensed in the same state as the Project.

B. Special Inspection (Kentucky Building Code 2002, Section 1704):

- 1. If special inspection is required, Owner will retain the services of a Special Inspector of Record, at his/her cost, to inspect all applicable Work under this Contract. The Contractor is responsible for providing safe access to all areas of Work under this Contract to be

inspected at no additional cost to the Owner or his/her agents. No concrete fabrication Work for the Project shall take place without written approval of the Special Inspector of Record (SIR). Any progression of Work without the approval of the SIR will be subject to demolition at the Contractor's expense.

2. The extent of special inspection to be performed is listed in Table 1704.4 of the Kentucky Building Code 2002 (KBC 2002).

C. Manufacturer Certification:

1. The precast plant shall be certified by the Prestressed Concrete Institute (PCI) in the categories appropriate for this particular Project. At the completion of casting operations, the precast manufacturer shall submit a certificate of compliance addressed to the building official(s) stating that the Work was performed in accordance with the approved construction documents and Change/Field Orders.
2. If the manufacturer is not certified by the PCI, Special Inspection of the precast plant shall be performed by the Engineer-approved Special Inspector according to Article 1704.2 of the KBC 2002 and the cost of special inspection shall be back-charged to the Contractor.

D. Erector Certification:

1. The precast erector shall be certified by a nationally recognized institute in the categories appropriate for this particular project. At the completion of erection of the precast elements, the erector shall submit a certificate of compliance addressed to the building official(s) stating that the Work was performed in accordance with the approved construction documents and Change/Field Orders.
2. If the Erector is not certified by a nationally recognized institute, Special Inspection of the erection of the precast shall be performed by the Engineer-approved Special Inspector according to Article 1704.3 of the KBC 2002 and the cost of Special Inspection shall be back-charged to the Contractor.

## **2.0 PRODUCTS**

### **2.01 MATERIALS**

A. Formwork:

1. One-piece, full length and without seams.
2. As specified in Section 03310 – CAST-IN-PLACE CONCRETE.

- B. Reinforcing Steel: As specified in Section 03002 – CONCRETE REINFORCEMENT.
- C. Cement: As specified in Section 03310 – CAST-IN-PLACE CONCRETE.
- D. Pre-tensioning Strands: Seven-wire, uncoated, stress relieved, ASTM A416, Grade 270.
- E. Aggregates: As specified in Section 03310 – CAST-IN-PLACE CONCRETE, for ¾-inch maximum size aggregate. Furnish of consistent quality, gradation, and color for precast architectural panels to produce uniformity of appearance in all panels.
- F. Admixtures: As specified in Section 03310 – CAST-IN-PLACE CONCRETE.
- G. Embedded Items:
  - 1. ASTM A36 steel.
  - 2. Anchor Studs: Headed anchor studs (HAS), deformed bar anchors (DBA), or threaded studs as manufactured by Nelson Stud Welding Co., Lorain, OH, or approved equal.
  - 3. Furnish inserts for lifting tilt-up walls, bolting stiffeners, attaching braces, and as otherwise required.
- H. Grout: Non-shrink, nonmetallic Type H grout as specified in Section 03600 - GROUT.
- I. Sealer for Exterior Surfaces:
  - 1. Silane Sealer: One-component penetrating sealer, hydrophilic (isopropyl alcohol as a carrier) with 40 percent active ingredients.
  - 2. Manufacturers:
    - a. Master Builders Co.
    - b. Euclid Chemical Co.
    - c. Approved equal
- J. ALL pre-cast and cast-in-place concrete that may be exposed to sanitary wastewater, or to gases produced by/from sanitary wastewater, shall be provided with XYPEX Admix C-5000 crystalline waterproofing additive as manufactured by Xypex Chemical Corporation, 13731 Mayfield Place, Richmond, British Columbia V6V 2G9, Telephone (800) 961-4477, or approved equal.



1. Dosage shall be as recommended by the additive manufacturer for use in the specific concrete mix(es) provided on the Project, exposed to aged domestic sewage, subject to approval by the Engineer.
2. There shall be no substitutions, unless authorized in writing by the Engineer.
3. Structures to be treated include all Portland cement concrete structures that may be exposed continuously to raw sewage, or gasses released from raw sewage; including, but not necessarily limited to, all lift station wet well chambers and top slabs, lift station valve pits and top slabs, diversion chambers and top slabs, sanitary manholes including top cones, air/vacuum valve pits and top slabs, and all reinforced concrete pipe.
4. Concrete in structures that may be only infrequently exposed to minor sewage spills (i.e. operating deck, flow meter pit, etc.) is not required to include the waterproofing additive.

## 2.02 CONCRETE MIX

- A. As specified in Section 03310 – CAST-IN-PLACE CONCRETE, except as hereinafter modified.
- B. Design Strength: 5,000 psi at 28 days.
- C. Water/Cement Ratio: 0.38 maximum.

## 2.03 DESIGN REQUIREMENTS

### A. Structural Precast and Prestressed Members:

1. Meet applicable sections of PCI MNL-120.
2. Design for spans and superimposed live and dead loads shown plus dead loads of members.

### B. Prestressed Members:

1. Calculated tension at full service loads shall not exceed six times the square root of design strength except that in wet or corrosive service conditions and in walkway elements exposed to exterior weather conditions the calculated tension due to live load and dead load shall not exceed zero.
2. Limit long-term camber growth to span length divided by 360.

## 2.04 FABRICATION

### A. General:

1. Comply with PCI MNL- 117.
2. Reinforcing Steel and Pretensioning Strands:
  - a. Place in position before concrete is cast.
  - b. Keep clean and free from form oil or other substances harmful to bond.
3. Pre-tensioning Force, if used: Determine by elongation and by gauge pressure.
  - a. Method: Meet requirements of Prestressed Concrete Institute.
4. Forms: Produce smooth surfaces.
5. Concrete: Deposit, vibrate, finish, and cure in accordance with recommended practices of ACI 304R. Steam curing is permitted.
6. Release Strength for Pretensioning Method: Minimum 4,000 psi, unless otherwise approved.
7. Coordinate dimensions, determine type, quantity, size, and location of, and furnish necessary embedded items in precast concrete. Coordinate location of embedded items in cast-in-place concrete necessary to connect precast items.

### B. Surface Finish for Precast Structural Units: Furnish concrete finish, as specified in Section 03300 - CAST-IN-PLACE CONCRETE, to additional concrete field placed on precast units.

1. Other Surfaces: Smooth screeded finishes, unless otherwise shown.

### C. Sealer:

1. Apply to exterior surfaces exposed to weather at precast plant site in accordance with manufacturer's instructions.
2. Protect surface until installed in the Work.
3. Repair damage as approved by manufacturer.

## 2.05 SOURCE QUALITY CONTROL

### A. Prepare minimum three standard concrete test cylinders for each fifty (50) cubic yards, or fraction thereof, of concrete placed in the precast Work in accordance with ASTM C31.

### B. Test and record concrete strengths.

### **3.0 EXECUTION**

#### **3.01 ERECTION**

- A. Verify that anchorage inserts are in correct locations.
- B. Handle and erect precast concrete with care as recommended by manufacturer.
- C. Erect precast units plumb, straight, level, square, and in proper alignment.
- D. Fasten units securely in place and brace to maintain position, stability, and alignment until permanently connected and structure is complete and stable.
- E. Field Cutting: Not allowed without prior approval of Engineer.

#### **3.02 PATCHING**

- A. Mix and place patching mixture to match color and texture of surrounding concrete and to minimize shrinkage.
- B. Demonstrate patching method and obtain acceptance and approval.

#### **3.03 CLEANING**

- A. After installation, clean soiled precast concrete surfaces with detergent and water, using fiber brush and sponge.
- B. Use acid solution only to clean particularly stubborn stains after more conservative methods have been tried unsuccessfully.
- C. Use extreme care to prevent damage to precast concrete surfaces and to adjacent materials.
- D. Rinse thoroughly with clean water immediately after using cleaner.

#### **3.04 FIELD QUALITY CONTROL**

- A. Inspection:
  - 1. With Engineer, inspect precast structural elements for chips, cracks, discoloration, and other damage.
  - 2. Compare every element to approved sample panel and finish sample panel.

3. Record location and condition of damaged or nonmatching panels.

B. Resolution:

1. Repair damage to satisfaction of Engineer and Owner.
2. Remove elements with damage or repairs not acceptable to Engineer.
3. Install new acceptable elements in place of those removed.
4. Perform reinspection and obtain acceptance by Engineer.

3.05 PROTECTION

- A. Protect precast units from chipping, spalling, cracking or other damage to the units after delivery to the site.

- B. After erection, protect units from damage.

**4.0 PAYMENT**

No separate measurements or payment will be made for precast concrete units. Payment for this Work shall be included in the Bid Price of the Bid Item to which it is most subsidiary.

**END OF SECTION 03400**

## **SECTION 03600**

### **GROUT**

#### **1.0 GENERAL**

##### **1.1 REFERENCES**

A. The following is a list of standards, which may be referenced in this section:

1. American Society for Testing and Materials (ASTM):
  - a. C230, Standard Specification for Flow Table for Use in Tests of Hydraulic Cement.
  - b. C 10 18, Standard Test Method for Flexural Toughness and First-Crack Strength of Fiber-Reinforced Concrete (Using Beam with Third-Point Loading).
  - c. C 1107, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
  - d. C 1116, Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
  - e. D4580, Measuring Delaminations in Concrete Bridge Decks by Sounding, Practice for.
2. Corps of Engineers (COE):
  - a. CRD-C61 1, Flow of Grout for Preplaced Aggregate Concrete.
  - b. CRD-C621, Specification for Nonshrink Grout

##### **1.2 SUBMITTALS**

A. Shop Drawings:

1. Product data of grouts.
2. Proposed method for keeping existing concrete surfaces wet prior to placing grout.
3. Forming method for fluid grout placements.
4. Curing method for grout.

B. Quality Control Submittals:

1. Manufacturer's Written Instructions:
  - a. Adding fiber reinforcing to batching.
  - b. Cement-water ratio of grout topping.
  - c. Mixing of grout.
2. Manufacturer's proposed training schedule for grout work.
3. Manufacturer's Certificate of Compliance:

- a. Grout free from chlorides and other corrosion-causing chemicals.
  - b. Nonshrink grout properties of Categories H and III, verifying expansion at 3 or 14 days will not exceed the 28 day expansion and nonshrink properties are not based on gas or gypsum expansion.
- 4. Manufacturer's Certificate of Proper Installation.
- 5. Statements of Qualification: Nonshrink grout manufacturer's representative.
- 6. Test Reports:
  - a. Test report for 24-hour evaluation of nonshrink grout. Independent testing laboratory to certify that testing was conducted within the past 18 months.
  - b. Test results and service report from the demonstration and training session, and from field tests.
  - c. Field test reports and laboratory test results for field-drawn samples.

### **1.3 QUALIFICATIONS**

- A. Nonshrink Grout Manufacturer's Representative: Authorized and trained representative of grout manufacturer. Minimum of 1 year experience that has resulted in successful installation of grouts similar to those for this Project.

### **1.4 GUARANTEE**

- A. Manufacturer's guarantee shall not contain disclaimer on the product data sheet, grout bag, or container limiting responsibility to only the purchase price of products and materials furnished.
- B. Manufacturer guarantees participation with Contractor in replacing or repairing grout found defective due to faulty materials, as determined by industry standard test methods.

## **2.0 PRODUCTS**

### **2.1 NONSHRINK GROUT SCHEDULE**

- A. Furnish nonshrink grout for applications in grout category in the following schedule:

| Application                                                         | Temperature Range | Maximum Placing Time |                     |
|---------------------------------------------------------------------|-------------------|----------------------|---------------------|
|                                                                     | 40 to 100°F       | 20 min               | Greater Than 20 min |
| Filing Tie Holes                                                    | I                 | I                    | I                   |
| Blockouts for Gate Guides                                           | I or II           |                      | II                  |
| Precast Joints                                                      | I or II           |                      | II                  |
| Through-bolt openings                                               | II                | II                   | II                  |
| Machine bases 25 hp or less                                         | II                | II                   | II                  |
| Patching concrete walls                                             | II                | II                   | II                  |
| Machine bases 26 hp and up                                          | III               | III                  | III                 |
| Baseplates and/or soleplates with vibration, thermal movement, etc. | III               | III                  | III                 |

## 2.2 NONSHRINK GROUT

### A. Category I:

1. Nonmetallic and nongas-liberating flowable fluid.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. Test in accordance with AS TM C 1107:
  - a. Flowable consistency 140 percent, five drops in 30 seconds, in accordance with ASTM C230.
  - b. Flowable for 15 minutes.
4. Grout shall not bleed at maximum allowed water.
5. Minimum strength of grout, 3,000 psi at 3 days, 5,000 psi at 7 days, and 7,000 psi at 28 days.
6. Manufacturers and Products:
  - a. Master Builders Co., Cleveland, OH; SET GROUT.
  - b. Euclid Chemical Co., Cleveland, OH; NS Grout.
  - c. Dayton Superior Corp., Miamisburg, OH; Sure-Grip High Performance Grout.
  - d. Or approved equal

### B. Category II

1. Nonmetallic, nongas-liberating flowable fluid.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
4. Test in accordance with COE CRD-C621 and ASTM C 1107, Grade B:

- a. Fluid consistency 20 to 30 seconds in accordance with COE CRD-C61 1.
- b. Temperatures of 40, 80, and 100 degrees F.
- 5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
- 6. Minimum strength of grout, 2,500 psi at 1 day, 4,500 psi at 3 days, and 7,000 psi at 28 days.
- 7. Maintain fluid consistency when mixed in 1 to 9 yard loads in ready-mix truck.
- 8. Manufacturers and Products:
  - a. Master Builders Co., Cleveland, OH; Master Flow 928.
  - b. Five Star Products Inc., Fairfield, CT; Five Star 100.
  - c. Euclid Chemical Co., Cleveland, OH; Hi Flow Grout.
  - d. Or approved equal

C. Category III:

- 1. Metallic and nongas-liberating flowable fluid.
- 2. Prepackaged aggregate grout requiring only the addition of water.
- 3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
- 4. Test in accordance with COE CRD-C621 and ASTM C 1107, Grade B:
  - a. Fluid consistency 20 to 30 seconds in accordance with COE CRD-C61 1.
  - b. Temperatures of 40 and 100 degrees F.
- 5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
- 6. Minimum strength of grout, 4,000 psi at 1 day, 5,000 psi at 3 days, and 9,000 psi at 28 days.
- 7. Maintain fluid consistency when mixed in 1 to 9 yard loads in ready-mix truck.
- 8. Manufacturers and Products: Master Builders Co., Cleveland, OH; EMBECO 885, or approved equal.

### **3.0 EXECUTION**

#### **3.1 NONSHRINK GROUT**

- A. General: Mix, place, and cure nonshrink grout in accordance with grout manufacturer's representative training instructions.
- B. Form Tie or Through-Bolt Holes: Provide nonshrink grout, Category I and II, Fill space with dry pack dense grout hammered in with steel tool and hammer. Through-bolt holes, coordinate dry pack dense grout application with vinyl plug in Section 03 100, CONCRETE



FORMWORK and bonding agent in Section 03300, CAST-IN-PLACE CONCRETE.

C. Grouting Machinery Foundations:

1. Block out original concrete or finish off at distance shown below bottom of machinery base with grout. Prepare concrete surface by sandblasting, chipping, or by mechanical means to remove any soft material.
2. Set machinery in position and wedge to elevation with steel wedges, or use cast-in leveling bolts.
3. Form with watertight forms at least 2 inches higher than bottom of plate.
4. Fill space between bottom of machinery base and original concrete in accordance with manufacturer's representative training instructions.

3.2 FIELD QUALITY CONTROL

A. Evaluation and Acceptance of Nonshrink Grout:

1. Provide a flow cone and cube molds with restraining plates onsite. Continue tests during Project as demonstrated by grout manufacturer's representative.
2. Perform flow cone and bleed tests, and make three 2-inch by 2-inch cubes for each 25 cubic feet of each type of nonshrink grout used. Restraining caps for cube molds in accordance with COE CRD-C621.
3. For large grout applications make three more cubes, one more flow cone test, including bleed test for each additional 25 cubic feet of nonshrink grout placed.
4. Consistency: As specified in Article NONSHRINK GROUTS. Reject grout with consistencies outside range requirements.
5. Segregation: As specified in Article NONSHRINK GROUTS. Reject grout when aggregate separates.
6. Nonshrink grout cubes shall test equal to or greater than minimum strength.
7. Strength Test Failures: Reject nonshrink grout work failing strength tests, remove and replace grout.
8. Perform bleeding test to demonstrate grout will not bleed.
9. Store cubes at 70 degrees F.
10. Independent testing laboratory shall prepare, store, cure, and test cubes in accordance with COE CRD-C62 1.

### 3.3 MANUFACTURER'S SERVICES

#### A. General:

1. Coordinate demonstrations, training sessions, and applicable site visits with grout manufacturer's representative.
2. Provide and conduct onsite, demonstration and training sessions for leech tests, mixing, flow cone measurement, cube testing, application, and curing for each category and type of nonshrink grout.
3. Coordinate necessary equipment and materials are available for demonstration.

#### B. Training:

1. Grout manufacturer's representative shall train Contractor to perform grout work.
2. Establish location at site and schedule time for grout manufacturer's demonstration and training session of proposed nonshrink grouts. Mix nonshrink grouts to required consistency, test, place, and cure on actual Project, e.g., baseplates and tie holes to provide actual on-the-job training.
3. Use minimum of five bags for each grout Category H and Category III. Mix grout to fluid consistency and conduct flow cone and two bleed tests, make a minimum of six cubes for testing of two cubes at 1, 3, and 28 days. Use remaining grout for final Work. Training includes methods for curing grout.
4. Mix sufficient grout Category I for minimum of 15 tie holes.
5. Patching through-bolt holes and blockouts for gate guides, and similar items.
6. Transport test cubes to an independent test laboratory and obtain test reports.

### 3.4 SUPPLEMENTS

A. The supplement listed below, following "END OF SECTION 03600" is part of this Specification.

1. 24-hour Evaluation of Nonshrink Grout Test Form and Grout Testing Procedures.

**END OF SECTION 03600**

## SUPPLEMENT I

---

(Test Lab Name)

---

(Address)

---

(Phone No.)

### 24-HOUR EVALUATION OF NONSHRINK GROUT TEST FORM

OBJECTIVE: Define standard set of test procedures for an independent testing laboratory to perform and complete within a 24-hour period.

SCOPE: Utilize test procedures providing 24-hour results to duplicate field grouting demands. Intent of evaluation is establish grout manufacturer's qualifications.

PRIOR TO TEST: Obtain five bags of each type of grout.

1. From intended grout supplier for Project.
2. Five bags of grout shall be of same lot number.

ANSWER THE FOLLOWING QUESTIONS FOR GROUT BEING TESTED FROM  
LITERATURE, DATA, AND PRINTING ON BAG:

- A. Product data and warranty information contained in company literature and data? Yes\_\_\_\_\_ No\_\_\_\_\_
- B. Literature and bag information meet specified requirements? Yes\_\_\_\_\_ No\_\_\_\_\_
- C. Manufacturer guarantees grout as specified in Article GUARANTEE? Yes\_\_\_\_\_ No\_\_\_\_\_
- D. Guarantee extends beyond grout replacement value and allows participation with Contractor in replacing and repairing defective areas? Yes\_\_\_\_\_ No\_\_\_\_\_
- E. Water demands and limits printed on bag? Yes\_\_\_\_\_ No\_\_\_\_\_
- F. Mixing information printed on the bag? Yes\_\_\_\_\_ No\_\_\_\_\_
- G. Temperature restrictions printed on bag? Yes\_\_\_\_\_ No\_\_\_\_\_

\*Rejection of a grout will occur if one or more answers are noted NO.

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## **GROUT TESTING PROCEDURES**

### **A. Bagged Material:**

1. List lot numbers.
2. List expiration date.
3. Weigh bags and record weight.

Engineer will disqualify grout if bag weights have misstated measure plus or minus 2 pounds by more than one out of five bags. (Accuracy of weights is required to regulate amount of water used in mixing since this will affect properties.)

### **B. Mixing and Consistency Determination:**

1. Mix full bag of grout in 10 gallon pail.
2. Use electric drill with a paddle device to mix grout (jiffy or jiffler type paddle).
3. Use maximum water allowed per water requirements listed in bag instructions.
4. Mix grout to maximum time listed on bag instructions.
5. In accordance with COE CRD-C611 (flow cone) determine time of mixed grout through the flow cone. \_\_\_\_\_ seconds
6. Add water to attain 20 to 30 second flow in accordance with COE CRD-C61 1.
7. Record time of grout through cone at new water demand. \_\_\_\_\_ seconds
8. Record total water needed to attain 20 to 30 second flow. \_\_\_\_\_ pounds
9. Record percent of water. \_\_\_\_\_ percent

### **C. When fluid grout is specified and additional water is required beyond grout manufacturer's listed maximum water, COE CRD-C621 will be run at new water per grout ratio to determine whether grout passes using actual water requirements to be fluid. Use new water per grout ratio on remaining tests.**

### **D. Bleed Test:**

1. Fill two gallon cans half full of freshly mixed grout at ambient temperatures for each category and at required consistency for each.
2. Place one can of grout in tub of ice water and leave one can at ambient temperature.

3. Cover top of both cans with glass or plastic plate preventing evaporation.
4. Maintain 38 to 42 degrees F temperature with grout placed in ice and maintain ambient temperature for second container for 1 hour.
5. Visually check for bleeding of water at 15-minute intervals for 2 hours.
6. Perform final observation at 24 hours.

If grout bleeds a small amount at temperatures specified, grout will be rejected.

E. Extended Flow Time and Segregation Test (for Category H and 111):

1. Divide the remaining grout into two 3 gallon cans. Place the cans into the 40-degree F and 100-degree F containers and leave for 20, 40, and 60 minutes. Every 20 minutes remove and check for segregation or settlement of aggregate. Use a gloved hand to reach to the bottom of the can, if more than 1/4-inch of aggregate has settled to the bottom or aggregate has segregated into clumps reject the grout.
2. Right after the settlement test mix the grout with the drill mixer for 10 seconds. Take a COE CRD-C611 flow cone test of grout and record flow time. Maintain this process for 1 hour at ambient temperatures of 40 and 100 degrees F.
  - a. 20 min \_\_\_\_\_ sec. @ 40 degrees F.
  - b. 40 min \_\_\_\_\_ sec. @ 40 degrees F.
  - c. 60 min \_\_\_\_\_ sec. @ 40 degrees F.
  - d. 20 min \_\_\_\_\_ sec. @ 100 degrees F.
  - e. 40 min \_\_\_\_\_ sec. @ 100 degrees F.
  - f. 60 min \_\_\_\_\_ sec. @ 100 degrees F.

All Category 11 and III grout that will not go through the flow cone with continuous flow after 60 minutes will be disqualified.

\_\_\_\_\_  
Qualified

\_\_\_\_\_  
Disqualified

F. 24-hour Strength Test:

1. Using grout left in mixing cans in accordance with COE CRD-C621 for mixing and consistency determination test and for extended time flow test, make minimum of nine cube samples.
2. Store cubes at 70 degrees F for 24 hours.

3. Record average compressive strength of nine cubes at 24 hours.

Grout will be disqualified if 24-hour compressive strengths are under 2,500 psi for grouts claiming fluid placement capabilities.

Grouts that have not been disqualified after these tests are qualified for use on the Project for the application indicated in Nonshrink Grout Schedule.

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Signature of Independent Testing Laboratory

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Date Test Conducted

## **DIVISION 4: MASONRY**





## **SECTION 04220**

### **LOAD-BEARING CONCRETE UNIT MASONRY**

#### **PART 1 – GENERAL**

##### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### **1.02 SUMMARY**

- A. This Section includes the following:
  - 1. Concrete masonry units.
  - 2. Mortar and grout.
  - 3. Steel reinforcing bars.
  - 4. Masonry joint reinforcement.
  - 5. Ties and anchors.
  - 6. Miscellaneous masonry accessories.

##### **1.03 DEFINITIONS**

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

##### **1.04 PERFORMANCE REQUIREMENTS**

- A. Provide structural unit masonry that develops net-area compressive strengths at 28 days indicated on the drawings.

##### **1.05 PRECONSTRUCTION TESTING**

- A. Preconstruction Testing Service: Engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
  - 1. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C140 for compressive strength.

##### **1.06 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For the following:

1. Masonry Units: Submit drawings including plans, elevations, and details showing sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Submit drawings including plans, elevations, and details of wall reinforcement. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315 and ACI SP-66.
3. Control Joint Layout: Locations of control joints on shop drawings. Follow locations indicated on contract drawings but provide joints in accordance with NCMA TEK 10-2B and at a spacing not more than 24 feet apart.

C. Test Reports:

1. Concrete Masonry Unit Test: According to ASTM C140 for compressive strength.
2. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.
3. Mortar Test (Proportion Specification): For each mix provided, according to ASTM C780. Test mortar for air content only, do not test compressive strength.
4. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

D. Certificates:

1. Masonry Units: Include data on material properties substantiating compliance with requirements.
2. Cementitious Materials: Include brand, type, and name of manufacturer.
3. Preblended, Dry Mortar Mixes: Include description of type and proportions of ingredients.
4. Grout Mixes: Include description of type and proportion of ingredients.
5. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
6. Reinforcing Bars
7. Testing Agency: Qualified according to ASTM C1093 for testing indicated.
8. Cold-Weather and Hot-Weather Procedures: Submit detailed description of methods, materials, and equipment to be used to comply with requirements.

## 1.07 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C1093 for testing indicated.
- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

- D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

#### 1.09 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit

masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## **PART 2 - PRODUCTS**

### **2.01 MASONRY UNITS, GENERAL**

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

### **2.02 CONCRETE MASONRY UNITS**

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
  2. Provide bullnose units where indicated on drawings.
- B. CMUs: ASTM C 90.
1. Density Classification: Lightweight.
  2. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
  3. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
- C. Integral Water Repellent: Provide units made with integral water repellent for exposed units and for units in liquid containment areas.
1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514 as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.

- a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - 1) ACM Chemistries, Inc.; RainBloc.
  - 2) BASF Aktiengesellschaft; Rheopel Plus.
  - 3) Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block.
  - 4) Or approved equal

## 2.03 MASONRY LINTELS

- A. Masonry Lintels: Built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Temporarily support built-in-place lintels until cured. Masonry lintels to match pattern and texture indicated on drawings.

## 2.04 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.
- D. Aggregate for Mortar: ASTM C 144.
  - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
  - 2. White-Mortar Aggregates: Natural white sand or crushed white stone.
  - 3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- E. Aggregate for Grout: ASTM C 404.
- F. Water-Repellent Admixture: (exterior CMU exposed to weather only) Liquid water-repellent mortar admixture intended for use with CMUs, containing integral water repellent by same manufacturer.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. ACM Chemistries, Inc.; RainBloc for Mortar.
    - b. BASF Aktiengesellschaft; Rheopel Mortar Admixture.
    - c. Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.
    - d. Or approved equal

- G. Water: Potable.

## 2.05 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.
- B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
  - 1. Interior Walls: Hot-dip galvanized, carbon steel.
  - 2. Exterior Walls: Hot-dip galvanized, carbon steel.
  - 3. Wire Size for Side Rods: 0.187-inch diameter.
  - 4. Wire Size for Cross Rods: 0.148-inch diameter.
  - 5. Wire Size for Veneer Ties: 0.187-inch diameter.
  - 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c..
  - 7. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.
- C. Masonry Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.
- D. Masonry Joint Reinforcement for Multi-Wythe Masonry (CMU interior wythe with brick exterior wythe): Adjustable (two-piece) type, ladder design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.

## 2.06 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
  - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
  - 2. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
  - 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.35-mm-) diameter, hot-dip galvanized steel wire.
  - 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.187-inch diameter, hot-dip galvanized steel wire.
- C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section.
  2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.187-inch- diameter, hot-dip galvanized steel wire.
- D. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches.

Corrosion Protection: Hot-dip galvanized to comply with ASTM A153/A153M.

## 2.07 ANCHOR RODS

- A. Unheaded Anchor Rods: ASTM F1554, Grade 36.
1. Configuration: Straight, fully threaded with one nut, flat washer and plate washer each as indicated.
  2. Nuts: ASTM A5 63 heavy-hex carbon steel.
  3. Washers: ASTM F 844 USS Flat Washer and 1/4 x 3 x 3 A 36 plate washer each as indicated plate washers where indicated.
  4. Finish: Hot Dipped Galvanized according to appropriate ASTM specification for the type of material.

## 2.08 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or urethane.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

## 2.09 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, antifreeze compounds, or other admixtures unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
  2. Use portland cement-lime mortar unless otherwise indicated.

3. For exterior masonry, use portland cement-lime
  4. For reinforced masonry, use portland cement-lime mortar.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Use Water-Repellent admixture in mortar as indicated previously.
- D. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
1. For all concrete masonry use type M or S.
- E. Pigmented Mortar: Use colored cement product.
1. Pigments shall not exceed 10 percent of portland cement by weight.
  2. Mix to match Architect's sample.
- F. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
  2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
  3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
  2. Verify that foundations are within tolerances specified.
  3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.



### 3.02 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

### 3.03 TOLERANCES

- A. Dimensions and Locations of Elements:
  - 1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
  - 2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
  - 3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
  - 1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
  - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20, or 1/2 inch maximum.
  - 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
  - 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
  - 5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
  - 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
- C. Joints:
  - 1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
  - 2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

### 3.04 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
  1. Install compressible filler in joint between top of partition and underside of structure above.
  2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.
  3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.

### 3.05 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
  - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
  - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
  - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
  - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
  - 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
  - 2. Allow cleaned surfaces to dry before setting.
  - 3. Wet joint surfaces thoroughly before applying mortar.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

### 3.06 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
  - 1. Space reinforcement not more than 16 inches o.c.
  - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
  - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

### 3.07 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
  - 1. Provide an open space not less than 1 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
  - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
  - 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

### 3.08 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
  - 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
  - 2. Install preformed control-joint gaskets designed to fit standard sash block.
  - 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
  - 4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

### 3.09 LINTELS

- A. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

### 3.10 REINFORCEMENT UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
  - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
  2. Limit height of vertical grout pours to not more than 60 inches.

### 3.11 FIELD QUALITY CONTROL

- A. Owner may engage a qualified inspecting and testing agency to perform tests and inspections.
- B. Remove and replace work that does not comply with specified requirements.
- C. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

### 3.12 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
  3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.13 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

**END OF SECTION 04220**

## **SECTION 04230**

### **REINFORCED UNIT MASONRY**

#### **PART 1 - GENERAL**

##### **1.1 REFERENCES**

A. The following is a list of standards which may be referenced in this section:

1. American Concrete Institute (ACI): ACI 530/ASCE 5/TMS 405, Building Code Requirements for Masonry Structures.
2. American Society for Testing and Materials (ASTM):
  - a. A82, Standard Specification for Steel Wire, Plain, for concrete Reinforcement.
  - b. A 153, Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.
  - c. C90, Standard Specification for Load-Bearing Concrete Masonry Units.
  - d. C140, Standard Methods of Sampling and Testing Concrete Masonry Units.
  - e. C144, Standard Specification for Aggregate for Masonry Mortar.
  - f. C150, Standard Specification for Portland Cement.
  - g. C207, Standard Specification for Hydrated Lime for Masonry Purposes.
  - h. C270, Standard Specification for Mortar for Unit Masonry.
  - i. C404, Standard Specification for Aggregates for Masonry Grout.
  - j. C476, Standard Specification for Grout for Masonry.
  - k. C652, Standard Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale).
  - l. C744, Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units.
3. International Conference of Building Officials (ICBO):
  - a. UBC Structural Engineering Design Provisions, Volume 2, Chapter 21.
  - b. UBC Standard 21-16, Field Test Specimens for Mortar.
  - c. UBC Standard 21-17, Test Method for Compressive Strength of Masonry Prisms (ASTM E447)
  - d. UBC Standard 21-18, Method of Sampling and Testing Grout (ASTM C 10 19).

##### **1.2 SUBMITTALS**

A. Shop Drawings:

1. Information illustrating horizontal joint reinforcement and preformed control joint materials proposed.

2. Grout mix design proposed.
3. Mortar mix design proposed.

B. Samples, when solicited:

1. Individual Samples of each type of masonry unit to be used on Project.
2. Two each, Samples of textured, glazed, sound absorbing, and brick units for selection of color and texture.

C. Quality Control Submittals:

1. Method of placing grout.
2. Certified field test results within 5 days of performing specified tests.

### **1.3 QUALITY ASSURANCE**

A. Mockups:

1. Lay up Sample panel for each type of masonry at the site.
2. Dimensions: Minimum 4 feet high by 4 feet long.
3. Leave intact after approval until acceptance of permanent masonry work and then remove.
4. Approved panels shall serve as basis of color, texture, bond, quality of finished joints, and for acceptance of permanent construction.
5. Demonstrate ability to keep insulation and grout isolated and in certain cells in any sequence of placement, and to demonstrate materials will be restricted to cells and bond beams intended to receive each material.
6. Construction shall show areas required to receive mortar, including webs on each side of each cell to prevent insulation from entering cells to receive grout or to prevent grout from entering cells to receive insulation.
7. Where bond beams are to be used, demonstrate proper placement of both insulation and grout to bond beam level, and proper placement of bond beam prior to placement of insulation and grout above bond beam level.
8. Demonstrate proper use of running bond or stacked bond.

B. Fog Spray: Provide demonstration, prior to starting Work, of fog spray nozzles for curing mortar.

C. Special Inspection (Kentucky Building Code, Section 1704):

1. Special Inspections to be performed under this contract are listed in the General Provisions of the Structural Drawings. If special inspection is required, Owner will retain the services of a Special Inspector of Record at His/Her cost to inspect all applicable work under this contract and this Contractor is responsible for providing safe access to all areas of



work under this contract to be inspected at no additional cost to the Owner or His/Her Agents. No concreting shall take place without written approval of the Special Inspector of Record (SIR). Any progression of work without the approval of the SIR will be subject to demolition at this contractor's expense.

2. The extent of special inspection to be performed is listed in Table 1704.4 of the Kentucky Building Code.

#### **1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Storage and Protection: Keep lime and other ingredients dry.

#### **1.5 ENVIRONMENTAL REQUIREMENTS**

- A. Temperature: Do not lay masonry when ambient temperature is below 32 degrees F on a rising temperature or below 40 degrees F on a falling temperature, or when there is a probability of such conditions occurring within 48 hours, unless written approval of procedures for protection from freezing is obtained.
- B. Moisture Protection: Protect masonry construction from loss of moisture during curing period of 7 days when ambient air temperature is 90 degrees F or greater and when relative humidity is less than 50 percent.

### **PART 2 - PRODUCTS**

#### **2.1 COMPRESSIVE STRENGTH OF MASONRY**

- A. Minimum 28-Day Compressive Field Strength,  $F_m$ , of the Completed Assemblage: 1,500 psi.

#### **2.2 MASONRY UNITS**

- A. General:
  1. Furnish or cut special shapes for corners, jambs, lintels, and other areas shown or required.
  2. Special units shall match color and texture of standard units.
  3. Where units are placed so end of a unit is exposed, such as at a corner or intersection, the exposed end of that block shall have surface to match color and texture of sides of other units.
  4. Furnish sound, dry, clean units free of cracks, prior to placing in structure.
  5. Vertical Cells to be Grouted: Capable of alignment sufficient to maintain clear, unobstructed continuous vertical cell measuring minimum 2-inch by 3 -inch.
  - 6.

6. Masonry unit size and shape shall allow for all placement patterns to prevent materials such as grout or poured insulation from escaping from cell being filled to adjacent cells where material is not intended to be placed.

**B. Concrete Masonry Units (CMU):**

1. ASTM C90.
2. Nominal Size: 16 inches long by 8 inches high by thickness shown on Drawings.
3. Color of Units: Natural.
4. Surface Texture on Exposed Surfaces: As shown on Drawings.
5. Surface Texture on Interior, Concealed Exterior, and Surfaces below a point 1 foot 0 inch Below Finished Grade: Smooth.
6. Coordinate bond patterns, unit textures and colors with Architectural drawings

**B. Facing Brick:**

1. Facing brick shall be standard modular face brick (3 cr = 8": 7-5/8" x 3-5/8" x 2-1/4") Grade SW, Type FBS.
2. Texture and color shall be Belden, Modular Indian Red Clear A, 09-30 to match North Laurel Middle School.
3. At sills, caps, and similar applications indicated to be brick, provide uncured, or frogged, units with all exposed surfaces finished.

## **2.3 MORTAR AND GROUT MATERIALS**

A. Cement: ASTM C150, I or II Portland cement.

B. Lime: ASTM C207, Type S hydrated.

C. Aggregates:

1. Mortar: ASTM C144, sand.
2. Grout: ASTM C404.

D. Water: Fresh, clean, potable.

E. Brick mortar shall be Flamingo Brixmix (C-224 Ohio River Masonry Sand) to match North Laurel Middle School.

## **2.4 REINFORCEMENT**

A. Horizontal Joint Reinforcement:

1. Two parallel, ASTM A82, No. 9 wires, galvanized in accordance with ASTM A 1531, weld connected to No. 9 perpendicular cross wires at 15 inches on center.

2. Reinforcement: Clean and free from loose rust, scale, and coatings that reduce bond.
  3. Furnish special manufactured corner and wall intersection pieces.
  4. Manufacturers:
    - a. Dur-O-Wall National, Inc., Arlington Heights, IL.
    - b. AA Wire Products Co., Chicago, IL.
    - c. Other manufacturers who can establish product equivalency to the satisfaction of the Engineer.
- B. Deformed Bars: As specified in Section 05120, STRUCTURAL STEEL.

## **2.5 PREFORMED CONTROL JOINTS**

- A. Solid rubber extrusions as manufactured by:
1. Dur-O-Wall National, Inc., Arlington Heights, IL; Regular Rapid Control Joint.
  2. Sonnebom-Contech Co., Oakland, CA; Sonneborn Control Joint.
  3. Other manufacturers who can establish product equivalency to the satisfaction of the Engineer.

## **2.6 MORTAR MIXES**

- A. Minimum average mortar 28-day compressive strength 1,800 psi.
- B. Proportions:
1. In accordance with ASTM C270, Type S.
- C. Mixing:
1. Machine mix in approved mixers.
  2. Keep mixer drums clean and free of debris and dried mortar.
  3. Mix by placing 1/2 water and 1/2 aggregate in operating mixer.
  4. Add cement.
  5. Add remaining aggregate and water and mix for at least 2 minutes.
  6. Add lime and continue mixing as long as needed to secure a uniform mass, but no less than 3 minutes after addition of lime.
  7. Time addition of admixture in accordance with manufacturer's instructions. Procedure used for adding it to mix shall provide good dispersion.
  8. Follow manufacturer's instructions for mortar plasticizer admixture.
- D. Where colored masonry units are used, color mortar to match. Inert coloring pigments may be added but shall not exceed 6 percent by weight of cement.

## **2.7 GROUT MIXES**

A. Proportions: Conform to ASTM C476 for coarse grout except as follows:

1. Compressive Strength: Minimum 3,000 psi at 28 days.
2. For Pouring: Fluid consistency (suitable for pouring without segregation) meeting requirements of ASTM C476.
3. For Pumping:
  - a. Fluid consistency with minimum seven sacks of cement in each cubic yard.
  - b. Self-consolidating concrete.

B. Mixing:

1. Onsite: Follow procedure specified in Article MORTAR MIXES.
2. Transit-Mixed Grout: Meet requirements of ASTM C476.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

A. Prepare surface contact area on foundation concrete for initial mortar placement by one of following methods:

1. Sandblasting foundation and reinforcing dowels after concrete has fully cured to remove laitance and spillage and to expose sound aggregate.
2. Water blasting foundation and reinforcing dowels after concrete has partially cured to remove laitance and spillage and to expose sound aggregate.
3. Green cutting fresh concrete with high pressure water and hand tools to remove laitance and spillage from foundation and reinforcing dowels and to expose sound aggregate.

B. Clean surfaces of loose material prior to initial mortar placement.

C. Prevent surface damage to foundation concrete that will be exposed to view outside of contact area.

### **3.2 LAYING REINFORCED MASONRY UNITS**

A. General:

1. Conform to the Building Code applicable to this Project as supplemented by these Specifications.
2. Do not start laying masonry units unless foundation wall is plumb within 1/4 inch in 10 feet or not straight within 5/16 inch in 10 feet.
3. Finish Tolerances (Measured on Interior Surfaces):

- a. Maximum Permissible Variation From Plumb of Masonry Wall or of Line of Joints in Masonry Wall: 1/ 16 inch per foot of height, and 1/4 inch in the total height of the wall.
  - b. Maximum Permissible Variation From Horizontal Line Along Base of Wall or for Lines of Horizontal Joints: 1/ 16 inch per block, 1/4 inch per 50 feet of wall with proportionately greater tolerance for longer walls up to 1/2 inch in total length of wall.
4. Place units with chipped edges or comers within permissible ASTM limits in wall such that chipped area is not exposed to view.

B. Wall Units:

1. General:
  - a. If necessary to move a unit after once set in place, remove from wall, clean, and set in fresh mortar.
  - b. Toothing of masonry units is not permitted.
2. Running Bond:
  - a. Unless otherwise shown, lay up walls in straight, level, uniform courses using a running bond pattern.
  - b. Place units for continuous vertical cells and mortar joints to prevent materials such as grout or poured insulation from escaping from cell being filled to adjacent cells where material is not intended to be placed.
3. Glazed Concrete Masonry Units:
  - a. Single-faced units may be installed through the wall where walls or partitions are shown to have glazed masonry unit finish on one side only.
  - b. Use facing for dimensional and plane reference in installation.
  - c. Where glazed masonry unit finish is indicated on both sides of a wall or partition, install coved bases of two-unit construction or two-faced units through the wall.
  - d. Install coved bases flush with finished surfaces above, except as otherwise specified.
4. Stack Bond: Lay up walls in straight, uniform courses with vertical joints aligned and plumb.
5. Corners: Lay standard masonry bond for overlapping units and grout solid.
6. Intersecting Walls: Comply with ACI 530 and 530.1

C. Special Shapes:

1. Provide and place such special units as corner block, door jamb block, lintel block fillers, and similar blocks as may be required.
2. Use required shapes and sizes to work to corners and openings, maintaining proper bond throughout wall.

### **3.3 BUILT-IN ITEMS**

- A. Position door frames, windows, vents, louvers, and other items to be built in the wall, and construct wall around them.
- B. Install masonry anchors to secure items to wall.
- C. Fill spaces around items with mortar or grout.
- D. Do not place electrical, instrumentation, or water conduits in a cell containing reinforcement unless approved in writing by Engineer.

### **3.4 MORTAR JOINTS**

#### **A. General:**

- 1. Straight, clean, with uniform thickness of 3/8 inch.
- 2. Horizontal and vertical mortar joints shall have full mortar coverage on face shells.
- 3. Vertical Head Joints:
  - a. Butter well on each unit for a width equal to face shell of unit, shove tightly so mortar bonds well to both units.
  - b. Solidly fill joints from face of block to at least the depth of face shell.
- 4. As units are laid, remove excess mortar from grout space of cells to be filled.
- 5. Place mortar before initial setting of cement takes place. Do not retemper mortar that has started to set.

#### **B. Exposed Joints:**

- 1. Tool joints exposed to view after final construction, unless otherwise noted or shown.
- 2. Cut joints flush and, as mortar takes its initial set, tool to provide a concave joint.
- 3. Perform tooling when mortar is partially set but still sufficiently plastic to bond.
- 4. Perform tooling with a tool which compacts mortar, pressing excess mortar out rather than dragging it out.
- 5. Rake out joints which are not tight at time of tooling, point, and then tool.
- 6. Rake and tool joints at split-face surfaces, interior and exterior.

#### **C. Concealed Joints: Strike flush with no further treatment required.**

### **3.5 CONTROL JOINTS**

#### **A. Preformed Control Joints:**

1. Omit mortar from vertical joints.
2. Place rubber control joint material as wall is built.
3. After wall is grouted, cured, and cleaned, install backing rod and sealant as specified.
4. Place and tool sealant to match depth of typical joint.

### **3.6 REINFORCING**

#### **A. Foundation Dowels:**

1. Size, number, and location of foundation dowels shall match vertical wall reinforcing, unless otherwise noted.
2. When foundation dowel does not line up as intended, with vertical core, do not slope more than 1 horizontal to 6 vertical to bring it into alignment.

#### **B. Vertical Reinforcing:**

1. Use deformed bars.
2. Hold in position by wire ties or by reinforcing positioners.
3. Hold in position at each end at maximum intervals of 160 bar-diameters.

#### **C. Horizontal Reinforcing:**

1. Use deformed bars.
2. Lay on webs of bond beam units, and place as wall is built.
3. Lap reinforcing bars 48 bar-diameters minimum where spliced and wire tie together.
4. Minimum Bar Clearance: 1 bar-diameter from masonry and from additional parallel bars in same grout space.

#### **D. Horizontal Joint Reinforcement:**

1. Provide in addition to typical wall reinforcing steel.
2. Space maximum 16 inches apart, vertically.
3. Lap ends 6 inches minimum.
4. At control joints make reinforcement discontinuous.
5. Use manufactured corner and other wall intersection pieces.

### **3.7 GROUTING**

#### **A. General:**

1. Do not mix, convey, or place with equipment constructed of aluminum.
2. Secure vertical and horizontal reinforcement, ties, bolts, anchors, and other required embedments in place, inspect and verify before placing grout.

3. Grout beams over openings in one continuous operation.
4. Maintain vertical alignment in cells to provide a clear, unobstructed, continuous vertical cell measuring not less than 2 inches by 3 inches.
5. Place grout as soon as possible after mortar has set to reduce shrinkage cracking of vertical joints.
6. Vertical Reinforcement:
  - a. First wire tie to foundation dowels, then build wall around it.
  - b. Provide reinforcing positioners or approved cross-bracing to secure top of steel in place.
  - c. Do not drop in vertical steel after block is laid unless reinforcing positioners are provided in the course above previously grouted course.

B. Grouting Requirements:

1. Solid Grouting Requirements: Solid grout all vertically reinforced walls.
2. Form horizontal construction joints between pours by stopping the grout pour 1- 1/2 inches below a mortar joint.
4. Partial Grouting with Insulation Fill:
  - a. Where cells of masonry units are to receive masonry fill insulation in some cells and to receive grout in some cells, provide continuous mortar on block webs on each side of cells to be filled with grout to ensure that insulation will not enter grout cells.
  - b. Where bond beams are required together with both masonry fill insulation and grout, limit pours to less than 6 feet in height.
5. Fully embed horizontal steel by grout in an uninterrupted pour.
6. Do not construct wall more than one course above top of grout pour prior to placing grout.
7. Vibration:
  - a. Use internal "pencil" type vibrator as necessary to thoroughly consolidate grout and reduce amount of air voids.
  - b. After waiting sufficient time to permit the grout to become plastic, but before it has taken any set, reconsolidate grout.
  - c. Waiting period will vary depending upon weather conditions and block absorption rates, but under "normal" weather conditions with average masonry units the waiting period should be between 30 to 60 minutes.
8. Cleanouts:
  - a. Provide for grout pours over 5 feet in height.
  - b. Provide of sufficient size to permit cleaning of cell, positioning of reinforcing and inspection at bottom of every vertical cell containing reinforcing.
  - c. Location: Concealed from view after final construction unless otherwise approved by Engineer.
  - d. After wall has been inspected and approved and prior to grouting, cap cleanouts in a manner that will seal them from grout leakage and provide a flush finish.



### **3.8 FIELD QUALITY CONTROL**

- A. Masonry shall be tested by an independent testing agency, retained by Contractor and approved by Engineer.
- B. Masonry test prisms shall be constructed onsite with the same materials and workmanship to be used for the Project.
- C. Provide adequate facilities for safe storage and proper curing of masonry prisms, mortar samples, and grout samples, as applicable, onsite for first 24 hours, and for additional time as may be required before transporting to test lab.
- D. Masonry Testing:
  - 1. Prism Testing:
    - a. Method and frequency of sampling and testing in accordance with ACI/530.1/ASCE 6/TMS 602.
    - b. Prior to start of construction, construct and test a set of three prisms.
    - c. During construction, construct and test an additional set of three prisms for each 5,000 square feet of wall area.
    - d. Prepare and submit a test report for each set of prisms which includes name of testing lab and individual, dimensions, descriptions of materials, age of prism, maximum test load, net area, and compressive strength for each prism and for the set.
  - 2. Unit Strength Method:
    - a. Method and frequency for mortar, grout, and masonry unit sampling and testing in accordance with ACI 530.1/ASCE 6/TMS 602, Section 1.6.2.
    - b. Provide masonry units for test samples required.

### **3.9 CLEANING**

- A. Immediately after completion of grouting, clean masonry surfaces, using clean water and fiber brushes, of excess mortar, grout spillage, scum, stains, dirt, and other foreign substances.
- B. Clean walls not requiring painting or sealing such that there are no visible stains.

### **3.10 PROTECTION OF INSTALLED WORK**

- A. Do not allow grout and mortar stains to dry on face of exposed masonry.
- B. When moisture protection is required, use light fog spray nozzles to cure mortar.
- C. Protect tops of walls at all times. Cover tops of walls with waterproof paper when rain or snow is imminent and when Work is discontinued.
- D. Adequately brace walls until walls and roof are completed.

- E. Provide sufficient bracing to protect walls against damage from elements, including wind and snow.
- F. Protect masonry against freezing for minimum 72 hours after being laid.
- G. Protect masonry from damage until final acceptance of Work. Damaged units will not be accepted.

**END OF SECTION 04230**

## **DIVISION 5: METALS**



## SECTION 05003

### MISCELLANEOUS METALS

#### 1.0 GENERAL

The Contractor shall furnish all labor, materials, equipment and services necessary for fabrication and erection of all miscellaneous steel angles, beams, plates and channels as shown on the Drawings and specified herein and not specifically included under other sections of these Specifications.

#### 1.1 QUALITY ASSURANCE STANDARDS

A. Codes and Standards: All work shall comply with provisions of following, except as otherwise indicated:

1. AISC "Code of Standard Practice for Steel Buildings and Bridges".
2. Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence: "This approval constitutes the owner's acceptance of all responsibility for the design adequacy of any connections designed by the fabricator as a part of his preparation of these shop drawings."
3. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", including "Commentary" and Supplements thereto as issued.
4. AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
5. AWS D1.1 "Structural Welding Code".
6. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".

B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
  - a) If recertification of welders is required, retesting will be Contractor's responsibility.

## 1.2 SUBMITTALS

Shop drawings, giving complete information necessary for fabrication, layout and installation of all metal work, shall be submitted to the Engineer for approval prior to fabrication.

The preparation of shop drawings for fabricated metal items shall be coordinated by the Contractor with the manufacturers of various equipment in order to comply with details, locations, openings, etc. required by the manufacturers.

Field measurements shall be made to verify all dimensions in the field, which may affect installation of work before shop drawings are made and/or fabrication is performed.

## 2.0 MATERIALS

### 2.1 STRUCTURAL METALS

2.1.1 Steel wide flange shapes shall conform to the requirements of ASTM A992, grade 50. All other shapes, plates and bars shall be ASTM A36, or ASTM A572, grade 50. (Non-exposed and interior)

2.1.2 Aluminum shall conform to the requirements of ASTM B209, alloy 6061-T6.

### 2.2 ANCHORAGE ITEMS

The Contractor shall furnish all bolts, nuts, shims, pins, screws, straps, nails and other anchors, which may be required by the Drawings or job conditions, to secure all items permanently in place, whether or not specifically called for or shown on the Drawings.

## 3.0 EXECUTION

### 3.1 FABRICATION AND INSTALLATION OF METAL WORK

All metal items shall be accurately fabricated and erected with exposed joints close fitting. All joints shall be of such character and so assembled that they will be as strong and rigid as adjoining sections. Joints shall be located where least conspicuous. Items shall have smooth finished surfaces except where otherwise shown or specified.

Where welding is required or permitted, it shall conform to the requirements for shielding metal arc welding of the Standard Code for Arc and Gas Welding in Building Construction of the American Welding Society. Shop drawings shall show welding and shall indicate the size, length, spacing and type of welds.

Joints required to be welded shall be continuously welded or spot-welded as specified and face of welds dressed flush and smooth where exposed to view.

Members or parts to be built in with masonry or concrete shall be in a form affording a suitable anchorage or shall be provided with approved anchors, expansion shields or other approved means of securing members.

Ferrous and non-ferrous metals shall be insulated at all contacts with felt washers, strips or sheets, bitumastic paints, or other approved means.

3.1.1 All required anchors, couplings, bolts, and nuts required to support miscellaneous metal work shall be furnished and installed as required.

3.1.2 Weights of connections and accessories shall be adequate to safely sustain and withstand stresses and strains to which they will be normally subjected.

3.1.3 Connections shall be bolted except where welding is called for in the Drawings. Bolts shall have a minimum of 1/2-inch diameter unless noted or required otherwise.

3.1.4 Accurately place all miscellaneous metal items in the locations and to the required elevations.

3.1.5 Adequately brace any items which are cast in concrete masonry work.

3.1.6 Use concealed anchors wherever possible.

## 3.2 CLEANING

Remove and properly dispose of all debris and litter; leave the work area in a clean condition.

**END OF SECTION 05003**





## **SECTION 05004**

### **LADDERS**

#### **1.0 GENERAL**

##### **1.1 DESCRIPTION OF WORK**

A. This section of the specifications shall include the furnishing of all materials, equipment and other labor necessary for the complete installation of Ladders as shown on the Contract Drawings.

##### **1.2 PAYMENT**

A. No separate payment will be made for ladders. Cost for this work shall be included in the work to which it is subsidiary.

##### **1.3 QUALITY ASSURANCE**

A. All ladders furnished and installed shall comply with all OSHA requirements.

B. Acceptable Manufacturers

1. Permac-Paragon, Inc.
2. Cotterman Co.
3. Approved Equal

##### **1.4 SUBMITTALS**

A. Refer to the General Specifications of the Contract Documents.

B. Shop Drawings

1. Shop Drawings shall include fabrication, assembly, foundation and installation drawings along with detailed specifications and data covering materials, parts and accessories used.
2. Shop Drawings shall include recommendations for maintenance and cleaning methods and precautions for use of materials which may be detrimental to finishes when improperly applied.

### C. Certificates

1. The ladder manufacturer shall submit signed certificates of compliance that all fabrication and materials used meet, or exceed, all requirements of Paragraph 1.03 of this section.

### D. Samples

1. Submit duplicate samples of side frames and rungs showing finish.

## **2.0 PRODUCTS**

### **2.1 GENERAL**

- A. All ladders shall be fixed, permanently, unless noted otherwise on the Contract Drawings.
- B. Materials of construction shall be as shown on the Contract Drawings.
- C. Ladder style, standard or walk-thru, shall be as shown on the Contract Drawings.
- D. Spacing between rungs shall not exceed 12 inches. Rungs shall be a minimum of 16 inches long. Spacing between ladder and wall shall not be less than 7 inches.
- E. Walk-thru ladders shall extend a minimum of 42" above the last rung. Safety chains shall be provided.
- F. Standard ladders shall extend to within 6" of the access openings.

### **2.2 MATERIALS**

#### **A. Carbon Steel**

1. Side frame members shall be 1" minimum diameter, schedule 40 pipe and receive one coat of red oxide primer.
2. Side frames shall be 1/4" x 2" x 2" minimum angle iron and receive one coat of red oxide primer.
3. Rungs shall be 3/4" minimum diameter, schedule 40 pipe and shall be welded to side frames.

4. All metal surfaces shall receive one shop applied rust inhibitive prime coat.

**B. Stainless Steel**

1. Side frame members and rungs shall be 1" minimum diameter, schedule 40, type 304, grade ASTM A544 stainless steel with a 320 grit finish, and rungs shall be welded to the side frame members.

**C. Aluminum**

1. Aluminum shall be 6061-T6.
2. Side frame members shall be 3" x 2 1/2" minimum I-beams with a clear anodized finish.
3. Rungs shall be 1" minimum diameter bar aluminum, and shall be securely anchored to the side frames.

**D. Plastic**

1. Rungs shall be injection molded plastic, minimum 5" width and have an integral non-skid finish. Rungs shall be installed with the top surface level, with stainless steel hardware.

**E. Mounting Hardware**

1. Stainless steel ladders shall have type 304 stainless steel welded flanges with electropolished finish. Bolted flanges shall be cast bronze with chrome plated finish.
2. Carbon steel ladders shall have steel flanges and supports, either welded or bolted securely to the side frames.
3. Aluminum ladders shall have aluminum hardware.

### **3.0 EXECUTION**

#### **3.1 DELIVERY AND STORAGE**

- A. All deliveries and shipments shall be accompanied by a shipping list, bill of lading and invoice which describes all items in the lot. All items shall be inspected and marked as listed on the invoice.

- B. Store all materials on clean surfaces and protect from weather. Leave protective coatings intact until materials have been accepted and installed.
- C. The Contractor shall be responsible for carefully handling all materials during fabrication, storing, loading, transit, unloading, storage at the site and during installation.

### 3.2 INSTALLATION

- A. All ladders shall be installed in accordance with the manufacturer's written instructions, maintaining side frames in plumb position and the rungs level and parallel.
- B. Side frames used for hand railings shall be free of sharp edges, splinters or burs and afford an adequate gripping surface.
- C. Anchor and secure all ladders to insure a safe system.

### 3.3 ADJUSTMENT AND CLEANING

- A. Final Adjustment
  - 1. Remove and replace any defective materials or workmanship including dented or bent materials.
- B. Cleaning and Touch-up
  - 1. Wash thoroughly with clean water and soap, and rinse with clean water.
  - 2. Any damaged areas of finish shall be touched up in accordance with the manufacturer's written instructions for eliminating all evidence of repair.

**END OF SECTION 05004**

## **SECTION 05005**

### **ALUMINUM ACCESS HATCH**

#### **1.0 GENERAL**

##### **1.01 DESCRIPTION OF WORK**

This Section of the Specifications shall include the furnishing of all materials, equipment, and labor necessary for the complete installation of access doors in sizes and locations shown on the Drawings and described in these Specifications.

##### **1.02 SUBMITTALS**

A. Refer to the General Specifications of the Contract Documents.

B. Shop Drawings

1. Shop Drawings shall include fabrication, assembly, foundation and installation drawings along with detailed specifications and data covering materials, parts and accessories used.
2. Shop Drawings shall include recommendations for maintenance and cleaning methods and precautions for use of materials, which may be detrimental to, finishes when improperly applied.

#### **2.0 PRODUCT**

##### **2.01 ALUMINUM ACCESS HATCH**

- A. Locations and sizes shall be as shown on the Drawings. Furnish and install access frames and covers complete with hinge and flush locking mechanism and shall be as manufactured by U.S. Foundry, Bilco or approved equal. Door leaf shall be 1/4" aluminum, diamond pattern plate of skid proof design to withstand a live load of 300 pounds per square foot. Frame shall be 1/4" extruded aluminum with built-in neoprene cushion and with strap anchors bolted to exterior. Channel frames shall be 1/4" aluminum with an anchor flange around the perimeter. Doors shall be equipped with heavy forged brass hinges, stainless steel pins, spring operators for easy operation and an automatic hold-open arm with release handle. A snap lock with removable handle shall be provided. Hardware shall be cadmium plated and factory finish shall be mill finish with bituminous coating applied to exterior of frame. Channel frames shall be used in

installations where the access door leads to electrical equipment or where a watertight installation is needed. It shall be the responsibility of the Contractor to daylight the channel frame's drain.

- B. Installation shall be in accordance with manufacturer's instructions. Manufacturer shall guarantee against defects in material or workmanship for a period of five (5) years.
- C. Access hatches differing from that as specified above shall be as described on the Drawings. This shall apply to special hatches designed for heavier loadings, gas-tight hatches, bolt-down hatches, etc.
- D. Safety Gate: Access hatches scheduled to be installed with a safety grate (or net) assembly shall be designed and configured to accommodate the specified safety grate (or net), including the full range of operation of both the hatch and grate (net), as specified by the respective equipment manufacturer. It is the Contractor's responsibility to coordinate the materials, equipment and installation of the hatch and grate (net) to provide safe operation and unimpeded access to the interior of the subject chamber.

### **3.0 EXECUTION**

#### **3.01 DELIVERY AND STORAGE**

- A. All deliveries and shipments shall be accompanied by a shipping list, bill of lading and invoice, which describe all items in the lot. All items shall be inspected and marked as listed on the invoice.
- B. Store all materials on clean surfaces and protect from weather. Leave protective coatings intact until materials have been accepted and installed.
- C. The Contractor shall be responsible for carefully handling all materials during fabrication, loading, transit, unloading, and storage at the site and during installation.

#### **3.02 INSTALLATION**

All hatches shall be installed in accordance with the manufacturer's written instructions.

### 3.03 ADJUSTMENT AND CLEANING

#### A. Final Adjustment

1. Remove and replace any defective materials or workmanship including dented or bent materials.

#### B. Cleaning and Touch-up

1. Wash thoroughly with clean water and soap, and rinse with clean water.
2. Any damaged areas of finish shall be touched up in accordance with the manufacturer's written instructions for eliminating all evidence of repair.

### **4.0 PAYMENT**

Cost shall be included in the Work to which it is subsidiary. No separate measurement and payment will be made.

**END OF SECTION 05005**





**SECTION 05500**  
**METAL FABRICATIONS**

**PART 1 - GENERAL**

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SCOPE OF WORK

- A. Provide all labor, materials, equipment and services for furnishing and installing the metal fabrications as shown on the Drawings and specified herein.
- B. Metal fabrications include items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.

1.03 SUMMARY

- A. This Section includes the following:
  - 1. Miscellaneous Steel and Aluminum Framing Systems:
    - a. Steel and aluminum framing and supports for mechanical and electrical equipment.
    - b. Steel and aluminum framing and supports for applications where framing and supports are not specified in other Sections.
    - c. Steel and aluminum framing for ladders, stairs, platforms, and walkways.

1.04 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others. Provide detail drawings showing the dimensions of each piece including the dimensions and locations of all holes, openings, copes, etc. and the type and extent of the finishes for each piece.

## 1.05 QUALITY ASSURANCE

- A. Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code – Steel".
- C. Welding Qualifications: Qualify procedures and personnel according to the following, as applicable:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code – Steel".
  - 2. AWS D1.2/D1.2M, "Structural Welding Code – Aluminum".
  - 3. AWS D1.6, "Structural Welding Code - Stainless Steel."
- D. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for commercial class of stair unless more stringent requirements are indicated.

## 1.06 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

## 1.07 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

# PART 2 - PRODUCTS

## 2.01 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

## 2.02 FERROUS METALS

- A. Steel Plates, Shapes, and Bars other than Beams: ASTM A 36/A 36M.
- B. Steel Beams: ASTM A 992
- C. Steel Tubing: ASTM A 500 Grade B, cold-formed steel tubing.
- D. Steel Pipe: ASTM A 53/A 53M, Grade B standard weight (Schedule 40) unless otherwise indicated.

## 2.03 NON-FERROUS METALS

- A. Aluminum Plate and Sheet: ASTM B 209/B 209M, Alloy 6061-T6.
- B. Aluminum Extrusions: ASTM B 221/B 221M, Alloy 6063-T6.
- C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
- D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.
- E. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

## 2.04 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, otherwise. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.
- D. Eyebolts: ASTM A 489.
- E. Machine Screws: ASME B18.6.3.
- F. Lag Screws: ASME B18.2.1.
- G. Wood Screws: Flat head, ASME B18.6.1.
- H. Plain Washers: Round, ASME B18.22.1.
- I. Lock Washers: Helical, spring type, ASME B18.21.

- J. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- K. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- L. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
  - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
  - 2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

## 2.05 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Grout: Non-Shrink Non-Metallic Grout, Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD-C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this Section.
- C. Paint:
  - 1. Shop Primer for Ferrous Metal: Manufacturer's or Fabricator's standard, fast-curing, lead-free, "universal" primer; selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated and for capability to provide a sound foundation for field-applied topcoats prolonged exposure; complying with performance requirements of FS TT-P-645.
  - 2. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, complying with the Military Specifications MIL-P-21035 (Ships) or SSPC-Paint-20.

## 2.06 ROUGH HARDWARE

- A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division-6 sections.
- B. Fabricate items to sizes, shapes and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

## 2.07 STAIR SAFETY NOSINGS

- A. Step safety nosings shall be 4-inch wide, aluminum grit, crosshatched surface, complete with screws, nuts and wing anchors for anchoring to concrete, pre-drilled to admit anchor screws, Wooster WP4T Alumogrit as manufactured by Wooster Products Company, Wooster, Ohio; Style AXPF Nosing by SAFE-T-METAL Company; or equal. Nosings shall be furnished for all new interior concrete steps only.

## 2.08 ALUMINUM GRATING STAIR TREADS

- A. Provide aluminum grating for stair treads where metal stairs are shown on Drawings. Refer to Section "Aluminum Grating".

## 2.09 LOOSE STEEL LINTELS

- A. Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown on Drawings. Weld adjoining members together to form a single unit where indicated. Provide not less than 6" bearing at each side of openings, unless otherwise indicated. Loose still lintels exposed to the weather shall be hot-dipped galvanized.

## 2.010 MISCELLANEOUS FRAMING AND SUPPORTS

- A. Provide miscellaneous steel framing and supports, which are not a part of structural steel framework, as required to complete work.
- B. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise indicated, fabricate from structural steel shapes and plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
- C. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed. Except as otherwise indicated, space anchors 24" O.C. and provide minimum anchor units of 1-1/4" x 1/4" x 8" steel straps.

# PART 3 - EXECUTION

## 3.01 PREPARATION

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts,

sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

### 3.02 INSTALLATION

- A. General Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
- B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in form work for items which are to be built into concrete masonry or similar construction.
- C. Fit exposed connections accurately together to form tight hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units, which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
- E. Bar Gratings: Comply with recommendations of NAAMM Metal Bar Grating Manual for installation of gratings, including installation clearances and standard anchoring details. Secure removable units to supporting members with type and size clips and fasteners indicated, or if not indicated as recommended by grating manufacturer for type of installation conditions shown. Secure non-removable units to supporting members by welding where both materials are the same; otherwise fasten by bolting as indicated above. Attach toe plates to gratings by welding, at locations indicated.

### 3.03 ADJUSTING AND CLEANING

- A. Cleaning and touch-up painting of field welds, bolted connections and abraded areas of the shop paint on miscellaneous metal is specified in Division 9 of these Specifications.
- B. For galvanized surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

### 3.04 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

**END OF SECTION 05500**





## **DIVISION 6: WOOD AND PLASTICS**



**SECTION 061000**  
**ROUGH CARPENTRY**

**PART 1 - GENERAL**

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following:
  - 1. Wood blocking, cants, and nailers.
  - 2. Plywood backing panels.
  - 3. Blocking and framing as shown or required.
  - 4. Fasteners and accessories
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Section "Sheathing."

1.03 DEFINITIONS

- A. Rough carpentry includes carpentry work not specified as part of other Sections and generally not exposed, unless otherwise specified.
- B. Exposed Framing: Framing not concealed by other construction.
- C. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- D. Lumber grading agencies, and the abbreviations used to reference them, include the following:
  - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
  - 2. NLGA: National Lumber Grades Authority.
  - 3. RIS: Redwood Inspection Service.
  - 4. SPIB: The Southern Pine Inspection Bureau.
  - 5. WCLIB: West Coast Lumber Inspection Bureau.
  - 6. WWPA: Western Wood Products Association.

#### 1.04 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
  - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
  - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
  - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
  - 5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

#### 1.05 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- B. Evaluation Reports: For the following, from ICC-ES:
  - 1. Wood-preservative-treated wood.
  - 2. Fire-retardant-treated wood.
  - 3. Engineered wood products.
  - 4. Fasteners and Accessories

#### 1.06 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

## 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## PART 2 - PRODUCTS

### 2.01 LUMBER, GENERAL

- A. Lumber Standards: Furnish lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
- B. Inspection Agencies: Inspection agencies and the abbreviations used to reference them with lumber grades and species include the following:
  - 1. SPIB - Southern Pine Inspection Bureau.
- C. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
  - 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  - 4. Provide dressed lumber, S4S, unless otherwise indicated.

### 2.02 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWP A U1;
  - 1. Use Category UC2 for interior construction not in contact with the ground.
  - 2. Use Category UC3b for exterior construction not in contact with the ground.
  - 3. Use Category UC4a for items in contact with the ground.
  - 4. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
  - 1. Wood nailers, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.

## 2.03 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
  - 1. Use treatment that does not promote corrosion of metal fasteners.
  - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
  - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
  - 4. Design Value Adjustment Factors: Treated lumber shall be tested according ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841. For enclosed roof framing, framing in attic spaces, and where high temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- E. Application: Treat items indicated on Drawings, and the following:

1. Plywood backing panels.

#### 2.04 DIMENSION LUMBER

- A. For structural framing (2 to 4 inches thick, 5 inches and wider), provide the following grade and species:
  1. "No. 2" grade.
  2. Southern Pine graded under SPIB rules, or any species and grade that complies with the following requirements for species group as defined in Table 8.1a of N.F.P.A National Design Specification, for extreme fiber stress in bending "Fb" for single and repetitive members, and for modulus of elasticity "E":
    - a. Group II species, "Fb" of 1200 psi for single member use and of 1400 psi for repetitive member use, and "E" of 1,600,000 psi.

#### 2.05 MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction including rooftop equipment curbs and support bases, bucks, nailers, blocking, furring, grounds, stripping, and similar members.
- B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.
- C. Moisture content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.
- D. Grade: "Standard" grade light-framing-size lumber of any species or board-size lumber as required

#### 2.06 CONSTRUCTION PANELS, GENERAL

- A. Construction Panel Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood construction panels and, for products not manufactured under PS 1 provisions, with APA PRP-108.
- B. Trademark: Furnish construction panels that are each factory-marked with APA trademark evidencing compliance with grade requirements.

#### 2.07 CONSTRUCTION PANELS FOR BACKING

- A. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant-treated plywood panels with grade designation, APA C-D PLUGGED EXPOSURE 1, in thickness indicated, or, if not otherwise indicated, not less than 15/32 inch.

## 2.08 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of AISI Type 304 stainless steel.
- B. Nails, Wire, Brads, and Staples: FS FF-N-105.
- C. Power Driven Fasteners: National Evaluation Report NER-272.
- D. Wood Screws: ANSI B18.6.1.
- E. Lag Bolts: ANSI B18.2.1.
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.
- G. Proprietary Fasteners: Fasteners indicated or alternate equal subject to engineer's satisfactory review of submittal.

## 2.09 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Water Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbonate (IPBC) as its active ingredient.

# PART 3 - EXECUTION

## 3.01 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.
- B. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.
- C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.



- D. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole. Metal framing anchors shall be hot-dipped galvanized in accordance with ASTM A 153.
- E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- G. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.
- H. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
  - 1. Comply with approved fastener patterns where applicable. Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.

### 3.02 WOOD NAILERS, BLOCKING, AND SLEEPERS

- A. Install wood nailers, blocking, and sleepers where shown and where required for attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
- B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
- C. Where wood-preserved-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

### 3.03 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

**END OF SECTION 06100**



## **SECTION 06160**

### **SHEATHING**

#### **PART 1 - GENERAL**

##### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### **1.02 SUMMARY**

- A. Section Includes:
  - 1. Roof sheathing.
  - 2. Wall sheathing
- B. Related Requirements:
  - 1. Section "Rough Carpentry"

##### **1.03 ACTION SUBMITTALS**

- A. Product Data: For each product. Indicate component materials and dimensions and include construction and application details.
- B. Certification: Indicate that material conforms to the specification PS-1.

##### **1.04 QUALITY ASSURANCE**

- A. Sheathing shall bear the stamp of either the American Plywood Association (APA) or TimberCo, Inc. (TECO).
- B. Plywood shall conform to the requirements of the U.S. Department of Commerce specification PS-1.

##### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## **PART 2 - PRODUCTS**

### **2.01 ROOF & WALL SHEATHING**

#### **A. Plywood Roof Sheathing and Wall Sheathing: Exterior Sheathing.**

1. Nominal Thickness: Not less than 5/8 inch.
2. Exposure classification: Exterior Exposure
3. Roof Sheathing Shall Have Tongue & Groove Edges

### **2.02 FASTENERS**

#### **A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.**

1. For roof sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

#### **B. Nails, Brads, and Staples: ASTM F 1667.**

#### **C. Screws for Fastening Sheathing to Wood Framing: ASTM C 1002.**

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION, GENERAL**

#### **A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.**

#### **B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.**

#### **C. Securely attach to substrate by fastening as indicated, complying with the following:**

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."

#### **D. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.**

- E. Coordinate roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

### 3.02 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Roof Sheathing and Wall Sheathing:
    - a. Nail to wood framing.
    - b. Use only common wire nails, size as indicated on drawings.
    - c. Space panels 1/8 inch (3 mm) apart at edges and ends.

**END OF SECTION 06160**



## **SECTION 06175**

### **METAL-PLATE CONNECTED WOOD TRUSSES**

#### **PART 1 - GENERAL**

##### **1.01 SUMMARY**

- A. This Section includes the following:
  - 1. Wood roof trusses.
  - 2. Truss accessories.
- B. See Division 6 Section "Rough Carpentry" for supplementary framing and permanent bracing.

##### **1.02 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads indicated without exceeding allowable stresses and deflection limits.
- B. Trusses shall be fabricated in accordance with ANSI TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."

##### **1.03 SUBMITTALS**

- A. Product Data: For metal-plate connectors, metal framing anchors, bolts, and fasteners indicated.
- B. Truss layout and truss shop drawings shall be submitted for approval. These drawings shall include:
  - 1. A copy of the BCSI jobsite package, which are instructions for safe handling and erection of wood trusses.
  - 2. Truss layout showing location and shipping mark of each truss and locations of all compression web and chord bracing.
  - 3. Truss configuration, including span, pitch and location of all member intersections.
  - 4. Species, stress grade, and nominal size of lumber used.
  - 5. Design loads including point loads and reactions and load combinations used in design.
  - 6. Printout of member axial and flexural stresses plus interaction of combined stresses for the controlling load combination.

7. Printout of truss deflections under service load combinations.
  8. Joint, splice, and truss to truss girder connection design and details.
  9. Truss bracing details: Manufacturer's standard detail sheets for all conditions applicable to the project showing required bracing and reinforcement details and their required connections to the trusses, each other and other supports.
- C. Truss drawings shall bear the seal of the seal of the professional engineer under whose direct supervision they were prepared.
- D. Qualification Data: For the following:
1. Metal-plate manufacturer.
  2. Fabricator.
- E. Research/Evaluation Reports: for truss plates and other components.
- 1.04 QUALITY ASSURANCE
- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with TPI quality-control procedures for manufacture of connector plates published in TPI 1.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that involves inspection by SPIB, Timber Products Inspection, TPI, or other independent testing and inspecting agency acceptable to Engineer and authorities having jurisdiction.
- C. Truss Fabricator's responsibilities include preparation of Shop Drawings and comprehensive engineering analysis by a licensed professional engineer.
- D. Comply with ANSI TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
- E. Wood Structural Design Standard: Comply with applicable requirements in AFPA's "National Design Specifications for Wood Construction" and its "Supplement."
- F. Trusses shall be designed for a maximum vertical deflection of span/480 for live loads, and span/240 for total loads.
- G. Trusses shall be spaced at 2'-0" maximum.

## **PART 2 - PRODUCTS**

### **2.01 DIMENSION LUMBER**

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.



- B. Grade and Species: Any species for truss chord and web members, graded visually or mechanically, and capable of supporting required loads without exceeding allowable design values according to AFPA's "National Design Specifications for Wood Construction" and its "Supplement."

## 2.02 METAL PRODUCTS

- A. Metal Connector Plates: Fabricate connector plates to comply with TPI 1 not less than 0.036 inch (0.9 mm) thick. Hot-dip galvanize connector plates in accordance with ASTM A 153.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Alpine Engineered Products, Inc.
  - 2. CompuTrus, Inc.
  - 3. Eagle Metal Products.
  - 4. Jager Industries, Inc.
  - 5. Mitek Industries, Inc.
  - 6. Robbins Manufacturing Company.
  - 7. TEE-LOK Corporation.
  - 8. Truswal Systems Corporation.
  - 9. Or approved equal
- C. Fasteners: Where trusses are exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
  - 1. Nails, Wire, Brads, and Staples: FS FF-N-105.
  - 2. Power-Driven Fasteners: CABO NER-272.
  - 3. Wood Screws: ASME B18.6.1.
  - 4. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).
  - 5. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- D. Metal Framing Anchors: Provide framing anchors made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Alpine Engineered Products, Inc.
    - b. Cleveland Steel Specialty Co.
    - c. Harlen Metal Products, Inc.
    - d. KC Metals Products, Inc.
    - e. Silver Metal Products, Inc.
    - f. Simpson Strong-Tie Company, Inc.

- g. Southeastern Metals Manufacturing Co., Inc.
  - h. United Steel Products Company, Inc.
  - i. Or approved equal
- 2. Allowable Design Loads: Meet or exceed those indicated per manufacturer's published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

## 2.03 FABRICATION

- A. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1.
  - 1. Position members to produce design camber indicated.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Install and brace trusses according to TPI recommendations and as indicated. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- B. Truss handling and erection shall be in accordance with the BCSI guidelines. See [www.sbcindustry.com](http://www.sbcindustry.com) for more information.
- C. Anchor trusses securely at bearing points; use metal framing anchors. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- D. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
- E. Install wood trusses within installation tolerances in TPI 1.
- F. Do not cut or remove truss members.
- G. Return wood trusses that are damaged or do not meet requirements to fabricator and replace with trusses that do meet requirements.

**END OF SECTION 06175**

## **DIVISION 7: THERMAL AND MOISTURE PROTECTION**



**SECTION 07120**  
**BITUMINOUS WATERPROOFING**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section includes cold applied asphalt bituminous waterproofing.

1.2 REFERENCES

- A. American Society for Testing and Materials:
1. ASTM D41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
  2. ASTM D43 - Standard Specification for Coal Tar Primer Used in Roofing, Dampproofing, and Waterproofing.
  3. ASTM D449 - Standard Specification for Asphalt Used in Dampproofing and Waterproofing.
  4. ASTM D450 - Standard Specification for Coal-Tar Pitch Used in Roofing, Dampproofing, and Waterproofing.
  5. ASTM D1227 - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing.
  6. ASTM D3747 - Standard Specification for Emulsified Asphalt Adhesive for Adhering Roof Insulation.
  7. ASTM D4586 - Asphalt Roof Cement, Asbestos-Free.
  8. ASTM D5643 - Coal Tar Roof Cement, Asbestos Free.

1.3 SUBMITTALS

- A. Product Data: Submit properties of primer, bitumen, and mastics.
- B. Manufacturer's Installation Instructions: Submit special procedures and perimeter conditions requiring special attention.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until membrane has cured.

**PART 2 - PRODUCTS**

2.1 BITUMINOUS WATERPROOFING

- A. Sonneborn Hydrocide Mastic 700 or 700B.
- B. Other Acceptable Manufacturers:

1. Pecora.
2. Tremco.
3. Equal subject to approval.

## 2.2 COMPONENTS

- A. Cold Asphaltic Materials:
1. Asphalt Emulsion: Conforming to ASTM D3747.
  2. Asphalt Primer: ASTM D41, compatible with substrate.
  3. Asphalt Cement: ASTM D2822 Type 1.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of waterproofing system.
- B. Verify items penetrating surfaces to receive waterproofing are securely installed.

### 3.2 PREPARATION

- A. Protect adjacent surfaces not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing.
- C. Do not apply waterproofing to surfaces unacceptable to manufacturer or applicator.
- D. Apply mastic to seal penetrations, small cracks, or minor honeycomb in substrate.

### 3.3 INSTALLATION

- A. Prime surfaces in accordance with manufacturer's instructions.
- B. Apply cold bitumen by spray application.
- C. Apply bitumen at temperature limited by equiviscous temperature (EVT) plus or minus 25 degrees F; do not exceed finish blowing temperature for four hours.
- D. Apply bitumen in one coat, continuous and uniform, at rate of 8-9 gal/100 sq ft.
- E. Apply from 2 inches below finish grade elevation to top of footings.
- F. Seal items projecting through waterproofing surface with mastic. Seal watertight.
- G. Immediately backfill against waterproofing to protect from damage.

- H. Place protection board directly against membrane; butt joints.
- I. Adhere protection board to substrate to tacky waterproofing surface. Scribe and cut boards around Projections, penetrations, and interruptions.

#### 3.4 DAMP-PROOFING SCHEDULE

- A. Exterior Building Walls Below Grade: One coating of asphalt waterproofing on exterior side of Concrete and CMU walls where below grade on outside and building interior on inside.

**END OF SECTION 07120**





## SECTION 07214

### FOAMED-IN-PLACE MASONRY WALL INSULATION

#### 1.0 GENERAL

##### 1.1 SUMMARY

- A. Extent of insulation work is shown on drawings and indicated by provisions of this section.
- B. Applications of insulation specified in this section include the following:
  - 1. Foamed-in-Place masonry insulation for thermal, sound and fire resistance values.

##### 1.2 SUBMITTALS

- A. Product and technical presentation as provided by the manufacturer.
- B. Certified Test Reports: With product data, submit copies of certified test reports showing compliance with specified performance values, including R-values, fire performance and sound abatement characteristics.
- C. Material Safety Data Sheet: Submit Material Safety Data Sheet complying with OSHA Hazard Communication Standard, 29 CFR 1910 1200.

##### 1.3 QUALITY ASSURANCE

- A. Manufacturing Standards: Provide insulation produced by a single and approved manufacturer. The product must come from the manufacturer pre-mixed to ensure consistency.
- B. Installer Qualifications for Foamed-in-Place Masonry Insulation: Engage an experienced dealer/applicator who has been trained and licensed by the product manufacturer and which has not less than ten (10) years direct experience in the installation of the product used.
- C. Warranty: Upon request, a one year product and installation warranty will be issued by both the manufacturer and installer.

- D. Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by a testing agency acceptable to authorities having jurisdiction.
- E. Insurance: Insulation Subcontractor shall carry Products and Completed Operations Insurance with minimum liability limits of \$5,000,000.

**Product must be classified by Underwriters Laboratory<sup>R</sup> (“UL”) as to Surface Burning Characteristics**

|                                  |            |
|----------------------------------|------------|
| Fire Resistance Ratings:         | ASTM E-119 |
| Surface Burning Characteristics: | ASTM E-84  |
| Combustion Characteristics:      | ASTM E-136 |

## **2.0 PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. Manufacturers of Foamed-in-Place Masonry Insulation: Subject to compliance with requirements, provide products from the following:
  - 1. **“Core-Fill 500™”** – Tailored Chemical Products, P.O. Drawer 4186, Hickory, NC 28663, 800-627-1687.
  - 2. Air Krete, Inc.  
P.O. Box 380  
Weedsport, NY 13166
  - 3. CP Chemical Co. (Tripolymer)  
White Plains, NY
  - 4. Or approved equal

### **2.2 INSULATING MATERIALS**

- A. General: Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics.
- B. Foamed-in-Place Masonry Insulation: Two (2) component thermal insulation produced by combining a plastic resin and catalyst foaming agent surfactant which, when properly rationed and mixed,

together with compressed air produce a cold-setting foam insulation in the hollow cores of hollow unit masonry walls.

1. Fire-Resistance Ratings: Minimum four (4) hour fire resistance wall rating (ASTM E-1 19) for 8-inch (8") and 12-inch (12") concrete masonry units when used in standard two (2) hour rated CMUs.
2. Surface Burning Characteristics: Maximum flame spread, smoke developed and fuel contributed of 0, 5 and 0 respectively.
3. Combustion Characteristics: Must be noncombustible, Class A building material.
4. Thermal Values: "R" Value of 4.91/inch @ 32 degrees F mean; ASTM C-177.
5. Sound Abatement: Minimum Sound Transmission Class ("STC") rating of 53 and a minimum Outdoor Indoor Transmission Class ("OITC") rating of 44 for 8-inch (8") wall assembly (ASTM E 90-90).

### **3.0 EXECUTION**

#### **3.1 INSPECTION AND PREPARATION**

##### **A. Application Assemblies:**

1. Block Walls: 6", 8", 10" or 12" concrete masonry units
2. Cavity Walls: 2" cavity of greater

#### **3.2 INSTALLATION OF FOAMED-IN-PLACE INSULATION**

- A. General: Install foamed-in-place insulation from interior, or as specified, prior to installation of interior finish work and after all masonry and structural concrete work is in place; comply with manufacturer's instructions.
- B. Installation: Fill all open cells and voids in hollow concrete masonry walls where shown on drawings. The foam insulation shall be pressure injected through a series of 5/8" to 7/8" holes drilled into every vertical column of block cells (every 8" on center) beginning at an approximate height of four (4) feet from finished floor level. Repeat this procedure at an approximate height of ten (10) feet above the first horizontal row of holes (or as needed) until the void is

completely filled. Patch holes with mortar and score to resemble existing surface.

#### **4. MEASUREMENT AND PAYMENT**

Payment shall be included in the work to which it is subsidiary unless otherwise shown in the Bid Schedule.

**END OF SECTION 07214**

## SECTION 07610

### STANDING SEAM METAL ROOFING

#### 1.0 GENERAL

##### 1.1 DESCRIPTION

###### A. General:

1. Furnish all labor, material, tools, equipment and services for all preformed roofing as indicated, in accord with provisions of Contract Documents.
2. Completely coordinate with work of all other trades.
3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

##### 1.2 QUALITY ASSURANCE

###### A. Applicable Standards:

1. SMACNA: "Architectural Sheet Metal Manual" Sheet Metal and Air Conditioning Contractors National Association, Inc.
2. LSGI: "Light Gage Structural Institute"
3. AISC: "Steel Construction Manual" American Institute of Steel Construction.
4. AISI: "Cold Form Steel Design Manual," American Iron and Steel Institute (1996 Edition).
5. ASTM A792-83-AZ50 (Painted) & ASTM A792-83-AZ55 (Bare Galvalume Plus®): Specifications for steel sheet, aluminum-zinc alloy coated by the hot dip process, general requirements (Galvalume®).
6. ASTM E 1514-93: "Standard Specification for Structural Standing Seam Steel Roof Panel Systems", American Society for Testing and Materials.
7. UL580: "Tests for Uplift Resistance of Roof Assemblies", Underwriters Laboratories, Inc.
8. UL2218: "Test Standard for Impact Resistance", Underwriters Laboratories, Inc.
9. ICBO: Evaluation Report No. ER-5409, ICBO Evaluation Service, Inc.
10. ASTM E 1592-95: "Standard Test for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference", American Society for Testing and Materials.
11. ASTM E 1680-95: "Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems", American Society for Testing and Materials.
12. ASTM E 1646-95: "Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference", American Society for Testing and Materials.
13. ASTM E 408-71: Standard Test Method for Total Normal Emittance of Surfaces Using Inspection- Meter Techniques. (Energy Star® for Roof Products).

14. ASTM E 903-96 Standard Test Method for Solar Absorptance, Using Integrating Spheres. (Energy Star® for Roof Products)

B. Manufacturer's Qualifications:

1. Manufacturer has a minimum of five years experience in manufacturing metal roof systems of this nature. Panels specified in this section shall be produced in a factory environment (not with a portable roll former with fixed-base roll forming equipment) and in line leveling assuring the highest level of quality control. A letter from the manufacturer certifying compliance will accompany the product material submittals.

C. Installation Contractor's Qualifications:

1. Installer of the system shall be an approved installer, certified by the manufacturer, before beginning of installation of the metal roof system and meet the following minimum criteria:
  - a. Maintain \$250,000 general liability coverage for each loss.
  - b. Maintain sufficient worker's compensation coverage as mandated by law.
  - c. Have no viable claims pending regarding negligent acts or defective workmanship on previously performed or current projects.
  - d. Has not filed for protection from creditors under any state or federal insolvency or debtor relief statutes or codes.
  - e. Provide certification letter that installer has a minimum of three years of metal product installation experience immediately preceding the date upon which work is to commence.

### 1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Performance Testing:

1. Metal roof system must be tested in accordance with Underwriters Laboratories, Inc. (UL) Test Method 580 "Tests for Uplift Resistance of Roof Assemblies".
2. Metal roof system must be installed in accordance with UL Construction Method #286, min. 5/8," plywood deck with fixed/articulating clips at 5'-0" on center max.
3. Metal roof system must meet the air infiltration requirements of ASTM E 1680-95 when tested with a 6.24 PSF pressure differential. The resulting air infiltration leakage rate will be a minimum of 0.251 cfm/sq. ft.
4. Metal roof system must meet the water penetration requirements of ASTM E 1646-95 when tested with a 12.00 PSF pressure differential with no uncontrollable water leakage when five gallons per hour of water is sprayed per square foot of roof area.
5. Metal Roof Panels shall be high reflectance and high emittance in accordance with Energy Star®. Initial Reflectance (Galvalume Only) shall be at least 0.68 when tested with ASTM E- 903. The three year aged

reflectance shall be at least 0.57, when tested in accordance with ASTM E-1918 (Measured as Solar Reflectivity, Not Visible Reflectance).

#### 1.4 DESIGN REQUIREMENTS

##### A. Roof Design Loads:

1. Design criteria shall be in accordance with the most current version of the IBC and/or local building code.
2. Dead Loads
  - a. The dead load shall be the weight of the SSMR system. Collateral loads, such as sprinklers, mechanical and electrical systems, and ceilings shall not be attached to the panels.
3. Live Loads
  - a. The panels and concealed anchor clips shall be capable of supporting a minimum uniform live load of 20 psf.
4. Roof Snow Loads
  - a. The design roof snow loads shall be as shown on the contract drawings.
5. Wind Loads
  - a. The design wind uplift for the roof system shall be as shown on the contract drawings. The design uplift force for each connection assembly shall be that pressure given for the area under consideration, multiplied by the tributary load area of the connection assembly. The safety factor listed below shall be applied to the design force and compared against the ultimate capacity. Prying shall be considered when calculating fastener design loads.
    - i. Single fastener in each connection: 3.0
    - ii. Two or more fasteners in each connection: 2.25
6. Thermal Loads
  - a. Roof panels shall be free to move in response to the expansion and contraction forces resulting from temperature fluctuations during the life of the structure.

#### 1.5 SUBMITTALS

##### A. Shop Drawings:

1. Submit complete shop drawings and erection details, approved by the metal roofing manufacturer, for review. Do not proceed with manufacture of roofing materials prior to review of shop drawings and field verification of all dimensions.
2. Shop drawings show methods of erection, elevations and plans of roof and wall panels, sections and details, anticipated loads, flashings, roof curbs, vents, sealants, interfaces with all materials not supplied and proposed identification of component parts and their finishes.

B. Performance Tests:

1. Submit certified test results by a recognized testing laboratory or manufacturer's lab (witnessed by a professional engineer) in accordance with specified test methods for each panel system.

C. Calculations:

1. Submit engineering calculations defining all cladding loads for all roof areas based on design criteria listed in Para 1.04 Design Requirements, allowable clip loads and required number of fasteners to secure the panel clips to the designated substructure.
2. Compute uplift loads on clip fasteners with full recognition of prying forces and eccentric clip loading.
3. Calculate holding strength of fasteners in accordance with submitted test data provided by Fastener Manufacturer based on length of embedment and properties of materials.
4. Submit thermal calculations and details of floating clip, flashing attachments, and accessories certifying the free movement in response to the expansion/contraction forces resulting from a total temperature differential of 110 degrees F.

D. Samples:

1. Submit samples and color chips for all proposed finishes.
  - a. Submit one 8-inch long sample of panel, including clips.
  - b. Submit two 3 inch x 5 inch color chip samples in color selected by the architect (owner).

E. Warranties:

Metal roof system manufacturer, upon final acceptance for project, furnish a warranty.

1. Finish: Metal roof system manufacturer shall submit a specimen copy of the warranty upon final acceptance of the project. Finish Warranty shall warrant the panel finish against cracking, checking, blistering, peeling, flaking, chipping, chalking and fading for a period of twenty (20) years.
2. Weathertightness: Metal roof system manufacturer shall submit a specimen copy of manufacturer's Weathertightness Warranty, including evidence of application for warranty and manufacturer's acceptance of the applicator and warranty conditions.

F. Installation Contractor's Qualifications:

1. Submit certificate from manufacturer certifying that installer of the metal roof system has met all of the criteria outlined in "1.02 C. Installer's qualifications" and is an authorized installer certified by the manufacturer within one year of the beginning of installation of the metal roof system.
2. Submit five references from five different architects or building owners for projects that have been in service for a minimum of two years, stating satisfactory performance by the installation contractor.



## 1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery:
  - 1. Deliver metal roof system to job site properly packaged to provide protection against transportation damage.
- B. Handling:
  - 1. Exercise extreme care in unloading, storing and erecting metal roof system to prevent bending, warping, twisting and surface damage.
- C. Storage:
  - 1. Store all material and accessories above ground on well skidded platforms. Store under waterproof covering. Provide proper ventilation of metal roof system to prevent condensation build-up between each panel or trim/flashing component.

## 1.7 WEATHERTIGHTNESS WARRANTY

- A. The Contractor shall provide to the Owner, a warranty signed by the roofing manufacturer of the Standing Seam Roof System as outlined below:
  - 1. For a period of twenty (20) years from the date of substantial completion, the roofing manufacturer WARRANTS to the "Owner": that the roofing manufacturer's furnished roof panels, flashing, and related items used to fasten the roof panels and flashing to the roof structure ("Roof System") will not allow intrusion of water from the exterior of the roofing manufacturer's Roof System into the building envelope, when exposed to ordinary weather conditions and ordinary wear and usage. The Date of substantial completion is the date that is certified by the Architect, Owner, or Owner's Representative, when the roofing manufacturer's Roofing System is completed and accepted by or on behalf of the Owner.
  - 2. The Roofing Installer shall have the sole and exclusive obligation for all warranty work commencing on the date of substantial completion up to and until the roof system has performed leak free for (24) consecutive months.
  - 3. Roofing Manufacturer's Liability  
The total liability of the roofing manufacturer under limited solely to the Invoice Amount for the roof system (panels, fasteners, trim and accessories) to its customer.

## 2.0 **PRODUCTS**

### 2.1 MATERIALS

- A. Metal Roof System Profile:
  - 1. 3-inch high rib x 24 inch wide panel.
- B. Metal Roof System Style:
  - 1. Trapezoidal rib, positive snap together, standing seam, utilizing male and female rib configurations, with factory applied hot melt mastic in female rib.
  - 2. Minimum allowable roof slope; 1/2" : 12"

- C. Gauge:
  - 1. 24 gauge (UL90 rated)
- D. Substrate:
  - 1. Galvalume® steel sheet, minimum yield of 50,000 PSI.
- E. Clip:
  - 1. Two-piece floating clip providing thermal expansion or contraction (UL 90 rated).
  - 2. Articulating clip, providing thermal expansion or contraction, correcting for out-of-plane sub-framing alignment to a maximum of 7 degrees (UL 90 rated).
  - 3. One piece fixed clip 22 gauge with factory applied mastic (UL 90 rated).
- F. Texture:
  - 1. Smooth
- G. Finish:
  - 1. Premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin (20 year warranty).
- H. Color:
  - 1. Metal roof panels, soffit, fascia, trim, flashing, gutters and downspouts, etc. shall be Firestone, Regal Blue Steel to match North Laurel Middle School.

## 2.2 MISCELLANEOUS MATERIALS

- A. All self-tapping/self-drilling fasteners, bolts, nuts, self-locking rivets and other suitable fasteners shall be designed to withstand specified design loads shall be designed to withstand specified design loads.
  - 1. Use long life fasteners for all exposed fastener applications.
  - 2. Provide fasteners with a factory applied coating in a color to match metal roof system application.
  - 3. Provide neoprene washers under heads of exposed fasteners.
  - 4. Locate and space all exposed fasteners in a true vertical and horizontal alignment. Use proper torque settings to obtain controlled uniform compression for a positive seal without rupturing the neoprene washer.
- B. Accessories:
  - 1. Provide all components required per the metal roof system manufacturer's approved shop drawings for a complete metal roof system to include panels, panel clips, trim/flashing, fascias, ridge, closures, gutter, downspouts, sealants, fillers and any other required items.
    - a. All outside closures will be fabricated from Galvalume Plus® or Pre-Painted Galvalume® sheet steel of the same gauge, finish and color as the panels.
    - b. All tape seal is to be a pressure sensitive, 100 percent solids, polyisobutylene compound sealing tape with a release paper backing. Provide permanently elastic, non-sagging, non-toxic, non-staining tape seal approved by the metal roof system manufacturer.
    - c. All joint sealant is to be a one-part elastomeric polyurethane sealant approved by the metal roof system manufacturer.

### 2.3 FABRICATION

- A. Material shall be in-line tension leveled prior to roll forming panel profile.
- B. Where possible, roll form panels in continuous lengths, full length of detailed runs.
- C. Standard panel length shall be no more than 45 feet long (for longer length availability, contact manufacturer).
- D. Fabricate trim, flashing and accessories to detailed profiles.
- E. Fabricate trim and flashing from same material as panel.

### 2.4 PREFABRICATED CURBS AND EQUIPMENT SUPPORTS

- A. Comply with loading and strength requirements as indicated where units support other work. Coordinate dimensions of curbs and supports with equipment supplier/manufacturer.
- B. Fabricate curbs of structural aluminum (Min. 0.080 in. thickness for mechanical gear up to 1000 lbs; 0.125 in. thickness for mechanical gear between 1000 lbs. and 2000 lbs.; use a two curb system per the manufacturer above 2000 lbs.), factory primed and prepared for painting with mitered and welded corner joints. Provide integral base plates and water diverter crickets. The upper flange of the curb must be a minimum of 15" above the water diverter. Curbs shall be designed to install under metal roof systems on the high side and over the metal roof system on the low side.
- C. Minimum height of curb shall be 8" above finished metal roof system.
- D. Curbs shall be constructed to match slope of roof and provide a level top surface for mounting equipment.
- E. Curb flanges shall be constructed to match configuration of roof panels.
- F. Curb manufacturer will provide their own curb structural support system that can be installed between the purlins that will allow proper thermal movement of the curb with the roofing system.
- G. Submit roof curb manufacturer's shop drawings to metal roof system manufacturer for approval before fabrication of curbs.

### 2.5 PREFABRICATED ROOF JACKS

- A. Pipe flashings shall be a one piece EPDM (ethylene propylene diene monomer) molded rubber boot having a serviceable temperature range of - 65°F to 212°F and shall be resistant to ozone and ultraviolet rays. Units shall have an aluminum flanged base ring. Do not install pipe flashings through any panel seams - install ONLY in the flat portion of the panel.

### **3.0 EXECUTION**

#### **3.1 SURFACE CONDITIONS**

- A. Examination:
  - 1. Verify that installation may be made in accordance with approved shop drawings and manufacturer's instructions. This specifically includes verifying that secondary structural and/or decking is installed to meet UL and building code requirements. Coordinate with metal roof system manufacturer to ensure that reduced clip spacing at eave, rake, ridge and corner areas are accommodated.
- B. Discrepancies:
  - 1. In event of discrepancy, notify the architect (owner).
  - 2. Do not proceed with installation until discrepancies have been resolved.

#### **3.2 INSTALLATION**

- A. Install metal roof system so that it is weathertight, without waves, warps, buckles, fastening stresses or distortion, allowing for expansion and contraction.
- B. Install metal roof system in accordance with manufacturer's instructions and shop drawings.
- C. Provide concealed anchors at all panel attachment locations.
- D. Install panels plumb, level and straight with seams and ribs parallel, conforming to design as indicated.

#### **3.3 ROOF CURB INSTALLATION**

- A. Comply with metal roof system manufacturer's approved shop drawings, instructions and recommendations for installation of roof curbs. Refer to metal roof system manufacturer's standard installation details. Anchor curbs securely in place with provisions for thermal and structural movement.

#### **3.4 CLEANING, PROTECTION**

- A. Dispose of excess materials and remove debris from site.
- B. Clean work in accordance with manufacturer's recommendations.
- C. Protect work against damage until final acceptance. Replace or repair to the satisfaction of the architect (owner), any work that becomes damaged prior to final acceptance.
- D. Touch up minor scratches and abrasions.
- E. Do not allow panels or trim to come into contact with dissimilar metals such as copper, lead, graphite or cast iron. Water run-off from these materials is also prohibited. This specifically includes condensate from roof top A/C units.

**END OF SECTION 07610**

## **DIVISION 8: DOORS AND WINDOWS**



## **SECTION 08110**

### **HOLLOW METAL DOORS, FRAMES AND FINISH HARDWARE**

#### **1.0 GENERAL**

##### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this Section. Each water booster pump station shall be complete with all necessary equipment under this Section.

##### **1.2 SUMMARY**

###### **A. Section Includes:**

1. Standard hollow metal doors and frames.
2. Finish hardware.

###### **B. Related Sections**

1. Division 4 Section "Unit Masonry Assemblies" for embedding anchors for hollow metal work into masonry construction.
2. Division 8 Section "Fiberglass Reinforced Plastic (FRP) Doors and Frames" for doors and frames manufactured from Fiberglass Reinforced Plastic (FRP).
3. Division 8 Section "Door Hardware" for door hardware for hollow metal doors.
4. Division 9 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

##### **1.3 DEFINITIONS**

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

#### 1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thickness.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices and connections.
7. Details of accessories.
8. Details of moldings, removable stops and glazing.

C. Other Action Submittals:

1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

#### 1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

#### 1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver hollow metal work palletized, wrapped or crated to provide protection during transit and Project site storage. Do not use nonvented plastic.



- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch (102 mm) high wood blocking. Do not store in a manner that traps excess humidity.
  - 1. Provide minimum ¼ inch (6 mm) space between each stacked door to permit air circulation.

## **1.7 PROJECT CONDITIONS**

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

## **1.8 COORDINATION**

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts and items with integral anchors. Deliver such items to Project site in time for installation.

## **2.0 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Ceco Door Products; an Assa Abloy Group company.
  - 2. Curries Company; an Assa Abloy Group company.
  - 3. Security Metal Products Corp.
  - 4. Steelcraft; an Ingersoll-Rand company.
  - 5. Or approved equal

### **2.2 MATERIALS**

- A. Cold Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot Rolled Steel Sheet: ASTM A 1011-A 1011M, Commercial Steel (CS), Type B; free of scale, pitting or surface defects; pickled and oiled.

- C. Metallic Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
  - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts and Fasteners: Hot dip galvanized according to ASTM A 153/A 153M.
- F. Powder Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143.
- H. Mineral Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6 to 12 lb/cu ft. (96 to 192 kg/cu m) density; with maximum flame spread and smoke development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- I. Glazing: Comply with requirements in Division 8 Section "Glazing".
- J. Bituminous Coating: Cold applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4 mm) dry film thickness per coat. Provide inert type noncorrosive compound free of asbestos fibers, sulfur components and other deleterious impurities.

## 2.3 STANDARD HOLLOW METAL DOORS

- A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
  - 1. Design: Flush panel.

2. Core Construction: Manufacturer's standard kraft power honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral board or vertical steel stiffener core.
  3. Vertical Edges for Single Acting Doors: Beveled edge.
    - a. Beveled Edge: 1/8 inch in 2 inches (3 mm in 50 mm).
  4. Top and Bottom Edges: Closed with flush or inverted 0.042 inch (1.0 mm) thick, end closures or channels of same material as face sheets.
  5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames".
- B. Exterior Doors: Face sheets fabricated from metallic coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless).
    - a. Width: 1 3/4 inches (44.5 mm).
- C. Interior Doors: Face sheets fabricated from cold rolled steel sheet unless metallic coated sheet is indicated. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless).
    - a. Width: 1 3/4 inches (44.5 mm).
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- E. Fabricate concealed stiffeners and hardware reinforcement from either cold or hot rolled steel sheet.

## 2.4 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated from metallic coated steel sheet.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames as full profiled welded unless otherwise indicated.
3. Frames for Level 3 Steel Doors: 0.053 inch (1.3 mm) thick steel sheet.

C. Interior Frames: Fabricated from cold rolled steel sheet.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames as full profile welded unless otherwise indicated.
3. Fabricate knocked down, drywall slip-on frames for in place gypsum board partitions.
4. Frames for Level 3 Steel Doors: 0.053 inch (1.3 mm) thick steel sheet.
5. Frames for Wood Doors: 0.053 inch (1.3 mm) thick steel sheet.
6. Frames for Borrowed Lights: 0.053 inch (1.3 mm) thick steel sheet.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforced plates from same material as frames.

## 2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap and stirrup or T shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (50 mm) wide by 10 inches (250 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
3. Compression Type for Drywall Slip-On Frames: Adjustable compression anchors.
4. Post-installed Expansion Type for In Place Concrete or Masonry: Minimum 3/8 inch (9.5 mm) diameter bolts with expansion shields

or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:

1. Monolithic Concrete Slabs: Clip type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable type anchors with extension clips, allowing not less than 2-inch (50 mm) height adjustment. Terminate bottom of frames at finish floor surface.

## 2.6 HOLLOW METAL PANELS

A. Provide hollow metal panels of same materials, construction and finish as specified for adjoining hollow metal work.

## 2.7 STOPS AND MOLDINGS

A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as door face sheet in which they are installed.

B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated.

C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as frames in which they are installed.

## 2.8 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Ceiling Struts: Minimum ¼ inch thick by 1 inch (6.4 mm thick by 25.4 mm) wide steel.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

## 2.9 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp or buckle. Accurately form metal to required sizes and profiles, with

minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/NAAMM-HMMA 861.

C. Hollow Metal Doors:

1. Exterior Doors: Provide weep hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
2. Glazed Lites: Factory cut openings in doors.

D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress and make smooth, flush and invisible.
2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
3. Provide countersunk, flat or oval head exposed screws and bolts for exposed fasteners unless otherwise indicated.
4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
6. Jamb Anchors: Provide number and spacing of anchors as follows:
  - a. Masonry Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
    1. Two anchors per jamb up to 60 inches (1524 mm) high.

2. Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
  3. Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
  4. Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.
- b. Stud Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
1. Three anchors per jamb up to 60 inches (1524 mm) high.
  2. Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
  3. Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
  4. Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
  5. Two anchors per head for frames above 42 inches (1066 mm) wide and mounted in metal stud partitions.
- c. Compression Type: Not less than two anchors in each jamb.
- d. Post-installed Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.
7. Door Silencers: Except on weather stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
- a. Single Door Frames: Drill stop in strike jamb to receive three door silencers.
  - b. Double Door Frames: Drill stop in head jamb to receive two door silencers.

- E. Fabricate concealed stiffeners, edge channels and hardware reinforcement from either cold or hot rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 8 Section "Door Hardware".
  - 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  - 2. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
- G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with buttered or mitered hairline joints.
  - 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
  - 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
  - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
  - 4. Provide loose stops and moldings on inside of hollow metal work.
  - 5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

## 2.10 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
  - 1. Shop Primer: Manufacturer's standard, fast curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field applied coatings despite prolonged exposure.



## 2.11 FINISH HARDWARE

A. Finish Hardware includes items known commercially which are required for swing, sliding and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and frame. Extent of finish hardware required is indicated in drawings and in schedules.

B. A recognized supplier who has been furnishing hardware in the project's vicinity for a period of not less than 2 years, and who is, or who employs an experienced architectural hardware consultant who is available for consultation at reasonable times during the course of the work.

C. Submit manufacturer's technical data for each item of hardware. Include all information necessary to show compliance with requirements and include instructions for installation and for maintenance of operating parts.

D. Hardware supplier shall receive and check all hardware at his warehouse. All hardware shall be delivered to the job site by the supplier in one shipment. All hardware shall be properly wrapped in separate packages complete with trimmings, screws, etc., each plainly labeled and numbered to agree with the door numbers and Contractor's typewritten schedule.

E. Work shall be done by a craftsman skilled and experienced in the installation of finish hardware. Mortised items shall be neatly set in and made flush with the door or frame surface. Manufacturer's instructions and recommendations shall be strictly followed. Mortised items shall be installed at frame manufacturer's standard locations.

F. Surface mounted items shall be installed at heights recommended by the Door and Hardware Institute, Arlington, Virginia. Hinges, pivots, locks and exit devices shall be installed with proper sex bolts supplied by the manufacturer. Door pulls shall be installed on doors with through-bolts as supplied by manufacturer. All removable mullion to be installed with mullion stabilizers.

G. Hardware Set:

| Item Description             | Quantity | Brand  | Model         |
|------------------------------|----------|--------|---------------|
| Hinge                        | 3        | Hager  | BB119 NRP     |
| Lockset                      | 1        | Yale   | PBR8822FL     |
| Exit Devise                  | 1        | Yale   | 7100 x M0626F |
| Kickplate                    | 1        | Hager  | 193S 8"       |
| Closer (Corrosion Resistant) | 1        | Norton | PA1601SS      |
| Cast Aluminum Threshold      | 1        | Hager  | 727S          |
| Weatherstrip                 | 1        | Hager  | 726S          |
| Sweep                        | 1        | Hager  | 750S-CLR-N    |

**Note: Items of equal quality will be accepted from other manufacturers.**

### 3.0 EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas and conditions with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing in for embedded and built in anchors to verify actual locations before frame installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling and dressing, as required to make repaired area smooth, flush and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist and plumbness to the following tolerances:
  - 1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - 2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.

3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive nontemplated, mortised and surface mounted door hardware.

### 3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
1. Set frames accurately in position, plumbed, aligned and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress and make splice smooth, flush and invisible on exposed faces.
    - b. Install frames with removable glazing stops located on secure side of opening.
    - c. Install door silencers in frames before grouting.
    - d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - e. Check plumbness, squareness and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - f. Field apply bituminous coating to backs of frames that are filled with grout containing anti-freezing agents.
  2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

- a. Floor anchors may be set with powder actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
3. Metal Stud Partitions: Solidly pack mineral fiber insulation behind frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
6. In Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors and fill and make smooth, flush and invisible on exposed faces.
7. In Place Gypsum Board Partitions: Secure frames in place with post-installed expansion anchors through floor anchors at each jamb. Countersink anchors and fill and make smooth, flush and invisible on exposed faces.
8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
9. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist and plumb to the following tolerances:
  - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
  - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines and perpendicular to plane of wall.
  - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non Fire Rated Standard Steel Doors:

- a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
- b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
- c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).
- d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).

D. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with hollow metal manufacturer's written instructions.

- 1. Secure stops with countersunk flat or oval head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2-inches (50 mm) o.c. from each corner.

### 3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air drying, rust inhibitive primer.
- D. Metallic Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

**END OF SECTION 08110**



## **DIVISION 9: FINISHES**





**SECTION 09900**  
**GENERAL PAINTING & FINISHES**  
**FOR**  
**BOOSTER PUMP STATIONS AND EQUIPMENT VAULTS**

**1.0 GENERAL**

**1.1 RELATED DOCUMENTS**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

**2.0 DESCRIPTION OF WORK**

2.1 Extent of painting work is indicated on drawings and as herein specified.

2.2 Work includes painting and finishing of interior and exterior exposed items and surfaces through project, except as otherwise indicated.

Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.

2.3 Work includes field painting of exposed bare and covered pipes and ducts (including color coding), and of hangers, and exposed steel and iron work, and primed metal surfaces of equipment installed under mechanical and electrical work, except as otherwise indicated.

2.4 "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

2.5 Surfaces to Be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Owner/Engineer will select these from standard colors or finishes available.

2.6 Following categories of work are not included as part of field-applied finish work.

Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing to specified for such items as (but not

limited to) metal toilet enclosures, pre-finished partition systems, acoustic materials, architectural woodwork and casework, elevator entrance doors and frames, elevator equipment, and finished mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets.

**Concealed Surfaces:** Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.

**Finished Metal Surfaces:** Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.

**Operating Parts:** Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, and motor and fan shafts will not require finish painting.

**2.7 Shop Priming:** Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, metal fabrications, hollow metal work and similar items.

**2.8** Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

### **3.0 QUALITY ASSURANCE**

**3.1 Single Source Responsibility:** Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.

**3.2 Coordination of Work:** Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use to ensure compatible prime coats are used.

### **4.0 SUBMITTALS**

**4.1 Product Data:** Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.

**4.2 Samples:** Prior to beginning work, Owner/Engineer will furnish color chips for surfaces to be painted. Use representative colors when preparing samples

for review. Submit samples for Owner/Engineer's review of color and texture only. Provide a listing of material and application for each coat of finish sample. On 12" x 12" hardboard, provide two samples of each color and material, with texture to simulate actual conditions. Re-submit samples as requested by Owner/Engineer until acceptable sheen, color and texture is achieved.

On concrete masonry, provide two 4" square samples of masonry for each type of finish and color, defining filler, prime and finish coat.

## **5.0 DELIVERY AND STORAGE**

5.1 Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

- Name or title of material
- Fed. Spec. number, if applicable
- Manufacturer's stock number and date of manufacturer
- Manufacturer's name
- Contents by volume, for major pigment and vehicle constituents
- Thinning instructions
- Application instructions
- Color name and number

5.2 Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.

Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

## **6.0 JOB CONDITIONS**

6.1 Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 deg. F (10 deg. C) and 90 deg. F (32 deg. C), unless otherwise permitted by paint manufacturer's printed instructions.

6.2 Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 deg. F (7 deg. C) and 95 deg. F (35 deg. C), unless otherwise permitted by paint manufacturer's printed instructions.

6.3 Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.

Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

## **PART 2 – PRODUCTS**

### **1.0 ACCEPTABLE MANUFACTURERS**

1.1 Manufacturer: Subject to compliance with requirements, provide products for one of the following:

- TNEMEC
- Rustoleum
- Or approved equal

### **2.0 MATERIALS**

2.1 Material Quality: Provide best quality grade various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.

Proprietary names used to designate colors or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers.

Manufacturer's products which comply with coating qualitative requirements of applicable Federal Specifications, yet differ in quantitative requirements, may be considered for use when acceptable to Owner/Engineer. Furnish material data and manufacturer's certificate of performance to Owner/Engineer for any proposed substitutions.

2.2 Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

Lead content in pigment, if any, is limited to contain not more than 0.06% lead, as lead metal based on the total non-volatile (dry-film) of paint by weight.

This limitation is extended to interior surfaces and those exterior surfaces, such as stairs, decks, porches, railing, window and doors which are readily accessible to children under seven years of age.

## **PART 3 – EXECUTION**

### **1.0 INSPECTION**

1.1 Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Applicator.

1.2 Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.

1.3 Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

### **2.0 SURFACE PREPARATION**

2.1 General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.

Provide barrier coats over incompatible primers or remove and reprime as required. Notify Owner/Engineer in writing of any anticipated problems in using the specified coating systems with substrates primed by others.

Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.

Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.

2.2 Cementitious Materials: Prepare cementitious surfaces of concrete, concrete block, cement plaster and cement-asbestos board to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.

Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before

application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

Clean concrete floor surfaces scheduled to be painted with a commercial solution of muriatic acid, or other etching cleaner. Flush floor with clean water to neutralize acid, and allow it to dry before painting.

2.3 Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.

Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, paneling.

When transparent finish is required, use spar varnish for backpriming.

Backprime paneling on interior partitions only where masonry, plaster, or other wet wall construction occurs on backside.

Seal tops, bottoms, and cut-outs of unprimed wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.

2.4 Ferrous Metals: Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

Touch-up shop-applied prime coats wherever damaged or bare, where required by other sections of these specifications.

Clean and touch-up with same type shop primer.

2.5 Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent, followed by an acid wash treatment, before priming.

2.6 Surfaces which cannot be prepared or painted as specified shall be immediately brought to the attention of the Owner/Engineer in writing. Starting of work without such notification shall be considered acceptance of the surfaces/finishes involved. Contractor shall be responsible for replacement of any unsatisfactory work.

### **3.0 MATERIALS PREPARATION**

3.1 Mix and prepare painting materials in accordance with manufacturer's directions.

3.2 Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

3.3 Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

### **4.0 APPLICATION**

4.1 General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

Paint colors, surface treatments, and finishes, are indicated on the drawings or shall be as directed by the Owner/Engineer.

Provide finish coats which are compatible with prime paints used.

Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.

Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.

Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.

Sand lightly between each succeeding enamel or varnish coat.

Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.

4.2 Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

4.3 Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, of not indicated, as recommended by coating manufacturer.

4.4 Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed in mechanical equipment rooms and in occupied spaces.

4.5 Mechanical items to be painted include, but are not limited to, the following:

- Piping, pipe hangers, and supports.
- Tanks, as directed by Owner/Engineer.
- Ductwork, insulation, as directed by Owner/Engineer.
- Motor, mechanical equipment, and supports, as directed by Owner/Engineer.
- Accessory items.

4.6 Electrical items to be painted include, but are not limited to, the following:

- Conduit and fittings.
- Switchgear.

4.7 Prime Coats: Apply prime coat of material which is required to be painted or finished, and which has not been prime coated by others.

Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

4.8 Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.



4.9 Transparent (Clear) Finishes: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.

Provide satin finish for final coats, unless otherwise indicated.

4.10 Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

## **5.0 FIELD QUALITY CONTROL**

5.1 The right is reserved by Owner to invoke the following material testing procedure at any time, and any number of times during period of field painting:

Engage services of an independent testing laboratory to sample paint being used. Samples of materials delivered to project site will be taken, identified and sealed, and certified in presence of Contractor.

Testing laboratory will perform appropriate tests for any or all of following characteristics: Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance and quantitative materials analysis.

5.2 If test results show that material being used does not comply with specified requirements, Contractor may be directed to stop painting work, and remove non-complying paint; pay for testing; repaint surfaces coated with rejected paint; remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are non-compatible.

## **6.0 CLEAN-UP AND RESTORATION**

6.1 Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.

6.2 Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

6.3 Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Engineer.

Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrapping provided by others for protection of their work, after completion of painting operations.

At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

## **7.0 PAINT SCHEDULE**

7.1 General: Provide the following paint systems for the various substrates.

### **7.2 COATING SYSTEMS FOR DUCTILE OR CAST IRON – PIPE, PUMPS, AND VALVES**

#### **TNEMEC PRODUCTS**

- A. Exterior Exposed:
1. Surface Preparation: NAPF 500-03-03 Power Tool Cleaning.
  2. Primer: Series 1 Omnithane. DFT 2.5 to 3.5 mils.
  3. Intermediate Coat: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
  4. Finish Coat: Series 1074 Endura-Shield. DFT 2.0 to 3.0 mils.
  5. Total DFT: 6.5 to 9.5 mils.
  6. Finish Color: As indicated on the drawings.

#### **RUSTOLEUM PRODUCTS**

- A. Exterior Exposed:
1. Surface Preparation: NAPF 500-03-03 Power Tool Cleaning.
  2. Primer: Rustoleum C 9578 Coal tar. DFT – 6.0 to 7.0 mils.
  3. Intermediate Coat: Rustoleum C 9578. DFT – 6.0 to 7.0 mils.
  4. Finish Coat: Series Rustoleum C 9578. DFT – 6.0 to 7.0 mils.
  5. Total DFT: 18.0 to 21.0 mils.
  6. Finish Color: As indicated on the drawings.

#### **OR APPROVED EQUAL**

### **7.3 COATING SYSTEMS FOR PRECAST CONCRETE, CAST-IN-PLACE CONCRETE, AND DENSE CONCRETE MASONRY UNITS**

#### **TNEMEC PRODUCTS**

- A. Interior Exposed:
1. Surface Preparation: SSPC-SP 13/NACE 6 and ICRI Guideline 03732, CSP-3.
  2. Primer: Series N69 Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils.

3. Finish Coat: Series N69 Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils.
4. Total DFT: 8.0 to 12.0 mils.
5. Spray apply, or additional coats may be required.
6. Finish Color: As indicated on the drawings.

#### RUSTOLEUM PRODUCTS

- A. Interior Exposed:
1. Surface Preparation: SSPC-SP 13/NACE 6 and ICRI Guideline 03732, CSP-3.
  2. Primer: Rustoleum 9100 (non-potable, 9200 potable). DFT 5.0 to 7.0 mils.
  3. Finish Coat: Rustoleum 9100 (non-potable, 9200 potable). DFT 5.0 to 7.0 mils.
  4. Total DFT: 10.0 to 14.0 mils.
  5. Finish Color: As indicated on the drawings.

#### OR APPROVED EQUAL

### 7.4 COATING SYSTEMS FOR CONCRETE FLOORS

#### TNEMEC PRODUCTS

- A. Light Traffic / Low Impact Exposure:
1. Surface Preparation: SSPC-SP 13/NACE 6 and ICRI Guideline 03732, CSP-3.
  2. Primer: Series 201 Epoxo prime. DFT 6.0 to 8.0 mils.
  3. Intermediate Coat: Series 280 Tnemec-Glaze. DFT 6.0 to 8.0 mils.
  4. Finish Coat: Series 280 Tnemec-Glaze. DFT 6.0 to 8.0 mils.
  5. Total DFT: 18.0 to 24.0 mils.
  6. Finish Color: As indicated on the drawings. (*Limited Color Selection*)

#### RUSTOLEUM PRODUCTS

- A. Light Traffic / Low Impact Exposure:
1. Surface Preparation: SSPC-SP 13/NACE 6 and ICRI Guideline 03732, CSP-3.
  2. Primer: Rustoleum 9100. DFT 5.0 to 7.0 mils.
  3. Intermediate Coat: Rustoleum 9100. DFT 5.0 to 7.0 mils.
  4. Finish Coat: Rustoleum 9100. DFT 5.0 to 7.0 mils.
  5. Total DFT: 15.0 to 21.0 mils.
  6. Finish Color: As indicated on the drawings. (*Limited Color Selection*)

#### OR APPROVED EQUAL

## 7.5 COATING SYSTEMS FOR POROUS CONCRETE MASONRY UNITS

### TNEMEC PRODUCTS

- A. Interior Exposed:
1. Surface Preparation: SSPC-SP 13/NACE 6. Clean and dry.
  2. Primer: Series 130 Masonry Filler. Spreading rate 80 to 100 sf/gal.
  3. Intermediate Coat: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
  4. Finish Coat: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
  5. Total DFT: 4.0 to 6.0 mils plus filler.
  6. Finish Color: As indicated on the drawings.

### RUSTOLEUM PRODUCTS

- A. Interior Exposed:
1. Surface Preparation: SSPC-SP 13/NACE 6. Clean and dry.
  2. Primer: Rustoleum/Zinser Water Tight.
  3. Intermediate Coat: Rustoleum 5200. DFT 2.0 to 4.0 mils.
  4. Finish Coat: Rustoleum 5200. DFT 2.0 to 4.0 mils.
  5. Total DFT: 4.0 to 6.0 mils plus filler.
  6. Finish Color: As indicated on the drawings.

### OR APPROVED EQUAL

## **8.0 MEASUREMENT AND PAYMENT**

Payment for painting is incidental to the work in which it is included. There is no separate payment for painting.

**END OF SECTION 09900**

## **DIVISION 11: EQUIPMENT**



## **SECTION 11210**

### **BOOSTER PUMP STATION**

#### **1.0 GENERAL**

The Contractor shall furnish and install the water booster pump station, with all the necessary piping, controls, and appurtenances as shown on the plans and as specified herein. Each water booster pump station shall be complete with all necessary equipment installed in a concrete block building. Also all tie-ins, access entrance, yard piping etc. shall be considered part of the lump sum bid for each pump station.

#### **1.1 REFERENCE STANDARDS**

The Work in this Section is subject to the requirements of applicable portions of the following standards:

- A. HI – Hydraulic Institute
- B. ANSI – American National Standards Institute
- C. ASTM – American Society for Testing and Materials
- D. IEEE - Institute of Electrical and Electronics Engineers
- E. NEMA – National Electrical Manufacturers Association
- F. NEC – National Electrical Code
- G. ISO – International Standards Organization

#### **1.2 RELATED WORK**

- A. Section 11900 – INTEGRATION OF TELEMETRY CONTROLS
- B. Division 16 – Electrical

#### **2.0 DEFINITIONS**

When the term "pumping unit" is used it shall be deemed to mean a pump or pumps, complete with, but not limited to, drive motor, accessories, appurtenances and all associated equipment.

### **3.0 CONTRACT DRAWINGS**

The contract drawings are intended to show a general arrangement of pump equipment, drives, structural supports, foundations, connected piping and valves.

The pump suction and discharge nozzles shown shall be considered minimum sizes unless otherwise specified.

### **4.0 MANUFACTURER**

#### **4.1 QUALITY ASSURANCE**

All pumping units shall be of approved design and make and products of manufacturers who have built equipment of similar type, size and capacity.

#### **4.2 ADDITIONAL SUBMITTALS**

The Contractor shall submit, upon request, any additional information that the Engineer may deem necessary to determine the ability of the proposed manufacturer to produce the specified equipment.

#### **4.3 REPLACEMENT PARTS CAPABILITY AND SERVICE**

Pumping units shall be the products of manufacturers who can produce evidence of their ability to promptly furnish any and all interchangeable replacement parts as may be needed at any time within the expected life of the pumps. Upon request, the Contractor certifies and shall submit full details of the proposed manufacturer's ability to promptly fill replacement orders. The manufacturer shall have a fully staffed factory trained service center within three (3) hours of the installation.

#### **4.4 MANUFACTURE INFORMATION**

All manufacturer information required by the specifications shall be submitted by the Contractor within thirty (30) calendar days of the date of receipt of the Notice to Proceed.

Any additional information or data, specifically requested by the Engineer, concerning manufacturer's capabilities (especially relating to requirements described hereinbefore), shall be submitted by the Contractor within fourteen (14) calendar days of the receipt of the written request therefore, unless otherwise specified.

Approval of the manufacturers or suppliers will not be given until all information required by the specifications or requested by the Engineer has been submitted and found acceptable.



#### 4.5 DISQUALIFICATION OF MANUFACTURER

- A. Failure to successfully comply with the provisions of sub-paragraphs 4.1 through 4.4, inclusive, will constitute grounds for disqualification of pump manufacturer.
- B. Poor performance of similar pumping equipment now in operation under the specified conditions of service and pump rating constitute grounds for disqualification of the pump manufacturer, supplier, or both, unless such poor performance has been corrected.

### 5.0 **SUBMITTALS**

#### 5.1 GENERAL

The Contractor shall comply with the provisions in the specifications regarding submittals, unless otherwise specified herein.

#### 5.2 CONTENT OF SUBMITTALS

The following shall be included in submittals as a minimum. However, any additional information or data shall be added if and whenever requested by the Owner or Engineer. Where applicable, submit separate data for each pump.

#### 5.3 DESCRIPTIVE LITERATURE

- A. Dimensions
- B. Materials of construction (including required coatings)
- C. Performance data
  - 1. Size of pump
  - 2. GPM
  - 3. TDH
  - 4. BHP
  - 5. Overall pump efficiency (inlet through discharge head)
  - 6. RPM
  - 7. Performance curves showing overall pump efficiencies
  - 8. NPSH curve (if applicable)
  - 9. Shutoff head
  - 10. Weight of pump
  - 11. Head
  - 12. Rated HP of motor
  - 13. Weight of motor

#### **5.4 INSTALLATION INFORMATION**

Submit drawings and information necessary for final design of foundations, connecting piping and valves, pump drip and drainage piping, electrical connections, starting, speed regulating and protective equipment, and auxiliary equipment.

Submit drawings showing location, size and full details of foundation bolts for all components for all pumping units.

For all pumping units, a dimensioned and scaled assembly outline drawing or drawings of the complete pump, drive, and all associated equipment furnished shall be submitted for approval. Such drawing or drawings shall show plan, elevation, and any other views or sections requested.

For all pumping units, a scaled cross-sectional drawing of the assembled pump showing full details and materials of construction shall be submitted for approval.

The Contractor shall submit all other drawings, material lists and other information specified, requested and/or necessary to show complete compliance with all details of the contract documents.

#### **5.5 MAINTENANCE AND OPERATIONS MANUAL**

Manual shall contain all information necessary for proper operation and maintenance of pumping units, as well as the location of the nearest permanent service headquarters. Three (3) bound copies of the pump station operation and maintenance manual shall be provided.

#### **6.0 TIME OF DELIVERY**

Since time is of the essence on all work under this contract, manufacturers or suppliers are hereby notified that they will be required through the Contractor to state and guarantee a firm delivery date for all equipment specified under this section which they offer to furnish.

#### **7.0 MANUFACTURER'S REPRESENTATIVE**

For all pumping units the Contractor shall furnish the services of accredited representatives of the pump manufacturer who shall supervise the installation, adjustment, and testing of each pumping unit and give instructions to operating personnel. Pumping equipment shall be tested for performance according to curves and other approved data as soon as practical after installation. Failure of the equipment to perform as curves indicate and with other approved data shall be sufficient cause for rejection. As one condition necessary to acceptance of any pumping unit, the Contractor shall submit a certificate from the

manufacturer, stating that the installation of the pumping unit is satisfactory, that the unit is ready for operation, and that the operating personnel have been suitably instructed in the operation, lubrication, and care of the unit.

## **8.0 IDENTIFICATION - NAMEPLATE**

Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, and principal rating data. Provide an extra nameplate or label with nameplate information for each pump and install the extra label in the pump control panel.

## **9.0 TOOLS AND ACCESSORIES**

The Contractor shall furnish with each type, kind, or size of pumping unit, two sets of any special suitable marked high grade tools, gauges and fixtures which may be needed to adjust, operate, maintain, or repair the equipment. Such tools and appliances shall be furnished in neat special steel cases fitted with locks and keys, and delivered to the Engineer prior to the initial operation of the equipment.

## **10.0 GUARANTEE PERIOD**

After successful completion of tests and trials under operating conditions on all equipment, the Contractor shall guarantee all equipment and materials from undue wear and tear, from mechanical and electrical defects, and from any failure whatever except those resulting from proven carelessness or deliberate actions of the Owner, for a minimum of one year. This one-year minimum shall not replace a standard manufacturer's guarantee if it exceeds one year.

## **11.0 PUMP WARRANTY**

The Contractor guarantees and warrants that during the first year of operation, the pumps will operate satisfactorily and continuously according to the pump schedule specified herein, and that after due notice has been given by the Owner, he or the pump manufacturer will proceed, within a reasonable time, to adjust, regulate, repair and renew at his own expense such part or parts, equipment, auxiliaries, appurtenances or perform such work as is necessary to maintain the guaranteed capacities, efficiencies and performances.

## **12.0 EQUIPMENT**

### **12.1 BOOSTER PUMPS**

12.1.1 General: The booster pumps shall meet the hydraulic and driver data as set forth in the specification section titled, "Operating Conditions".

1. A data sheet covering each pump completely filled in.

2. Performance Curve showing expected performance at points other than the design conditions. Curve shall show head, capacity, efficiency and horsepower based on performance and shall cover the complete operating range of the pump from zero capacity to the maximum capacity. The curve is to also include a net positive suction head required curve.
3. Drawings of the proposed equipment giving general dimensions sufficient to determine how the equipment is to be supported and if it will fit within the space available.

## 12.2 PUMP STATIONS

### 12.2.1 KY 472 Pump Station

Operating Conditions. The pump station shall be capable of delivering the fluid medium at the following capacities and heads.

|                      |                      |
|----------------------|----------------------|
| Minimum              | 50 gpm @ 120' TDH    |
| Design               | 350 gpm @ 90' TDH    |
| Maximum              | 470 gpm @ 55' TDH    |
| Efficiency at Design | 78.02%               |
| Horsepower           | 15.0                 |
| Electric             | 3 phase 230/460 volt |
| Speed                | 3530 rpm             |

NPSH requirements shall not exceed 10 feet at Design GPM.

Pumps for KY 472 Pump Station shall be **Grundfos Frame Mounted End Suction Pump Series LF 25707** or approved equal.

### 12.2.2 Frame Mounted End Suction Pumps

- A. Furnish and install frame mounted end suction pumps as per plans and pump schedule.
- B. The pump, electric motor, base frame, coupling, and coupling guard shall be factory assembled at the pump manufacturer's facility. The pump manufacturer shall have complete unit responsibility.

### 12.2.3 Pumps

- A. The pumps shall be flexible coupled, frame mounted, single stage, end suction top discharge design, cast iron stainless steel fitted construction specifically designed for high performance.
- B. The pumps shall have the following features:
  - 1) All pumps shall be of the back pull-out design so that the rotating element can be removed from the casing without disconnecting the suction or discharge piping. The casing material shall be close-grained cast iron ASTM A48 – Class 30 with a minimum tensile strength of 30,000 psi. Volute shall have integrally cast suction and discharge connections, gauge ports at nozzles, and vent and drain ports. Pumps with specific speed greater than 1600 shall have double volute casing. Pumps with discharge size 3" and larger shall have suction splitter to reduce pre-rotation and improve efficiency. Casings shall be designed for scheduled working pressure and can withstand hydrostatic test at 150% of the maximum working pressure under which the pump could operate at design speed.
  - 2) Pumps with impeller diameter larger than 5" shall be fitted with bronze renewable case wear rings.
  - 3) Pumps with discharge size 2.5" and larger shall have full flanged connections on both suction and discharge. Suction and discharge flanges shall be drilled to ANSI Class 125# standards and be machined flat face.
  - 4) Pumps with discharge sizes 2" and below shall have NPT threaded connection.
  - 5) Pump shall be mounted on a heavy-duty cast-in-one-piece cast iron bearing frame with integrally cast feet to mount on a common base frame.
  - 6) The bearing frame shall be of the back pull-out design and supply support for heavy-duty single row, double shield, deep groove greased for life ball bearings. The pump shaft shall be adequately supported by the pump bearings to limit the shaft deflection to 0.002 inches. Bearing shall provide a minimum L10 life of 20,000 hours.
  - 7) The pump shaft shall be of solid, stress-proof steel AISI 1144 with Bronze sleeves covering the wetted area of the shaft.
  - 8) The pump manufacturer shall recommend the proper mechanical seal based on the pressure, temperature, and liquid outlined on the equipment schedule. Mechanical seals, at a minimum, shall have ceramic stationary seats, carbon rotating rings, buna elastomers, and stainless steel hardware. Application of a mechanical seal shall be internally flushed type, without requiring external flushing lines. Seals shall be capable of being inspected and easily replaced without removing the piping or volute.

- 9) Impeller shall be of the enclosed francis vane type, single suction design, made of Stainless Steel 304 (UNS S30400), both hydraulically and dynamically balanced to ISO 1940-1:2003 balance grade G6.3 and keyed to the shaft. The impeller shall be trimmed to meet the specific hydraulic requirements.
- 10) Pump Construction. The standard material of construction for the pump shall be as below. Special material shall be available as option to suit the liquid pumped.
- Volute: Cast Iron ASTM A48 – Class 30
  - Case Wear ring: Tin Bronze ASTM B584-90500
  - Impeller: Stainless Steel 304 (UNS S30400)
  - Shaft: Stressproof Steel AISI 1144
  - Shaft Sleeve: Bronze III923 C89835
  - Mechanical Seals: Carbon – Ceramic with Buna Elastomers and Stainless Steel hardware
  - Bearings: Greased for life Heavy duty Single row Ball bearing
  - Bearing Frame: Cast iron ASTM A48 – Class 30
- C. A flexible coupling shall be employed between the pump and motor. A coupling capable of absorbing torsional vibration and of operating in variable speed applications shall be provided upon requirement. An optional Spacer Coupler shall be available in order to allow for replacement of mechanical seals and bearings without disturbing pump volute or movement of the pump's motor and electrical connections.
- D. The pump manufacturer shall provide an OSHA approved coupling guard, which shall be mounted between the pump and motor.
- E. Base frame shall be cast iron or welded structural steel with securely welded cross members and integral drip pan. The minimum base plate stiffness shall conform to ANSI/HI 1.3-2000, section 1.3.5.3 for *Horizontal Base Plate Design* standards. Bases shall be groutable.
- F. Pump rotation shall be clockwise as viewed from the motor end.
- G. Pump shall be of a maintainable design for ease of maintenance and should use machine fit parts that are easily disassembled.
- H. Each pump shall be painted with one coat of high quality factory approved paint and name-plated before shipment from the factory.
- I. Where noted on schedule the pump shall also be NSF-50 or NSF-61 certified.
- J. Pumps shall be manufactured and assembled in an ISO-9001 certified facility.

#### 12.2.4 Motors

- A. Motors shall meet scheduled horsepower, speed, voltage, and enclosure design. Pump and motors shall be factory aligned, and shall be realigned after installation by the manufacturer's representative.
- B. Motors shall be suitably sized per ISO5199 and shall meet NEMA specifications and conform to the standards outlined in EISA 2007.

#### 12.2.5 Installation

The pump shall be installed per manufacturer's recommendations. The pumps shall be realigned by the Contractor, according to the standards of the Hydraulic Institute, after grouting of the base and connection of piping.

#### 12.2.6 Testing

Where noted on schedule, pumping equipment may require one or more of the following:

- Certified Performance test
- Hydro static test
- NPSH Test
- Any other factory test as noted in the pump Schedule

The testing shall be in accordance with Hydraulic Institute level B or the latest HI standard as noted in the pump schedule.

#### 12.2.7 Warranty

The warranty period shall be a non-prorated period of 12 months from date of installation, not to exceed 18 months from date of manufacture. Warranty shall cover against defective material and/or faulty workmanship.

### 12.3 CONTROL SYSTEM

Refer to Section 16900 for control panel requirements. Refer to the Drawings and Division 16 for electrical, control, instrumentation, and telemetry requirements.

### 12.4 PUMP PRESSURE GAUGES

Each pump shall be provided with pressure gauges according to the schedule. All pressure gauges within the booster pumping station shall have 4-1/2" minimum diameter faces. The case shall be black, cast aluminum, flanged back type with close type ring and clear glass face. The gauge connections shall be

at the bottom of the gauge and will be 1/4" N.P.T. The gauge internal construction shall include phosphor bronze bourdon tube with a brass movement, bronze bushed independently mounted. Pressure gauge range and scale graduations shall be in feet of water and psi as follows:

INLET PRESSURE - 0 to 200 psi, 10 psi figure intervals,  
with graduating marks every 2 psi.

OUTLET PRESSURE - 0 to 300 psi, 20 psi figure intervals,  
with graduating marks every 5 psi.

## 12.5 BOOSTER PUMP CONTROL VALVE

Full Port, Double Chamber, Hydraulically Operated Valve:

Valve(s) shall be a hydraulically operated globe / angle valve. The inner valve assembly shall be guided in two locations by means bearing bushings. The inner valve assembly shall be the only moving part and shall be securely mounted on a AISI 316 Stainless Steel stem. Lower grades of Stainless Steel stems will not be acceptable. The two operating chambers shall be separated from each other by the diaphragm and from the flowing media by an adapter plate.

All pressure containing components shall be constructed of ASTM A536-65 / 45 / 12 Ductile iron. The flanges shall be designed to ANSI Class 150 or Class 300 standards. Flange drilling to ANSI shall be standard; however, ISO and other drillings shall be available upon request. Valve(s) shall have a protective fusion bonded epoxy coating internally and externally. The protective fusion bonded epoxy coating shall conform to the ANSI / AWWA C116 / A21.16 (current version) specification.

Valve(s) 8 in / 200 mm and smaller shall provide smooth, frictionless motion with actuation being achieved by the use of a flat style EPDM / Buna-N diaphragm. They shall be constructed of nylon fabric bonded with synthetic rubber. The diaphragms shall not be used as a seating surface. Valve(s) 10 in / 250 mm and larger shall provide smooth, frictionless motion and maximum low flow stability with actuation being achieved by the use of rolling diaphragm technology. The diaphragms shall be fully supported through their full stroke and not be used as a seating surface.

The valve cover shall have a separate stem cap giving access to the stem for alignment check, spring installation and ease of assembly. On valve(s) 3 in / 80 mm and larger, bonnets shall be accurately located to bodies utilizing locating pins. Locating pins shall eliminate corrosion resulting from the use of uncoated ductile iron to ductile iron surfaces. Valves with lipped spigot covers shall not be acceptable due to risk of rust and difficulty in assembly.



Valve(s) 3 in / 80 mm to 8 in / 200 mm shall have the AISI 316 Stainless Steel seat with integral bottom guide, bolted in place, utilizing Spiralock thread tapping technology. The AISI 316 Stainless Steel seat ring shall be easily replaceable without special tools. Valves 10 in / 250 mm and larger shall incorporate a two piece seat and bottom guide design.

The valve(s) shall form a drip-tight seal between the stationary stainless steel seat ring and the resilient disc, which has a rectangular cross-section and is retained by clamping on three and one half sides. The resilient disc shall be constructed of Buna-N or EPDM for normal service conditions. All external fasteners shall be AISI 18-8 Stainless Steel with AISI 18-8 Stainless Steel washers. Mild steel studs or bolts will not be acceptable.

All repairs and maintenance shall be possible without removing the valve from the line. To facilitate easy removal and replacement of the inner valve assembly and to reduce unnecessary wear on the guide, the stem shall be vertical when the valve is mounted in a horizontal line. Each valve shall be air tested prior to shipment. The standard test shall include leakage test, seat leakage test, and stroke test. The valve manufacturer needs to preset the pilot where the set-point is provided..

The valve(s) shall be covered by a minimum three year (3) warranty against defects in materials and workmanship. The stainless steel seat ring shall be covered by a lifetime replacement warranty. The optional Internal Drop Check feature shall provide rapid, positive shut-off to prevent reverse flow, independently of the stem position or the pilot operation. When this option is included in a 106-PT valve, the model name becomes 106-PTC.

The valve shall be a Singer Valve model 106-BPC / 206-BPC or approved equal, ANSI Class 150 (ANSI 300, ANSI flange drilled to ISO PN 10 / 16/ 25 or 40) pressure rating / flange standard, globe (angle), style valve. Solenoid valve shall be four-way de-energized to close valve, with a 120VAC / 60Hz (220 VAC / 50 Hz or 240 VAC/ 60 Hz) solenoid coil. Assembly shall be according to Schematic A-0426H.

The Booster Pump control valve will eliminate surges associated with the normal stopping and starting of booster pumps. On pump start-up, a pilot solenoid is energized to begin opening the valve, at a rate governed by the opening speed control. Separate flow control valves and a double chamber design will allow opening and closing speeds to be adjusted independently. When the solenoid is de-energized, the valve slowly closes while the pump continues to run. When the valve is almost fully closed and flow is virtually zero, a stem-mounted cam triggers the limit switch to stop the pump. In the event of power failure while the pump is running, or other sudden stoppage of the pump, an internal drop check valve will prevent reverse flow back through the valve or pump.

## 12.6 SUCTION DIFFUSER

One (1) basket strainer, aka suction diffuser, shall be a part of the station assembly. Strainer shall be Mueller Model 166-DI, or equal.

## 12.7 ELECTROMAGNETIC FLOW METER

The meter shall be equal in all respects to the Badger Model M-2000.

### 12.7.1 Operating Conditions

#### A. System Components

##### 1. Metering Tube (Detector)

- a. Consists of stainless steel tube lined with a non-conductive material. Energized detector coils around tube create a magnetic field across the diameter of the pipe. As a conductive fluid flows through the magnetic field, a voltage is induced across two electrodes; this voltage is proportional to the average flow velocity of the fluid.

##### 2. Signal Amplifier

- a. Consists of unit which receives, amplifies, and processes the detector's analog signal. Signal is converted to both analog and digital signals that are used to display rate of flow and totalization. Processor controls zero-flow stability, analog and frequency outputs, serial communications and a variety of other parameters. Integrated LCD display indicates rate of flow, forward and reverse totalizers and diagnostic messages. Display guides user through programmable routines.

#### B. Operational Requirements

##### 1. Electromagnetic Flow Meter

- a. The flow meter system shall operate with a pulsed DC excitation frequency, and shall produce a signal output that is directly proportional and linear with the volumetric flow rate of the liquid flowing through the metering tube. The metering system shall include a metering sensor tube (detector), a signal amplifier, and the necessary connecting wiring. The metering system shall have the ability to incorporate a meter mounted or remote mounted amplifier. A manufacturer-furnished calibration certificate traceable to NIST is required.
- b. Engineering Units:
  - 1) The signal amplifier shall be program selectable to display the following units of measure: U.S. gallons,

imperial gallons, million gallons (U.S.), cubic feet, cubic meters, liters, hector-liters, oil barrels, pounds, ounces or acre feet.

c. Operating Principle: Electromagnetic Induction

d. Metering Tube (Detector)

- 1) The metering tube (detector) shall be constructed of 316 stainless steel, and rated for a maximum allowable non-shock pressure and temperature for steel pipe flanges, according to ANSI B16.5.
- 2) The metering tube (detector) shall be available in line size from ¼" [6 mm] to 54" [1400 mm].
- 3) The metering tube (detector) end connections shall be carbon steel or 316 stainless steel flanged, according to ANSI B16, Class 150 and AWWA Class B standards.
- 4) The insulating liner material of the metering tube (detector) shall be made of a hard rubber elastomer and NSF-listed for meter sizes 4" and above, in conformance with manufacturer's recommendation for the intended service or an NSF-listed meter option with PTFE liner.
- 5) The metering tube (detector) shall include two self-cleaning measuring electrodes. The electrode material shall be corrosion resistant and available in Alloy C or 316 stainless steel.
- 6) The metering tube (detector) shall include a third "empty pipe detection" electrode located in the upper portion of the inside diameter of the flow tube in order to detect an empty pipe condition when the flow tube is running partially empty. Empty pipe detection that is not activated until the pipe is 50% empty is not acceptable.
- 7) The metering tube (detector) housing shall be constructed of carbon steel, welded at all joints, and rated to meet NEMA 6P (for the Master meter vault installation) or 4X (for the pump station installation) ratings.
- 8) The amplifier shall be factory-mounted on the flow tube for the pump stations, and remote mounted at the Master Meter station.

- 9) When installed in non-metallic or internally lined piping, the metering tube (detector) shall be provided with a pair of corrosion resistant grounding rings. The grounding ring material shall be 316 stainless steel.
- 10) Fluid Temperature Range
  - i. For remote amplifier applications, the fluid temperature range shall be 32°F to 178°F [0°C to 80°C] at a maximum ambient temperature of 122°F [50°C] for the hard rubber liner material.
  - ii. For meter-mounted amplifier applications, the fluid temperature range shall be 32°F to 178°F [0°C to 80°C] at a maximum ambient temperature of 122°F [50°C] for the hard rubber liner material.
- e. Signal Amplifier
  - 1) The signal amplifier shall be microprocessor based, and shall energize the detector coils with a digitally controlled pulsed DC. The excitation frequency shall be program selectable for the following: 1Hz, 3.75Hz, 7.5Hz, or 15Hz. (factory optimized to pipe size and application)
  - 2) The signal amplifier electrical power requirement shall be 85-265VAC, 45-65Hz. The power consumption shall not exceed 15W.
  - 3) The signal amplifier shall have an ambient temperature rating of -4°F to 140°F [-20°C to 60°C].
  - 4) The signal amplifier shall include non-volatile memory capable of storing all programmable data and accumulated totalizer values in the event of a power interruption.
  - 5) Automatic zero stability, low flow cut-off, empty pipe detection and bi-directional flow measurement shall be inherent capabilities of the signal amplifier.
  - 6) All signal amplifier outputs shall be galvanically isolated to 250 volts.
  - 7) The signal amplifier shall be constructed of cast aluminum (powder-coated paint) and shall meet NEMA 4X/6P (IP66/IP67) ratings.
  - 8) Outputs:
 

The signal amplifier shall provide a total of four digital outputs, one analog output and one digital input.

    - i. Up to four open collector digital outputs, program selectable from the following: Forward pulse, reverse pulse, AMR pulse, flow set point, empty

- pipe alarm, flow direction, reset output, error alarm and 24V supply.
  - ii. Up to two active digital (24 Volt) outputs, program selectable from the following: Forward pulse, reverse pulse, AMR pulse, flow set point, empty pipe alarm, flow direction, preset output, error alarm and 24V supply.
  - iii. Up to two AC solid-state relay outputs, program selectable from the following: Frequency output, flow set point, empty pipe alarm, flow direction, preset amount and error alarm.
  - iv. One digital input, program selectable from the following: Remote reset, batch reset and positive return to zero.
  - v. Advanced protocol support using Modbus/RTU.
  - vi. One analog output programmable and scalable from the following: 0-10mA, 0-20mA, 2-10mA or 4-20mA. Voltage sourced and isolated. Max. loop resistance = 800 ohms.
- f. Control and Programming
  - 1) The signal amplifier shall be programmed via three function buttons. The programming functions shall be available in a user-friendly, menu driven software through the four-line LCD interface. The signal amplifier shall accommodate the following languages: English, German, Czech, French or Spanish.
  - 2) Programmable parameters of the amplifier include, but are not limited to: calibration factors, totalizer resets, unit of measure, analog and pulse output scaling, flow-alarm functions, language selection, low-flow cutoff, noise dampening factor and excitation frequency selection.
  - 3) The signal amplifier shall have a programming option allowing entry of a selected numeric password value for tamper protection.
- g. System Performance
  - 1) The metering system shall operate over a flow range of 0.10 to 39.4 ft/s [0.03 to 12.0 m/s].
  - 2) The metering system shall perform to an accuracy  $\pm$  0.25 percent of rate for velocities greater than 1.64 ft/s [0.50 m/s],  $\pm$  0.004 ft/s [ $\pm$  1 mm/s] for velocities less than 1.64 ft/s [0.50 m/s].

- 3) The metering system shall be capable of measuring the volumetric flow rate of liquids having an electrical conductivity as low as 5.0 micromhos per centimeter.
  - 4) The system measuring repeatability shall be <0.10% of full scale.
- h. Indication
- 1) The signal amplifier shall include a four-line, 20-character, backlit LCD interface to display the following values:
    - i. Flow rate in selectable rate units
    - ii. Forward totalizer in selectable volume units
    - iii. Reverse totalizer in selectable volume units
    - iv. Net totalizer in selectable volume units
    - v. Error or alarm messages
    - vi. Software revision level

Meter to be installed per manufactures recommendation.

### **13.0 ACCEPTANCE**

Any defects in the equipment or failure to meet the guaranteed requirements of these specifications shall be promptly corrected by the Contractor by replacement or otherwise. The decision of the Engineer as to whether or not the Contractor has fulfilled his obligation shall be final and binding on all parties.

### **14.0 PAYMENT**

Payment for KY 472 Pump Station and all new work on Sheet 12 of the Drawings except those items specifically noted to be paid under separate Bid Item(s) shall be provided at the Lump Sum Bid Price. Item shall include all equipment, materials, installation, testing, documentation, instruction and incidental work required to produce a complete and functional station.

**END OF SECTION 11210**

## SECTION 11900

### INTEGRATION OF TELEMETRY CONTROLS

#### 1.0 GENERAL

This specification section is to clarify the Contractor's responsibility regarding the telemetry controls.

#### 2.0 INTEGRATION OF TELEMETRY CONTROLS

This bid item stipulates an established cost of \$20,000 for the purchase of a Telemetry (SCADA/RTU) Panel and shall be included in the Total Base Bid. The Owner shall obtain cost quotations for the equipment and deliver the quotations to the Contractor for the purchase of the Telemetry Panel. The Contractor shall be responsible for installing the panel and all related field wiring as indicated in the plans and specifications. A contract cost adjustment will be made by Change Order to reflect the actual equipment cost. The following list of equipment will be provided by the telemetry equipment manufacturer. All other equipment required for a complete and operable telemetry system shall be provided by the contractor.

Equipment provided by telemetry manufacturer:

| <u>Quantity</u> | <u>Item</u>                               |
|-----------------|-------------------------------------------|
| 1               | Complete Telemetry Panel                  |
| 1               | Antenna with mounting U-bolts             |
| 1               | Coaxial cable with Connectors as needed   |
| 1               | 20' tower, air terminal, and safety cable |

Telemetry manufacturer shall cover freight cost to jobsite. Manufacturer will make a single trip to provide startup services. A two week notice and full payment (less retainage) will be required prior to arranging startup services. Verification of installation shall be confirmed by the Contractor prior to startup.

#### 3.0 PUMP STATION START-UP

The Owner and the telemetry provider will be present during pump station start-up to coordinate the telemetry equipment operation with the operational elements of the pump station.

**END OF SECTION 11900**





## **DIVISION 15: MECHANICAL**



## **SECTION 15100**

### **WATER LINES**

#### **1.0 GENERAL**

The Contractor shall furnish all labor, materials and equipment to install the water lines as shown on the plans and as specified herein.

The water lines may either be pressure-rated plastic pipe (PVC), municipal plastic pipe (MPVC), ductile iron (DI), or polyethylene (PE), all as specified hereinafter. The bid documents and plans shall show the amounts of each type and class of pipe to be provided by the Contractor.

The Owner will obtain all rights-of-way for operations through private property. It will also secure building permits and the permits for all pipe laid in highway rights-of-way. Any charges for inspections or other fees required will be the responsibility of the Contractor since the amounts of these are dependent upon the operation of the Contractor.

##### **1.1 DEPARTMENT OF TRANSPORTATION BONDING**

The Kentucky Department of Transportation will require that the Owner post a bond for all work accomplished on their right-of-way. Each contract on which work is to be performed will be a separate application and will require a separate bond. Each permit will have conditions attached and these conditions will vary depending on the area where work is to be performed. In areas where traffic control may pose a problem, working hours may be limited. A copy of the encroachment permit will be provided to the Contractor. The Contractor will be responsible for knowledge of the permit's content and conditions in order that the construction may be accomplished in accordance with the specified requirements.

Should any additional bonds or requirements be imposed by the Kentucky Department of Transportation, the Owner shall also be responsible for the bonding of the additional requirements.

#### **2.0 PIPE AND FITTINGS**

##### **2.1 POLYVINYL CHLORIDE RIGID PIPE AND FITTINGS**

This specification covers rigid, pressure-rated, polyvinyl chloride pipe and fittings, hereinafter called PVC pipe and PVC fittings, for sizes 1/2 inch through 12-inch. Pipe shall be as manufactured by North American, Diamond, J-M or approved equal.

**2.1.1 PVC Pipe.** PVC pipe shall be extruded from Type 1, Grade 1, polyvinyl chloride material with a hydrostatic design stress of 2,000 psi for water at 73.4°F, designated as PVC 1120, meeting ASTM Specifications D-1784 for material and D- 2241 for pipe, latest revisions. Pipe shall also meet all applicable provisions of the Product Standards and shall bear the National Sanitation Foundation (NSF) seal of approval in compliance with NSF Standard No. 14. PVC pipe having a maximum hydrostatic working pressure of 160 psi (SDR26), 200 psi (SDR21), 250 psi (SDR17), or 315 psi (SDR13.5) shall be used as shown in the Bid Documents and Plans.

Samples of pipe and physical and chemical data sheets shall be submitted to the Engineer for review and determination of compliance with these specifications before pipe is delivered to job. The pipe shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other defects.

The workmanship, pipe dimensions and tolerances, outside diameters, wall thickness, eccentricity, sustained pressures (ASTM D-1598), burst pressures (ASTM D-1599), flattening, extrusion quality (ASTM D-2152), marking and all other requirements of the Product Standard PS 22-70 shall be with in all respects. No pipe, 2 inches in diameter or larger, with a wall thickness less than 0.090 inches may be used.

Pipe shall be furnished in 20 feet or 40 feet lengths. The pipe shall be bell on one end. Male ends of pipe must be beveled on the outside. Pipe shall have a ring painted around the male end or ends in such a manner as to allow field checking of setting depth of pipe in the socket. This requirement is made to assist construction superintendents and inspectors in visual inspection of pipe installation.

Pipe must be delivered to job site by means which will adequately support it, and not subject it to undue stresses. In particular, the load shall be so supported that the bottom rows of pipe are not damaged by crushing. Pipe shall be unloaded carefully and strung or stored as close to the final point of placement as is practical. Pipe must not be exposed to the direct rays of the sun for an extended period. If pipe is not to be installed shortly after delivery to the job site, it must be stored in a shaded location and strung as needed.

**2.1.2 PVC Pipe Jointing.** Pipe shall be joined with slip-type joints with rubber gaskets. Pipes with bells shall have all parts of the bell, including the gasket groove, made from the same extruded piece, integral with the pipe, and shall be thickened to meet standard dimension ratios of wall thickness to outside diameter. This manufacturing procedure shall be the normal practice of the pipe manufacturer and proven by past performance of pipe in service. The gasket groove shall be constructed such that gasket rollout will not occur. Rubber gasketing shall conform to ASTM 3139.

The pipe manufacturer shall have an experienced representative on the job for a minimum of one day at the commencement of joining and laying operations. Joint lubricant shall be of a type recommended by the manufacturer for their pipe subject to the Engineer's approval. Lubricant shall be water soluble, non-toxic and have no objectionable properties.

**2.1.3 PVC Couplings.** Where PVC couplings are used, they shall be of the same material as the pipe and may be of the molded, or extruded type. PVC couplings shall have a minimum rating of 200 psi for continuous operation at 73.4°F.

**2.1.4 Fittings** Ductile iron mechanical restrained joint type fittings with appropriate adaptors as manufactured by Romac or approved equal, shall be used with PVC pipe. All such fittings shall be approved by the pipe manufacturer, and complete data sent to the Engineer, including the manufacturer's approval, for review. Fittings shall comply with AWWA C-110 or C-153 and shall be manufactured for the size and pressure class of the line on which they are used. Use of transition gaskets will not be allowed unless specifically approved by the pipe manufacturer. Coatings and lining shall be in accordance with 2.3.7.F of this section of the Specifications.

**2.1.5 Service Connections.** All service connections on PVC lines shall be made by means of tees, factory tapped couplings, or bronze service clamps manufactured specifically for use with PVC pipe as manufactured by Ford or approved equal. Whenever possible, corporation stops shall be installed in plastic lines before conducting hydrostatic tests.

## **2.2 MUNICIPAL POLYVINYL CHLORIDE (MPVC) PRESSURE PIPE**

This specification covers the requirements for AWWA approved Polyvinyl Chloride Pressure Pipe for water supply and distribution systems.

**2.2.1 MPVC Pipe.** MPVC pipe shall meet the requirements of AWWA C900, latest revision, "Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4" through 12" for water" and shall be furnished in cast-iron pipe equivalent outside diameters with rubber-gasketed separate couplings. Pipe shall be as manufactured by Certainteed or approved equal.

MPVC pipe and couplings shall be made from Class 12454-A or Class 12454-B virgin compounds as defined in ASTM D-1784. The standard code designation shall be PVC 1120. The PVC compounds shall be tested and certified as suitable for potable water products by the NSF Testing Laboratory and shall carry the NSF approval marking.

Solvent-cement couplings or joints shall not be used. PVC joints using elastomeric gaskets shall be tested as assembled joints and shall meet the laboratory performance requirements specified in ASTM D-3139.

Pipe and couplings shall be pressure Class 100, DR 25 (Dimension Ratio), pressure Class 150, DR 18, or pressure Class 200, DR 14 as shown on the plans or the bid form.

Pipe and couplings shall be marked as follows:

- a. Nominal size and OD base.
- b. Material code designation (PVC 1120).
- c. Dimension ratio number.
- d. AWWA pressure class.
- e. AWWA designation number (AWWA C900).
- f. Manufacturers name or trademark and production record code.
- g. Seal of the NSF Laboratory.

Pipe and couplings shall meet or exceed the following test requirements:

| <u>Sustained Pressure</u> | - | <u>ASTM D-1598 (1000 Hrs.)</u> |
|---------------------------|---|--------------------------------|
| <u>DR</u>                 |   | <u>Sustained Pressure</u>      |
| 14                        |   | 650 psi                        |
| 18                        |   | 500                            |
| 25                        |   | 350                            |

| <u>Burst Pressure</u> | - | <u>ASTM D-1599 (60-70 seconds)</u> |
|-----------------------|---|------------------------------------|
| <u>DR</u>             |   | <u>Minimum Burst Pressure</u>      |
| 14                    |   | 985                                |
| 18                    |   | 755                                |
| 25                    |   | 535                                |

Hydrostatic Integrity - Each standard and random length of pipe shall be proof-tested at four times its rated class pressure for a minimum of 5 seconds. Bells or couplings shall be tested with pipe.

Flattening - The pipe shall not split, crack, or break when tested by the parallel-plato method as specified by ASTM D- 2241.

Extrusion quality - The pipe shall not flake or disintegrate when tested by the acetone-immersion method as specified in ASTM D-2241.

Standard length - Pipe shall be furnished in standard laying lengths of 20 ft.  $\pm$  1 in. A maximum of 15 percent of each pipe size may be furnished in random lengths of not less than 10 ft. each.

**2.2.2 MPVC Pipe Jointing.** Pipe shall be joined with slip-type joints with rubber gaskets. Manufacturing and installation procedures shall be as recommended by

the manufacturer and as described for PVC pipe in Section 2.1.2 of this specification.

**2.2.3 Fittings.** Fittings for municipal PVC shall be ductile iron only. Fittings shall be restrained mechanical joint. Fittings shall be manufactured for the size and pressure class of the line on which they are used and shall comply with AWWA C-110 or C-153. Coatings and lining shall be in accordance with subsection 2.3.7.F of this section of the Specifications. Fittings shall be as manufactured by Tyler, Clow, U.S. Pipe, Union Foundry or approved equal.

**2.2.4 Service Connections.** Service connections shall be made by means of bronze service clamps manufactured specifically for use with municipal PVC pipe. Clamps shall be Mueller Catalog No. H-161 or approved equal.

**2.2.5 Underground Marking for PVC Pipe.** Underground marking for PVC pipe shall be one of the following types. The type required for this project is specified in the notes on the Drawings.

**2.2.5.1 Underground Marking Wire.** At all locations where PVC pipe is utilized, a detectable underground marking wire shall be placed in the trench as shown on the miscellaneous drawings. The wire used shall be No. 12 insulated copper wire. Copper split bolt screw connectors shall be used for splice connections, see miscellaneous drawings. Extreme care shall be exercised in connecting and taping splices and joints to assure continuity. At each valve box the wire shall be looped to the surface extending 12-inches above the concrete valve box pad (see Std. Dwg. for valve). When the entire project or pipeline segment is complete, including meter installation and leak repairs, the locating wire system shall be checked for continuity.

**2.2.5.2 Underground Marking Tape.** At all locations where PVC pipe is utilized, a detectable underground marking tape shall be placed in the trench approximately twelve inches below the finished grade. The tape used shall be mylar encased aluminum foil with the printing "CAUTION - Buried Water Line Below". Printing shall be readable through the clear mylar and surface printing is not acceptable. Tape size shall be 2 inch width as provided by Lifeguard, Inc. or approved equal. Color of the tape shall be blue.

## **2.3 DUCTILE IRON PIPE**

These specifications cover ductile iron pipe (3-inch diameter and greater) to be used in water transmission systems with mechanical joints, rubber ring slip type joints or flanged joints.

**2.3.1 General.** Ductile iron pipe shall be designed in accordance with AWWA H3 (ASA A21.50) and for pressures and conditions as stated in these

specifications or called for on the plans. Ductile iron pipe shall conform to AWWA C-151 (ASA A21.51.).

2.3.2 Minimum Nominal Thickness. The specified thickness will be determined for the given internal and external loading requirements in accordance with ASA A21.50. The class of pipe, wall thickness, and coatings required will be shown on the plans or the bid form for all ductile iron pipe installation.

2.3.3 River Crossing Pipe. River crossing pipe shall be ductile iron, Flex-Lok as manufactured by the American Cast Iron Pipe company or equal conforming to the appropriate requirements of ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.5 with a thickness class of 54.

2.3.4 Lengths. Pipe may be furnished in 12, 16, 16 1/2, 18 or 20 feet nominal laying lengths.

2.3.5 Tests. Hydrostatic and acceptance tests shall be in accordance with AWWA Specification C-106 for "Cast Iron Pipe Centrifugally Cast In Metal Molds" or C-108 for sand molds. The Engineer shall be provided with five (5) copies of each of the following tests for each contract involved:

- a. Talbot strip test.
- b. Ring and full-length bursting tests.
- c. Chemical analysis of pipe.
- d. Certification that pipe was hydrostatically tested.

Any pipe not meeting the AWWA Specifications quoted above shall be rejected in accordance with the procedure outlined in the particular specifications.

2.3.6 Marking. The net weight, class or nominal thickness and sampling period shall be marked on each pipe.

2.3.7 Pipe Joints for Ductile Iron Pipe. Pipe joints shall be mechanical joint, rubber ring slip joint, flanged, or locked mechanical joint as shown on the plans.

A. Mechanical Joint

Mechanical joints are to be furnished according to AWWA Specifications C-111. All pipe joints must be furnished complete with all accessories. Mechanical joint bolts and nuts shall be of alloy cast iron or alloy steel (Corten type such as U.S. Alloy) or approved equal. Rubber gaskets shall be made of plain first grade rubber, free of imperfections and porosity. Hardness shall be 70 to 75 durometers.



B. Rubber Ring Slip Joint

Rubber ring slip joint shall be equal to AWWA C-111-64 or latest revision. The joints shall be of the following materials:

- a. Rubber ring gasket compressed in groove in bell of pipe.
- b. Beveled spigot end of pipe for initial centering into rubber gasket in bell.

C. Locked Mechanical Joint

Locked mechanical joints shall be equal to Clow Corporation's "Locked Mechanical Joint".

D. Ductile Iron Flanged Pipe and Special Coupling

a. Flanged Pipe. All ductile iron flanged pipe shall have flanges faced and drilled, 125 pound in accordance with ASA A21.10 (AWWA C-110) unless otherwise specified on the Drawings. Flanges may be cast integrally with the pipe or they may be screwed on specially designed long hub flanges, refaced across both face of flange and end of pipe. Flanged pipe shall be in accordance with ASA A21.6 (AWWA C-106) Specifications, latest revision, and be the class called for on the plans or bid forms. Where plain ends of flanged and plain end pipe fit into mechanical joint bells, centrifugally cast pipe shall be used. Flanged pipe for water service shall be cement lined and bituminous coated the same as written herein for bell-joint pipe.

b. Special Coupling. Flexible couplings for flanged pipe shall be a mechanical joint cast to a special flanged joint using a neoprene O-ring in place of the usual 1/16-inch rubber ring gasket. The mechanical bell and special flanged joint piece shall be of high-grade gray cast iron (ASTM A48-56, AWWA C-100-54T) with bolt circle, bolt size and spacing according to ASA Specifications. Mechanical joint follower flange shall be of ductile iron ASTM A399 or malleable iron ASTM A47, Grade 35018 or 32510, latest revision with high strength/weight ratio design.

Bolts shall be fine grained high tensile malleable iron with malleable iron hexagon nut. Stainless steel nuts shall be used in vaults and wet wells. Where pressures may exceed 20 pounds, anchor studs shall be included with spigots of pipes connected drilled to receive ends of studs.

E. All items used for jointing pipe shall be furnished with the pipe and tested before shipment. The joints shall be made with tools and lubricant in strict conformity with the manufacturer's instructions. Three (3) copies of such instruction shall be delivered to the Engineer at start of construction.

F. Coatings and Lining. All buried ductile iron pipe shall have manufacturer's outside coal tar or asphaltic base coating and a cement lining and bituminous seal coat on the inside. Cement mortar lining and a bituminous seal coat inside shall conform to ANSI A21.4 (AWWA C-104) latest revision.

All pipe and fittings housed and in vaults shall be lined and coated on the inside as specified herein for buried ductile iron pipe and fittings, but shall be left uncoated on the outside so that it may be painted without the use of tar stop.

G. Fittings for Ductile Iron Pipe. Ductile iron mechanical, rubber ring slip and flanged joints shall conform to ASA Specifications A21.10 (AWWA C-110) for centrifugally cast iron water pipe. Mechanical joints shall also conform in all respects to ASA 21.11 (AWWA C-111). All fittings shall be manufactured for the size and pressure class of the pipeline in which they are to be used. Mechanical joint type fittings with appropriate adaptors as manufactured by Megalug or approved equal, shall be used. All fittings shall be furnished complete with all joint accessories. All ductile iron pipe fittings for water, sewer, air, gas and force main service shall be bituminous coated outside and lined on the inside same as the line on which they are installed.

H. Underground Marking Tape. At all locations where Ductile Iron pipe is utilized, a detectable underground marking tape shall be placed in the trench approximately twelve inches below the finished grade. The tape used shall be mylar encased aluminum foil with the printing "CAUTION - Buried Water Line Below". Printing shall be readable through the clear mylar and surface printing is not acceptable. Tape size shall be 2-inch width as provided by Lifeguard, Inc. or approved equal. Color of the tape shall be blue.

## 2.4 POLYETHYLENE PIPE

This pipe is used primarily for stream crossings and other special applications in locations indicated on the Drawings. The required pressure class shall be as shown on the Drawings.

The pipe shall be PE 4710 high density, high molecular weight polyethylene pipe equal to DRISCOPLEX 4000/4100 Series as manufactured by Performance Pipe, Inc. The pipe shall meet or exceed the following specifications:

- a. ASTM 3350 having a cell classification of PE445574C
- b. ASTM F714 - Dimensions and Workmanship
- c. AWWA C901 - Potable Water Pipe
- d. ASTM D1248 - Type III, Class C, Category 5, Grade P34
- e. ASTM D3261 - Fittings Standard
- f. NSF - Listed, Standard #14

The pipe shall be joined by the butt fusion technique utilizing controlled temperatures and pressures to produce a fused, leak-free joint that has equal or greater strength than the pipe itself in both tension and hydrostatic loading. The joining system shall be equal to Phillips butt fusion joint system.

Transitions to the continuing pipeline shall be made with the appropriate fittings to maintain the integrity of the piping system as recommended by the pipe manufacturer.

Drawings showing details of the installation shall be submitted to the Engineer for approval prior to installation.

### **3.0 HAULING AND STORAGE**

The Contractor shall notify the Engineer when pipe will be received on the job so that proper arrangements may be made for inspecting the unloading and stringing, as well as inspecting and examining the pipe materials.

All pipe shall be covered with tarpaulin during hauling from the manufacturer to the job site. It is acceptable for the front end only to be covered. The intent is to prevent diesel exhaust residue from coating the pipe and/or contaminating the gaskets.

The Contractor will be required to deliver all equipment and other materials and place same as and where required for installation. Care must be exercised in the handling of all materials and equipment and the Contractor will be held responsible for all breakage or damage to same caused by his workmen, agents, or appliances for handling or moving. Pipes and other castings shall in no case be thrown or dropped from cars, trucks, or wagons to the ground, but same shall be lowered gently and not allowed to roll against or strike other castings and unyielding objects violently. Pipe and other castings may be distributed at places that will not interfere with other building operations and unloaded, or yarded and distributed as required, as the Contractor may elect.

Valves, castings, fabricated metal, reinforcing steel, etc. shall be yarded or housed in some convenient location by the Contractor and delivered on the ground as required. All equipment and materials subject to damage from the weather, dampness, changes in temperature, or exposure shall be protected by a dry, weatherproof enclosure until ready for installation or use. The cost of all hauling, handling, and storage shall be included in the prices bid for equipment and materials in place. The Owner takes no risk or responsibility for fire, flood, theft, or damage until after the final acceptance of the work.

#### **4.0 LINES AND GRADES**

The Contractor will be required to accomplish any detailed layout, including that required for establishing the grade of the pipeline.

#### **5.0 TRENCH EXCAVATION**

##### **5.1 GENERAL**

This section describes the acceptable methods of trenching for the installation of pressure pipe and casing pipe in an open trench.

Trenching may be accomplished by means of a backhoe, trenching machine or by hand depending on the construction area.

At the Contractor's option, trenching, by a trenching machine or by backhoe is acceptable except as noted below:

Where the pipeline is being constructed close to other utilities, structures, building, or large trees, and it is reasonable to anticipate possible damage from the use of a backhoe, then trenching shall be made by hand methods.

The Contractor shall include in his unit price bid, all trenching necessary for installation of all pipelines as planned and specified. Trenching shall include all clearing and grubbing, including all weeds, briars, small trees, stumps, etc. encountered in the trenching. The Contractor shall dispose of any such material by burning, burial, or hauling away (or as noted on the drawings), at no extra cost to the Owner. It shall be the Contractor's responsibility to notify the appropriate State and local Air Pollution Control agencies when he conducts open burning of refuse. Ornamental shrubs shall be removed, protected, and replanted. Trenching also includes such items as minor street, road, sidewalk, pipe and small creek crossings; cutting, moving or repairing damage to fences, poles, or gates and other surface structures regardless of whether shown on the plans.

The Contractor shall protect existing facilities against danger or damage while pipeline is being constructed and backfilled, or from damage due to settlement of this backfill. In case of damage to any existing structures, repair and restoration

shall be made at once and backfill shall not be replaced until this is done. In all cases, restoration and repair shall be such that the damaged structures will be in as good condition and serve its purpose as completely as before and such restoration and repair shall be done without extra cost to the Owner. The use of trench-digging machinery will be permitted except where its operations will cause damage to trees, buildings or existing structures above or below the ground. At such locations hand methods shall be employed to avoid such damage. All excavated material shall be piled in a manner that will not endanger the work and will avoid obstructing sidewalks and driveways. Gutters shall be kept clear or other satisfactory provisions made for street drainage.

All excavation shall be open trenches, except where the drawings call for tunneling, boring, or jacking under structures, railroads, sidewalks and roads. The construction procedure for these types of excavation is described elsewhere in these specifications.

All trench excavation shall be termed unclassified and costs shall be included in the unit price bid for the pipe.

## 5.2 CLEARING

The Contractor shall accomplish all clearing and/or grubbing as required for the construction under this contract. Clearing and grubbing shall include the cutting and removal of trees, stumps, brush, roots, logs, fences and other loose or projecting material and natural obstructions which, in the opinion of the Engineer, must be removed to properly prosecute the construction and operate the facilities upon completion of construction. Trees, unless designated otherwise on the plans, shall remain and be properly protected. Ornamental shrubs, plantings, fences, walls, etc. shall be removed and replanted or replaced or protected from the construction activity. Clearing and/or grubbing shall be incidental to the various bid items and no additional compensation will be paid for same.

## 5.3 TRENCH DEPTH

Trenches shall be excavated to the line and grade required for the installation of pipe at the elevations indicated on the plans. The minimum depth of cover shall be 30 inches above the top of the pipe, unless shown otherwise on the plans or on the Standard Details. When the pipe is laying in or on solid rock, the minimum depth of cover shall also be 30 inches above the top of the pipe. No additional compensation will be made for extra depth where required by the plans or due to Contractor error. Excavation, except as required for exploration, shall not begin until the proposed work has been staked out. Materials which are not required for backfill and site grading shall be removed and disposed of as directed by the Engineer. Hauling, bedding, and backfilling shall be considered incidental to the various bid items and will not be paid for directly. Excavation shall be of sufficient depth to allow the piping to be laid on the standard pipe bedding in accordance

with the Section 6 of this section. The trenches shall be excavated to a minimum of six (6) inches below the bottom of the pipe barrel in rock. In all cases where lines are under traffic a minimum cover of forty-two (42") inches shall be provided. Should it be necessary to avoid existing utilities, culverts, outlets, or other structures, the water line shall be carried deeper at no additional expense to the Owner.

Where the plans call for extra trench depth, this extra depth shall be provided at no extra cost.

#### 5.4 TRENCH WIDTH

Trench widths shall exceed the minimum width that will provide free working space on each side of the pipe and to permit proper backfilling around the pipe as shown in the accompanying table and unless specifically authorized by the Engineer, shall not be excavated to wider than two (2) feet plus the nominal diameter of the pipe at the top of the trench. Before laying the pipe, the trench shall be opened far enough ahead to reveal any obstruction that may necessitate changing the line and grade of the pipe. Should the Contractor fail to accomplish this, and changes are required, they shall be at his sole expense. In rock, all ledge rocks, boulders and large stones shall be removed to provide six (6) inches of clearance on each side and below all pipe and fittings.

##### MINIMUM TRENCH WIDTH

| <u>Size</u>   | <u>Width</u> | <u>Size</u> | <u>Width</u> |
|---------------|--------------|-------------|--------------|
| Up to 4" Pipe | 2'-0"        | 15" Pipe    | 2'-8"        |
| 6" Pipe       | 2'-0"        | 16" Pipe    | 2'-8"        |
| 8" Pipe       | 2'-0"        | 18" Pipe    | 3'-0"        |
| 10" Pipe      | 2'-4"        | 20" Pipe    | 3'-2"        |
| 12" Pipe      | 2'-6"        | 21" Pipe    | 3'-4"        |
| 14" Pipe      | 2'-6"        | 24" Pipe    | 3'-8"        |

#### 5.5 SHORING, SHEETING AND BRACING OF EXCAVATION

Where unstable material is encountered, or where the depth of the excavation in earth exceeds five (5) feet, the sides of the trench or excavation shall be supported by substantial sheeting, bracing, or shoring. The design and installation of all sheeting, sheet piling, bracing or shoring shall be based on computations of pressure exerted by the materials to be retained under retaining conditions. Adequate and proper shoring of all excavations will be the entire responsibility of the Contractor. The Standards of the Federal Occupational Safety and Health Act and the Kentucky Department of Labor shall be followed.

The Engineer will not be responsible for determining requirements for bracing or sheeting.

#### 5.6 REMOVAL OF WATER

The Contractor shall provide for adequate removal of all water and the prevention of surface water from entering the excavation. The Contractor shall maintain dry conditions within the excavations until the backfill is placed. No additional compensation will be paid for replacement and/or stabilization of prepared excavations due to flooding and/or deterioration from extended exposure. All water pumped or drained from the excavation shall be disposed of in a suitable manner without damage to adjacent property or to other work under construction.

#### 5.7 PAVEMENT REMOVAL

Pavement removal shall be as indicated on the plans or directed by the Engineer. When so required, or when directed by the Engineer, only one-half (1/2) of the street crossings or road crossings shall be excavated before placing temporary bridges over the side excavated, for the convenience of the traveling public. All backfilled ditches shall be maintained in such a manner that they will offer no hazard to the passage of traffic. The convenience of the traveling public and the property Owners abutting the improvements shall be taken into consideration. All public or private drives shall be promptly backfilled or bridged at the direction of the Engineer. Pavement replacement shall be in accordance with Section 15102 of these specifications. Excavated materials shall be disposed of so as to cause the least interference and in every case the disposition of excavated materials shall be satisfactory to the Engineer.

#### 5.8 TRAFFIC MAINTENANCE

The Contractor must "red light" and guard all open trenches or obstructions placed on the streets or sidewalks. The lights must be burning from sunset to sunrise in order to effectually warn and safeguard the public against dangers connected with open trenches, excavations and other obstructions. The Contractor shall be held responsible for any damage that may occur to persons or property by reason of the failure of the Contractor to properly "red light" and guard all open trenches or obstructions along the routes of the water lines. This Contractor at his own expense shall also maintain warning signs, barricades and a watchmen or flagmen to control traffic at such times as his work would interfere with the flow of traffic. No excavation shall begin that may present a safety hazard unless the signs, barricades, lights, etc. are available to protect the open excavation at the conclusion of the day. The Contractor will comply with all Federal and State Occupational Safety and Health requirements for this type of construction. The Contractor shall also comply with all local and Kentucky Department of Highways requirements for signing and traffic control.

## 5.9 LINE LOCATION

The location of pipelines and their appurtenances as shown are those intended for the final construction. However, conditions may present themselves before construction on any line is started that would indicate desirable changes in location. In such cases, the Owner reserves the right to make reasonable changes in line and structure locations without extra cost, except as may be determined by extra units of materials and construction actually involved. The Owner is under no obligation to locate pipelines so they can be excavated by machine.

## 6.0 BEDDING OF PIPELINE

In all cases the foundation for pipe shall be prepared so that the entire load of the backfill on top of the pipe will be carried uniformly on the barrel of the pipe. The bells of the pipe shall not carry any of the load of the backfill. The Contractor should refer to the Standard Details for pipe bedding shown in the plans. The bedding specifications shall govern the backfill from the bottom of the trench up to the centerline or spring line of the pipe.

### 6.1 STABLE EARTH FOUNDATION

On all PVC pipelines, the trench bottoms shall be smooth and free of frozen material, clods of dirt and stones over 1/2" diameter. Bottom dirt left by trenching equipment will usually provide adequate material to level the trench bottom and provide bedding support for the pipe barrel. If the trench bottom is free of dirt, soft material may be shoveled off the side walls or shoveled under the pipe to insure proper pipe barrel bedding. In areas where the trench bottom is hard, a layer of soft backfill must be provided to ensure the pipe barrel is properly cushioned. See the plans for proper bedding material depth.

If the foundation is good firm earth the pipe may be laid directly on the undisturbed earth provided the pipe barrel is supported for its full length.

Bedding of No. 9 stone, fine gravel, sand or compacted finely graded select earth shall be used to correct irregularities in the subgrade. Where bell and spigot is involved, bell holes shall be excavated to prevent the bells from being supported on undisturbed earth.

As an alternative to the above method, excavation in earth may be undercut to a depth below the required invert elevation that will permit laying the pipe on a bed of granular material or finely graded select earth to provide continuous support for the pipe barrel. Bedding depth shall be as shown on the plans.



The bedding is not a separate pay item and shall be included as incidental expense in the unit price for the pipe bid per foot of pipe.

## **6.2    TRENCHES IN ROCK**

All installation in rock will utilize the undercutting method. Bedding will be with 6 inches crushed stone as shown in the Standard Details.

## **6.3    UNSTABLE TRENCHES**

If unstable material is encountered which may not provide a suitable foundation for the pipe, the unstable material will be removed and an adequate layer of encasement concrete or other special bedding shall be placed for the pipe foundation in accordance with the Standard Details in the plans. Such "special pipe foundation" shall only be installed if directed by the Engineer in writing or on the plans.

All ductile iron pipe shall be installed in accordance with Standard ANSI/AWWA C150/A21.50 Laying Condition Type 3 unless otherwise noted.

## **7.0    PIPE LAYING**

### **7.1    GENERAL**

Proper instruments, tools and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work. Each pipe manufacturer shall have an experienced representative on the job for at least one day at the commencement of jointing and laying operations.

Before any length of pipe is placed in the trench, a careful inspection shall be made of the interior of the pipe to see that no foreign material is in the pipe. In order to properly remove any foreign materials, a swab of necessary length is to be available at all times.

All pipe shall be lowered carefully into the trench, properly aligned and properly jointed by use of suitable tools and equipment, in such a manner as to prevent damage to water line materials and protective coatings and linings. Excessive scratching of the exterior surface of the pipe will be cause for rejection of the pipe.

Under no circumstances shall pipeline materials be dropped or dumped into the trench. The pipe and fittings shall also be inspected for the purpose of determining if they are sound and free from cracks. Laying of pipe shall be commenced immediately after excavation is started. Pipe shall be laid with bell ends facing in the direction of laying.

When pipe laying is not in progress, the open ends of pipe shall be closed by approved means to prevent entrance of trench water into the line. Whenever water is excluded from the interior of the pipe, adequate backfill shall be deposited on the pipe to prevent floating. Any pipe which has floated shall be removed from the trench and re-laid as directed by the Engineer. No pipe shall be laid in water or on frozen trench bottom, or whenever the trench conditions or the weather are unsuitable for such work.

If any defective pipe and fittings shall be discovered after the pipeline is laid, they shall be removed and replaced with a satisfactory pipe or fitting without additional charge to the Owner. Open ends of unfinished pipelines shall be securely plugged or closed at the end of each day's work or when the line is left temporarily at any other time.

## **7.2    LAYING DUCTILE IRON PIPE**

Ductile iron bolted joint, rubber ring slip joint, and ball and socket river crossing pipe shall first be thoroughly cleaned at joints, then joined according to instructions and with tools recommended by the manufacturer. Three (3) copies of instructions shall be furnished the Engineer and one (1) copy shall be available at all times at the site of the work. The lining inside ductile iron pipe must not be damaged by handling.

All pipes must be forced and held together, or "homed" at the joints, before sealing or bolting. Pipe must be aligned as each joint is placed, so as to present as nearly true, straight lines and grades as is practical, and all curves and changes in grades must be laid in such a manner that the manufacturer's recommended maximum deflection is not exceeded at any joint.

Cutting of pipe may be done by wheeled pipe cutters or saws, or by hammer and chisel, as the Contractor may elect, but the Contractor will be held responsible for breakage or damage caused by careless cutting or handling.

All ductile iron pipe shall be installed with Standard ANSI/AWWA C150/A21.50 Laying Condition Type 3 unless otherwise noted, six (6) inches crushed stone bedding shall be used in rock. Sufficient space (limited to 2 feet longitudinally) shall be left out of 4 or 6 inch cushion for tightening of bolts where bolted joints are used. No pipe shall be laid resting on rock, blocking, or other unyielding objects. Jointing before placing in trench, and subsequent lowering of more than one section jointed together may be allowed, subject to the Engineer's approval and direction.

When using pipe with push-on joints care must be exercised to make certain that the correct gasket is being used for the type of joint installed and that the gasket faces the proper direction. Before inserting the gasket, the groove and bell

socket should be carefully cleaned of all dirt. If sand or dirt is permitted to remain in the groove, leaks may occur. Lubricant must be applied to bell socket, gasket and plain-end of pipe as required by manufacturer. Plain-end must be beveled before joint is made. Deflection required at the joint shall be obtained after the joint is made.

Cut pieces of ductile iron pipe 18 inches or more in length, shall be used in fitting to special conditions, and valves and fitting changes in grade and alignment, provided cutting is even enough to make first class joints and no cracks are evident.

### 7.3 LAYING PLASTIC PIPE

The trench bottom must be smooth and uniform, and the alignment must conform to the plans. Bedding and cover as specified herein and shown in the Standard Details is required.

To make a clean and unobstructed joint, it is necessary to wipe the ring, groove and pipe spigot free from all foreign materials at the time of assembly (welded joints will be allowed only in special cases and will be required as shown on the plans). The ring must be positioned properly in the fitting to receive the pipe by a worker who is not in contact with the lubricant. In general, the lubricant is applied to the spigot (not the ring or groove). However, the manufacturer's instructions are to be followed in all cases. Only an approved lubricant may be used in accordance with the manufacturer's recommendations. All plastic pipe shall be joined by hand.

Where good bedding conditions are attained PVC pipe smaller than 4 inches may be assembled outside the trench in longer sections (as conditions allow) and then lowered into the trench. At any time when improper bedding is discovered or the pipe is severely deflected, the pipe will be removed from the trench and the condition corrected. Pipe in sizes 4 inch and above may be assembled outside the trench but must be lowered into the trench as each joint is assembled. Regardless of installation methods all couplings must be inspected after laying in trench for proper insertion and alignment. Field cuts and bevels will be allowed in accordance with the manufacturer's recommendations for these operations. A new reference mark shall be installed before joining any field cut pipe. The same requirements for clearance from rock or other objects, thrust blocking and deflections shall apply to PVC pipe as for other pipe materials.

Municipal PVC pipe of all sizes must be assembled in the trench in strict accordance with the manufacturer's requirements.

### 7.4 INSTALLATION OF RIVER CROSSING PIPE

The ball joint pipe shall be assembled and installed in accordance with manufacturer's recommendations. Installation shall be made at time of low flow, using cofferdams as necessary to divert stream flow. The ball joint pipe shall be laid and allowed to settle before joining to the pipe on each side of the stream. The ball and joint pipes shall be tested separately once in place to detect any leaks or bad joints. After connecting to the land pipe, it shall be tested the same as specified for the other water mains. See the Drawings for additional installation requirements.

## **8.0 BACKFILLING**

Backfilling must be started as soon as practicable after pipe has been laid and joints hardened sufficiently, and jointing and alignment approved. Spading of crushed rock, sand, or mechanical tamping of earth, around pipe (as specifically required) between joints shall be the usual procedure as the laying progresses. This is in order to avoid danger or misalignment from slides, flooding or other causes. The Engineer shall be given a minimum of 24 hours for inspection before backfilling. The backfill shall be crushed rock, sand, or finely divided earth free from debris, organic material and stones, placed simultaneously on both sides of pipe to the same level by hand.

In backfilling of the lower part of the trench beginning at the top of the bedding, the backfill material shall be carefully and solidly tamped by hand or approved mechanical methods in 6" layers around the pipe and up to a point 8 inches higher than the top of the pipe. For PVC only, the backfill shall be select material and may be walked-in. Walking or working on the completed pipeline, except as necessary in tamping or backfilling, shall not be permitted until the trench has been backfilled to a point one diameter higher than the top of the pipe. The filling of the trench and the tamping of the backfill shall be carried on simultaneously on both sides of the pipe in such a manner that the completed pipeline will not be disturbed and injurious side pressures do not occur.

After the above specified backfill is hand placed, rock may be used in the backfill in pieces no larger than 18 inches in any dimension and to an extent not greater than one-half (1/2) the backfill materials used. If additional earth is required, it must be obtained and placed by the Contractor. Filling with rock and earth shall proceed simultaneously, in order that all voids between rocks may be filled with earth. Above the hand placed backfill, machine backfilling may be employed without tamping, (if not contrary to specified conditions for the location) provided caution is used in quantity per dump and uniformity of level of backfilling. Backfill material must be uniformly ridged over trench and excess hauled away, with no excavated rock over 1-1/2 inch in diameter or pockets of crushed rock or gravel in top 6 inches of backfill. Ridged backfill shall be confined to the width of the trench and not allowed to overlap onto firm original earth and its height shall not be in excess of needs for replacement of settlement of backfill. All rock, including crushed rock or gravel from construction, must be removed from yards and

fields. Streets, roadways and walks shall be swept to remove all earth and loose rock immediately following backfilling.

In the case of street, highway, railroad, sidewalk and driveway crossings or within any roadway paving or about manholes, valve and meter boxes, the backfill must be machine tamped in not over 4-inch layers, measured loose in accordance with the standard details. Where backfill is under paved driveways, streets, highways, railroads, sidewalks, paved parking areas and other areas where settlement is not allowed, crushed stone or coarse sand backfill only shall be used up to the paving surface. Crushed stone shall be Kentucky Department of Highways Standard Specification No. 78 or finer. Coarse sand backfill shall be spread in layers not over 4 inches thick and thoroughly compacted. Sand may be moistened to aide compaction. Tunnels shall be backfilled in not over 3-inch layers, measured loose, with selected material suitable for mechanically tamping. If material suitable for tamping cannot be obtained, sand, gravel or crushed rock (No. 78) shall be blown, packed or sluiced to complete fill all void spaces.

Where local conditions permit, pavement shall not be placed until 30 days have passed since placing backfill. Crushed stone is specified for roads and parking areas and sidewalks or their bases, shall be placed and compacted to the top of trench. Backfills shall be maintained easily passable to traffic at original ground level, until acceptance of project or replacement of paving or sidewalks.

Where the final surfacing is to be crushed stone, compacted earth backfill may be used in the trench to within 6 inches of the top as shown in the Standard Details.

Railroad Company and Highway Department requirements regarding backfilling will take precedence over the above general specification where they are involved.

Excavated materials from trenches and tunnels in excess of quantity required for trench backfill shall be disposed as shown on the plans or as directed by the Engineer.

The Contractor shall protect all sewer, gas, electric, telephone, water and drainpipes or conduits, power and telephone poles and guy wires from danger of damage while pipelines are being constructed and backfilled, or from danger due to settlement of his backfill.

In case of damage to any such existing structures, repair and restoration shall be made at once and backfill shall not be replaced until this is done. In all cases, restoration and repair shall be such that the damaged structure will be in as good condition and serve its purpose as completely as before uncovering and such restoration and repair shall be done without extra charge.

No extra charge shall be made for backfilling of any kind, except as provided in the Bid. Backfilling shall be included as a part of the unit price bid for which it is subsidiary. No extra charge shall be made for supplying outside materials for backfill.

Before completion of contract, all backfills shall be reshaped, holes filled and surplus material hauled away, and all permanent walks, street, driveway and highway paving, and sod, replaced (if such surface replacement items are included in the contract) and reseeding performed.

The line Contractor shall be responsible for clean-up, grading, seeding, sodding or otherwise restoring all areas that he disturbs within the work limits of other Contractors on this project.

Any deficiency in the quantity of material for backfilling the trenches or for filling depressions caused by settlement, shall be supplied by the Contractor.

## **9.0 TIE-INS TO EXISTING PIPELINES**

This work shall consist of connecting new water pipes to the existing system where shown on the plans and shall include the necessary fittings, tapping sleeves, valves and necessary equipment and material required to complete the connection.

Knowledge of pipe sizes in the existing system may not be accurate, therefore, it is recommended that the Contractor check outside diameters of existing pipe and types of pipe prior to ordering the required accessories. No additional payment will be allowed for matching pipe and/or accessories when the proper size is not ordered.

Neither the Owner nor the Engineer can guarantee the location of the existing lines. The Contractor shall verify the location of all existing water mains and valves pertaining to the proposed improvements before excavation is started.

The necessary regulation or operation of the valves on existing mains, to allow for the connections being made, shall be supervised by the Engineer. Before shutting down an existing water main or branch main for a proposed connection, prior approval for a specific time and time interval shall be obtained from a representative of the Owner. At no time shall an existing main be shut down without the Owner's knowledge and permission.

Excavation to existing water mains shall be carefully made, care being exercised not to damage the pipe. The excavation shall not be of excessive size or depth beneath the pipe. The sides of the excavation shall be as nearly vertical as possible.

The Contractor shall be responsible for any damage to the existing system and any such damage shall be repaired to the satisfaction of the Engineer at the Contractor's expense.

The Contractor shall verify, by field inspection, the necessary sizes, lengths and the types of fittings needed for each interconnection. Typical connections are shown on the plans and any modifications or changes shall be subject to the approval of the Engineer. The exact length of the proposed water main needed for this work shall also be determined by field measurement as required.

The probing required to locate existing mains is not a separate pay item.

## **10.0 PIPE ENTERING STRUCTURES**

Ductile iron, steel or PVC pressure pipe, 4-inch diameter or larger, entering structure below original earth level, unsupported by original earth for a distance of more than six (6') feet, shall be supported by Class B concrete, where depth of such support does not exceed three (3') feet, and by Class B Concrete piers where depth exceeds three (3') feet in accordance with the Standard Details. All other pressure pipe entering buildings or basins below original earth level, which have more than 3 feet span between wall and original earth and having a cover of more than 24 inches of earth, or under roadway, shall be supported as shown on Standard Detail drawings, in order to prevent breakage from settlement of backfill about the structure. Concrete and reinforcing steel for such supports are to be included in the unit price of work to which it is subsidiary, and not as extra concrete, in order to discourage excessive excavation outside the limits of structures. Pipe entering structures shall have flexible joint within 16 inches of exterior of structure.

## **11.0 OWNERSHIP OF OLD MATERIALS**

Pipe - Unless otherwise indicated, all existing pipe that is to be abandoned that interferes with construction or is easily removed shall become the property of the Contractor. All pipe that is not easily removed or not required to be removed as a result of the new construction, shall be abandoned in place by this Contractor.

Pipeline Fittings and Appurtenances - All pipe line fittings, valves, hydrants and other like appurtenances that are removed as a result of new construction shall be removed by this Contractor but shall become the property of the Owner. All such fittings and appurtenances shall be delivered to a point by the Contractor. Said point shall be on the Owner's property and shall be designated by the Engineer.

Other Materials - All other materials or items that are to be removed, demolished, or abandoned as a part of this contract shall become the property of the Contractor and shall be disposed of by him.

## **12.0 THRUST BLOCKS AND ANCHORAGE**

Thrust blocks shall be installed whenever the pipeline changes direction, as at tees, bends, crosses, stops, as at a dead end; or at valves. The locations of thrust blocks depend on the direction of thrust and type of fitting. Their size and type depend on pressure, pipe size, kind of soil, and the type of fitting. Where thrusts act upward (as at vertical curves) the weight of the pipe, the water in the pipe and the weight of the soil over the pipe should be determined to make certain that the total weight is sufficient to resist upward movement. If there is not enough soil or if it will not compact over the pipe or it is too soft and mushy to resist movement, then ballast or concrete may be placed around the pipe in sufficient weight and volume to counteract the thrust. Where a fitting is used to make a vertical bend, the fitting may be anchored to a concrete thrust block designed to key in to undisturbed soil and to have enough weight to resist upward and outward thrust, since the new placed backfill may not have sufficient holding power.

Thrust blocks shall be constructed of not less than Class B concrete conforming to KTC Specification 601 and placed between the fitting and the trench wall. It is important to place the concrete so it extends to undisturbed (freshly cut) trench wall.

## **13.0 MAINTENANCE OF FLOW OF DRAINS AND SEWERS**

Adequate provision shall be made for the flow of sewers, drains and water courses encountered during construction. Any structures which are disturbed shall be satisfactorily restored by the Contractor.

## **14.0 INTERRUPTION OF UTILITY SERVICES**

No valve, switch or other control on any existing utility system shall be operated for any purpose by the Contractor without approval of the Engineer and the Utility. All consumers affected by such operations shall be notified by the Contractor as directed by the Engineer and utility before the operation and advised of the probable time when service will be restored.

## **15.0 FENCING**

Where water supply line is being constructed in fields where stock is being grazed, Contractor shall provide temporary fence as approved by the Engineer around open trenches to prevent stock from falling in trenches. Where trenching operations should isolate grazing stock from their source of water, Contractor will



either provide temporary bridging over trench or else provide water for such stock.

Where trench crosses near sound existing corner posts and existing fence is in good condition, fence may be taken loose, rolled back and stored until pipeline is completed at this point, then replaced by stretching tightly and thoroughly stapling. Additional posts will be provided, and additional new fence shall be provided when it is necessary to place the fence crossed by the water line in a condition equal to existing fence before water line was constructed.

Where it is necessary to cut existing fence, new end posts shall be installed on each side of the water line and the old fence thoroughly stapled to these new posts before cutting. After pipeline is completed at this point, a new fence of galvanized wire (No. 9 gauge with No. 11 filler wires) shall be stretched between these new end posts and thoroughly stapled to existing posts and any new intermediate posts necessary to provide a good fence. Replacement of fences shall be on a replacement in-kind basis and shall be considered incidental to laying of the lines and any additional cost shall be included in the unit price bid per lineal foot of pipe. Contractor shall notify property owner prior to cutting fence.

## **16.0 PROTECTION OF ADJACENT LANDSCAPE**

Reasonable care shall be taken during construction of the water lines to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

During construction, the Contractor may deflect horizontal alignment of the water line to avoid trees and to keep from damaging their roots. The Contractor shall be fully responsible for settling all claims by private property owners concerning damage to trees and shrubs.

## **17.0 COORDINATION WITH UTILITIES**

The Plans show the general location of existing utilities, such information having been determined from the utilities. However, such information shall be considered general and is not guaranteed by Owner, Engineer or the Utility.

Prior to construction, the Contractor shall arrange to meet with representatives of all utilities and provide them with his anticipated work schedule. The Contractor shall have the utilities make their best determination of utility locations in the areas in which he is working. Throughout the progress of the work, such field markings of utilities shall be kept current.

Repairs to any utilities damaged by the Contractor shall normally be performed by the utility at the Contractor's expense, unless the Contractor and the utility negotiate other understandings and/or procedures.

## **18.0 BLASTING AND ROCK EXCAVATION**

The Contractor shall make his own investigation as he deems necessary to ascertain the sub-surface conditions to be encountered in the work.

All blasting operations shall be conducted in accordance with municipal ordinances, state and federal laws and Section 9, Explosives, of the "Manual of Accident Prevention in Construction", published by the Associated General Contractors of America, Inc. Soil particle velocity shall not exceed limit set by Kentucky law. All explosives shall be stored in conformity with said ordinances, laws and safety regulations. No blasting shall be done within five feet of any water mains, sewer lines, natural or manufactured gas lines, liquid petroleum product lines or other utilities. Any damage done by blasting is the responsibility of the Contractor and shall be promptly and satisfactorily repaired by him.

The Contractor shall use delay caps or other approved methods to reduce earth vibrations and noise. Mud capping, as defined in the above manual, will not be permitted as a method of breaking boulders. No blasting shall be permitted on Sundays or after dark.

Prior to commencing with the work, the Contractor shall, during a preconstruction conference with the Owner and Engineer, state clearly his approach to performing the excavations on the project. He shall be familiar with the laws and ordinances covering blasting and shall also give consideration to the use of hydraulically operated rock breaking devices in lieu of blasting where considered necessary. If blasting is not handled in an expert manner at all times, the Engineer reserves the right to suspend blasting and require the work to proceed without it.

Prior to blasting, the Contractor shall make his own detailed pre-blast survey of adjacent walks, curbs, retaining walls, house foundations, etc. to determine conditions prior to the work. Such a file of information, including photographs, may be certified in such a manner as the Contractor believes necessary since this information that may stand in his defense.

## **19.0 MEASUREMENT AND PAYMENT**

Payment for supplying, transporting and storing pipe, trenching, standard bedding, pipe installation, fittings, thrust-blocking, pipe locating wire or tape, testing, backfilling, disinfection, seeding, crop damage, regular stream crossings, clean-up, tie-ins to other structures and other incidental items in this section shall

be made on the basis of the unit price per linear foot for the type and size of pipe installed. Payment will include all those items not specifically covered by another proposal. Pipe will be measured along the centerline of the pipe as installed with no deduction for valves and fittings. Clean-up is not a separate pay item.

**END OF SECTION 15100**



## SECTION 15101

### WATERLINE ACCESSORIES

#### 1.0 GENERAL

The Contractor is to supply and install all valves, hydrants, blow-offs and other equipment at the locations shown on the plans in complete accordance with these specifications.

#### 2.0 GATE VALVES

All gate valves shall be the resilient seat-type, iron body, non-rising stem, fully bronze mounted, and suitable for working water pressures of not less than 200 psi for installations on PVC pipe and not less than 250 psi for installations on DI pipe. Valves shall be of standard manufacture and of the highest quality both of materials and workmanship and shall conform to the latest revision of AWWA C-509 Standard. Valves shall be furnished with flanged connections for exposed piping and push-on or mechanical joint connections for buried service. Gate valves shall have a clear water way equal to the nominal diameter, and shall be opened by turning counter-clockwise. The operating nut or wheel shall have an arrow cast in the middle, indicating the direction of opening. Each valve shall have the maker's initials, pressure rating and the year in which manufactured, cast on the body. Prior to shipment from the factory each valve shall be tested by hydraulic pressure of at least 300 pounds per square inch. The valves shall be Mueller or Kennedy brand or approved equal.

Underground valves shall be nut operated, unless otherwise shown on the plans. Valve supplier shall furnish two standard stem iron wrenches for turning nut operated valves. All underground valves which have nuts deeper than thirty inches (30") below the top of valve box shall have extended stems with nuts located within two feet (2') of valve box cap. Buried service valves shall have either epoxy-coated or tar-coated exteriors.

The valve maker is to supply the Engineer, through the bidder, within one week after award is made, complete catalogs or other material giving complete details and dimensions of valves and accessories.

Gate valves installed in underground piping systems may be installed in the vertical position for sizes to 12-inch. Gate valves 14-inch and larger shall be installed in the horizontal position with bevel gear operators unless otherwise noted on the drawings. Gear operators shall be the totally enclosed type, oil filled and designed for buried and submerged service. Gear housing shall be ductile iron. Gears shall be steel. Pinion shafts shall be stainless steel. Shaft bearings shall be Teflon with "O"-Ring bearings.

### **3.0 FIRE HYDRANTS**

#### **3.1 WORK INCLUDED**

Under this Item, the Contractor shall provide all labor, tools, equipment and materials to furnish and install hydrants with gate valves as shown on the drawing and as directed by the Engineer.

#### **3.2 MATERIALS**

All fire hydrants shall have a six inch bell connection, shall have two hose outlets and one pumper connection, shall be designed for 250 pounds working pressure or 300 pounds hydrostatic pressure and shall conform to the latest specifications of the AWWA C502. All working parts shall be bronze. Both hose outlets shall be 2 1/2 inch with NST threads and the pumper outlet shall be 4 1/2 inch with NST thread. Hydrants shall be designed so that no water will be lost when they are broken off and so they can be repaired with a repair kit. Design, materials, and workmanship shall be similar and equal to the latest stock pattern ordinarily produced by the manufacturer. Length of barrel shall be such to provide a 3 1/2 foot bury depth. Working drawings and full description of hydrants shall be submitted to the Engineer before ordering. All hydrants shall have a 5 1/4 inch valve opening against pressure. The hydrants shall be Mueller or Kennedy brand or approved equal. All hydrant extensions will be the responsibility of the Contractor.

#### **3.3 PAINT**

Hydrants shall be painted one coat of red paint and two finish coats of approved paint of color directed by the Engineer. All hydrants are to receive the final coat of paint after field installation.

#### **3.4 INSTALLATION**

Hydrants shall be set at such elevations that the connecting pipe will have the same depth of cover as the distribution main. The back of the hydrant opposite the pipe connection shall be firmly wedged against one and one-half square feet or enough of the vertical face of the trench with concrete to prevent the hydrants from blowing off the line. In addition, all fittings, valves and hydrants shall be joined by the use of all-thread rods, nuts and "DUC-LUG" offsets as shown on the attached drawing to prevent movement of the hydrant. If the character of the soil is such, in the opinion of the Engineer, that the hydrant cannot be securely wedged, bridle rod collars shall be used which shall be not less than three-fourths inch stock and shall be protected by a coat of acid resistant paint.

Not less than seven cubic feet of No. 9 stone shall be placed around the base of the hydrant to insure drainage. Before the No. 9 stone is placed and before it is

backfilled the drain hole shall be inspected and thoroughly cleaned if necessary. The backfill around the hydrant shall be thoroughly compacted to the grade line in a manner satisfactory to the Engineer. Hydrants shall have the interior cleaned of all foreign matter before installation.

All hydrants will be installed with the pumper connection facing the main access road or as directed by the Engineer.

Stuffing boxes shall be tightened and the hydrants shall be inspected in open and closed position to see that all parts are in working condition.

## **4.0 AIR VALVES**

### **4.1 AIR RELEASE VALVES**

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. 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. The valve shall have a minimum orifice size of 3/32". Valves shall be suitable for a working water pressure of 250 PSIG. The air release valve shall be mounted on 3/4" bronze riser pipe. The riser pipe shall be connected to the water main by use of a service clamp and a corporation stop. The riser shall also have a 3/4" bronze ball valve with stainless steel handle and be suitable for a 250 PSIG working water pressure. Air release valves shall be as manufactured by DeZurik Models 65 or 50, or approved equal.

Air release valves will be installed in the same type of box used for meter installation. The box must allow for adequate cover over the pipe at installation.

In locations where the air release valve can not be placed directly above the water main, such as roadway drainage ditches, then a section of service tubing shall be used to locate the valve as directed by the Engineer. The service tubing shall be installed with a continuous upward slope to eliminate air pockets. Additional payment for the tubing shall be made based on the linear foot bid for service tubing. Tubing shall also be rodded through the box to support the valve. No additional payment will be made for the tubing supports.

## **5.0 VALVE BOXES**

All valves (gate, air release, check, etc.) installed underground shall be installed in an approved valve box. Each gate valve shall be installed in a vertical position with a valve box. Valve boxes shall be of a cast iron, two or three-piece, slip-type consisting of a base, a center section and a top section with a cover marked "water". Where valve box is constructed in a paved area the box shall be a screw type box. The entire assembly shall be adjustable for elevation

and shall be set vertically and be properly adjusted so that the cover will be in the same plane as the finished street surface (no more than 1/2" above ground in yards or pastures or 2" in unsodded areas). The assembly must provide for the required cover over the pipe at the installation site and shall rest on concrete pads as shown in the Standard Details. The Contractor shall furnish two valve wrenches for the project.

## **6.0 BLOW-OFF ASSEMBLY**

Blow-off assembly shall be installed in accordance with the details and the specifications at locations shown on the plans and in other locations as directed by the Engineer. The gate valve is included in the unit bid price for blow-off assembly. The Contractor should refer to the Standard Details for blow-off installation.

The blow-off pipe from the main to the flush valve shall be connected to the main by means of a tee. Do not use a corporation stop for this connection. The gate valve included in the blow-off connection shall be in accordance with Subsection 2.0 of this specification.

## **7.0 TAPPING SLEEVE AND VALVE**

Tapping sleeves shall be as manufactured by Mueller or approved equal, and shall be rated for a minimum working water pressure of 250 psi. Contractor shall ascertain the type and size of pipe to which the connection is to be made prior to selection. The valve shall be as specified under Section 2.0 of this specification.

## **8.0 TIE IN CONNECTIONS**

All tie-in connections shall include any fittings suitable to make the required connection. The fittings shall be mechanical joint, ductile iron type as specified in other sections.

## **9.0 END CAPS**

All end caps installed to deaden existing lines shall be installed in accordance with the details shown on the plans as appropriate.

## **11.0 MEASUREMENT AND PAYMENT**

Payment for all valves, tapping sleeve and valves, tie-in connections, and fire hydrants or blow-off assemblies will be made at their respective unit bid prices.

## **END OF SECTION 15101**



## **SECTION 15102**

### **SPECIAL ITEMS OF CONSTRUCTION**

#### **1.0 GENERAL**

These specifications govern special crossings, installations and construction procedures required to deal with unusual construction items or special requirements of governing agencies.

#### **2.0 STATE HIGHWAY CROSSINGS**

In all cases, these crossings will be made in compliance with the requirements of the State Highway Department. Such requirements will normally be described by the appropriate District Highway Office. In general, unless otherwise shown on the plans or directed otherwise by the Engineer, the crossing of all State Highways shall be accomplished by boring under the roadway. In addition, the crossing of service lines 1-1/2 inches and greater under rigid and flexible surfaced paved roads shall be accomplished by boring and jacking a casing pipe under said roadway. In certain cases, as shown on the plans, service lines of all sizes will require casing pipe installed with the crossing.

##### **2.1 OPEN TRENCH CROSSINGS**

The trench shall be excavated to a minimum width that will allow the pipe installation. The trench walls shall be kept as nearly vertical as possible. The minimum specified cover above the pipe shall be maintained. The Miscellaneous Detail Drawings show the requirements for open trench crossings.

The backfill in the trench under any roads, driveways, or parking areas where the open trench method is used shall be of the type shown in the Miscellaneous Details and shall be deposited and compacted in uniform layers not to exceed the depth shown in the Miscellaneous Details.

The surface of the road, driveway, or parking area shall be replaced with the same type of material as specified under pavement replacement.

##### **2.2 BORING AND JACKING**

The work is herein defined as the operations in which both the boring by auger and the jacking of the casing pipe are done mechanically and in which the diameter of the casing pipe is too small to permit hand working at the heading of the casing pipe. Two basic methods are; (1) pushing the casing pipe into the fill or earth simultaneously as the boring auger drills out the ground; and (2) drilling the hole through the fill or earth and pushing the casing or carrying pipe into the hole after the drill auger has completed the bore.

A suitable approach trench shall be opened adjacent to the slope of the embankment, or adjacent to point of bored and jacked section as shown on the plans. The approach trench shall be long enough to accommodate the selected working room. Guide timbers or rails for keeping the casing pipe on line and grade shall be accurately set and maintained in the bottom of the approach trench and with heavy timber back-stop supports installed at the rear of the approach trench to adequately take thrust of the jacks without any movement or distortion. It is paramount to the securing of acceptable tolerance limits of workmanship in the boring and jacking operation that extreme care be taken in the setting of all guides, rails and jacks to the end that the casing pipe in final position be within the limits of acceptability for the placing and laying of the carrier pipe. The minimum cover of forty-two inches (42") under the roadway must be maintained. Additional depth may be required as shown on the plans.

In general, the diameter, thickness, style, joints and materials selected for casing pipe shall be as shown on the plans and shall be considered as "minimum" requirements, all subject to prior approval of the Engineer. In all cases, the approval for construction by agreement with the private company and/or construction permit issued by the State, County, or Municipal agency will be required before construction starts.

Steel casing pipe for road and railroad crossings using the boring and jacking method shall be steel, plain end, uncoated and unwrapped, and shall be furnished in at least 18-foot lengths. Steel pipe shall meet the requirements of ASTM Specification A-120 and AWWA C200. Pipes up to and including 4 inches in diameter shall be Schedule 40. Pipe larger than 4 inches shall have a wall thickness equal to or greater than 0.312 inches under railroads and 0.250 for all other uses. The inside diameter of all casing pipes shall be a minimum of four (4") inches greater than the largest outside diameter of the carrier pipe, joint or coupling.

The steel casing pipe shall be bored and/or jacked in place at the locations as shown on the plans or as directed by the Engineer. All joints between lengths shall be solidly welded with a smooth non-obstructing joint inside. Any field welding shall be performed by a certified welder and shall be in accordance with AWWA C206. The casing pipe may be extended beyond the boring limits by open trenching as shown in the Standard Details. This would apply when the casing is required from right-of-way to right-of-way or ditch line to ditch line. Open trenching at jacked or bored locations will be allowed no closer than 3 feet from edge of pavement.

Positioning guides (insulators) shall be utilized on all carrier pipe which is within the casing pipe. Positioning shall be accomplished by the use of prebuilt spacers such as those manufactured by CALPICO or an approved equal. The Contractor shall submit the type of position guide proposed for use for the approval of the

Engineer. Spacing of the positioning guides shall be in accordance with the Standard Drawings.

The ends of the casing pipe shall be plugged and made watertight in a manner acceptable to the Engineer prior to backfilling. Casing seals as manufactured by Pipeline Seal & Insulator, Inc. (PSI), Advance Products & Systems, Inc. (APS) or equal shall be used.

Where road crossings are made using plastic pipe or copper, the location of joints under the roadway should be avoided by using lengths of adequate dimension for the crossing. This principle also applies to other types of pipe where sufficiently long lengths are available.

### **3.0 RAILROAD CROSSINGS**

At all railroad crossings, cover pipe (casing) for water lines (carrier pipe) shall be jacked or pushed beneath tracks and the carrier pipe jointed and pushed through the cover pipe. Detailed drawings of railroad crossings including the length of casing and depth below track are shown in the plans. Contractor shall obtain and pay for services of a representative of the railroad to direct the Contractor's operations while on the railroad property when required by the railroad.

### **4.0 STREAM CROSSINGS**

#### **4.1 NO-FLOW CONDITION**

Where required on the plans or instructed by the Engineer, the Contractor shall construct a special creek crossing as shown in the Miscellaneous Detail Drawings. Crossings shall be scheduled for construction in times of no flow or very low flow, if practicable, otherwise the stream shall be directional bored. Concrete shall not be placed under water and Contractor shall provide suitable pumps to keep water out of trench excavation during stream crossing construction. Special creek crossings shall be designated as Type A or Type B as contained in the Miscellaneous Detail Drawings.

#### **4.2 NORMAL EARTHEN STREAM CROSSING**

Where the stream crossing is made in earth or other beds which are stable (no casing or anchorage required), then the pipe will be laid in a narrow trench at the depth specified in the Miscellaneous Details to maintain the required cover between pipe and stream bed. Initial backfill will be mechanically compacted. Trench backfill in any stream crossing area from one foot (1') above the top of the pipe shall consist of trench excavated rock, if available. No extra payment will be made above normal construction for this type of creek crossing.

#### **4.3 BLUE LINE STREAM CROSSINGS**

All crossing of streams that appear as a blue line on a USGS 7.5 minute topographical map shall be accomplished in accordance with:

##### **GENERAL CERTIFICATION - NATIONWIDE PERMIT #58 UTILITY LINE ACTIVITIES FOR WATER AND OTHER SUBSTANCES**

This document is bound in back of the specifications. The Contractor shall read, understand, and comply with the requirements and procedures.

Stream size, for purposes of this specification, is differentiated as large or small. A stream is classified as small when the distance across the stream channel at top of banks is 15 L.F. or less. A stream is classified as large when this measurement is greater than 15 L.F.

It is the intent of the plans to identify a stream crossing at each blue line stream. Small stream crossings may frequently be accomplished by trenching when the stream is in a no-flow condition. If the stream is in a flow condition, irregardless of the size classification, the crossing shall be accomplished by directional boring or other method that complies with the General Certification and is approved by the Engineer. Specific details for stream crossings are contained in the Miscellaneous Detail Drawings.

See Section 15 for Basis of Payment.

#### **4.4 BYPASS TEST METER**

At locations as indicated on the Plans, where a new creek crossing is installed, a bypass test meter shall be installed. The meter shall be installed as a normal water meter with taps on each side of a valve, as shown in the Miscellaneous Detail Drawings.

#### **5.0 RIVER OR LAKE CROSSINGS**

Crossings in rivers or lakes where the pipe cannot be laid in a trench shall normally be made with ductile iron pipe having ball and socket joints or polyethylene pipe or directional bored as indicated on the Drawings. Details for any required installations of this type including pipe required; number, size and location of anchors; and, installation technique are shown in the plans and Miscellaneous Detail Drawings. See Section 15100 for installation requirements.

#### **6.0 BRIDGE CROSSINGS**

Wherever possible bridges will not be utilized for stream crossings. However, where it is necessary for the water line to be attached to bridges, the pipe shall be securely fastened to bridge stringers or beams using supports as

dimensioned and located in the plans. The carrier pipe shall be insulated with Vermiculite or other approved material to prevent freezing. Expansion joints to allow for movement of the bridge will be required as shown on the plans.

## **7.0 FREE BORE**

### **7.1 WORK INCLUDED**

Under this item, the Contractor shall provide all labor, tools, equipment and materials to install the free bore at all bituminous and concrete driveways and/or county road unless otherwise directed by the Engineer.

### **7.2 INSTALLATION**

The Contractor shall provide a jacking pit and bore through the earth at the proper line and grade. The augured hole shall be as small as practical to allow the carrier pipe to pass through.

This bid item does not apply to service tubing.

### **7.3 MEASUREMENT AND PAYMENT**

The unit price bid per linear foot for free boring, as measured from edge of pavement to edge of pavement, regardless of size of bore, shall constitute full compensation for the work specified.

## **8.0 WATER LINE AND SEWER LINE SEPARATION**

### **8.1 GENERAL**

Wherever sewer lines cross, or are adjacent to, each other, special precautions shall be taken.

### **8.2 PARALLEL WATER AND SEWER LINES**

Water lines must, if possible, be located a minimum lateral distance of 10 feet from any existing or future sewer lines measured from outside diameters. Where water lines and sewer lines must be placed in the same trench, the water line must be located on a shelf, 2 feet above and 2 feet to the side of the sewer line. Whenever this condition cannot be met, and upon direction from the Engineer, the water line shall be uncovered and encased with concrete per the standard encasement detail.

### **8.3 CROSSING WATER AND SEWER LINES**

Wherever sewer lines and water lines cross, it is desirable, if practical, that the sewer line be at least 24 inches below the water line.

Where it is not practical to provide such a separation, care shall be taken to ascertain that the existing water line or existing sewer line is in good sound condition and that no evidence of joint leakage is known in that vicinity. If any such evidence does exist, the existing line shall be exposed by the Contractor at least 10 feet each side of the new pipe crossing, carefully examined and any defects positively corrected. The Owner will arrange for examining and correcting any defects in the existing lines, but the Contractor shall cooperate in every way possible.

When the water line must be below or less than 2 feet above the sewer line, the Contractor shall encase the water line 5 feet in each direction from the crossing as directed by the Engineer. This encasement should only be accomplished when directed by the Engineer and shall be accomplished in accordance with the details shown on the drawings. The encasement is a separate pay item.

## **9.0 CLEANUP, SEEDING AND SODDING**

### **9.1 GENERAL**

Upon completion of the installation of the work, the Contractor shall remove all debris and surplus construction materials resulting from the work. The Contractor shall fine grade all the disturbed surfaces around the area of the work in a uniform and neat manner leaving the construction area in a condition as near as possible to the original ground line or to the lines as directed by the Engineer. The Contractor shall provide effective cleanup of the work as it progresses. Procrastination of cleanup will not be tolerated.

### **9.2 ROUGH GRADE WORK AND CLEANUP**

Rough Grade Work and Cleanup (Rough Cleanup) shall be defined to include the final backfill and windrowing of the ditch line, disposal of excess excavated material, level grading of the disturbed areas adjacent to the ditch line, filling and leveling street and driveway cuts, cleaning up and removal of rubbish, repair of fences and structures, and any other such work that may be required to result in a neat, orderly project area. Rough Cleanup shall be performed as other construction progresses and must be completed within one week of the adjacent pipeline construction.

Rough Cleanup is not a separate pay item. The cost for this work shall be included in the unit bid price for water lines. If Rough Cleanup is not performed

as specified, the Owner, after notification to the Contractor, will refuse payment for additional pipeline installation until the Rough Cleanup is accomplished.

### 9.3 FINAL CLEANUP

Final cleanup, grade work and seeding shall be performed on each line when backfilled trenches have had adequate time to settle, but at least within 30 days from the date each line is constructed. Final grade work and seeding on Kentucky Transportation Cabinet rights-of-way shall be done in accordance with said Cabinet's specifications and the permit granted to the Owner specifically for this project.

Where work was performed on private property in lawns, earth of good quality, free from rock shall be spread over the disturbed area and graded and compacted to match adjacent ground contours. The graded and seed bed area shall be prepared with a power landscape rake and further hand raked if necessary, until smooth and free from rock, potholes, and bumps. The disturbed area shall then be seeded with the seed variety used on the original lawn (e.g., a bluegrass lawn shall be reseeded with bluegrass seed). In the case of no preference by the Owner, the mixture of grasses shall consist of one-third (1/3) Rye grass, one-third (1/3) Kentucky Fescue and one-third (1/3) Kentucky Bluegrass by weight and shall be applied in accordance with the supplier's recommendations. The area shall be fertilized with 12-12-12 fertilizer applied at a rate of 6 pounds per 1,000 square feet of area. After the seed and fertilizer have been applied, the Contractor shall then lightly cover the seed by use of a drag or other approved device. The seeded area shall then be covered with clean straw to a depth of approximately one (1) inch.

Where work was performed on private property and not in lawns the trench line shall be graded and filled if necessary to match adjacent contours. All rock larger than 1-1/2" in diameter shall be removed from the disturbed area. In general, pasture and fallow land shall be fertilized and seeded with Kentucky 31 Fescue and plowed fields shall be left unseeded, however, the desire of each property owner shall govern regarding seeding. The entire pipeline length that is seeded shall be strawed.

In all cases on private property the rate of seed and fertilizer application shall be that recommended by the material supplier or the University of Kentucky Cooperative Extension Service for new plantings of the variety of grass seed used. If the trench line settles following final grade work or if grass seed fails to germinate within a reasonable time, the Contractor shall regrade or reseed the area in question as specified above and as directed by the Engineer.

Final cleanup will not constitute a separate pay item.

## **10.0 PAVEMENT AND OTHER STRUCTURE REPLACEMENT**

The Contractor shall replace all pavement cut or disturbed, with pavement similar in all respects to existing pavement in accordance with the Standard Details and at those locations approved by the Engineer. Every effort shall be made to avoid cutting the pavement. In restoring pavement, new pavement is required, except that granite paving blocks, sound brick or sound asphalt paving blocks may be reused. No permanent paving shall be placed within thirty (30) days after the backfilling has been completed. All concrete and asphalt paving materials shall be in conformance with the Miscellaneous Details shown in the plans. The pipeline trench through all paved areas (parking lots, driveways, roads, etc.) shall be fully backfilled with crushed stone.

### **10.1 CLASSIFICATIONS OF PAYMENTS**

- A. Concrete Pavement Replacement - This pavement replacement shall be Portland cement concrete construction in accordance with the requirements shown in the Standard Details. It shall include all pavement replacement on concrete surfaced roads, concrete driveways, concrete sidewalks and concrete parking areas, both public and private.
- B. Heavy-Duty Bituminous Pavement Replacement - This type of asphalt pavement replacement shall be bituminous concrete surface over concrete base in accordance with the details. This type of pavement replacement shall be used on all heavily trafficked roads having an existing pavement greater than 2", whether public or private, or in other locations as directed by the Engineer.
- C. Light-Duty Bituminous Pavement Replacement - This type of pavement replacement shall be bituminous concrete constructed in accordance with the details. This item shall include all light-duty bituminous concrete roadways, bituminous driveways and bituminous parking lots, both public and private.
- D. Crushed Stone Surface Replacement - This type of surface replacement shall include all graveled roadways, driveways, parking areas, or other gravel surfaced areas, both private and public. This type of surfacing may also be required as a base course for other pavement replacement.

### **10.2 MATERIALS**

The crushed stone backfill as noted on the drawings shall be dense graded aggregate per Kentucky Department of Highways Specifications or as noted on the Drawings. The Contractor shall continuously be responsible for the



maintenance of the aggregate and the surface of the trenches until the pavement replacement is completed.

Portland cement concrete for pavement replacement shall contain a minimum of 6 sacks of cement per cubic yard, the maximum free water content shall be 6 gallons per sack of cement, the slump shall be between 2 and 4 inches, and the concrete shall have minimum 28-day compression strength of at least 3,500 PSI. Cement, aggregate and water shall be described in these specifications for Class "A" concrete. A set of cylinders shall be made and tested for each 25 cubic yards of concrete placed, or fraction thereof, to supply representative sampling and testing of the concrete, upon the direction of the Engineer. The Contractor shall produce a broomed, or burlaped uniformly smooth and nonskid surface, consistent with the existing pavement.

Bituminous materials and mixes shall be consistent with the recommended practice of the asphalt institute and it shall conform to the requirements of the Kentucky Department of Highways for prime coat and Class 1 bituminous concrete. The bituminous concrete shall consist of a binder or base course and a surface course.

### 10.3 INSTALLATION OF PAVEMENT REPLACEMENT

The Contractor shall cut back the surfacing adjacent to the trench for 12 inches on both sides of the trench and shall cut down the dense graded aggregate he has placed to a depth required for either type of pavement replacement. The resulting surface shall be rolled to yield a smooth, dense surface and a uniform depth.

The concrete shall be placed in accordance with standard practice, with the welded wire mesh if required in proper position and thoroughly vibrated into place. The Contractor shall produce a surface consistent with the existing pavement. The Contractor shall apply a liquid curing component, sprayed on the surface of the concrete, and shall provide adequate protection to the pavement until it has set.

For bituminous concrete, the Contractor shall clean and broom the prepared surface, then apply the prime coat at the rate of 0.20 to 0.25 gallons per square yard, with a pressure distributor or approved pressure spray method. When the prime coat has become tacky but not dry and hard, the bituminous binder course, or base course, whichever applies, shall be placed and compacted. The Contractor shall then apply the surface course. It is recommended, but not required, that the base course remain in place for approximately one week before placing the surface course. The finished course shall be compacted and the completed surface shall match the grades and slopes of the adjacent existing surfacing and be free of offsets, depressions, raised places and all other irregular surfaces.

#### **10.4 SEASONAL AND WEATHER LIMITATIONS FOR PAVEMENT REPLACEMENT**

In the event the progress and scheduling of the work is such that the bituminous pavement replacement would occur in the winter months, during adverse cold weather and/or during such times the asphalt plants are not in operation, then the final pavement replacement shall be postponed until favorable weather occurs in the spring and the asphalt plants resume normal operations. No bituminous concrete shall be laid when the temperature is below 40°F except by written permission of the Engineer.

Concrete pavement shall not be placed when the temperature is such that the pavement placed will freeze before it has had adequate time to set and shall be placed in conformance with the temperature conditions approved by the Engineer.

The Contractor shall be responsible for replacement of pavement which he has placed which has been damaged by cold weather or freezing without additional compensation.

In the meantime, the Contractor will be required to maintain the temporary surfacing until the permanent pavement is placed. Such labor, materials and equipment as is required for temporary maintenance of the streets, roadways and driveways shall be provided at the Contractor's expense and is not a pay item. The Contractor will be required to use a cold mix asphaltic concrete as a temporary surface for trenches under heavy traffic use.

#### **10.5 GUARANTEE**

The one year guarantee as specified in the contract documents is also applicable to trench settlement and pavement replacement.

#### **11.0 SIDEWALK AND DRIVEWAY REPLACEMENT**

Sidewalks and driveways will be replaced if damaged by the Contractor in any way. Payment will be made for those pavements necessarily damaged by the line installation in accordance with the Standard Details. No pavements are to be replaced over a backfilled trench for at least 30 days after filling. Pavements damaged otherwise are to be replaced immediately at the Contractor's expense.

Materials and dimensions are to be at least equal to existing pavement and are to conform to the Standard Details.

## **12.0 PAYMENT FOR WATER**

All water used from the Utility shall be metered with meters supplied by the Contractor. The Contractor shall pay for such water monthly at the rates published by the water utility. Unmetered water lost through water line breakage shall also be paid at the rates published by the water utility. The quantity lost shall be computed on the basis of a discharge velocity of 7 feet/second, the diameter of the line, and the estimate duration of free uncontrolled discharge.

## **13.0 FINAL CLEAN-UP**

The Contractor shall provide effective cleanup of the work as it progresses. Procrastination of cleanup will not be tolerated. At the time of final inspection, no trenches shall show any undue evidence of the previous construction. All areas shall be left free of ruts due to construction equipment and shall have a clean and neat appearance without rubble or debris. The areas shall not be mounded up and shall be completely restored, and all yards and fields shall be reseeded so land may be cultivated, mowed, etc. Straw and fertilizer shall accompany the seeding. If necessary to hasten proper restoration of terraces, principally along ditch lines, the Contractor shall sod such areas at the Engineer's direction. For all line segments, final cleanup shall be performed within 30 days from day of installation.

## **14.0 PROTECTION OF ADJACENT LANDSCAPE**

Reasonable care shall be taken during construction of the water lines to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

In the course of construction, the Contractor may deflect horizontal alignment of the water line to avoid trees and to keep from damaging their roots. The Contractor shall be fully responsible for settling all claims by private property owners concerning damage to trees and shrubs.

## **15.0 PAYMENT**

Casing pipe will be paid according to the unit bid price for boring or open cutting, as appropriate. The price shall include, as necessary, the cost of the casing pipe, the cost of boring or cutting, and the cost of special requirements for the road or railroad crossing. Carrier pipe will be paid according to Section 15100.

The unit price bid per linear foot for free boring, as measured from edge of pavement to edge of pavement, regardless of size of bore, shall constitute full compensation for the work specified.

Payment for special creek crossings will be at the unit price bid per linear foot for that item and shall include encasement pipe, crushed stone, concrete, solid rock excavation and all other work necessary for a satisfactory installation. The carrier pipe installed in the casing shall be paid separately under the unit price bid for pipe installed.

Payment for Bypass Test Meter or Leak Detection Test Meter shall include a meter setting (5/8" x 3/4") and taps on both sides of a gate valve. The gate valve, sized for the line, is a separate pay item, covered in Section 15101.

Additional costs for normal earth creek crossings shall be included in the unit price bid for pipe installation and no special payment will be made for these crossings.

Payment for asphalt and concrete pavement replacement will not be based on the quantities purchased by the Contractor. Payment for surfacing will be paid on the basis of linear feet installed in accordance with the Standard Drawings with a maximum width of pipe diameter plus twenty-four inches (24"). Crushed stone sub-grade under paving shall be included in paving price and not paid for separately. Any additional cost estimated by the Contractor must be included in the cost of pipe in place.

Sidewalk/driveway crossings when included as a bid item shall include the extra cost of free-boring or the removal and disposal of existing pavement and replacement with new construction. Payment for pavement replacement will be on the basis of linear feet installed. Width for payment for a standard trench crossing is shown in the Standard Details. When sidewalk/driveway crossings or replacement are not included as a bid item, their costs shall be considered subsidiary to the bid for pipe installation.

Where required by the Special Provisions or the Bid Proposal, the cost of pavement replacement, boring, crossings of all types and other incidental construction shall be included in the unit price bid for pipe line installation and shall comprise total compensation for all such work.

All clean-up associated with installing water lines is incidental to the cost of installing the water lines. There is no separate pay item for clean-up.

## **END OF SECTION 15102**

## **SECTION 15103**

### **PRESSURE TESTING AND STERILIZATION**

#### **1.0 TESTING**

1.1 After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure test of at least 1.5 times the working pressure at the point of testing, but in no case less than that required by other Sections herein. In addition, a leakage test shall be conducted concurrently with the pressure test.

#### **1.2 PRESSURE TEST**

A. Test pressure shall:

1. Not be less than 1.25 times the working pressure at the highest point along the test section.
2. Not exceed pipe or thrust restraint design pressures at the lowest point along the test section.
3. Be of at least six (6) hour duration unless otherwise stipulated by Owner.
4. Not vary by more than plus or minus 5 psi.
5. Not exceed twice the rated pressure of the valves or hydrants when the pressure of the test section includes closed gate valves or hydrants.
6. Not exceed the rated pressure of resilient seat butterfly valves when used.

B. Each valved section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer.

C. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed, and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged, or left in place at the discretion of the Engineer.

- D. All exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damage or defective pipe, fittings, valves, hydrants or other appurtenances that are discovered during or following the pressure test shall be repaired or replaced with sound equipment and materials, and the test shall be repeated until all test results are satisfactory in the opinion of the Engineer.

### 1.3 LEAKAGE TESTING

- A. 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 pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.
- B. No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{ND\sqrt{P}}{133,200}$$

in which L is the allowable leakage, in gallons per hour; N is the length of pipeline tested in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.

1. Allowable leakage at various pressures is shown in Table K-1.
  2. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/hr/in of nominal valve size shall be allowed.
  3. When hydrants are in the test section, the test shall be made through the open isolation valve and against the closed hydrant valve.
- C. Acceptance shall be determined based on allowable leakage. If any test of pipe laid discloses leakage greater than that specified in Section 1.03.B the Contractor shall, at his own expense, locate and repair the defective material until the leakage is within the specified allowance.

All visible leaks are to be repaired regardless of the amount of leakage.

**Table K-1**  
**Allowable Leakage Per 1,000 Ft. Of Pipeline (GPH)**

| Avg.<br>Test<br>Pressure<br>(psi) | Nominal Pipe Diameter (Inches) |      |      |      |      |      |      |      |      |
|-----------------------------------|--------------------------------|------|------|------|------|------|------|------|------|
|                                   | 2                              | 3    | 4    | 6    | 8    | 10   | 12   | 14   | 16   |
| 450                               | 0.32                           | 0.48 | 0.64 | 0.95 | 1.27 | 1.59 | 1.91 | 2.23 | 2.55 |
| 400                               | 0.30                           | 0.45 | 0.60 | 0.90 | 1.20 | 1.50 | 1.80 | 2.10 | 2.40 |
| 350                               | 0.28                           | 0.42 | 0.56 | 0.84 | 1.12 | 1.40 | 1.69 | 1.97 | 2.25 |
| 300                               | 0.26                           | 0.39 | 0.52 | 0.78 | 1.04 | 1.30 | 1.56 | 1.82 | 2.08 |
| 275                               | 0.25                           | 0.37 | 0.50 | 0.75 | 1.00 | 1.24 | 1.49 | 1.74 | 1.99 |
| 250                               | 0.24                           | 0.36 | 0.47 | 0.71 | 0.95 | 1.19 | 1.42 | 1.66 | 1.90 |
| 225                               | 0.23                           | 0.34 | 0.45 | 0.68 | 0.90 | 1.13 | 1.35 | 1.58 | 1.80 |
| 200                               | 0.21                           | 0.32 | 0.43 | 0.64 | 0.85 | 1.06 | 1.28 | 1.48 | 1.70 |
| 175                               | 0.20                           | 0.30 | 0.40 | 0.59 | 0.80 | 0.99 | 1.19 | 1.39 | 1.59 |
| 150                               | 0.19                           | 0.28 | 0.37 | 0.55 | 0.74 | 0.92 | 1.10 | 1.29 | 1.47 |
| 125                               | 0.17                           | 0.25 | 0.34 | 0.50 | 0.67 | 0.84 | 0.01 | 1.18 | 1.34 |
| 100                               | 0.15                           | 0.23 | 0.30 | 0.45 | 0.60 | 0.75 | 0.90 | 1.05 | 1.20 |

| Avg.<br>Test<br>Pressure<br>(psi) | Nominal Pipe Diameter (Inches) |      |      |      |      |      |      |      |
|-----------------------------------|--------------------------------|------|------|------|------|------|------|------|
|                                   | 18                             | 20   | 24   | 30   | 36   | 42   | 48   | 54   |
| 450                               | 2.87                           | 3.18 | 3.82 | 4.78 | 5.73 | 6.69 | 7.65 | 8.60 |
| 400                               | 2.70                           | 3.00 | 3.60 | 4.50 | 5.41 | 6.31 | 7.21 | 8.11 |
| 350                               | 2.53                           | 2.81 | 3.37 | 4.21 | 5.06 | 5.90 | 6.74 | 7.58 |
| 300                               | 2.34                           | 2.60 | 3.12 | 3.90 | 4.68 | 5.46 | 6.24 | 7.02 |
| 275                               | 2.24                           | 2.49 | 2.99 | 3.73 | 4.48 | 5.23 | 5.98 | 6.72 |
| 250                               | 2.14                           | 2.37 | 2.85 | 3.56 | 4.27 | 4.99 | 5.70 | 6.41 |
| 225                               | 2.03                           | 2.35 | 2.70 | 3.38 | 4.05 | 4.73 | 5.41 | 6.03 |
| 200                               | 1.91                           | 2.12 | 2.55 | 3.19 | 3.82 | 4.46 | 5.09 | 5.73 |
| 175                               | 1.79                           | 1.98 | 2.38 | 2.98 | 3.58 | 4.17 | 4.77 | 5.36 |
| 150                               | 1.66                           | 1.84 | 2.21 | 2.76 | 3.31 | 3.86 | 4.41 | 4.97 |
| 125                               | 1.51                           | 1.68 | 2.01 | 2.52 | 3.02 | 3.53 | 4.03 | 4.53 |
| 100                               | 1.35                           | 1.50 | 1.80 | 2.25 | 2.70 | 3.15 | 3.60 | 4.05 |

## **2.0 STERILIZATION**

### **2.1 GENERAL**

It is the intent of this Section to present essential procedures for disinfecting new and repaired water mains. This Section is patterned after AWWA C651. The basic procedure comprises:

- A. Preventing contaminating materials from entering the water mains during construction or repair and removing by flushing materials that may have entered the water main.
- B. Disinfecting any residual contamination that may remain.
- C. Determining the bacteriologic quality by laboratory test after disinfection.

## 2.2 PREVENTIVE MEASURES DURING CONSTRUCTION

- A. Precautions shall be taken to protect pipe interiors, fittings, and valves against contamination. Pipe delivered for construction shall be strung to minimize entrance of foreign material. When pipe laying is not in progress, for example at the close of the day's Work, all openings in the pipeline shall be closed by watertight plugs. Joints of all pipe in the trench shall be completed before Work is stopped. If water accumulates in the trench, the plugs shall remain in place until the trench is dry.

If dirt that, in the opinion of the Engineer, will not be removed by the flushing operation (Section 2.3) enters the pipe, the interior of the pipe shall be cleaned and swabbed as necessary, with a five (5%) percent hypochlorite disinfecting solution.

- B. Packing Materials and Joints—No contaminated material or any material capable of supporting prolific growth of micro-organisms shall be used for sealing joints. Packing material shall be handled in such a manner as to avoid contamination. Where applicable, packing materials must conform to AWWA standards. Packing material for cast iron pipe must conform to AWWA C600. Yarning or packing material shall consist of molded or tubular rubber rings, rope of asbestos or treated paper. Materials such as jute or hemp shall not be used. The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water. It shall be delivered to the job in enclosed containers and shall be kept clean.

## 2.3 PRELIMINARY FLUSHING

The main shall be flushed prior to disinfection unless disinfected by the method in Section 2.04.B.1. It is recommended that the flushing velocity be not less than 2.5 ft/sec. The rate of flow required to produce this velocity in various diameters is shown in Table K-2. No site for flushing should be chosen unless it has been determined that drainage is adequate at the site.



**Table K-2**  
**Required Openings to Flush Pipelines**  
**(40-PSI Residual Pressure)**

| Pipe Size (in.) | Flow Required to Produce 2.5 fps Velocity (gpm) | Orifice Size (in.) | Hydrants Required  |                   |
|-----------------|-------------------------------------------------|--------------------|--------------------|-------------------|
|                 |                                                 |                    | Number of Hydrants | Nozzle Size (in.) |
| 4               | 100                                             | 15/16              | 1                  | 2 1/2             |
| 6               | 220                                             | 1 3/8              | 1                  | 2 1/2             |
| 8               | 390                                             | 1 7/8              | 1                  | 2 1/2             |
| 10              | 610                                             | 2 5/16             | 1                  | 2 1/2             |
| 12              | 880                                             | 2 13/16            | 1                  | 2 1/2             |
| 14              | 1,200                                           | 3 1/4              | 2                  | 2 1/2             |
| 16              | 1,565                                           | 3 5/8              | 2                  | 2 1/2             |
| 18              | 1,980                                           | 4 3/16             | 2                  | 2 1/2             |

## 2.4 FORM OF CHLORINE FOR DISINFECTION

The most common forms of chlorine used in the disinfecting solutions are liquid chlorine (gas at atmospheric pressure), calcium hypochlorite granules, and sodium hypochlorite solutions.

### A. Liquid Chlorine

1. *Use:* Liquid chlorine shall be used only when suitable equipment is available and only under the direct supervision of a person familiar with the physiological, chemical, and physical properties of this element and who is properly trained and equipped to handle any emergency that may arise. Introduction of chlorine-gas directly from the supply cylinder is unsafe and shall not be permitted.

NOTE: The preferred equipment consists of a solution fed chlorinator in combination with a booster pump for injecting the chlorine-gas water mixture into the main to be disinfected. Direct feed chlorinators are not recommended because their use is limited to situations where the water pressure is lower than the chlorine cylinder pressure.

### B. Hypochlorites

1. *Calcium Hypochlorite:* Calcium hypochlorite contains seventy (70%) percent available chlorine by weight. It is either granular or tabular in form. The tablets, 6-8 to the ounce, are designed to dissolve slowly in water. Calcium hypochlorite is packaged in containers of

various types and sizes ranging from small plastic bottles to one hundred (100) pound drums.

A chlorine-water solution is prepared by dissolving the granules in water in the proportion requisite for the desired concentration.

2. Sodium Hypochlorite: Sodium hypochlorite is supplied in strengths from five and one-quarter (5.25%) to sixteen (16%) percent available chlorine. It is packaged in liquid form in glass, rubber, or plastic containers ranging in size from one (1) quart bottles to five (5) gallon carboys. It may also be purchased in bulk for delivery by tank truck.

The chlorine-water solution is prepared by adding hypochlorite to water. Product deterioration must be reckoned with in computing the quantity of sodium hypochlorite required for the desired concentration.

3. Application: The hypochlorite solutions shall be applied to the water main with a gasoline or electrically powered chemical feed pump designed for feeding chlorine solutions. For small applications, the solutions may be fed with a hand pump, for example, a hydraulic test pump. Feed lines shall be of such material and strength as to withstand safely the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the hypochlorite solution is applied to the main.

## 2.5 METHODS OF CHLORINE APPLICATION

A Continuous Feed Method: This method is suitable for general application.

1. Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate into the newly laid pipeline. The water shall receive a dose of chlorine, also fed at a constant, measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the pipe is maintained at a minimum of 50 mg/L available chlorine. To assure that this concentration is maintained, the chlorine residual should be measured at regular intervals in accordance with the procedures described in the current edition of Standard Methods and AWWA M12—Simplified Procedures for Water Examination.

NOTE: In the absence of a meter, the rate may be determined either by placing a pitot gauge at the discharge or by measuring the time to fill a container of known volume.

Table K-3 gives the amount of chlorine residual required for each one hundred (100) feet of pipe of various diameters. Solutions of one (1%) percent chlorine may be prepared with sodium hypochlorite or calcium hypochlorite. The latter solution requires approximately one pound (1 lb.) of calcium hypochlorite in eight and five tenths (8.5) gallons of water.

**Table K-3**  
**Chlorine Required to Produce 50 mg/L Concentration**  
**In 100 Ft. Of Pipe (By Diameter)**

| <b>Pipe Size<br/>(in.)</b> | <b>100 Percent<br/>Chlorine (lb)</b> | <b>1 Percent<br/>Chlorine<br/>Solutions<br/>(gal)</b> |
|----------------------------|--------------------------------------|-------------------------------------------------------|
| 4                          | 0.027                                | 0.33                                                  |
| 6                          | 0.061                                | 0.73                                                  |
| 8                          | 0.108                                | 1.30                                                  |
| 10                         | 0.170                                | 2.04                                                  |
| 12                         | 0.240                                | 2.88                                                  |

2. During the application of the chlorine, valves shall be manipulated to prevent the treatment dosage from flowing back into the line supplying the water. Chlorine application shall not cease until the entire main is filled with the chlorine solution. The chlorinated water shall be retained in the main for at least twenty-four (24) hours during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this twenty-four (24) hour period, the treated water shall contain no less than 25 mg/L chlorine throughout the length of the main.
- B. Slug Method: This method is suitable for use with mains of large diameter for which, because of the volumes of water involved, the continuous feed method is not practical.
1. Water from the existing distribution system or other approved source of supply shall be made to flow at a constant, measured rate (see section 2.5.1.1) into the newly laid pipeline. The water shall receive a dose of chlorine also fed at a constant, measured rate. The two rates shall be proportioned so that the concentration in the water entering the pipeline is maintained at no less than 300 mg/L. The chlorine shall be applied continuously and for a sufficient period to develop a solid column or "slug" of chlorinated water that will, as it passes along the line, expose all interior surfaces to a concentration of at least 300 mg/L for at least three (3) hours. The application shall

be checked at a tap near the upstream end of the line by chlorine residual measurements.

2. As the chlorinated water flows past tees and crosses, related valves and hydrants shall be operated as to disinfect appurtenances.

## 2.6 FINAL FLUSHING

- A. After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system, or less than 1 mg/L. Chlorine residual determination shall be made to ascertain that the heavily chlorinated water has been removed from the pipeline.
- B. Disposing of Heavily Chlorinated Water. The environment into which the chlorinated water is to be discharged shall be inspected. If there is any possibility that the chlorinated discharge will cause damage to the environment, then a neutralizing chemical shall be applied to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. See Table K-4 for neutralizing chemicals. Federal, state, provincial, and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

**Table K-4**  
**Amount of Chemicals Required to Neutralize Various Residual Chlorine**  
**Concentrations in 100,000 Gallons of Water**

| Residual Chlorine<br>Concentration | Sulfur Dioxide<br>(SO <sub>2</sub> ) |           | Sodium Bisulfate<br>(NaHSO <sub>3</sub> ) |           | Sodium Sulfite<br>(Na <sub>2</sub> SO <sub>3</sub> ) |           | Sodium Thiosulfate<br>(Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> • 5H <sub>2</sub> O) |           |
|------------------------------------|--------------------------------------|-----------|-------------------------------------------|-----------|------------------------------------------------------|-----------|-------------------------------------------------------------------------------------------|-----------|
| <i>mg/L</i>                        | <i>lb</i>                            | <i>kg</i> | <i>lb</i>                                 | <i>kg</i> | <i>lb</i>                                            | <i>kg</i> | <i>lb</i>                                                                                 | <i>kg</i> |
| 1                                  | 0.8                                  | 0.36      | 1.2                                       | 0.54      | 1.4                                                  | 0.64      | 1.2                                                                                       | 0.54      |
| 2                                  | 1.7                                  | 0.77      | 2.5                                       | 1.13      | 2.9                                                  | 1.32      | 2.4                                                                                       | 1.09      |
| 10                                 | 8.3                                  | 3.76      | 12.5                                      | 5.67      | 14.6                                                 | 6.62      | 12.0                                                                                      | 5.44      |
| 50                                 | 41.7                                 | 18.91     | 62.6                                      | 28.39     | 73.0                                                 | 33.11     | 60.0                                                                                      | 27.22     |

## 2.7 BACTERIOLOGIC TESTS

1. After final flushing, and before the water main is placed in service, a sample or samples shall be collected from the end of the line and tested for bacteriologic quality and shall show the absence of coliform organisms. If the number and frequency of samples is not prescribed by the public health authority having jurisdiction, at least one (1) sample shall be collected from chlorinated supplies where a chlorine residual is maintained throughout the new main. From

unchlorinated supplies at least two (2) samples shall be collected at least twenty-four (24) hours apart.

2. Samples for bacteriologic analysis shall be collected in sterile bottles treated with sodium thiosulphate. No hose or fire hydrant shall be used in collection of samples. A suggested sampling tap consists of a standard corporation cock installed in the main with a copper tube gooseneck assembly. After samples have been collected, the gooseneck assembly may be removed, and retained for future use.

## 2.8 REPETITION OF PROCEDURE

If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until satisfactory samples have been obtained. The tablet method cannot be used in these subsequent disinfections. When the sample tests indicate that disinfection has been effective, the main may be placed in service.

## 2.9 PROCEDURE AFTER CUTTING INTO OR REPAIRING EXISTING MAINS

The procedures outlined in this Section apply primarily when mains are wholly or partially dewatered. Leaks or breaks that are repaired with clamping devices while the mains remain full of water under pressure present little danger of contamination and require no disinfection.

- A. Trench "Treatment": When an old line is opened, either by accident or by design, the excavation will likely be wet and may be badly contaminated from nearby sewers. Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from such pollution. Tablets have the advantage in such a situation because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.
- B. Main Disinfection: The following procedure is considered as a minimum that may be used.
  1. Swabbing with Hypochlorite Solution: The interior of all pipe and fittings used in making the repair (particularly couplings and tapping sleeves) shall be swabbed with a five (5%) percent hypochlorite solution before they are installed.
  2. Flushing: Thorough flushing is the most practical means of removing contamination introduced during repairs. If valving and hydrant locations permit, flushing from both directions is recommended. Flushing shall be started as soon as the repairs are completed and continued until discolored water is eliminated.

3. Slug Method: Where practicable, in addition to the procedures of section 2.9.2.1, a section of main in which the break is located shall be isolated, all service connections shut off, and the section flushed and chlorinated as described in section 2.5.2, except that the dose may be increased to as much as 500 mg/L, and the contact time reduced to as little as one-half (1/2) hour. After chlorination, flushing shall be resumed and continued until discolored water is eliminated.
- C. Sampling: Bacteriologic samples shall be taken after repairs to provide a record by which the effectiveness of the procedures used can be determined. If the direction of flow is unknown, samples shall be taken on each side of the main break.

### **3.0 PAYMENT**

No separate payment shall be made for testing and sterilization of water lines. Items described in this Section shall be incidental to the cost of installing the water line.

**END OF SECTION 15103**

## **SECTION 15104**

### **METERS AND SERVICES**

#### **1.0 GENERAL**

The Contractor shall furnish all labor, tools, equipment and materials for installing water services as shown on the plans and as directed.

#### **2.0 WATER METER SETTINGS**

##### **2.1 MATERIALS**

Meters shall include meter box and cover, coppersetter (including cut-off valve), four feet of pipe, saddle and corporation stop iron pipe or rod to hold meter plumb, plus two feet of pipe and plug or cap on the customer's side of meter. (This latter item is to prevent the customer or his plumber from disarranging or loosening the meter after the Contractor has already set the meter in its proper position.) Where the main line is in the highway right-of-way, meters shall be set as close to the right-of-way fence as practicable or as directed on the plans. The standard details show the required meter setting.

##### **2.2 CORPORATION STOPS, SETTERS AND SADDLES**

The corporation stops shall be equal to Ford F-Series. The meter setter shall be equal to the Ford 170-Series Coppersetter VB-HH-72-7W 44-33 with seven inch rise. A tandem coppersetter to accommodate a pressure reducer and meter shall be used where specified. Saddles shall be equal to Ford S70 Series for PVC and 202 Series for Ductile Iron Pipe.

Service line connections are to be made with compression fittings only.

##### **2.3 METERS**

The meters for this project shall be RG3 Perpetual Low Lead Meters with AMR Reading System to match the current water meters in the East Laurel Water District distribution system.

##### **2.4 METER BOXES**

Meter boxes for 5/8" x 3/4" meters shall be 24-inch and equal to AMETEK meter box combo (box, lid and 6" riser) No. 17105 with locking device and meter reading lid. Extensions shall be equal to AMETEK and utilized as necessary.

## 2.5 INSTALLATION

Meters shall be set in a workmanlike manner with backfill neatly compacted in place. In yards, pastures and other grassed areas, top of meter box may be placed no higher than 1/2 inch above original ground and no lower than flush with original ground. Boxes in sidewalks or other concrete areas shall be flush with surface. In areas which have not been sodded top of box shall be 2 inches above grade. The service line must meet the same cover requirements as the main line as described in these specifications except that the service line may be brought up to a depth of approximately 24 inches within 5 feet of each side of the meter installation when a 24-inch deep meter box is used. In all other cases the service pipe will be brought up to a depth which accommodates installation at the bottom of the meter box in accordance with the Standard Details. As shown in the Details, after 5 feet from box, service pipe must return to 30 inch cover (forty-two inches (42") in traffic). If meter box area is subject to traffic a deeper box will be required to maintain forty-two inches (42") of cover over the service pipe.

## 3.0 **SERVICES**

### 3.1 GENERAL

Service lines up to four feet (4') on the inlet side of the meter and two feet (2') on the customer side is included in the meter setting. Additional service pipe is an extra pay item and must be approved by the Engineer or designated Construction Representative.

### 3.2 SERVICE LINES NOT CROSSING A ROAD

Unless indicated otherwise on the plans, all Service Lines shall be 3/4" polyethylene plastic tubing using a corporation stop in accordance with the Standard Details. Service pipe shall meet all AWWA Specifications with a minimum pressure rating of 250 psi. Polyethylene service tubing shall comply with ASTM D2737 and shall be ultra-high density type equal to DRISCOPEX Series 5100 CTS, JM Eagle "Pure-core" series or approved equal. Stainless steel stiffeners will be used with the tubing at all corp. stops, meter tie-ins, etc. Tracer wire as specified in Section 15100 shall be laid with all service tubing.

### 3.3 SERVICE LINES CROSSING A COUNTY ROAD OR CITY STREETS

Same as above, except that in general all pipe shall be jacked beneath certain paved or blacktopped city streets or county roads, unless solid rock prevents using this method in which case, the open trench method may be used. The open trench method generally will be used on all unpaved city streets, county roads and private driveways. In general, blacktopped and concrete private driveways shall also be jacked under. In all cases where lines are under traffic, a minimum cover of forty-two inches (42") shall be provided. All backfill shall be



compacted by air tampers in layers no greater than 6-inch depth. In cases of open trench construction, crushed stone, blacktop and concrete paving shall be replaced according to the Standard Drawings.

### **3.4 SERVICE LINES CROSSING A STATE HIGHWAY**

Same as Section 3.3 except the pipe shall be jacked or pushed under paving. If solid rock is encountered, the crossing may be relocated to permit boring or jacking. No additional compensation will be made for relocation of service crossing. Service tubing crossing state highways shall be encased. Polyethylene pipe shall be used as casing pipe unless otherwise indicated by the plans.

## **4.0 EXECUTION**

### **4.1 RECONNECT METER SERVICE**

This item covers meter settings, which can remain in place, but need to be connected to a new water line. The Contractor shall supply all items to connect the meter to the new line. The Contractor shall close the corporation stop at the existing line if the existing line is not abandoned.

### **4.2 NEW METER SERVICE**

New meter services (all new materials) shall include meter box and cover, coppersetter (including angle valve and check valve), saddle and corporation stop iron pipe or rod to hold meter plumb, and plug or cap on the customer's side of meter. (This latter item is to prevent the customer or his plumber from disarranging or loosening the meter after the Contractor has already set the meter in its proper position.) Where the main line is in the highway right-of-way, meters shall be set as close to the right-of-way fence as practicable but no meter on the same side of the road as the main line shall be set with more than six feet (6') of service line unless prior approval has been obtained from the Engineer or his representative or as directed on the plans. The standard details show the required meter setting.

Meter settings shall be made in a workmanlike manner with backfill neatly compacted in place. In yards, pastures and other grassed areas, top of meter box may be placed no higher than 1/2 inch above original ground and no lower than flush with original ground. Boxes in sidewalks or other concrete areas shall be flush with surface. In areas which have not been sodded top of box shall be two inches (2") above grade. The service line must meet the same cover requirements as the main line as described in these specifications except that the service line may be brought up to a depth of approximately twenty-four inches (24") within five feet (5') of each side of the meter installation when a twenty-four inch (24") deep meter box is used. In all other cases the service pipe will be brought up to a depth which accommodates installation at the bottom of

the meter box in accordance with the Standard Details. As shown in the Details, after five feet (5') from box, service pipe must return to thirty-inch (30") cover (forty-two inches (42") in traffic). If meter box area is subject to traffic a deeper box will be required to maintain forty-two (42") inches of cover over the service pipe.

## **5.0 PAYMENT**

Service Tubing shall be paid at the Unit Price Bid for each foot of service tubing installed and shall include all labor, materials, tracer wire, equipment incidentals, etc. No extra shall be paid for service tubing bored, jacked and/or encased.

The Unit Price Bid for Reconnect Meter Service shall constitute full compensation for all labor, materials, equipment, etc. required in reconnecting the existing meter setting, to the new water line including locating and shutting off corporation stops for any existing meter services when necessary.

The Unit Price Bid for New Meter Service shall constitute full compensation for furnishing and installing the all new items such as: saddle, corporation stop, meter box, meter, cover, meter setter and valve, holding rod, and service tubing extension as shown and specified. This shall include locating and shutting off corporation stops for any existing meter services when necessary. All materials included with this bid item are new; no items shall be reused from the old meter settings. All materials pertaining to the old meter settings are to be returned to East Laurel Water District unless directed otherwise by the District.

## **END OF SECTION 15104**

## **SECTION 15784**

### **PACKAGED WALLMOUNT HEAT PUMP UNITS**

#### **PART 1 - GENERAL**

##### **1.01 SCOPE OF WORK**

- A. This Section includes packaged wall-mounted heat pump units and accessories and controls.

##### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

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

##### **1.03 SUBMITTALS**

- A. Product Data: Include rated capacities, weights, furnished specialties, and accessories for each model indicated.
- B. Shop Drawings: Provide specifications/product data, detail equipment dimensions, wall penetration dimensions, and wiring diagrams. Also provide a color chart with at least (5) color options for Owner color selection, and proposed warranty information.
- C. Shop Drawing submittal shall include proposed lintel and girt details based on the equipment selected.
- D. Operation & Maintenance Data: Provide O&M manuals.
- E. Test Report
- F. Training Report

##### **1.04 QUALITY ASSURANCE/WARRANTIES**

- A. Unit performance shall be certified in accordance with ARI standard 390 for vertical single package heat pumps.
- B. Electrical system shall be either UL or ETL listed to the latest ANSI standard for Safety for Heating and Cooling Equipment. It shall also be NEC/NFPA 70 compliant.

- C. A manufacturer 5-year (minimum) warranty certification is required.
- D. Unit shall comply with the latest Mechanical & Energy codes in effect.

#### 1.05 COORDINATION

Coordinate layout and installation of units and wall construction where unit penetrates wall or is supported by it.

### **PART 2 - PRODUCTS**

#### 2.01 MANUFACTURERS

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- 1. Bard
- 2. Marvaire
- 3. Or Equal

#### 2.02 MANUFACTURED UNITS

- A. Description: Packaged, self-contained, wall-mounted heat pumps with electric refrigeration system, heating, and temperature controls; fully charged with refrigerant and filled with oil. Heat pump can operate in heating or cooling mode.
- B. Cabinet: 20 gauge galvanized steel painted and capable of resisting a 1000 hour salt spray exposure per ASTM B117.
  - 1. Mounting: Wall with integral side mounting brackets.
  - 2. Finish: Baked enamel with polyurethane primer. The color shall be as selected by Owner during submittal review.
- C. Refrigeration System: Direct-expansion copper tube coil with aluminum fins and capillary restrictor, hermetically sealed compressor with internal spring isolation, and overload protection. Refrigerant shall be R-410A

- D. Air System: Forward-curved, centrifugal, indoor fans with permanent-split-capacitor motor and throwaway filters.
- E. Outdoor Fan: Propeller type with separate permanent-split-capacitor motor.
- F. Filter – Provide 1 inch throwaway filter.
- G. Electric Resistance heating: Electric supplemental heaters shall be provided of the capacity as indicated on the Drawings. Each heater shall be equipped with an automatic reset limit switch and a one-time high temperature thermal cutout for additional safety back up protection.
- H. Efficiency: The efficiency of the unit shall be compliant with the latest Energy Code in effect, but not less than 11.0 EER at 95°F (cooling mode) and 3.0 COP at 47°F (heating mode).
- I. Ventilation: The unit shall include a motorized fresh air damper.

## 2.03 CONTROLS

- A. Controls: Provide remote-mounted adjustable autochangeover thermostat.
- B. Low Ambient Control to allow cooling cycle operation down to 0°F.
- C. Shall include an alarm relay to provide signal upon a condition of shutdown on either high or low-pressure controls.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Install units according to manufacturer's written instructions.
- B. Provide a lintel to support the masonry above each duct penetration.
- C. Provide girts where necessary for structural stability of the wall.
- D. Supply and return openings shall be ducted with G90 sheet steel from the heat pump unit to the register.

### 3.02 CONNECTIONS

- A. Condensate Drain: Pipe to grade level. Ensure that grade is sloped away from building.
- B. Electrical: Connect units to wiring systems and to ground as indicated and instructed by manufacturer.
- C. Ground equipment.
  - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

### 3.03 CLEANING

After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris, and repair damaged finishes including chips, scratches, and abrasions.

### 3.04 COMMISSIONING

- A. After installation, check the following:
  - 1. Unit casing has no visible damage.
  - 2. Compressor, air-cooled condenser coil, and fans have no visible damage.
  - 3. Labels are clearly visible.
  - 4. Controls are connected and operable.
  - 5. Shipping bolts, blocks, and tie-down straps are removed.
  - 6. Filters are installed and clean.
  - 7. Drain line is installed correctly.
- B. Lubricate bearings on fan.
- C. Check fan-wheel rotation for correct direction without vibration and binding.
- D. Start unit according to manufacturer's written instructions. Complete manufacturer's startup checks.

E. Provide balancing and ventilation damper adjustment. Refer to the schedule on the Contract drawings and balance to within 10% of specified ventilation. Submit test report to Engineer.

F. After starting and performance test, change filters.

### 3.05 TRAINING

A. Subsequent to commissioning, provide training of Owner personnel on system operation and maintenance. Submit report of training curriculum and attendance.

**END OF SECTION 15784**





## **DIVISION 16: ELECTRICAL**



**SECTION 16020**  
**PUMPING STATION ELECTRICAL**

**PART 1 - GENERAL**

**1.01 SCOPE OF WORK**

- A. Provide all labor, material, tools, approvals, excavation, backfill, and other services and equipment necessary to install the electrical system as shown on the Contract Drawings and as specified herein.
- B. Each Contractor bidding on the work included in these Specifications shall view the building site and carefully examine the contract Drawings and Specifications, so that he/she may fully understand what is to be done, and to document existing conditions.

**1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Contractors bidding work under this Contract shall read and understand Division Zero and Division 1 - General Requirements. If any discrepancies are discovered between this Division and the General Requirements, the above-mentioned documents shall overrule this section.
- B. Section 16900 – Control Panel
- C. Division 17 – Instrumentation/SCADA

**1.03 SUBMITTALS**

- A. Provide shop drawings including descriptive literature and/or installation, operation and maintenance instructions. Shop drawings shall be submitted for all equipment proposed to be furnished under this Division.
- B. Electrical submittals shall be submitted after the pumping/process equipment has been approved. Otherwise, the Contractor is responsible for any changes and costs incurred as a result of changes necessary to the electrical equipment.
- C. Shop Drawings shall be clearly marked and or highlighted as to which product, type, option, etc. is being submitted.
- D. Where wiring diagrams are not shown on the Contract Drawings, they are to be provided by the supplier of the equipment served.
- E. O&M manuals are required and shall consist of approved shop drawings, manufacturer O&M instructions, and test reports.

#### 1.04 SYMBOLS AND ABBREVIATIONS

- A. The symbols and abbreviations generally follow standard electrical practice, however, exceptions to this shall be as shown on the Contract Drawings.

#### 1.05 COORDINATION WITH OTHER TRADES

- A. The Contractor shall coordinate the electrical work with that of other trades to ensure proper final location of all electrical equipment and/or connections.

#### 1.06 CODES

- A. Comply with the latest revision of the following codes:

|     |                                                       |       |
|-----|-------------------------------------------------------|-------|
| 1.  | Kentucky Building Code                                | KBC   |
| 2.  | National Electrical Code                              | NEC   |
| 3.  | National Electrical Safety Code                       | NESC  |
| 4.  | Underwriters Laboratories, Inc.                       | UL    |
| 5.  | National Fire Protection Association                  | NFPA  |
| 6.  | National Electrical Manufacturers Association         | NEMA  |
| 7.  | Occupational Safety and Health Administration         | OSHA  |
| 8.  | Insulated Cable Engineers Association                 | ICEA  |
| 9.  | Instrument Society of America                         | ISA   |
| 10. | American National Standards Institute, Inc.           | ANSI  |
| 11. | Anti-Friction Bearing Manufacturers Association, Inc. | AFBMA |
| 12. | Federal Communications Commission                     | FCC   |

- B. Comply with any other applicable federal, state, or local laws and ordinances.
- C. Where the Engineer's design requires a higher standard than the applicable code, the Engineer's design shall be followed.

#### 1.07 INSPECTIONS AND PERMITS

- A. Inspection of the electrical system on all construction projects is required. If the local government has appointed a state licensed inspector, the Contractor shall be required to use that person to perform the inspections. If a locally mandated inspector does not exist, the Contractor shall select and hire a state licensed inspector, who has jurisdiction before any work is concealed.
- B. At the time of completion of the project, there shall be furnished to the Owner and Engineer a certificate of compliance, from the agency having jurisdiction pursuant to all electrical work performed.
- C. All permits necessary for the complete electrical system shall be obtained by the Contractor from the authorities governing such work.

## 1.08 STORAGE

- A. All work, equipment, and materials shall be protected against dirt, water, or other injury during the period of construction. Complete replacement with new equipment is required for any damaged materials.
- B. Sensitive electrical equipment such as motor starters, controls, transmitters, etc., delivered to the jobsite, shall be protected against injury or corrosion due to atmospheric conditions or physical damage by other means. Protection is interpreted to mean that equipment shall be stored under roof, in a structure properly heated in cold weather and ventilated in hot weather. Provision shall be made to control the humidity in the storage area at 50 percent relative. The stored equipment shall be inspected periodically, and if it is found that the protection is inadequate, further protective measures shall be employed.

## 1.09 MATERIALS

- A. All materials used shall be new and at least meeting the minimum standards as established by the NEC and/or National Electrical Manufacturers Association. All materials shall be UL listed for the application where a listing exists. All equipment shall meet applicable FCC requirements and restrictions.
- B. The material and equipment described herein has been specified according to a particular trade name or make to set quality standards. However, each Contractor has the right to substitute other material and equipment in lieu of that specified, other than those specifically mentioned at matching or for standardization, providing such material and equipment meets all of the requirements of those specified and is accepted, in writing by the Engineer.
- C. The reuse of salvaged electrical equipment and/or wiring will not be permitted unless specified herein or indicated on the Contract Drawings.
- D. All salvaged or abandoned electrical materials shall become the property of the Contractor and shall be removed from the job site upon completion of the project, unless otherwise noted on the Contract Drawings or specified herein.

## 1.10 ERRORS, CORRECTIONS, AND/OR OMISSIONS

- A. Should a piece of utilization equipment be supplied of a different size or horsepower than shown on the Contract Drawings, the Contractor shall be responsible for installing the proper size wiring, conduit, starters, circuit breakers, etc., for proper operation of that unit and the complete electrical system at no extra cost to the Owner.

- B. It is the intent of these Specifications to provide for an electrical system installation complete in every respect, to operate in the manner and under conditions as shown in these Specifications and on the Contract Drawings. The Contractor shall notify the Engineer, in writing, of any omission or error at least 10 days prior to opening of bids. In the event of the Contractors failure to give such notice, he/she may be required to correct work and/or furnish items omitted without additional cost.
- C. Necessary changes or revisions in electrical work to meet any code or power company requirement shall be made by the Contractor without additional charge.

#### 1.11 GUARANTEES AND WARRANTIES

- A. The Contractor shall guarantee all work including equipment, materials, and workmanship. This guarantee shall be against all defects of any of the above and shall run for a period of 1 year from the date of acceptance of the work, concurrent with the one-year guarantee period designated for the general construction contract under which electrical work is performed.
- B. Repair and maintenance for the guarantee period is the responsibility of the Contractor and shall include all repairs and maintenance other than that which is considered as routine. (That is oiling, greasing, etc.) The Engineer shall be the judge of what shall be considered as routine maintenance.

#### 1.12 TESTING

- A. After the wiring system is complete, and at such time as the Engineer may direct, the Contractor shall conduct an operating test for acceptance. The equipment shall be demonstrated to operate in accordance with the requirements of these Specifications and the Contract Drawings. The test shall be performed in the presence of the Engineer or his authorized representative. The Contractor shall furnish all instruments and personnel required for the tests, as well as the necessary electrical power.
- B. Before energizing the system, the Contractor shall check all connections and set all relays and instruments for proper operation. He shall obtain all necessary clearances, approvals, and instructions from the serving utility company prior to placing power on the equipment.
- C. Cost of utilities for testing done prior to beneficial occupancy by the Owner shall be borne by the Contractor.

#### 1.13 CLEANUP

- A. Cleanup shall be performed as soon as possible after the electrical installation is complete. All control panels, switches, etc., shall be free from tags, stickers, etc. All painted enclosures shall be free from scratches or splattered paint. The interior of all enclosures shall be clean from dust, wire strippings, etc. Surplus material,

rubbish, and equipment shall be removed from the jobsite upon completion of the work.

- B. During construction, cover all Owner equipment subject to damage.

#### 1.14 EXCAVATION AND BACKFILL

- A. Excavation for conduits shall be of sufficient width to allow for proper jointing and alignment of the type conduit used. Conduit shall be bedded on original ground unless indicated otherwise on the Drawings. Where conduit is in solid rock, a 6 inch earth cushion must be provided. Conduit shall be laid in straight lines between pull boxes and/or structures unless otherwise notes on the Contract Drawings. The cost of solid rock excavation shall be included in the lump sum bid.
- B. Backfill shall be hand placed, loose granular earth for a height of 6 inches above the top of the largest conduit. This material shall be free of rocks over ½ inches in diameter. Above this, rocks up to 3" diameter may be included but must be mixed with sufficient earth to fill all voids.

#### 1.15 POWER COMPANY COORDINATION

- A. The Contractor is responsible for coordinating all activities onsite by the power company.
- B. The Contractor is required to meet all requirements and special provisions of the power company. The Contractor shall coordinate with the utility prior to bidding the project. No extras will be allowed for provisions required by the power company.
- C. Owner will pay the utility tap-on fee directly. Do not include this fee in the bid price.

#### 1.16 TEMPORARY ELECTRICAL POWER

- A. The Contractor shall be responsible for providing temporary electrical power as required during the course of construction and shall remove the temporary service equipment when no longer required.

#### 1.17 OVERCURRENT PROTECTION

- A. Circuit breakers or fused switches shall be the size and type as written herein and shown on the Contract Drawings. Any additional overcurrent protection required to maintain an equipment listing by an authority having jurisdiction shall be installed by the Contractor at no extra cost to the Owner.

#### 1.18 TRAINING

- A. Provide onsite training on major items of equipment. The training shall be conducted by a qualified representative of the manufacturer, and shall be sufficient in content and length such that the Owner's personnel are fully qualified to

operate, maintain, and troubleshoot the equipment. O&M manuals must be approved before training can commence. Only one training class is required for each item of equipment. Coordinate the time/date with the Owner.

- B. An official training report shall be submitted to the Engineer. It shall be signed by Owner's personnel.

#### 1.19 RECORD DRAWINGS

- A. The Contractor shall maintain 1 set of the Contract Drawings on the job in good condition for examination at all times. The Contractor's qualified representative shall enter upon these Drawings, from day to day, the actual "as-built" record of construction and/or alteration progress. Entries and notes shall be made in a neat and legible manner and these Drawings delivered to the Engineer after completion of the construction, for use in preparation of Record Drawings. Underground lines must be dimensioned to permanent structures.

#### 1.20 MAINTAINING CONTINUOUS ELECTRICAL SYSTEM AND SERVICE

- A. Existing service continuity shall be maintained at all times. In no way shall be installation and/or alteration of the electrical work interfere with or stop the normal operation of the existing facilities, except where prior arrangements have been made. Provide all equipment necessary (including temporary switchgear, controls, and rental power generation equipment if necessary) to ensure that the existing system remains operational until the new system is fully functional.

#### 1.21 GROUNDING AND BONDING

- A. All metallic conduit, cabinets, equipment, and service shall be grounded in accordance with NEC requirements. All supporting framework in contact with electrical conduit, cable, and/or enclosures, shall be properly grounded.

#### 1.22 SERVICE ENTRANCE

- A. Conductors and terminations for service entrances shall be furnished and installed by the Contractor. Voltage, phase, and number of wires shall be as shown on the Drawings. Clearances for overhead entrance wires shall be per power company, NEC, and NESC requirements.

#### 1.23 CONTRACTOR LICENSING

- A. The Contractor performing the electrical work on this project shall be a licensed electrical contractor in the State of Kentucky.

#### 1.24 ELECTRICAL COMPONENT MOUNTING HEIGHTS

- A. Mounting heights shall be as shown on the Contract Drawings. Operators and control devices shall not be mounted higher than 6'6" above finished floor or



grade.

## 1.25 EQUIPMENT IDENTIFICATION

- A. All starters, feeder units, disconnects, instruments, etc., shall be marked to indicate the motors, circuit, they control or monitor. Marking is to be done with engraved laminated nameplates. Nameplates shall be fastened to equipment with stainless steel screws, one each side. In no way shall the installation of the mounting screws void the NEMA enclosure rating of the equipment in which they are installed. If there are more than one number, the equipment shall be numbered consecutively and labeled as such. Nameplate background color shall be white, with black engraved letters.
- B. Disconnect switches, control panels, transfer switches, panelboards etc. shall be labeled with orange OSHA-compliant vinyl self-adhesive signs that list the maximum voltage contained inside the cabinet or panel.

## 1.26 EQUIPMENT CONFIGURATION/PROGRAMMING

- A. Any equipment furnished by the Contractor is required to be configured or programmed by the Contractor or his subcontractor/vendor. Any necessary studies or engineering necessary to configure or program this equipment shall be provided by the Contractor as needed to place the equipment into successful operation. Engineer or Owner will not be responsible for equipment configuration or programming.
- B. If a manufacturer or manufacturer's representative is required to startup/commission the equipment in these Specifications, then it is required that the Contractor provide the services of the manufacturer to configure/program the equipment. This includes the provision of any necessary studies or engineering necessary for the configuration/programming.

## 1.27 SPARE PARTS

- A. Provide (3) spare fuses of each unique fuse supplied for the project.

# PART 2 - PRODUCTS

## 2.01 ACCEPTABLE MANUFACTURERS

- A. Raceways
  - 1. Rigid Aluminum Conduit - "Allied," "Wheatland," "Indalex," or equal.
  - 2. PVC Conduit – "Allied," "Carlson," "Cantex," or equal.
  - 3. Liquidtight Flexible Metal Conduit – "Allied," "Anaconda," or equal.

B. Wires and Cables

1. Building Wire (Types THWN and THW) - "General Cable," "Southwire," "AWC" or equal.
2. Instrumentation Cables - "General Cable," "Belden," "Okonite," or equal.

C. Boxes - "Appleton," "Crouse-Hinds," "Hoffman," "Rittal," or equal.

D. Wire Connections and Connecting Devices

1. Termination and Splice Connectors - "3M Scotchlok," "Anderson," "T&B," "Burndy," or equal.
2. Connectors, Lugs, etc. - "T&B," "Anderson," "Burndy," or equal.

E. Grounding Equipment - "Cadweld," "ITT Blackburn," "Copperweld Bimetallics Group," "Cathodic Engineering Equipment Co.," or equal.

F. Motor Control Equipment - "Schneider," "Allen Bradley," "Eaton," "G.E.," or equal.

## 2.02 MATERIALS

A. Conduit and Fittings

1. Aluminum Conduit

- a. Aluminum conduit shall be extruded from alloy 6063 and shall be the rigid type, non-toxic, corrosion resistant, and non-staining. It shall be manufactured per UL standards as well as listed/labeled by same.
- b. Fittings, boxes, and accessories used in conjunction with aluminum conduit shall be die cast, copper free aluminum. They shall be resistant to both chemical and galvanic corrosion. All covers shall have neoprene gaskets. Aluminum fittings containing more than 0.4 percent copper are prohibited.
- c. Fittings are required to be threaded. Threadless connectors or couplings shall not be used.
- d. Aluminum conduit proposed for concrete slab or underground applications shall be UL listed for the purpose and factory pre-coated. Corrosion-resistant taping is allowed for stubouts out of the ground.

2. Polyvinylchloride (PVC) Conduit - PVC conduit and fittings shall be Schedule 80 heavy wall and UL listed. Expansion joints shall be used as

recommended by the manufacturer in published literature. PVC systems shall be 90 degrees Celsius minimum UL rated, have a tensile strength of 7,000 psi @ 73.4 degrees Fahrenheit, flexural strength of 11,000 psi and compressive strength of 8,000 psi.

3. Liquidtight Flexible Conduit - Flexible conduit shall be the metallic liquidtight type UA constructed from flexibly or spirally wound electro-galvanized steel with light gray PVC coating. Connections shall be by means of copper-free aluminum fittings.
4. Locknuts shall be bonding type with sharp edges for digging into the metal wall of an enclosure. Myer-style aluminum hubs shall be used rather than locknuts for all NEMA 4X and exterior penetrations.
5. Bushings shall be metallic insulating type, consisting of an insulating insert molded or locked into the metallic body of the fitting. Bushings made entirely of metal or nonmetallic material are not permitted.
6. Corrosion-Protection Tape: The corrosion protection tape shall be Scotchrap 51 or equal with 20mil thickness PVC tape and high-tack adhesive. Degreasing and priming of the conduit is required prior to applying the corrosion-protection tape.

B. Conductors (600 Volts and Below)

1. All conductors shall be insulated so that they are rated at 600 volts.
2. Insulated conductors shall be minimum #12 AWG for power or #14 AWG for control and shall be stranded.
3. All conductors brought to the job site shall be new and unused and where no special factory cut lengths are involved, shall be delivered to the job site in standard coils. Contractor shall provide verification to the Engineer of wire condition before wire is installed.
4. All conductors shall be soft drawn, 98% conductivity copper conforming to the latest ASTM Specifications and the requirements of the National Electrical Code.
5. Conductors shall be insulated with type THWN insulation and all conduits shown on the Drawings are sized accordingly.

C. Instrumentation Cable - Instrumentation cable shall have individually shielded and twisted pairs or triads. Conductors shall be tinned copper, and the cable shall include a separate drain conductor. Voltage rating shall be 600 Volt. Conductor colors shall be black and white. Shielding shall be a combination braid/foil with 100% coverage. Insulation shall be PVC or XLPE. Conductors shall be #18AWG minimum, but no smaller than the size indicated on the Drawings. Insulation shall

be polyethylene, rated for underground wet location use, and resistance at 68 degrees Fahrenheit between conductors and between conductors and ground should be at least 500 megohms per 1,000 feet.

D. Boxes and Enclosures

1. Junction boxes for outdoors surface mounting shall be stainless NEMA 4X, with at least 5 ½ full threads for each conduit opening, and shall be suitable for surface mounting as required with drilled external, cast mounting extensions. Box covers shall be hinged or cap screw retained as required, of the same material as the box and provided with stainless steel hardware.

E. Wire Connections and Connecting Devices

1. Terminals and splice connectors from #22 to #4 AWG shall be compression type with barrels to provide maximum conductor contact and tensile strength. Performance, construction, and materials shall be in conformance with UL standards for wire connectors and rated for 600 Volts and 105 degrees Celsius.
2. Lugs and splice connectors from #6 AWG to 1000 kcmil shall be compression types with barrels to provide maximum conductor contact and tensile strength. They shall be manufactured from high conductivity copper and entirely tin plated. They shall be crimped with standard industry tooling. The lugs and connectors must have a current carrying capacity equal to the conductors for which they are rated and must also meet all UL requirements. All lugs above #4/0 shall be 2 hole lugs with NEMA spacing. The lugs shall be rated for operation through 35 KV. The lugs shall be of closed end construction to exclude moisture migration into the cable conductor.

F. Wiring Devices

1. General – All receptacles shall be heavy duty specification grade duplex receptacle, Nema 5-20R, 20A, 125V, 3-wire. Provide weatherproof cover where indicated on the Drawings.
2. Duplex outlet (interior) - “Hubbell” catalog series 5362, or equal.
3. Ground fault interrupting receptacles shall be required where shown on the Contract Drawings, and shall be indicated by the abbreviation “GFI” beside the circuit symbol on the Contract Drawings. They shall be rated 20 amps (125 volts) and shall be of the duplex, feed through type, capable of protecting all downstream receptacles on the same circuit. They shall be UL listed and shall comply with UL 943 and interrupt the current between 4-6 milliamps of ground fault leakage. Appropriate plates shall be furnished and installed. The 20 ampere rating shall apply not only to device internals

but to the faceplate as well. Receptacle shall be Hubbell GFI 5352, or equal.

4. Weatherproof covers shall be Hubbell WP series, Thomas and Betts 2CKG, or equal. They shall be weatherproof-in-use with cast aluminum construction. Mounting screws shall be stainless. Protection shall be Nema 3R.
5. General – Switches shall be industrial grades, 120/227VAC, 20A
  - a. Single pole (exterior) - “Hubbell” cat. no. 1222-gray, or equal.
  - b. Weatherproof switch covers shall be Hubbell 7420 series, or equal, with stainless mounting screws, cast aluminum construction and wet location rating.

#### G. Panelboards

1. Shall be UL listed with copper bussing.
2. Enclosure shall be NEMA 1 minimum.
3. Circuit breakers shall be bolt-in.
4. Panelboards rated for 120/208V service shall have an interrupting capacity of not less than 10,000A, RMS symmetrical.
5. Panelboards rated for 480V service shall have an interrupting capacity of not less than 14,000A, RMS symmetrical.
6. Panelboards scheduled for use as service equipment shall be service-entrance listed and shall have an integral surge protection device (SPD) as specified below.

#### H. Motors

1. Ratings and Electrical Characteristics:
  - a. Time: All motors shall be rated for continuous duty.
  - b. Temperature: Maximum ambient temperature of 40 degrees C. and an altitude of 3,300 feet or less, according to service factor and insulation class employed.
  - c. Voltage: All single phase motors shall be rated 115/208/230 volts and all polyphase motor 230/460 volts. All motors shall be capable of normal operation at balanced voltages in the range of + 10 percent from rated winding voltage.

- d. Frequency: All AC motors shall be rated for 60 hz. operation. All motors shall be capable of normal operation at frequencies 5 percent above or below the normal rating of 60 hz.
- e. Locked Rotor Current: Locked rotor current shall be in accordance with NEMA standards.
- f. Efficiency: NEMA premium efficiency is required.
- g. Speed: Slip shall not exceed 4 percent at full load.
- h. Service Factor: The service factor shall be 1.15 unless requirements of the driven load necessitate a higher service factor.
- i. Insulation Class: Insulation shall be NEMA Class F or Class H. All motors shall be inverter-duty and suitable for operation on variable frequency drives. The motors are additionally required to have a shaft grounding ring – Aegis or equal.
- j. Design Level: Motors shall be NEMA design B, except as otherwise noted.
- k. Enclosure: Motors for process equipment 2 HP and smaller shall be totally enclosed. All motors for process equipment larger than 2 HP shall be TEFC (totally enclosed fan cooled), suitable for use indoors or outdoors, except as otherwise noted. Totally enclosed non-ventilated (or air-over) motors may be used for ventilators and other auxiliary equipment that by virtue of the load are provided with more than adequate ventilation.
- l. Winding Overtemperature Sensors: All motors 15 horsepower and over shall be provided with motor winding thermostats. The devices shall be hermetically sealed, snap-acting thermal switches, actuated by a thermally responsive bi-metallic disk. A minimum of 1 per phase is required, with switches wired into the control circuit of the starter to provide de-energization should overheating threaten. All submersible motors shall be equipped with motor winding thermostats.

2. Tests, Nameplates and Shop Drawings:

- a. Test: Tests shall be required on integral horsepower motors only. A factory certified test report of “electrically duplicate motors previously tested” shall be supplied on all motors under 200 horsepower. The test shall be certified by the factory and shall contain a statement to the effect that complete tests affirm the guaranteed characteristics published in the manufacturer’s catalogs or descriptive literature.

Tests shall be in accordance with IEEE test procedures.

- b. Nameplates: Each motor shall have a permanently affixed nameplate of brass, stainless steel, or other metal of durability and corrosion resistance. The data contained on the nameplate shall be in accordance with NEMA standards. Provide a spare nameplate with each motor and mount the nameplate in the starter cabinet. A Brady label with equivalent nameplate information will be accepted in lieu of an actual spare nameplate.

### 3. Efficiency Requirements

- a. The following motor full load efficiency requirements shall be met as a minimum for totally enclosed 3 phase integral horsepower motors (per NEMA test Methods):

| Horsepower | Nominal<br>3600 RPM<br>(Minimum %) | Nominal<br>1800 RPM<br>(Minimum %) | Nominal<br>1200 RPM<br>(Minimum %) |
|------------|------------------------------------|------------------------------------|------------------------------------|
| 1          | 75.5                               | 82.5                               | 80.0                               |
| 1.5        | 82.5                               | 84.0                               | 85.5                               |
| 2          | 84                                 | 84.0                               | 86.5                               |
| 3          | 85.5                               | 87.5                               | 87.5                               |
| 5          | 87.5                               | 87.5                               | 87.5                               |
| 7.5        | 88.5                               | 89.5                               | 89.5                               |
| 10         | 89.5                               | 89.5                               | 89.5                               |
| 15         | 90.2                               | 91.0                               | 90.2                               |
| 20         | 90.2                               | 91.0                               | 90.2                               |
| 25         | 91.0                               | 92.4                               | 91.7                               |
| 30         | 91.0                               | 92.4                               | 91.7                               |
| 40         | 91.7                               | 93.0                               | 93.0                               |
| 50         | 92.4                               | 93.0                               | 93.0                               |
| 60         | 93.0                               | 93.6                               | 93.6                               |
| 75         | 93.0                               | 94.1                               | 93.6                               |
| 100        | 93.6                               | 94.5                               | 94.1                               |
| 125        | 94.5                               | 94.5                               | 94.1                               |
| 150        | 94.5                               | 95.0                               | 95.0                               |
| 200        | 95.0                               | 95.0                               | 95.0                               |

- b. Motors shall be energy efficient and shall be documented in the shop

drawings submittal in sufficient detail to allow the Engineer complete review of what is offered. Motors shall meet NEMA premium efficiency standards.

I. Surge Protection Devices (SPD)

1. Distribution Equipment SPD:

- a. The SPD shall be suitable for application in category C3 environments as described in ANSI/IEEE C62.41. The SPD shall be of parallel design and provide protection, line to ground, neutral to ground, and line to neutral for wye or delta distribution systems. The SPD shall be compatible with the indicated electrical system, voltage, current and distribution configuration.
- b. SPD shall comply with ANSI/IEEE C62.1, C62.41, and C62.45. The TVSS shall be capable of surviving 1,000 sequential category C3 surges without failure following IEEE test procedures established in C62.45.
- c. The SPD shall have LED indicators that provide indication of suppression failure. It shall also have a surge counter. It shall also have a relay contact that provides remote indication of surge protection failure.
- d. The SPD maximum continuous operating voltage (MCOV) shall be capable of sustaining 110 percent of the nominal RMS voltage continuously without degradation.
- e. SPD shall have surge current capacity of 80,000 amps minimum per mode with a response time no greater than 5 nanoseconds, for any of the individual protection modes, under laboratory conditions with optimum lead lengths.
- f. The SPD UL 1449 surge suppression rating for any suppression mode shall not exceed:

| Electrical     |        | UL 1449 Surge |
|----------------|--------|---------------|
| System Voltage | Phases | Suppression   |
|                |        | Ratings       |
| 120/240        | 1      | 330V          |
| 120/240        | 3      | 330V          |
| 120/208        | 3      | 330V          |
| 208            | 3      | 700V          |
| 277/480        | 3      | 700V          |
| 480            | 3      | 1500V         |



## J. Safety Switches

1. All safety switches shall be heavy-duty load break type with a quick-make, quick-break, switch mechanism. The switches shall be fused or unfused as indicated on the Drawings. The handle position shall give visual indication of open and closed switch position. Padlocking capability shall be provided for locking the switch in the "OFF" (open) position. Switches are required to be UL98 listed and shall comply with NEMA KS-1 latest version.
2. The switch jaws shall be multi-spring type for positive grip of the switch blades and shall be provided with arc suppressors. The fuse clips shall be spring reinforced, positive pressure type of electrolytic copper. Fuse clips shall be rejection type.
3. The switch shall be provided with cover-blade interlock so that the cover cannot be opened when the switch blades are closed, nor can the switch blades be closed with the cover open. Interlock bypassing devices shall be included for use by authorized personnel. Note: where indicated, safety switches shall have integral electrical interlocks. Contacts shall be open when the switch is in the off position.
4. Enclosures shall be NEMA 1 where used inside the building and NEMA 3R where used outside unless otherwise shown on the Drawings.
5. Each safety switch shall be provided with ground lugs as required to accept grounding conductors as shown on the Drawings. The grounding lugs shall be factory installed and shall have direct metal-to-metal contact with the switch enclosure.
6. Double throw fused safety switches shall be furnished where indicated. They shall be lockable in any position and shall be service-entrance rated. They shall be heavy-duty NEMA 3R painted steel unless noted otherwise.

## K. Camlok Connection Cabinet / Generator Docking Station

1. Cabinet shall be a Generator Docking Station with male Camlocks arranged for connection of a portable generator. The camlocks shall be arranged on an interior dead-front panel with a hinged bottom panel that allows portable cable entry into the enclosure.
1. Cabinet shall be NEMA 3R, wall-mountable, with padlock provisions that prevent unauthorized access.
2. Cabinet shall be UL/ETL 1008 listed. It shall be rated for the voltage and amperage indicated on the Drawings, with lug sizes and quantities for the cable indicated on the Drawings.
3. Camlocks shall be color-coded in the quantity necessary to accommodate

the voltage system indicated on the Drawings, including ground Camlok. A neutral Camlok shall be provided where a neutral conductor is indicated on the Drawings.

L. Motor Starters

1. General

- a. All starters shall be of the voltage rating, type, and sized for the motor size shown in these Specifications and/or on the Contract Drawings. NEMA 1 or NEMA 12 enclosure is required. All starters shall be of the magnetic type. Should a piece of electrically driven equipment be furnished with a larger motor than shown on the Contract Drawings, the proper size starter shall be provided for the equipment supplied, at no extra cost to the Owner.
- b. Control voltage shall be 120 volts, a-c.

2. Overloads

- a. Each starter shall have a thermal overload device in each ungrounded leg. The overload shall be of the "Ambient compensated Bi-metallic", thermal element type. All overloads shall be of the manual reset type and shall be reset without opening the starter enclosure. Heaters will be sized for the proper temperature rise of the motor that it is being used on. Heaters for general service shall be of the standard trip type. An extra normally-open contact is required for overload alarm signal, in addition to the normally-closed contact connected to the starter coil.

3. Contactors

- a. All contactors for motor starters shall be of the a-c magnetic type with "undervoltage" protection when used in conjunction with momentary contact push-button control and "undervoltage" release when used with maintained contact push-button control.
- b. Contactor size shall be as indicated on Drawings.
- c. Contacts shall be of the heavy duty silver-to-silver type and shall be totally enclosed in individual arc quenching chambers. Contacts shall be easily accessible for replacement.
- d. The contactor coil shall be of the vacuum impregnated or epoxy resin type, moisture resistant and corrosion proof.

M. Lighting

1. All fixtures shall be delivered complete with suspension and mounting accessories, diffusers, reflectors, etc., all wired and assembled. All accessory wiring shall be furnished and installed as shown on the Contract Drawings.
2. All supports required for luminaires shall be furnished and installed by the Contractor.

N. Supporting Devices – All strut, channel, conduit clamps/straps, and other supporting devices shall be either stainless steel or aluminum. All hardware such as nuts, bolts, anchors, washers, etc. shall be stainless steel.

O. Grounding Equipment – Ground rods shall be 10' x 3/4" size, minimum.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION/APPLICATION/ERECTION**

A. Cabinets – all wall/surface-mounted cabinets, panels, safety-switches, etc. shall be mounted with a minimum 0.5" air gap between the cabinet and the wall surface.

B. Conduit

1. PVC conduit shall be utilized below grade, and aluminum conduit shall be used above grade. The transition from PVC to aluminum shall occur below grade prior to the elbow. The aluminum conduit shall be taped with corrosion-prevention tape from the transition point to 6" above finished grade.
2. During construction, all new conduits shall be kept dry and free of moisture and debris. Before the wire is pulled in, all conduits shall be swabbed to clear all moisture and debris which may have unavoidably accumulated.
3. Rigid conduits, where they enter panelboards, cabinets, pull boxes or outlet boxes, shall be secured in place by Myers hubs. The use of locknuts is not acceptable.
4. All field bends shall be made with standard tools and bending equipment manufactured especially for this purpose. Bends in metallic conduit shall be made while cold and in no case shall the conduits be heated. Conduits shall not be bent through more than 90 degrees.
5. Size of conduits shall not be less than that indicated on the Contract Drawings. If the conduit size is not indicated, provide the minimum size

required by the National Electrical Code.

6. In general, flexible conduit is prohibited. Where absolutely necessary, it shall be liquidtight, with maximum lengths of 3 feet.
7. All conduit joints shall be made up tight and no running threads shall be permitted on threaded connections. No kinked, clogged or deformed conduits shall be permitted on the job.
8. During construction, all installed conduits shall be temporarily capped or corked.
9. All moisture proofing or other material for thread protection shall be removed from conduit threads prior to installation. No material of insulating quality shall be used on the conduit threads or other places which will reduce the overall conductivity of the conduit system.
10. Raceways shall be securely and rigidly fastened in place with conduit clamps or approved conduit hangers. Bolts, screws, etc. used in securing the work shall be stainless steel and of ample size for the service. Assembly bolts, nuts, washers, etc., shall be stainless steel. Raceways shall not be welded to steel structures.
11. Conduit runs shall be supported by one-hole straps with clamp backs or by mini-clamps/hangers. An air-gap is required between the conduit and the wall/ceiling. All mounting screws/bolts/hardware shall be stainless steel.
12. The use of perforated iron straps or wire for supporting conduits will not be permitted.
13. Conduits shall not be installed horizontally inside concrete slabs. The conduit must be installed underneath of the slab as indicated on the Drawings.
14. Depth of bury for all conduit shall be as indicated but not less than 30 inches below finished grade.
15. All conduit shall have an insulated ground wire pulled to all equipment.
16. All conduits penetrating enclosures shall have duct seal applied to seal the conduit and prevent moisture from entering the enclosure.

C. Wire and Cable (600 Volts and Below):

1. All wiring shall be installed in conduit. Wire shall not be installed until all work of any nature that may cause injury to the wire is completed.
2. Mechanical means shall not be used in pulling in wires No. 8 or smaller.

3. Approved wire pulling lubricant shall be used as required to prevent insulation damage and over stressing of the wire while pulling through conduit. In no case shall conductors be greased or coated with any substance injurious to the conductor insulation or sheath.
4. All wiring in control equipment, cabinets, etc., shall be neatly wrapped, taped, or laced into groups to provide a neat and orderly appearance in the equipment.
5. Where the wire is shown larger than that required for the load, it is done so for voltage drop or other purposes and must be installed as shown. Where the wire is stranded, the removal of strands in order to install the wire into a lug provided on any equipment will not be permitted. A larger lug shall be installed which will accept the wire size indicated.
6. For the wiring of circuits consisting of AWG No. 10 or smaller wire, self-insulated pressure connectors (wirenuts) shall be utilized for all splices or joints.
7. Each wire shall be labeled at both termination points. Individual conductor or circuit identification shall be carried throughout, with circuit numbers or other identification clearly stamped on terminal strips and shown in wiring diagrams.
8. In all junction boxes, cabinets, control compartments and terminal boxes where no terminal board is provided, each wire, including all power wires, shall be properly identified by plastic coated, self-adhesive, wire marker.
9. In cases similar to the above where the terminal boards are provided for the control, indicating, and metering wires, all wires including motor leads and other power wires shall be identified by wire markers as specified above.
10. Equipment ground wire insulation shall be colored green or green with two or more yellow stripes.
11. In general and unless otherwise shown on the Drawings, no two wires of the same color shall be run in the same conduit except such as control wiring, switch legs, neutral, and ground. Where a conduit run is shown on the drawings to have two or more wires connected to the same phase and, therefore, are the same color, pressure sensitive, plastic marked wire marker identification tape shall be used wherever the wire is accessible (junction boxes, panels, device boxes, etc). The numbers shall in each case, correspond to the circuit number and panelboard from which the circuit emanates. Control wiring inside any compartment which may be energized from a source outside the compartment shall have insulation. Where yellow insulated wires are used inside any cabinet, compartment, etc., a machine engraved, laminated plastic identification marker shall be installed on the outside of the compartment.

12. Insulation on ungrounded conductors larger than AWG #10 and on grounded (neutral) and grounding (equipment ground) conductors larger than AWG #6 may be black with color coding accomplished with the use of colored plastic tape. Tape shall be installed on the conductors wherever they are visible and shall be wrapped at least three (3) turns around the conductor.
13. All wiring on this project, except control wiring, shall reflect the phase relationship as follows:  
  
480 volt system: brown, orange and yellow for ungrounded conductors, gray with brown tracer for neutral conductors.  
  
208Y/120 volt system: black, red and blue for ungrounded conductors, white for neutral conductors.  
  
120/240 volt, 3-phase  
4-wire,delta system: black, red for ungrounded conductors, orange for ungrounded conductor connected to "high leg", white for neutral.

D. Grounding

1. Ground rods shall be driven vertically into the earth to at least one foot below finished grade. Where a counterpoise or grounding grid is indicated and where rock is encountered at a depth of less than four (4) feet, rods shall be buried in a trench at not less than two feet below finished grade, and at equal angles from any two adjacent sides on the outside of the counterpoise or grid. In these cases, at the Contractor's option, equal lengths of bare conductor of the same size as the counterpoise or grid may be used in place of ground rods.
2. Conductors connecting the main ground bars in switchgear to the earth shall be continuous without joints or splices. Connections to the grounding system at the switchgear shall be made with pressure connectors such as defined in Article 100, "Connector, Pressure (Solderless)", of the National Electrical Code.
3. Connections to ground rods and all other ground connections below grade shall have a minimum mechanical contact surface area between the conductor and the ground rod of not less than three (3) square inches.
4. All connections made below finished grade shall be exothermic.
5. Installation of grounding conductors shall be such that they are not exposed to physical damage. All connections shall be firm and tight. Conductors and connectors shall be so arranged and provided so that there is no strain upon the connection. Buried equipment grounding conductors shall be

buried at least 24 inches below finished grade and shall not be buried below concrete pads, paving, etc. except where running a tap to the grid or where shown on the contract drawings. Where buried below concrete or paving, grounding conductors shall be in rigid conduit unless shown on the drawings as a part of a grid.

6. Resistance measurements shall be made between the main grounding bar in the switchgear and a good earth ground. If this resistance is not equal to or less than 5 Ohms, an additional grounding electrode system in the form of ground rods installed and connected together in a 10 feet by 10 feet grid shall be added. The rods shall be connected together and this grid connected to the system with AWG #3/0 bare tinned copper. The number of rods shall be as required to register the resistance value mentioned above. Measurements shall be made in normally dry conditions and, in no case, less than 48 hours after rainfall. Submit a ground test report to the Engineer using the "Fall of Potential" method and appropriate ground testing instrumentation.
7. Where a bare conductor is the only conductor installed in conduit or other raceway, and this conductor is serving as a grounding conductor, it shall be bonded to the raceway that contains it at each end of the raceway. The bond shall be made using a grounding type bushing and bonding jumper. The size of the jumper shall be the maximum size that the grounding bushing lug will accept and it shall be connected to the bushing with the lug and to the grounding conductor with a split bolt connector.
8. All metal electrical equipment cabinets (wireways, panels, switchgear, device boxes, junction and pull boxes, motor control panels, etc.) shall be securely bonded to a grounding conductor running through any conduit terminating at the cabinet or enclosure by use of a grounding lug bushing and jumper wire to the enclosure wall. Switchgear, panelboards and motor control equipment shall be provided with an equipment ground bus (including lugs or screw terminals) securely bonded to the enclosure. Junction boxes and other enclosures shall utilize an equipment ground bus or lug as required to securely bond the equipment grounding conductor to the enclosure. The grounding conductor shall be connected with pressure connectors at the main switchgear to the main grounding system. Where screw terminals or set screw lugs are used, sufficient lugs shall be provided such that not more than one conductor is installed into each lug or terminal.
9. No raceway (including rigid steel conduit, EMT, etc.) shall serve as a grounding conductor.
10. All main feeder circuits and all branch circuits shall contain a grounding conductor sized according to Table 250-95, Article 250 of the National Electrical Code or as shown on the Drawings. This grounding conductor shall be connected to the main grounding conductor in the switchgear from which the circuit emanates. Individual components of the system served by

the main feeder circuit shall have their enclosures connected to the main feeder grounding conductor with pressure connectors.

11. The grounding conductor serving motor circuitry shall be connected inside the entrance compartment to the motor frame with a bolted solderless pressure connector. Bolts, nuts, washers and other assorted hardware shall be bronze, cadmium plated steel, or other corrosion resistant material. The motor ground connection shall be to the motor frame and independent of the mounting bolts or sliding base.
12. Grounded and Grounding Conductor: Connections to the grounding conductor and/or the neutral (grounded) conductor shall be made in such a manner that removal of any device or equipment will not interrupt the continuity of these conductors to any device downstream from the device removed.

E. Lighting

1. The Contractor shall furnish all light fixtures, lighting equipment, components, hangers, etc., as shown on the Contract Drawings and shall install them at the locations shown on the Contract Drawings.
2. Mounting heights specified as indicated shall be to bottom of fixture. Coordinate exact mounting of lighting fixture with type, style and pattern of ceiling being installed.
3. Clean interior lighting fixtures of dirt and debris upon completion of installation. Protect installed fixtures from damage during remainder of construction period.

**END OF SECTION 16020**



**SECTION 16900**  
**PUMP CONTROL PANELS**

**PART 1 - GENERAL**

**1.01 SCOPE OF WORK**

- A. Provide pilot pump control panels as specified herein and as shown on the Contract Drawings.

**1.02 RELATED WORK**

- A. Drawings and General and Supplementary Conditions of the Contract and Division 1 Specifications sections apply to this Section.

**1.03 SUBMITTALS**

- A. Panel and enclosure plan and elevation drawings depicting all components and wiring duct
- B. Complete wiring diagrams
- C. Catalog cut-sheets on all components, with options clearly indicated and non-applicable items clearly excluded
- D. Shop Drawings shall be clearly marked and or highlighted as to which product, type, option, etc. is being submitted. Product literature with one or more styles / configurations for a single product shall have a written description of use for each of the styles / configurations represented on the literature.
- E. O&M manuals shall be submitted in accordance with Section 16020. They shall include all field modifications made such that the wiring diagrams exactly match the field-installed equipment and control panels. They shall also include complete cut-sheets, product data, operation, and maintenance information.

**1.04 REFERENCES**

- A. NFPA 79 – All control panels shall comply with NFPA 79.
- B. NEC – All control panels shall comply with NEC article 409.
- C. UL508 – All control panels shall be listed to UL508 and shall bear the UL label.

**1.05 GENERAL REQUIREMENTS**

- A. All control panels furnished under this Contract shall be manufactured in accordance with industry standards and as herein specified. The Contractor shall coordinate all subcontractors and vendors to ensure that the control panels are furnished and meet the requirements specified herein.
- B. Control panels shall be as manufactured by ControlWorks, Inc., Quality Controls, ADGO, or other UL or ETL qualified panel vendor. Panel construction shall comply with OSHA requirements and shall be either UL or ETL listed.
- C. Control panels to be furnished on this project shall be wired to function according to schematics shown on the Contract Drawings. All Control Panels shall be manufactured using "relay logic" as shown on schematics (control circuits) located in the Contract Drawings. In addition to the requirements shown on the Contract Drawings, the panels shall adhere to additional requirements as written herein, and in the utilization equipment specifications.
- D. All components shall be mounted with threaded screws to a subpanel inside the enclosure such that they are replaceable without removing the subpanel. All wiring must be stranded and protected by a circuit breaker. Supplementary circuit breakers may be utilized for circuits that require wiring smaller than 14 gauge. Wiring ducts for cable/conductor management are required to be utilized for routing of conductors and cables. Ducts are also required to be provided for field-wiring at the top and bottom of the panels. All field wires should terminate at a terminal strip upon entering the control panel enclosure.
- E. Elementary control schematics and connection diagrams showing the spatial relationship of components and wiring shall be submitted for review. Also, a bill of materials, drawing of device arrangement on front, and enclosure fabrication drawings shall be submitted. Further, descriptive literature is required on all components. A copy of the as-built wiring diagrams and BOM shall be stored in a pocket inside the control panel enclosure.
- F. Labels shall be installed on all wires, keynoted back to the elementary schematic or the connection diagram, and all terminals identified.
- G. Short circuit ampacity: The minimum short circuit ampacity of the control panel shall be 5kA.
- H. Controlled equipment shall restart automatically after a power outage is restored, unless specifically exempted by Engineer due to safety concerns.

## **PART 2 - PRODUCTS**

### **2.01 ENCLOSURES**

- A. Control panel enclosure shall be wall-mount type. Enclosure shall include an IEC style rotary lockable disconnect for single phase power supply. Enclosures shall

be manufactured by Hoffman, or equal.

- B. Enclosure NEMA rating shall NEMA 12 and painted steel with ANSI 61 gray finish. The enclosure shall be sized to provide 10% spare panel space. Seams shall be continuously welded and ground smooth.
- C. Enclosure door shall have a 3-point latch. Screw clamps are not acceptable. The latch handle shall have a padlock hasp.

## 2.02 WIRING REQUIREMENTS

- A. Wire and cable shall comply with Section 16020 except Type MTW conductors shall be used inside the control panel for control circuits. Control circuit wiring shall be 18 gauge or larger.
- B. Control wiring shall be terminated using crimp-type ferrule, fork, or ring terminals. Power wiring shall utilize compression lugs.
- C. Wiring shall extend to terminal blocks for connection to external equipment.

## 2.03 MOTOR CONTROLS

- A. Variable Frequency Drives shall be separate from the pilot control panel and shall be compliant with Section 16483.

## 2.04 OVERCURRENT PROTECTION

- A. Main Single-Phase Breakers – Shall be Din-rail mountable with clear “on,” “off,” and “tripped” positions, Square D QOU or equal. Where a substantial number of breakers are used, provide a panelboard mounting base.
- B. Supplementary Protectors – Shall be Din-rail mountable UL489 listed. Trip rating shall match load served.

## 2.05 MISCELLANEOUS PANEL COMPONENTS

- A. Terminal Blocks, #10 conductor size and smaller.
  - 1. Terminal blocks shall be Din-rail mountable IEC style with minimum width of 6.2 mm. They shall be rated for conductors from #10 to #24 AWG. Current rating shall be 30A, minimum. Terminal blocks shall be finger-safe. Double level terminal blocks may be utilized where necessary to conserve space.
  - 2. Screw clamp terminal blocks are required. Terminal blocks that rely upon spring pressure only for conductor termination are not acceptable.
  - 3. Provide cross connection bridges, partition plates, end anchors, zack strip labels, and all other components necessary for a complete installation. Each block shall be labeled with a machine-printed label. No more than 2 conductors may be landed under on single terminal block terminal screw.

4. Utilize the following terminal block colors:
    - a. 120V Power – Black
    - b. 120V Control – Red
    - c. 120V Neutral – White
    - d. Equipment Grounding – Green or Green/Yellow
    - e. DC Positive – Blue
    - f. DC Negative/Grounded – Gray
    - g. Conductor energized from remote source: Yellow
  5. Terminal blocks shall be manufactured by Phoenix Contact, Allen-Bradley, or equal.
- B. Fuse blocks (control circuits) – Fuse blocks shall be finger safe and shall have LED indication when the fuse is blown. Fuses may be used only where indicated on the Drawings; otherwise use circuit breakers.
- C. Conductor Labels – Shall be the heat-shrink type, machine printed. Brady, or equal.
- D. Component nameplates – Shall be engraved, rigid, laminated plastic with adhesive back and letter height of 3/16" minimum. Nameplates shall be white with black letters.
- E. Pilot Devices
1. Selector switches shall be NEMA 4X, 30mm, oil-tight construction, and of the quick-make, quick-break type.
  2. Pushbuttons shall be NEMA 4X oil-tight, 30mm.
  3. Pilot lights shall be 30mm, oil-tight, push-to-test, NEMA 4X LED type. Green pilot lights shall be used for indicating "pump running," and yellow shall be used for "seal leak."
  4. Elapsed time meters shall be non-resettable.
  5. Timing relays shall have an adjustable time range suitable for the application, with the time delay occurring after energization.
- F. Control Relays
1. Control relays shall be magnetic, general purpose, "ice cube" type with 3-pole (minimum), double throw contacts rated at 5 amperes (minimum), 120 volts (minimum). Coils shall be rated to operate at the indicated control voltage.
  2. Provide proper bases, mounting track, etc. for a complete installation. All relays shall have a retainer clip, manual operator, and pilot light. Coils

connected to solid-state digital outputs shall have transient surge protection.

### **PART 3 - EXECUTION**

#### **3.01 LABELING**

- A. Provide labels for all conductors and components.
- B. Legends for nameplates shall be taken from the diagram in the Contract Drawings. Wire and miscellaneous component labels shall match the O&M manual wiring diagrams.

#### **3.02 GROUNDING**

- A. Enclosures shall be grounded in accordance with the NEC.

#### **3.03 INSTALLATION/ERECTION**

- A. Equipment furnished under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the Drawings, Specifications, manufacturer Shop Drawings, and manufacturer installation instructions.

**END OF SECTION 16900**



## **DIVISION 17: SCADA**





**SECTION 17010**  
**GENERAL INSTRUMENTATION AND SCADA REQUIREMENTS**

**PART 1 - GENERAL**

**1.01 SCOPE OF WORK**

- A. The Contractor shall furnish and install all materials, services, spare parts, commissioning, and other services as shown and specified and as required to integrate the new booster pump stations into the existing supervisory control and data acquisition (SCADA) system as indicated on the Drawings and as described herein. Microcomm is the required SCADA supplier to integrate with the District's existing SCADA system.
- B. All Instrumentation/SCADA equipment shall be installed, connected, and left in operating condition. The number and size of cables and conductors between all equipment and SCADA monitoring/control devices shall be as required to obtain the operation described in these Specifications, and/or by the Contract Drawings, and/or as shown in manufacturer-furnished, Engineer-reviewed Shop Drawings. The Contractor shall be responsible for supplying all components such as relays, loop isolators, transducers, etc., as necessary, whether indicated or not, at no additional cost to the Owner in order to leave a complete functional instrumentation system. The Contractor shall ensure compatibility between all system components and provide any necessary peripheral equipment as required to make the components compatible.
- C. The Contractor shall be responsible for making any modifications to existing equipment, where required to accept new equipment and systems. If modifications are to be made to equipment that is still under warranty of a manufacturer that the Contractor is not authorized to perform service to, then the Contractor shall obtain the services of that equipment manufacturer's service personnel to perform the work under the supervision of the Contractor.

**1.02 RELATED WORK**

- A. Contractors bidding work under this Contract shall read and understand Division Zero and Division 1 - General Requirements. If any discrepancies are discovered between the General Instrumentation and Supervisory Control and Data Acquisition (SCADA) Requirements and General Requirements, the above-mentioned documents shall overrule this section. The General Instrumentation/SCADA Requirements are intended as a supplement to the above-mentioned documents. The Contractor shall bid as outlined in the above-mentioned Specifications and shall be governed by any alternates or unit prices called for in the form of proposal.
- B. Division 16 - Electrical

### 1.03 SUBMITTALS

- A. Shop Drawings including descriptive literature and/or installation, operation and maintenance instructions shall be submitted in the amount of copies as listed in the General Conditions, but no less than 8 copies. All Shop Drawings shall be submitted in loose-leaf three-ring cardboard reinforced vinyl binders with extensive indexing. Each sheet in the binder shall have hole reinforcements. Should there be any exceptions to the Specifications, the Supplier shall completely describe such in front of the submittal via a point-by-point letter referencing the specification paragraph number. The hardware submittal shall be arranged as follows:
1. Front Cover – Project description and pertinent information
  2. Review stamp page.
  3. Table of Contents
  4. Overall description of the system and overall BOM of equipment to be delivered
  5. Block diagram of system, including network architecture and IP addressing
  6. Complete Wiring diagrams, panel layouts/elevations, and panel BOMs. Diagrams must be customized for this project.
  7. Complete manufacturer's information on all equipment, including highlighted catalog/model number data sheets
  8. Complete list of spare parts
  9. Warranty description and information.
- B. Shop Drawings shall be submitted on all equipment and software specified in this Division unless a specific written exemption is obtained from the Engineer. The Contractor shall not procure or install any materials, equipment, or software without approved shop drawings.
- C. The Engineer reserves the right to make modifications to instrumentation & SCADA equipment after Shop Drawing review, if the Instrumentation/SCADA Shop Drawings are submitted prematurely (prematurely meaning submitted before all process equipment has been reviewed and accepted). Cost of modifications shall be the Contractor's responsibility.
- D. Operation & Maintenance Manuals: Manuals shall include the accepted shop drawing information along with the following additions:
1. Include complete addresses of all equipment manufacturing representatives and phone numbers of each.
  2. Incorporate complete record drawings indicating final installation of equipment and wiring.
  3. Include complete manufacturer's installation, operations, and maintenance manual for each piece of equipment and software supplied. Note, if the

manufacturer's manual exceeds 50 pages in length, include only a placeholder page that directs the reader to the USB thumb drive electronic documentation.

4. Complete as-built overall Bill of Materials, and BOM for each panel.
5. Include a configuration record for each piece of equipment, including all parameter settings and set points.
6. Include calibration certificates for Instrumentation.
7. The manuals shall include a USB thumb drive which include electronic version of all of the above information, along with the following additional information:
  - a. Backup of all programs developed in the course of the project.
  - b. Backup of all reports, databases, set point listings, and all other electronic information utilized in the project.
  - c. Manufacturer O&M manuals which exceed 50 pages in length.
  - d. Software license documentation
  - e. Backup of any other software pertinent to documenting or restoring instrumentation/SCADA system operation in the event of a failure.

#### 1.04 QUALITY ASSURANCE

- A. The Contractor shall be a factory authorized representative capable of start-up services of the equipment or shall provide the services of a factory authorized representative.
- B. The Contractor shall have at least five years experience within the last five years in the design, manufacture, installation, calibration, and commissioning of instrumentation/SCADA systems of similar size and complexity to this project.

#### 1.05 SYMBOLS AND ABBREVIATIONS

- A. The symbols and abbreviations generally follow standard instrumentation and electrical practice, however, exceptions to this shall be as shown on the Contract Drawings.

#### 1.06 COORDINATION WITH OTHER TRADES

- A. The Contractor shall coordinate the instrumentation/SCADA work with that of other trades to ensure proper installation and functionality of all equipment and process control/monitoring programs. Installation of equipment may be performed by other trades unless specified otherwise.

#### 1.07 CODES

A. The minimum standard for all work shall be the latest revision of the Kentucky Building Code (KBC), and the National Electrical Code (NEC). Whenever and wherever state and/or local laws or ordinances and/or regulations and/or the Engineer's design require a higher standard than these codes, then these laws and/or regulations and/or the design shall be followed.

B. Following is a list of other applicable Standards or Codes:

|     |                                                        |      |
|-----|--------------------------------------------------------|------|
| 1.  | Kentucky Building Code                                 | KBC  |
| 2.  | National Electrical Code                               | NEC  |
| 3.  | International Electrotechnical Commission              | IEC  |
| 4.  | Underwriters Laboratories, Inc.                        | UL   |
| 5.  | Factory Mutual System                                  | FM   |
| 6.  | National Fire Protection Association                   | NFPA |
| 7.  | National Electrical Manufacturers Association          | NEMA |
| 8.  | Occupational Safety and Health Administration          | OSHA |
| 9.  | National Institute of Standards and Technology         | NIST |
| 10. | Instrument Society of America                          | ISA  |
| 11. | Institute of Electrical and Electronic Engineers, Inc. | IEEE |
| 12. | American National Standards Institute, Inc.            | ANSI |
| 13. | Federal Communications Commission                      | FCC  |

#### 1.08 STORAGE

A. All work, equipment, and materials shall be protected against dirt, water, or other injury during the period of construction.

B. Sensitive instrumentation/SCADA equipment shall be protected against injury or corrosion due to atmospheric conditions or physical damage by other means. Protection is interpreted to mean that equipment shall be stored under roof, in a structure properly heated in cold weather and ventilated in hot weather. Provision shall be made to control the humidity in the storage area to 50 percent relative. The stored equipment shall be inspected periodically, and if it is found that the protection is inadequate, further protective measures shall be employed. Instrumentation/SCADA equipment shall not be installed until the structure is under roof with doors and windows installed.

#### 1.09 ERRORS, CORRECTIONS, AND/OR OMISSIONS

A. Should a piece of process equipment be supplied of a different type or manufacturer than shown or specified in the Contract documents, the Contractor shall be responsible for installing, programming, and commissioning the proper instrumentation/SCADA equipment for proper operation, control, and monitoring of that process equipment at no extra cost to the Owner.

B. It is the intent of these Specifications to provide for an instrumentation/SCADA system installation complete in every respect, to operate in the manner and under

conditions as shown in these Specifications and on the Contract Drawings. The Contractor shall notify the Engineer, in writing, of any omission or error at least 10 days prior to opening of bids. In the event of the Contractor's failure to give such notice, he/she may be required to correct work and/or furnish items omitted without additional cost. The submission of a bid indicates that the Contractor believes the design to be sound and can provide a fully functional and complete instrumentation and SCADA system. Further requirements on this subject may be found in the General Requirements, Division 1.

#### 1.10 GUARANTEES AND WARRANTIES

- A. The Contractor shall guarantee all work including equipment, materials, and workmanship. This guarantee shall be against all defects of the electrical system or improper equipment operation. It shall last for the period of time specified in the General Conditions of the Contract, but not less than one year from the date of system acceptance (i.e. – when the Engineer accepts that the punchlist is complete.) On-site response within 24 hours is required, at no additional cost, for problems experienced within the warranty period.
- B. Equipment manufacturers shall provide a minimum of one-year of technical support and software updates dating from final acceptance. The costs of this shall be included in the bid Certification of this shall be provided to the Owner with the O&M manuals.

#### 1.11 TESTING

- A. After the instrumentation/SCADA system is complete, and at such time as the Engineer may direct, the Contractor shall conduct an operating & performance test for acceptance. The system shall be demonstrated to operate in accordance with the requirements of these Specifications and the Contract Drawings. The test shall be performed in the presence of the Engineer or his authorized representative. The Contractor shall furnish all instruments, hardware, software, and personnel required for the tests.

#### 1.12 UTILITY AND REGULATORY COORDINATION

- A. The Contractor is responsible for coordinating all activities required by the necessary utilities and regulatory agencies, including FCC licensing.
- B. Any special provisions required by the utilities or regulatory agencies shall be as outlined on the Contract Drawings or as advised by the utility at the time of construction, and work required by these special provisions shall be executed with no extra cost to the Owner.
- C. Fees charged by the utilities shall be included in the Contractor's lump sum bid.

#### 1.13 TRAINING

- A. All manufacturers supplying equipment for this division shall provide the Owner's operations staff with training in the operation and maintenance on the equipment being furnished. The training shall be conducted at the project site by a qualified representative of the manufacturer.
- B. The cost of this training shall be included in the bid price.
- C. The required training shall consist of both classroom and hands-on situation. Classroom training shall include instruction on how the equipment works, its relationship to all accessories and other related units, detailed review of shop drawings, detailed presentation of written O & M instructions, troubleshooting and record-keeping recommendations. Hands-on-training shall include a review of the manufacturer's O & M instructions, check out of each operator as to identifying key elements of the equipment, tear down as appropriate, calibration, adjustment, and operating manipulations of all controls.
- D. The training shall be scheduled through the Contractor with the Owner. The timing of the training shall closely coincide with startup of the equipment, but no training shall be conducted until the equipment is operational. The training program shall not begin until operations and maintenance manuals have been reviewed and sent to the Owner. Training shall use the accepted O & M manuals.
- E. The training program length shall be as described in the individual Division 17 sections.
- F. At least 30 days prior to the training the manufacturer shall submit through the Contractor to the Engineer an outline of the training proposed for the Engineer's review and concurrence.

#### 1.14 RECORD DRAWINGS

- A. The Contractor shall maintain 1 set of the Contract Drawings on the job in good condition for examination at all times. The Contractor's qualified representative shall enter upon these drawings, from day to day, the actual record of construction and/or alteration progress. Entries and notes shall be made in a neat and legible manner and these drawings delivered to the Engineer after completion of the construction, for use in preparation of Record Drawings.

#### 1.15 MAINTAINING CONTINUOUS PROCESS CONTROL AND MONITORING SYSTEM

- A. Existing system(s) continuity shall be maintained at all times. In no way shall the installation and/or alteration of the instrumentation/SCADA work interfere with or stop the normal operation of the existing facilities, except where prior arrangements have been made.
- B. When additions and modifications to existing system(s) require outages of duration in excess of a few minutes, arrangements shall be made in advance for

such outages. All outages shall be held to an acceptable minimum in coordination with Owner. If necessary, outages shall be performed on premium time. Under no circumstances shall a process control/monitoring outage of any duration be initiated until the Owner and Engineer have concurred, and as far as possible in advance.

#### 1.16 RECEIPTS

- A. Some sections of the Specifications call for equipment, materials, accessories, etc. to be furnished and “turned over to the Owner” or like requirements. The Contractor shall obtain a receipt for each item turned over, signed by the Owner or his representative. A copy of this receipt shall be transmitted to the Engineer.
- B. When a question arises concerning whether items have been turned over to the Owner, and there is no signed receipt, it may be assumed that the items were not furnished.

### **PART 2 - PRODUCTS**

#### 2.01 MATERIALS

- A. All materials used shall be new unless noted otherwise. All materials shall be UL listed for the application where a listing exists. Additional requirements are found in Division 1. All equipment shall meet applicable FCC requirements and restrictions.
- B. The material and equipment described herein has been specified according to a particular trade name or make to set quality standards. However, each Contractor has the right to substitute other material and equipment in lieu of that specified, other than that specifically mentioned for standardization, providing such material and equipment meets all of the requirements of that specified and is accepted, in writing by the Engineer.
- C. The reuse of salvaged equipment will not be permitted unless specified herein or indicated on the Contract Drawings.

### **PART 3 - EXECUTION**

#### 3.01 GROUNDING AND BONDING

- A. All metallic conduit, cabinets, supporting framework and instrumentation/SCADA equipment shall be grounded in accordance with the latest issue of the National Electrical Code.

#### 3.02 ANCHORING/MOUNTING

- A. Instrumentation/SCADA equipment other than computer equipment located in the office/control room shall be rigidly supported as specified in Division 16.
- B. All wall/surface mounted cabinets, panels, or other devices shall be mounted with a minimum 0.5" air gap between the cabinet and the wall.

**END OF SECTION 17010**



## **SECTION 17100 PROCESS INSTRUMENTATION**

### **PART 1 – GENERAL**

#### **1.01 SCOPE OF WORK**

- A. The Contractor shall provide instrumentation as indicated on the Contract Drawings. Provide all materials, labor, spare parts, start-up services, as shown and specified and as required to install a complete, functional, calibrated instrumentation system.
- B. Provide instrumentation training services.
- C. Additional requirements are in Section 17010.

#### **1.02 RELATED WORK**

- A. Installation of all electrical equipment, conductors, and related items shall be in accordance with all applicable sections of Division 16 of these specifications.
- B. General Requirements are included in Division 1.
- C. Division 11 – Equipment
- D. Section 17010 - General Instrumentation and SCADA requirements.

#### **1.03 SUBMITTALS**

- A. Shop drawing approval is required before the Contractor purchases or installs any equipment. Submit in accordance with Section 17010.
- B. Operation and Maintenance Manuals shall be submitted in accordance with Section 17010.

#### **1.04 QUALITY ASSURANCE**

- A. See Section 17010 for requirements.
- B. Manufacturer NIST or equal calibration certificate is required for all instruments with an analog current or voltage signal output.

#### **1.05 WARRANTY AND SERVICE**

- A. See Section 17010 for requirements.

#### **1.06 TRAINING**

- A. Training shall be in accordance with Section 17010.

- B. The instrumentation training program shall be a minimum of a 2-hour session on-site.

#### 1.07 DELIVERY AND STORAGE

- A. See Section 17010 for requirements.

### **PART 2 – PRODUCTS**

#### 2.01 GENERAL

- A. Acceptable manufacturers/suppliers for the instrumentation equipment shall be Rosemount, Foxboro, Endress-Hauser, ABB, or equal. Manufacturers of small peripheral equipment are listed with each piece of equipment.
- B. All equipment shall be UL listed where a listing exists.
- C. All electronic instrumentation equipment shall be of the solid-state type and shall utilize linear transmission signals of 4 to 20 mA dc. No zero based signals will be allowed for remote transmission.
- D. All instrumentation supplied shall be of the manufacturer's latest design and be compatible for the industry it is being applied.
- E. All scales and readouts shall be direct reading in process units. Conversions are not acceptable.
- F. All transmitters shall be provided with indicators, either integral or remote mounted, but must be within site of the transmitter unless specifically indicated otherwise on the Contract drawings.
- G. All equipment must be able to reset after a power outage without having to be manually reset.
- H. All circuit boards in instruments mounted outdoors, or in damp locations, shall be fungus proofed.
- I. All equipment mounted outdoors shall be protected from the sunlight, and extreme temperatures between –20 degrees and 140 degrees Fahrenheit. Provide all necessary shielding, heaters, or air conditioners as required. All externally mounted panels shall have self-sacrificing corrosion inhibitors installed.

## 2.02 INSTRUMENTATION EQUIPMENT

### A. Pressure Gauges

1. All indicating gauges shall be pipe mounted with male and brass threaded pipe connections. Gauges shall be liquid filled for maximum vibration and corrosion protection. Gauges shall have phosphor bronze Bourdon tubes, white laminated phenol dials, micrometer pointer and be enclosed in painted aluminum enclosure. All gauges shall be 4 ½" with 0.5% of scale accuracy. Gauges shall be manufactured by Helicoid Gauge Division, James P. Marsh Corporation, Ashcroft, U.S. Gauge, or equal.
2. Piping valves and fittings for gauges, and the fittings for gauges on the discharge side of the pumps, shall be rated for 300 psi.

### B. Pressure Switches

1. Pressure switches shall be industrial type NEMA 4X epoxy-coated aluminum body with UL listing.
2. The pressure switch shall have a single pole double throw relay output. The setpoint shall have an adjustable range suitable for operation in the conditions shown on the Drawings and in the equipment specifications.
3. The switch shall be rated for operation in –25°F to 130°F ambient. Setpoint shall drift no more than 1.5% for a 50°F ambient temperature change.
4. Setpoint repeatability shall be within 1.5% of adjustable range, maximum.
5. Electrical connection shall be either a ½" or ¾" threaded connection.
6. Pressure connection shall be NPT.
7. Provide isolation valve and bleed valve suitable for removing the pressure switch from its connection under pressure.
8. The pressure switch shall be Allen-Bradley, or equal.

### C. Pressure Cells & Transmitters

1. The transmitters shall be Foxboro Model IGP20, or equal, for measuring gauge pressure.
2. The transmitter shall loop-powered
3. The transmitter shall transmit a 4-20 mA signal when supplied with voltage in a range from 11.5 to 42 VDC
4. The transmitter shall have an LCD display with on-board pushbuttons
5. The transmitter shall have an external zero adjustment
6. The transmitter shall have a Type 316 stainless steel cover and housing. It shall be rated NEMA 4X.

7. The transmitter range shall be 0 to 300psi.
8. Accuracy shall be +/-0.075 percent of calibrated span, minimum. Repeatability shall be better than 0.5 percent of calibrated span.
9. The transmitter shall be equipped with HART communications.
10. Mounting bracket shall be stainless steel.
11. Manufacturer warranty shall be 5 years, minimum.

D. Electromagnetic Flowmeter and Transmitter

1. The electromagnetic flow meter shall consist of a flow sensor based on Faraday's Law of Electromagnetic Induction and microprocessor-based signal converter & transmitter.
2. The sensor flow tube liner material shall be EPDM rubber for drinking water applications. Measurement and grounding electrodes shall be 316 stainless steel. Flow tube shall have corrosion resistant epoxy coating. Drinking water flow meters shall be approved by NSF.
3. The flowtube and transmitter assembly shall be NEMA 4X or better.
4. Operating temp: Operating Temp: -5 to +120° F minimum acceptable band
5. Display: Background illumination with alphanumeric 3-line, 20-character display to indicate flow rate, totalized values, settings, and faults
6. Power supply: 115/230 VAC as indicated on Contract Drawings.
7. Outputs: 4-20 mA into 800 ohms max. One relay rated at 42 VAC/2 A, 24 DC/1A. Provide Digital pulse for external display of flow rate or totalizer.
8. Flow Range: 1.5 fps to 33 fps for accuracies stated below.
9. Accuracy: 0.5% of actual flow.
10. Separation: Allowable distance of 900 feet between signal converter and sensor without the use of any additional equipment
11. Provide Bi-directional flow capabilities
12. Totalizer: Two eight-digit counters for forward, net, or reverse flow.
13. The transmitter shall be mounted integrally as indicated on the Drawings.
14. Insertion type flow meters will not be accepted.

F. Instrument Valves (1/4" through 3/4")

1. Shutoff valves shall be provided on each pressure line to an instrument and accessory item, and shall be bronze 1/4 turn ball valves with Teflon seats as manufactured by Whitey Co., Gould, Hoke, Apollo, or equal. Valves shall have a corrosion resistant handle.
2. Throttling valves where required and/or shown on the Contract Drawings shall be bronze globe valves, NUPRO "J" Series, Hoke 3700-3800 Series, or equal. Valves shall have a corrosion resistant handle.

G. Tubing

1. Tubing for pressure lines to transmitters shall be hard drawn copper or 316 stainless steel. Bulkhead fittings, bushings, etc., shall be those especially designed for the tubing and used at all terminations. Tubing shall be Type "L" copper bent with bending tools, or as to have a minimum

number of joints. Solder joint fittings are not allowed; compression type shall be utilized, Swagelok or equal.

2. All runs of tubing shall be straight, parallel to walls with a slope to a drip leg at each connection to a transmitter, where the transmitter is below the primary element. Horizontal liquid-filled lines shall slope at least 1 inch per foot downward toward the measuring element to ensure that air or gas bubbles return to the main flow line or tank.

#### H. Magnetic Contact Switches

1. The contact shall be a hermetically sealed reed switch nominally 3" L x 1" H x 0.50" D with matching actuating magnet. Mounting holes shall be on approximately 2" centers. Contact and magnets shall be in brushed anodized aluminum tube housing. Contact shall be sealed in polyurethane potting compound. Right angle mounting bracket shall be furnished with contact.
2. The contact shall be a Form C (SPDT) reed contact. For doors, the contact shall be biased such that contact will be difficult to defeat with an external magnet and three feet of flex stainless steel conduit shall be permanently attached to the contacts. Contacts in cabinets need not have the biased feature and can be provided with vinyl-jacketed cable.
3. When installed in NEMA-rated cabinets, mounting arrangement shall not derate the NEMA rating of the cabinet.
4. The contact shall be GE Sentrol, or equal.

### 2.03 MISCELLANEOUS ACCESSORIES

- A. Flange Adapters – Dresser Style 128 or equal for steel, ductile iron, or cast iron piping. Contractor must ensure the proper type of flange is procured. Provide restraints where specified in Division 2.

## PART 3 EXECUTION

### 3.01 EQUIPMENT INSTALLATION

#### A. General

1. All piping to and from field instrumentation shall be provided with necessary unions, tees, adapters, and shut-off valves.
2. Install all equipment in accordance with the manufacturer's installation and maintenance information.
3. Provide and install all necessary mounting equipment, brackets, required for mounting of equipment.

4. Instrument cables shall be pulled without undo stress that may aggravate the number of twists per foot. Shields shall be continuous and shall be only grounded at one end.
5. Place duct seal around the wires in each conduit entering every instrument enclosure for the project.
6. All instruments and equipment shall be left free from shipping burrs, paint overspray, grease, etc. All scratches shall be touched up with manufacturer's matching paint.
7. Install on each instrument, transmitter, recorder, indicator, etc., a plastic engraved white with black letters nameplate secured to the panel. Nameplates shall be permanently secured with stainless steel screws if it does not interfere with the NEMA rating of the box. Instruments shall be supplied with a stainless or aluminum engraved tag with black letters if no flat spot exists for a nameplate. Chain shall be stainless steel.
8. Locate instruments as shown on the electrical drawings and primary elements as shown on the electrical or plant process drawings.
9. Transmitters or indicators shall not be mounted from process piping or hangers, only the building structure.
10. Remove all shipping tags, lifting rings, from enclosures. Plug all non-used holds in enclosures.
11. The placing and location of system components, their connections to the process equipment panels, cabinets and devices, shall be coordinated with the Engineer's acceptance.
12. Flowmeters shall be installed with flange adapters to facilitate installation and removal.

### 3.02 STARTUP SERVICES

- A. After equipment and materials have been shipped to the job site, the Contractor shall furnish the services of a factory-trained service technician or engineer to assist and advise the Contractor during installation and to provide calibration/adjustment at initial startup.
- B. Following installation, checkout, and final adjustment of all panels, instruments, meters, monitoring, and control devices, the Contractor shall schedule a performance test in the presence of the Engineer on all equipment. The Contractor shall furnish the services of servicemen, all special tools, calibration equipment, and labor to perform the tests.

- C. Meters shall be tested at 0 percent, 25 percent, 50 percent, 75 percent, and 100 percent of scale, if possible. All status and alarm switches as well as all monitoring and control functions shall also be checked. Testing shall be done from the signal source to the final element or device including all field wiring.
- D. If, during running of the tests, one or more points appear to be out by more than the system accuracy statement, the Contractor shall make such adjustments or alterations as are necessary to bring equipment up to specification performance. Following such adjustment, the tests shall be repeated for all specified points to ensure compliance.

**END OF SECTION 17100**





## **SECTION 17200 SCADA HARDWARE**

### **PART 1 – GENERAL**

#### **1.01 SCOPE OF WORK**

- A. The Contractor shall provide a new RTU for the KY-472 booster pump station along with miscellaneous accessories as specified herein.
- B. Additional requirements are specified in Section 17010.

#### **1.02 RELATED WORK**

- A. Installation of all electrical equipment, conductors, and related items shall be in accordance with all applicable sections of Division 16 of these specifications.
- B. General Requirements are included in Division 1.
- C. Section 17010 - General Instrumentation and SCADA requirements.
- D. Section 17400 – SCADA Software

#### **1.03 SUBMITTALS**

- A. Shop drawing approval is required before the Contractor purchases or installs any equipment. Submit in accordance with Section 17010.
- B. Operation and Maintenance Manuals shall be submitted in accordance with Section 17010.

#### **1.04 QUALITY ASSURANCE**

- A. See Section 17010 for requirements.

#### **1.05 WARRANTY AND SERVICE**

- A. See Section 17010 for requirements.

#### **1.06 SPARE PARTS**

- A. Five fuses of each size/type in the system.
- B. One coax/antenna surge arrestor

## 1.07 TRAINING

- A. Not required for the RTU hardware on this project.

## 1.08 TERMINOLOGY

- A. MTU – Master Telemetry Unit: A radio with associated equipment used to communicate to remote locations.
- B. RTU – Remote Telemetry Unit: A radio with inputs and outputs used to communicate with the master telemetry unit or other remote telemetry units.
- C. PLC – Programmable logic controller

## PART 2 – PRODUCTS

### 2.01 GENERAL

- A. Acceptable manufacturer of SCADA hardware shall be Microcomm. Manufacturers of small peripheral equipment are listed with each piece of equipment.
- B. All equipment must be able to reset after a power outage without having to be manually reset.

### 2.02 SCADA RTU CABINET

- A. General: The RTU shall be provided compliant with the following features:
  - 1. Enclosure: Sized for 10% spare panel space with a single 3-point roller latch. Screw clamps are unacceptable. NEMA rating shall be NEMA 12 minimum. Components installed in the exterior of the enclosure shall maintain the NEMA rating of the enclosure. All enclosures shall have a padlock hasp.
  - 2. Main circuit breaker and transient voltage surge suppression
  - 3. Battery with charger for uninterruptable power supply, 30 minutes of backup required.
  - 4. Provide DC power supply, miscellaneous breakers, fuses, terminal blocks, wiring duct, and other panel components
  - 5. Provide prewired with all field wiring landed on terminal blocks for field installation
  - 6. An LCD display shall be included that shall indicate pump station flow rate, suction pressure, discharge pressure, and remote water tank level.

7. Programmable controller with all required inputs and outputs as required to meet the requirements of the Contract Drawings and these specifications. 20% spare I/O of each type is required.
8. Radio
9. Antenna feedline surge protection, Polyphaser or equal

## 2.03 COMPUTERS

- A. A computer is not required. The existing SCADA computer hardware shall be utilized. Provide any necessary software or licensing updates as needed to integrate the new signals indicated.

## 2.04 SURGE SUPPRESSION

- A. Cabinet Power Supply Surge Protective Device (SPD)
  1. The power supply SPD shall be a Din-Rail-Mounted device and shall be installed to protect the equipment in the cabinet from harmful surges and voltage spikes.
  2. The SPD shall have nominal ratings of 120VAC and 26A minimum. Temperature range shall be  $-40^{\circ}\text{C}$  to  $80^{\circ}\text{C}$ .
  3. The device shall have a surge handling capacity of 10kA (8/20microsecond) minimum. It shall have hybrid technology for "fine" voltage clamping and "coarse" surge current handling. The clamping voltage shall be less than or equal to 500V. The response time shall be less than or equal to 25 nanoseconds.
  4. The device shall be a Phoenix Contact "Mains-Plugtrab PT Series," or equal.

## 2.05 MISCELLANEOUS EQUIPMENT

- A. Loop Isolator and Signal Converters: The loop isolator or signal converter shall be provided where necessary to isolate signals. Isolators shall provide 3-way isolation. Isolators and converters shall be Action Instruments, Phoenix Contact, or equal.

## 2.06 RADIO MODEM

- A. The radio shall be a single, integrated unit matching the District's existing radios. It shall be rated for operation with the unit transmitting continuously. The radio shall be programmable to operate on the District's existing frequency.

## **PART 3 EXECUTION**

### **3.01 EQUIPMENT INSTALLATION**

- A. Install all equipment in accordance with the manufacturer's installation and maintenance information.
- B. Furnish and install all necessary mounting equipment, brackets, required for mounting of equipment.
- C. Place duct seal around the wires in each conduit entering every SCADA cabinet for the project.
- D. All equipment shall be left free from shipping burrs, paint overspray, grease, etc. All scratches shall be touched up with manufacturer's matching paint.
- E. Locate equipment as shown on the electrical drawings.
- F. Remove all shipping tags, lifting rings, etc. from enclosures. Plug all non-used holes in enclosures.
- G. The placing and location of system components, their connections to the process equipment panels, cabinets and devices, shall be coordinated with the Engineer's acceptance.

### **3.02 STARTUP SERVICES**

- A. Following installation, checkout, and final adjustment of all hardware, the Contractor shall schedule a performance test in the presence of the Engineer on all equipment. This test shall be concurrent with the SCADA software test.

**END OF SECTION 17200**

**SECTION 17400**  
**SCADA SOFTWARE**

**PART 1 – GENERAL**

**1.01 SCOPE OF WORK**

- A. Provide SCADA software development, testing, and commissioning services as specified herein to integrate the KY-472 booster pump station into the existing SCADA application. Provide all materials, labor, software, and services as required to implement a complete and functional system. Microcomm is the required SCADA supplier.
- B. Integrate each I/O point indicated on the Contract drawings into the SCADA software.
- C. Provide software operation training services.

**1.02 RELATED WORK**

- A. General requirements are located in Division 1.
- B. Section 17010 – General Instrumentation/SCADA Requirements
- C. Section 17200 – SCADA Hardware

**1.03 SUBMITTALS**

- A. Software submittal shall be submitted in accordance with Section 17010.
- B. Operation & Maintenance manuals shall be submitted in accordance with Section 17010.

**1.04 QUALITY ASSURANCE**

- A. See Section 17010 for requirements.

**1.05 WARRANTY & SERVICE**

- A. See Section 17010 for requirements.

**1.06 TRAINING**

- A. Software training shall comply with Section 17010 requirements.

- B. Onsite Software Training shall be provided to familiarize Owner personnel with all aspects of pump station SCADA operations, monitoring, analysis, and reporting.

## **PART 2 – PRODUCTS**

### **2.01 GENERAL**

- A. The existing software shall be utilized for the integration of the new booster pump station. If any upgrades or license changes are necessary to implement the requirements specified herein, then these upgrades shall be provided in the lump sum bid.

## **PART 3 - EXECUTION**

### **3.01 SOFTWARE SERVICES**

- A. General: Software services shall include program development, testing, documentation, and work necessary to implement a complete and fully operating system as shown on Drawings and as specified. Work requires coordination with concurrent program development for programmable controllers (PLCs), Operator Interfaces, Management Reports, and Data Collection. Include PLC error detection logic for communications failures, data highway faults, internal faults, and time outs. Communicate PLC error conditions to Operator Interface for logging and reporting. Employ a "watchdog" timer for each remote PLC and poll that PLC if no message has been received in a reasonable amount of time. Accept Operator Interface directives for set point changes and hand switches.
- B. SCADA Interface Screens: Provide graphic representation of pump station processes. Also provide data collection activities to provide historical trend analysis and process data readings for use in management reporting. Provide the following screens or screen updates:
  - 1. Main Menu
  - 2. KY-472 Booster Station Overview
  - 3. Alarm Summary
  - 4. Alarm History
  - 5. Network Status
  - 6. Trending
  - 7. Runtime/ #-start Reports

8. Flow Total Reports

C. SCADA software required application features:

1. Video displays shall match existing resolution. They shall be fully windowed and shall use a mouse for control. Use colors, function keys, and navigational controls consistently.
2. Alarm Management: For each process or system event classed as an alarm provide facilities for displaying and logging in database, acknowledgment, and purging of stale messages. Alarm events are derived from discrete inputs, analog trip values, logic combinations and computations as needed. Log and display both alarm events and returns to normal. Provide date/time stamps for events, descriptive message, and event type code. Use color combinations to distinguish following alarm states: Alarm-Unacknowledged, Alarm-Acknowledged, Normal-Unacknowledged, and Normal-Acknowledged.
  - a. For each pump, provide a "Failure to Start" alarm that triggers 10 seconds after the equipment is called to run if it is not confirmed to be running by the feedback signal.
  - b. For each 4-20mA instrument, provide a "Transmitter Failure" alarm that triggers if the signal falls below 3.8 mA or exceeds 20.2 mA. This alarm shall not be triggered if a power outage occurs.
3. Graphic Displays:
  - a. Provide process-oriented displays showing current process status and accepting operator input for setpoint and status changes.
  - b. For each display, show process elements such as pumps, valves, tanks, pipe lines, etc., with their current operational status. Emphasis shall be placed on depicting the system in a "P&ID" format that allows easy conceptualization of process flow rather than depicting equipment in actual physical location or scale.
  - c. Not running state: graphic shall be natural color with no motion.
  - d. Running state: Graphic shall be green color and shall rotate or show other type of motion as appropriate. Both color and motion shall be depicted.
  - e. Red color shall be reserved for alarm graphics.
  - f. Tanks shall include both analog and digital indication of current fill/level status. Also, static text must be added to indicate level

- at bottom of tank and top (or overflow) of tank.
- g. Indicators shall use an appropriate number of significant digits and dead band to produce steady values.
4. Trending: Provide on-screen trending displays that are user definable that operate from either previously collected historical trend groups (named file) or from a group of real-time variables. Provide facilities for user selection of colors, time (horizontal), and measurement (vertical) scales. Accommodate real-time sampling intervals as short as 1 second. Real-time trends shall show alarm setpoints. Historical trend displays shall have time-scale panning controls. All trends must have an adjustable cursor that indicates both Y and X axis values at the user-selected location.
5. Security: Using operator interface and operating system software, implement a security system to restrict access to parts of system. Provide the following as a minimum:
- a. Administrator - Access to all facilities including changing displays and logic.
  - b. Supervisor - Access to all displays, control pumps, acknowledge alarms, and change setpoints
  - c. Operator - Access to all displays, control pumps, and acknowledge alarms.
  - d. Guest - Access to displays only.
6. Data Storage:
- a. All tags, both analog and digital, shall be stored via "Delta" storage method. That is, a new value shall be stored only when the tag has changed an appropriate amount. Normally the delta storage should be triggered at 0.1% change against the tag's maximum value, although this level may need to be adjusted if the tag has an abnormally wide range of operation.
  - b. Establish automatic backup of historical data on a daily basis. The data shall be stored on an external harddrive provided by the Contractor unless noted otherwise on the Drawings.



7. Trending

- a. For each tag selected to be trended on the Contract Drawings, provide a pre-configured trend that shows both real-time and historical values. Certain tags may be added to the same trend where appropriate as long as they are uniquely identified via color and label.
- b. Provide a custom trend screen whereby the operator has the ability to trend any tag in the database.

8. Reports:

- a. Reporting requirements shall consist of both live HMI screens that dynamically update the values for “today”, “yesterday”, “this month”, and “last month” and also published historical reports. The published reports shall be accessible via web browser across the internet with appropriate security.
- b. Daily totals shall be published at 11:59:55 PM and reset to zero at midnight. Monthly totals shall be published at 11:59:55 PM on the last day of the month and reset at midnight.
- c. Totalization time slices shall not exceed 5 seconds.
- d. The following parameters shall be reported:
  - i. Motor & Equipment Run times: For each motor or piece of equipment that is monitored, report “Run Time Today” and “Run Time Yesterday”.
  - ii. Flow Totals: For each flow meter, report “Flow Total Today”, “Flow Total Yesterday”, “Flow Total This Month”, and “Flow Total Last Month.”

3.02 CONTROL SEQUENCES

A. KY-472 Booster Station Requirements

- 1. Provide manual and automatic control of the pumps. Only one pump shall be allowed to run at a time.
- 2. Under manual mode, the operator shall be able to start/stop a pump via a button or switch on the screen.

3. Under automatic control, two control modes shall be provided: level control and discharge pressure control. The operator shall be able to select which mode of operation is desired. In the event of a communication failure to the controlling water tank while operating in level control mode, the system shall automatically revert to discharge pressure control mode.
5. Automatic level control mode shall include adjustable “Off” and “On” level setpoints referenced to the controlling water tank level.
6. Automatic discharge pressure control mode shall include adjustable “Off” and “On” discharge pressure setpoints.
7. Provide an alternation switch that allows automatic alternation of the pumps with each cycle off, or the ability to lock in Pump 1 or Pump 2 as the pump that will run.

### 3.03 PERFORMANCE TEST

- A. Following installation, checkout, and final adjustment of software, the Contractor shall schedule a performance test in the presence of the Engineer and the Owner.
- B. Demonstrate to the Engineer and Owner that each I/O point scheduled on the Contract Drawings has been integrated and is functioning properly.
- C. Demonstrate trending, reporting, and alarm messaging has been configured properly and is operational.
- D. Software development shall not be accepted until the SCADA system functions for at least one week with no nuisance alarms. Nuisance alarms shall be as defined by the Engineer.

**END OF SECTION 17400**

## **SECTION 17500**

### **RADIO TELEMETRY SYSTEM**

#### **1.01 SCOPE OF WORK**

- A. Provide a radio-frequency (RF) data transmission/telemetry system for communication between the supervisory control and data acquisition system (SCADA) central station equipment and the new KY-472 booster station remote telemetry unit (RTU).

#### **1.02 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to this Section.
- B. Electrical work is specified in Division 16.
- C. Section 17010: General Instrumentation/SCADA requirements.

#### **1.03 REFERENCES**

- A. Code of Federal Regulations (CFR): 47 CFR 15 Radio Frequency Devices
- B. IEEE C62.41 Surge Voltages in Low-Voltage AC Power Circuits
- C. NFPA 780 Installation of Lightning Protection Systems

#### **1.04 SUBMITTALS**

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Provide the following information in a single submittal for Engineer approval:
  - 1. System Drawing
    - a. Data transmission system block diagram.
    - b. Radio system installation and wiring diagrams.
    - c. Radio system physical layout and schematics.
    - d. Details of connections to power sources and grounding.

- e. Details of surge protection device installations.
  - f. Details of cable splicing and connector installation.
- 2. Equipment Data
  - a. A complete data package shall be delivered for all materials, including field and system equipment.
- 3. Data Transmission System Descriptions and Analyses
  - a. The submittal shall include complete system descriptions, analyses, and calculations used in sizing equipment required by these specifications. Descriptions and calculations shall show how the equipment will operate as a system to meet the performance of this specification.
  - b. The data package shall include a software-generated radio path study. The path study shall include path profiles indicating the topography between each link along with correction for earth curvature and 60% Fresnel zone. The study shall take into account the specific characteristics of the radios, antennas, tower heights, distances, and other items that may impact link reliability. The path study shall include the effects of signal dissipation from trees.
- 4. System Overall Reliability Calculations
  - a. The data package shall include manufacturers' reliability data and calculations required to show compliance with the reliability specified herein.
- 5. Certifications
  - a. All specified manufacturer's certifications shall be included with the data package.

#### 1.05 OPERATION & MAINTENANCE MANUALS

- A. O&M manuals with complete as-built information and operation/maintenance instructions are required to be submitted in accordance with Section 17010.

## 1.06 WARRANTY

- A. Equipment supplied under this section shall be warranted for a period of two years dating from final completion. Warranty shall include all parts, labor, and expenses as required to repair the system and restore it to full operational status.

## 1.07 GENERAL REQUIREMENTS

### A. Environmental Requirements

- 1. Equipment to be utilized indoors shall be rated for continuous operation under ambient environmental conditions of 2.1 to 48.9 degrees C (35 to 120 degrees F) dry bulb and 10 to 95 percent relative humidity, noncondensing. All other equipment shall be rated for continuous operation under the ambient environmental temperature, pressure, humidity, and vibration conditions specified or normally encountered for the installed location.

### B. Electrical Requirements

- 1. The equipment shall operate from a voltage source as shown, plus or minus 10 percent, and 60 Hz, plus or minus 2 percent.

### C. Power Line Surge Protection

- 1. Equipment connected to ac circuits shall be protected from power line surges. Equipment shall meet the requirements of IEEE C62.41. Fuses shall not be used for surge protection.

### D. Communications Links Surge Protection

- 1. A lightning protector – polyphasor or equal – is required on the incoming coax cable at the RTU.

## 1.08 RF SYSTEM REQUIREMENTS

### A. Minimum Signal

- 1. A minimum signal voltage of 3.1 microvolts into 50-ohm load shall be maintained during signal transmission at any point within the system.

B. Error Rate

1. An error rate of less than 5 errors per 100,000 commands shall be maintained.

C. Adequate Fade Margin

1. The individual links shall each be designed for 25dB fade margin, minimum. Actual as-built measurements shall yield a minimum of 20dB fade margin in order to be accepted.

D. Reliability

1. The system shall be designed for 99.999% reliability.

## **PART 2 - PRODUCTS**

### **2.01 ACCEPTABLE MANUFACTURERS**

- A. Microcomm / Motorola

### **2.02 RADIO MODEMS**

- A. The radio shall be a single, integrated unit. It shall be rated for operation with the unit transmitting continuously. The radio shall be programmable to operate on the existing Water district frequency.
- B. Transmitter power shall be selected to be consistent with paragraph RF System Requirements above.
- C. Additional Requirements:
1. Frequency stability: 0.00025% minimum over the operating temperature range.
  2. Transmitter Output Impedance: 50 Ohm
  3. Harmonic and spurious content of the output signal level shall be at least 55 dB below the carrier portion of the output signal level.
  4. Frequency deviation shall be equal to or less than 5 kHz.
  5. Receiver Input impedance: 50-ohm
  6. Receiver modulation acceptance bandwidth: 25 kHz.

7. Receiver sensitivity: -101dBm @ 12 dB SINAD or better.
8. RF Data Rate: 56 kbps or better

## 2.03 REPEATERS

- A. Repeaters shall be provided where required to meet system requirements. The repeater receiver and transmitter sections shall conform to the requirements specified for radio modems. Repeater shall relay two-way data transmission between the base station and remote stations.

## 2.04 ANTENNA SYSTEM

- A. Antenna system shall be selected to be consistent with the paragraph RF System Requirements above. The antenna system shall utilize vertical polarization antennas, communication links between transmitters and antennas, and matching networks as needed for the proper coverage. The antenna system shall be shaped-coverage as determined by the Contractor from the topography. The antenna system and cabling shall be furnished to provide adequate system gain. The antennas shall be capable of withstanding the environmental conditions of 70 mph wind and ½ inch radial ice without failure. The antenna system shall be selected by the Contractor to meet the requirements as determined from the topography. Lightning protection shall comply with NFPA 780.
- B. Antenna grounding conductors shall be minimum No. 12 AWG copper.
- C. Ground rods shall be as specified in Division 16.
- D. Transmission line between the transmitter and the antenna shall be 50-ohm impedance rated for the transmitter output power. Minimum requirement shall be cable that exhibits an attenuation not exceeding 1.1 dB per 30.5 m (100 feet) at 200 MHz.
- E. The Contractor shall be responsible for providing all mounting as required to support the antennas at the elevations and orientations required by the radio path survey within the FCC regulations. Masts and poles shall be suitable for out-door environmental conditions, provide adequate support and protection for transmission lines and be provided complete with all necessary mounting accessories.

## 2.05 CONDUIT

- A. Conduit shall be as specified in Division 16.

## 2.06 ENCLOSURES

- A. Enclosures shall be as specified in Section 17200.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. All system components and appurtenances shall be installed in accordance with the manufacturer's instructions and as shown. All necessary interconnections, services, and adjustments required for a complete and operable data transmission system shall be provided.
- B. Antenna: All tubular radiator elements shall be plugged to prevent wind vibration fatigue. All vertical tubular elements shall have drain holes near the bottom. All outside connectors shall be snug, filled with silicone grease, and properly taped over with plastic tape suitable for cold weather.
- C. Interior Work: All interior electrical work shall be installed as specified in Division 16 and as shown.
- D. Exterior Work
  - 1. Underground: Except as otherwise specified, underground electrical work shall be installed as specified in Division 16 and as shown.
  - 2. Splices in the antenna cable are not acceptable.
  - 3. Enclosure Penetrations: Enclosure penetrations shall be from the bottom and shall be sealed with duct seal.

### 3.02 TESTING

- A. General: The Contractor shall provide all personnel, equipment, instrumentation, and supplies necessary to perform all testing.
- B. Contractor's Field Test: The Contractor shall verify the complete operation of the radio telemetry system during the Field Testing. The Contractor's Field Test shall include an error rate test. The Contractor shall perform the test by sending 100,000 commands and measuring the error rate. The error rate shall be not greater than 5 out of 100,000. The Contractor shall also publish screen shots indicating the as-built fade margin of each link, which is required to be 20dB minimum. The Contractor shall prepare a report containing results of the field test.



- C. Verification Test: The radio telemetry system shall be tested as a part of the completed SCADA system during the Performance Verification Test as specified in Section 17010.

### 3.03 TRAINING

- A. Not required for this Section.

### 3.04 SPARES

- A. The following is a list of spare parts required within this contract:
  - 1. One radio modem for each unique type installed.
  - 2. One lightning arrestor for each unique type installed.

**END OF SECTION 17500**





# 2021 Nationwide Permit Summary

US Army Corps  
of Engineers  
Louisville District ®

Issued: March 15, 2021

Expires: March 14, 2026

## **No. 58. Utility Line Activities for Water and Other Substances**

(NWP Final Rule, 86 FR 2744)

Activities required for the construction, maintenance, repair, and removal of utility lines for water and other substances, excluding oil, natural gas, products derived from oil or natural gas, and electricity. Oil or natural gas pipeline activities or electric utility line and telecommunications activities may be authorized by NWPs 12 or 57, respectively. This NWP also authorizes associated utility line facilities in waters of the United States, provided the activity does not result in the loss of greater than 1/2-acre of waters of the United States for each single and complete project.

*Utility lines:* This NWP authorizes discharges of dredged or fill material into waters of the United States and structures or work in navigable waters for crossings of those waters associated with the construction, maintenance, or repair of utility lines for water and other substances, including outfall and intake structures. There must be no change in pre-construction contours of waters of the United States. A “utility line” is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose that is not oil, natural gas, or petrochemicals. Examples of activities authorized by this NWP include utility lines that convey water, sewage, stormwater, wastewater, brine, irrigation water, and industrial products that are not petrochemicals. The term “utility line” does not include activities that drain a water of the United States, such as drainage tile or french drains, but it does apply to pipes conveying drainage from another area.

Material resulting from trench excavation may be temporarily sidecast into waters of the United States for no more than three months, provided the material is not placed

in such a manner that it is dispersed by currents or other forces. The district engineer may extend the period of temporary side casting for no more than a total of 180 days, where appropriate. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench. The trench cannot be constructed or backfilled in such a manner as to drain waters of the United States (e.g., backfilling with extensive gravel layers, creating a french drain effect). Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line crossing of each waterbody.

*Utility line substations:* This NWP authorizes the construction, maintenance, or expansion of substation facilities associated with a utility line in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not result in the loss of greater than 1/2-acre of waters of the United States. This NWP does not authorize discharges of dredged or fill material into non-tidal wetlands adjacent to tidal waters of the United States to construct, maintain, or expand substation facilities.

*Foundations for above-ground utility lines:* This NWP authorizes the construction or maintenance of foundations for above-ground utility lines in all waters of the United States, provided the foundations are the minimum size necessary.

*Access roads:* This NWP authorizes the construction of access roads for the construction and maintenance of utility lines, including utility line substations, in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not cause the loss of greater than 1/2-acre of non-tidal

waters of the United States. This NWP does not authorize discharges of dredged or fill material into non-tidal wetlands adjacent to tidal waters for access roads. Access roads must be the minimum width necessary (see Note 2, below). Access roads must be constructed so that the length of the road minimizes any adverse effects on waters of the United States and must be as near as possible to pre-construction contours and elevations (e.g., at grade corduroy roads or geotextile/gravel roads). Access roads constructed above pre-construction contours and elevations in waters of the United States must be properly bridged or culverted to maintain surface flows.

This NWP may authorize utility lines in or affecting navigable waters of the United States even if there is no associated discharge of dredged or fill material (see 33 CFR part 322). Overhead utility lines constructed over section 10 waters and utility lines that are routed in or under section 10 waters without a discharge of dredged or fill material require a section 10 permit.

This NWP authorizes, to the extent that Department of the Army authorization is required, temporary structures, fills, and work necessary for the remediation of inadvertent returns of drilling fluids to waters of the United States through sub-soil fissures or fractures that might occur during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines. These remediation activities must be done as soon as practicable, to restore the affected waterbody. District engineers may add special conditions to this NWP to require a remediation plan for addressing inadvertent returns of drilling fluids to waters of the United States during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to conduct the utility line activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges of dredged or fill material, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. After construction, temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

**Notification:** The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) a section 10 permit is required; or (2) the discharge will result in the loss of greater than 1/10-acre of waters of the United States. (See general condition 32.) (Authorities: Sections 10 and 404)

**Note 1:** Where the utility line is constructed, installed, or maintained in navigable waters of the United States (i.e., section 10 waters) within the coastal United States, the Great Lakes, and United States territories, a copy of the NWP verification will be sent by the Corps to the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), for charting the utility line to protect navigation.

**Note 2:** For utility line activities crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Utility line activities must comply with 33 CFR 330.6(d).

**Note 3:** Access roads used for both construction and maintenance may be authorized, provided they meet the terms and conditions of this NWP. Access roads used solely for construction of the utility line must be removed upon completion of

the work, in accordance with the requirements for temporary fills.

**Note 4:** Pipes or pipelines used to transport gaseous, liquid, liquescent, or slurry substances over navigable waters of the United States are considered to be bridges, not utility lines, and may require a permit from the U.S. Coast Guard pursuant to the General Bridge Act of 1946. However, any discharges of dredged or fill material into waters of the United States associated with such pipelines will require a section 404 permit (see NWP 15).

**Note 5:** This NWP authorizes utility line maintenance and repair activities that do not qualify for the Clean Water Act section 404(f) exemption for maintenance of currently serviceable fills or fill structures.

**Note 6:** For activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require pre-construction notification (see paragraph (b)(4) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, "District Engineer's Decision." The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

#### **Nationwide Permit General Conditions**

**Note:** To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification

and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. **Navigation.** (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his or her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. **Aquatic Life Movements.** No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed

and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWP 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be

constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Structures and Fills. Temporary structures must be removed, to the maximum extent practicable, after their use has been discontinued. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used

more than once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. Permittees shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: <http://www.rivers.gov/>.

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed

for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify designated critical habitat or critical habitat proposed for such designation. No activity is authorized under any NWP which “may affect” a listed species or critical habitat, unless ESA section 7 consultation addressing the consequences of the proposed activity on listed species or critical habitat has been completed. See 50 CFR 402.02 for the definition of “effects of the action” for the purposes of ESA section 7 consultation, as well as 50 CFR 402.17, which provides further explanation under ESA section 7 regarding “activities that are reasonably certain to occur” and “consequences caused by the proposed action.”

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA (see 33 CFR 330.4(f)(1)). If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat or critical habitat proposed for such designation, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation), the pre-construction notification must include

the name(s) of the endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or that utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. The district engineer will determine whether the proposed activity “may affect” or will have “no effect” to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps’ determination within 45 days of receipt of a complete pre-construction notification. For activities where the non-Federal applicant has identified listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have “no effect” on listed species (or species proposed for listing or designated critical habitat (or critical habitat proposed for such designation), or until ESA section 7 consultation or conference has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation or conference with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(e) Authorization of an activity by an NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word “harm” in the definition of “take” means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it

actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at <http://www.fws.gov/> or <http://www.fws.gov/ipac> and <http://www.nmfs.noaa.gov/pr/species/esa/> respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring that an action authorized by an NWP complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting the appropriate local office of the U.S. Fish and Wildlife Service to determine what measures, if any, are

necessary or appropriate to reduce adverse effects to migratory birds or eagles, including whether "incidental take" permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (a) No activity is authorized under any NWP which may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)(1)). If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal

representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts commensurate with potential impacts, which may include background research, consultation, oral history interviews, sample field investigation, and/or field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect.

(d) Where the non-Federal applicant has identified historic properties on which the proposed NWP activity might have the potential to cause effects and has so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed. For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from

the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. Permittees that discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by an NWP, they must immediately notify the district engineer of what they have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine

monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, 52, 57 and 58 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed by permittees in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after she or he determines that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) Compensatory mitigation at a minimum one-for-one ratio will be required for all losses of stream bed that exceed 3/100-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. This compensatory mitigation requirement may be satisfied through the restoration or enhancement of riparian areas next to streams in accordance with paragraph (e) of this general condition. For losses of stream bed of 3/100-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas

may be the only compensatory mitigation required. If restoring riparian areas involves planting vegetation, only native species should be planted. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be



sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f).)

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). If permittee-responsible mitigation is the proposed option, and the proposed compensatory mitigation site is located on land in which another federal agency holds an easement, the district engineer will coordinate with that federal agency to determine if proposed compensatory mitigation project is compatible with the terms of the easement.

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan needs to address only the baseline conditions at the impact site and the number of credits to be provided (see 33 CFR 332.4(c)(1)(ii)).

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state or federal, dam safety

criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. (a) Where the certifying authority (state, authorized tribe, or EPA, as appropriate) has not previously certified compliance of an NWP with CWA section 401, a CWA section 401 water quality certification for the proposed discharge must be obtained or waived (see 33 CFR 330.4(c)). If the permittee cannot comply with all of the conditions of a water quality certification previously issued by certifying authority for the issuance of the NWP, then the permittee must obtain a water quality certification or waiver for the proposed discharge in order for the activity to be authorized by an NWP.

(b) If the NWP activity requires pre-construction notification and the certifying authority has not previously certified compliance of an NWP with CWA section 401, the proposed discharge is not authorized by an NWP until water quality certification is obtained or waived. If the certifying authority issues a water quality certification for the proposed discharge, the permittee must submit a copy of the certification to the district engineer. The discharge is not authorized by an NWP until the district engineer has notified the permittee that the water quality certification requirement has been satisfied by the issuance of a water quality certification or a waiver.

(c) The district engineer or certifying authority may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). If the permittee cannot comply with all of the conditions of

a coastal zone management consistency concurrence previously issued by the state, then the permittee must obtain an individual coastal zone management consistency concurrence or presumption of concurrence in order for the activity to be authorized by an NWP. The district engineer or a state may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its CWA section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is authorized, subject to the following restrictions:

(a) If only one of the NWPs used to authorize the single and complete project has a specified acreage limit, the acreage loss of waters of the United States cannot exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

(b) If one or more of the NWPs used to authorize the single and complete project has specified acreage limits, the acreage loss of waters of the United States authorized by those NWPs cannot exceed their respective specified acreage limits. For example, if a commercial development is constructed under NWP 39, and the single and complete project includes the filling of an upland ditch authorized by NWP 46, the maximum acreage loss of waters of the United States for the commercial development under NWP 39 cannot exceed 1/2-acre, and the total acreage loss of waters of United States due

to the NWP 39 and 46 activities cannot exceed 1 acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

“When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.”

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(Transferee)

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(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation.

The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires review by, or permission from, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a “USACE project”), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission and/or review is not authorized by an NWP until the appropriate Corps office issues the section 408 permission or completes its review to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) *Timing.* Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the

information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) *Contents of Pre-Construction Notification:* The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4) (i) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures.

(ii) For linear projects where one or more single and complete crossings require pre-construction notification, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters (including those single and complete crossings authorized by an NWP but do not require PCNs). This information will be used by the district engineer to evaluate the cumulative adverse environmental effects of the proposed linear project, and does not

change those non-PCN NWP activities into NWP PCNs.

(iii) Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial and intermittent streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45-day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-federal permittees, if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat (or critical habitat proposed for such designation), the PCN must include the name(s) of those endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or utilize

the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the “study river” (see general condition 16); and

(10) For an NWP activity that requires permission from, or review by, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from, or review by, the Corps office having jurisdiction over that USACE project.

*(c) Form of Pre-Construction Notification:* The nationwide permit pre-construction notification form (Form ENG 6082) should be used for NWP PCNs. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

*(d) Agency Coordination:* (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity’s compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity’s adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iii) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity’s compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure that the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided

below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies’ concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

## **2021 District Engineer’s Decision**

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the single and complete crossings of waters of the United States that require PCNs to determine whether they

individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings of waters of the United States authorized by an NWP. If an applicant requests a waiver of an applicable limit, as provided for in NWPs 13, 36, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects.

2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by an NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of

waters. The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure that the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) that the activity does not qualify for authorization under the

NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is required to comply with general conditions 18, 20, and/or 31), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

## **2021 Further Information**

1. District engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

## **2021 Nationwide Permit Definitions**

**Best management practices (BMPs):** Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

**Compensatory mitigation:** The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

**Currently serviceable:** Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

**Direct effects:** Effects that are caused by the activity and occur at the same time and place.

**Discharge:** The term “discharge” means any discharge of dredged or fill material into waters of the United States.

**Ecological reference:** A model used to plan and design an aquatic habitat and riparian area restoration, enhancement, or establishment activity under NWP 27. An ecological reference may be based on the structure, functions, and dynamics of an aquatic habitat type or a riparian area type that currently exists in the region where the proposed NWP 27 activity is located. Alternatively, an ecological reference may be based on a conceptual model for the aquatic habitat type or riparian area type to be restored, enhanced, or established as a result of the proposed NWP 27 activity. An ecological reference takes into account the range of variation of the aquatic habitat type or riparian area type in the region.

**Enhancement:** The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource

function(s). Enhancement does not result in a gain in aquatic resource area.

**Establishment (creation):** The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

**High Tide Line:** The line of intersection of the land with the water’s surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

**Historic Property:** Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

**Independent utility:** A test to determine what constitutes a single and complete non-linear project in the Corps Regulatory Program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other

phases were not built can be considered as separate single and complete projects with independent utility.

**Indirect effects:** Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

**Loss of waters of the United States:** Waters of the United States that are permanently adversely affected by filling, flooding excavation, or drainage because of the regulated activity. The loss of stream bed includes the acres of stream bed that are permanently adversely affected by filling or excavation because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters or wetlands for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities that do not require Department of the Army authorization, such as activities eligible for exemptions under section 404(f) of the Clean Water Act, are not considered when calculating the loss of waters of the United States.

**Navigable waters:** Waters subject to section 10 of the Rivers and Harbors Act of 1899. These waters are defined at 33 CFR part 329.

**Non-tidal wetland:** A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

**Open water:** For purposes of the NWP, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of flowing or standing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of “open waters” include rivers, streams, lakes, and ponds.

**Ordinary High Water Mark:** The term ordinary high water mark means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

**Perennial stream:** A perennial stream has surface water flowing continuously year-round during a typical year.

**Practicable:** Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

**Pre-construction notification:** A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

**Preservation:** The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources

through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

**Re-establishment:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

**Rehabilitation:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

**Restoration:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

**Riffle and pool complex:** Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a coarse substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

**Riparian areas:** Riparian areas are lands next to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a variety of

ecological functions and services and help improve or maintain local water quality. (See general condition 23.)

**Shellfish seeding:** The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

**Single and complete linear project:** A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term “single and complete project” is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

**Single and complete non-linear project:** For non-linear projects, the term “single and complete project” is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of “independent utility”). Single and complete non-linear projects may not be “piecemealed” to avoid the limits in an NWP authorization.

**Stormwater management:** Stormwater management is the mechanism for controlling stormwater runoff for the

purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities:

Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized jurisdictional stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a jurisdictional wetland that is inundated by tidal waters. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line.

Tribal lands: Any lands title to which is either: 1) held in trust by the United States for the benefit of any Indian tribe or individual; or 2) held by any Indian tribe or individual subject to restrictions by the United States against alienation.

Tribal rights: Those rights legally accruing to a tribe or tribes by virtue of inherent sovereign authority, unextinguished aboriginal title, treaty, statute, judicial decisions, executive order or agreement, and that give rise to legally enforceable remedies.

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWP, a waterbody is a "water of the United States." If a wetland is adjacent to a waterbody determined to be a water of the United States, that waterbody and any adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)).





**Andy Beshear**  
Governor

**COMMONWEALTH OF KENTUCKY**  
**TRANSPORTATION CABINET**  
Department of Highways, District 11 Office  
603 Railroad Avenue  
Manchester, Kentucky 40962  
(606) 598-2145  
[www.transportation.ky.gov/](http://www.transportation.ky.gov/)

**Jim Gray**  
Secretary

May 7, 2024

East Laurel Water District  
1670 Hal Rogers Parkway  
London, Kentucky 40741

Subject: Permit #: 11-2024-00080  
Permit Type: Utilities - Water  
Approval

Dear Applicant:

Attached is your permit approval and documentation for the subject permit.

Be advised that all work must be done in conformity with permit and application conditions. If you have any questions, please contact the Permits Section at this office.

Sincerely,

Chris Harris  
D11 Engineering Support - TEBM

Attachments



An Equal Opportunity Employer M/F/D



Kentucky Transportation Cabinet  
Department of Highways  
Division of Maintenance  
Permits Branch

TC 99-1 (B)  
07/2018  
Page 1 of 1

**ENCROACHMENT PERMIT**

**KYTC KEPT #:** 11-2024-00080

**Permittee:** East Laurel Water District

**Permit Type / Subtype:** Utilities / Water

**Work Completion Date:** 4/12/2025

| INDEMNITIES         |                 |                 |
|---------------------|-----------------|-----------------|
| Type                | Amount Required | Tracking Number |
| Performance Bond    | \$0.00          |                 |
| Cash / Check        | \$0.00          |                 |
| Self-Insured        | \$0.00          |                 |
| Payment Bond        | \$0.00          |                 |
| Liability Insurance | \$0.00          |                 |

This permit has been:      **APPROVED** ☒      **DENIED** ☐

|                  |                                |             |
|------------------|--------------------------------|-------------|
| Chris Harris     | D11 Engineering Support - TEBM | 5/2/2024    |
| <b>SIGNATURE</b> | <b>TITLE</b>                   | <b>DATE</b> |

The TC 99-1(B), including the application TC-99 1(A) and all related and accompanying documents and drawings make up the permit. It is not a permit unless both the TC 99-1(A) and TC 99-1(B) are both present.

| LOCATION(S) |                 |           |            |
|-------------|-----------------|-----------|------------|
| Description | County - Route  | Latitude  | Longitude  |
|             | Laurel - KY 472 | 37.146419 | -84.030227 |

## NOTICE OF COMPLETION OF ENCROACHMENT PERMIT WORK

---

### PERMITTEE

Name: East Laurel Water District  
Contact Person:  
Address: 1670 Hal Rogers Parkway  
City: London  
State: Kentucky  
Zip: 40741  
Telephone:

### PROJECT IDENTIFICATION

Permit Number: 11-2024-00080

---

I wish to notify the Department of Highways that the above mentioned permit work and any necessary right-of-way restoration have been completed and are ready for final inspection.

---

Permittee

---

Please return this form to the address below when work is completed and ready for final inspection.

Please Return to: Permit Engineer  
Department of Highways, District 11 Office  
603 Railroad Avenue  
Manchester, Kentucky 40962  
(606) 598-2145  
[www.transportation.ky.gov/](http://www.transportation.ky.gov/)

| LOCATION(S) |                 |           |            |
|-------------|-----------------|-----------|------------|
| Description | County - Route  | Latitude  | Longitude  |
|             | Laurel - KY 472 | 37.146419 | -84.030227 |



KENTUCKY TRANSPORTATION CABINET

Department of Highways  
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TC 99-1A

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**received**  
4-12-24**APPLICATION FOR ENCROACHMENT PERMIT**

KYTC KEPT #: 11-2024-00080

**SECTION 1: APPLICANT CONTACT INFORMATION**

|                                                        |                                                 |                             |                     |
|--------------------------------------------------------|-------------------------------------------------|-----------------------------|---------------------|
| <b>APPLICANT</b><br>East Laurel Water District         | <b>ADDRESS</b><br>1670 Hal Rogers Parkway       |                             |                     |
| <b>EMAIL</b>                                           | <b>CITY</b><br>London                           | <b>STATE</b><br>KY          | <b>ZIP</b><br>40741 |
| <b>CONTACT NAME 1</b><br>Jay Williams                  | <b>EMAIL</b><br>jaywilliams@woodcreekwater.org  | <b>PHONE #</b> 606-878-9420 |                     |
|                                                        |                                                 | <b>CELL #</b>               |                     |
| <b>CONTACT NAME 2 (if applicable)</b><br>Dewayne Lewis | <b>EMAIL</b><br>dewaynelewis@woodcreekwater.org | <b>PHONE #</b> 606-878-9420 |                     |
|                                                        |                                                 | <b>CELL #</b>               |                     |

**SECTION 2: PROPOSED WORK LOCATION**

|                          |                          |                               |                                     |
|--------------------------|--------------------------|-------------------------------|-------------------------------------|
| <b>ADDRESS</b><br>KY 472 | <b>CITY</b><br>London    | <b>STATE</b><br>Kentucky      | <b>ZIP</b><br>40741                 |
| <b>COUNTY</b><br>Laurel  | <b>ROUTE #</b><br>KY 472 | <b>MILE POINT</b><br>2.48-9.9 | <b>LONGITUDE (X)</b><br>37° 08' 47" |
|                          |                          |                               | <b>LATITUDE (Y)</b><br>-84° 01' 49" |

**ADDITIONAL LOCATION INFORMATION:****FOR KYTC USE ONLY**

**PERMIT TYPE:** ☐ Air Right ☐ Entrance ☒ Utilities ☐ Vegetation Removal ☐ Other: \_\_\_\_\_

**ACCESS:** ☐ Full ☐ Partial ☒ by Permit **LOCATION:** ☐ Left ☐ Right ☐ Crossing

**SECTION 3: GENERAL DESCRIPTION OF WORK**

MP 0.59: Proposed pump station on E side of KY 472.  
MP 2.48 to 2.72: Installation of 6" PVC waterline parallel to and on N side of KY 472.  
MP 2.72: Bore and Jack 14" steel encasement pipe across KY 472 to install 6" PVC waterline.  
MP 2.91: Bore and Jack 14" steel encasement pipe across KY 472 to install 6" PVC waterline.  
MP 4.26: Bore and Jack 14" steel encasement pipe across KY 472 to install 6" PVC waterline.  
MP 4.84: Tie-in new 3" PVC waterline to existing 6" PVC waterline on S side of KY 472.  
MP 9.9: Installation of check valve vault on NW side of KY 472.

☒ **APPROVED**

THE UNDERSIGNED APPLICANT(s), being duly authorized representative(s) or owner(s), DO AGREE TO ALL ORIGINAL UNEDITED TERMS AND CONDITIONS ON THE TC 99-1A, pages 1-4.

Jay Williams  
SIGNATURE

4-9-24  
DATE

This is not a permit unless and until the applicant(s) receives an approved TC 99-1B from KYTC. This application shall become void if not approved by the cancellation date. The cancellation date shall be a minimum of one year from the date the applicant submits their application.



## APPLICATION FOR ENCROACHMENT PERMIT

### TERMS AND CONDITIONS

1. The permit, including this application and all related and accompanying documents and drawings making up the permit, remains in effect and is binding upon the Applicant/Permittee, its successors and assigns, as long as the encroachment(s) exists and also until the permittee is finally relieved by the Department of Highways from all its obligations.
2. Applicant shall meet all requirements of the Clean Water Act if the project will disturb one acre or more, the applicant shall obtain a KPDES KYR10 Permit from the Kentucky Division of Water. All disturbed areas shall meet the requirements of the Department of Highway's Standard Specifications, Sections 212 and 213, as amended.
3. **INDEMNITY:**
  - A. **PERFORMANCE BOND:** The permittee shall provide to the Department a performance bond according to the Permits Manual, Section PE-203 as a guarantee of conformance with the Department's Encroachment Permit requirements.
  - B. **PAYMENT BOND:** At the discretion of the department, a payment bond shall be required of the permittee to ensure payment of liquidated damages assessed to the permittee.
  - C. **LIABILITY INSURANCE:** Liability insurance shall be required of the permittee (in an amount approved by the department) to cover all liabilities associated with the encroachment.
  - D. It shall be the responsibility of the permittee, its successors and assigns, to maintain all indemnities in full force and effect until the permittee is authorized to release the indemnity by the Department.
4. A copy of this application and all related documents making up the approved permit shall be given to the applicant and shall be made readily available for review at the work site at all times.
5. Perpetual maintenance of the encroachment is the responsibility of the permittee, its successors and assigns, with the approval of the Department as required, unless otherwise stated.
6. Permittee, its successors and assigns, shall comply with and agree to be bound by the requirements and terms of (a) this application and all related documents making up the approved permit, (b) by the Department's Permits Manual, and (c) by the Manual on Uniform Traffic Control Devices, both manuals as revised to and in effect on the date of issuance of the permit, all of which documents are made a part thereof by this reference. Compliance by the permittee, its successors and assigns, with subsequent revisions to applicable provisions of either manual or other policy of the Department may be made a condition of allowing the encroachment to persist under the permit.
7. Permittee agrees that this and any encroachment may be ordered removed by the Department at any time, and for any reason, upon thirty days written notice to the last known address of the applicant or to the address at the location of the encroachment. The permittee agrees that the cost of removing and of restoring the associated right-of-way is the responsibility of the permittee, its successors and assigns.
8. Permittee, its successors and assigns, agree that if the Department determines that motor vehicular safety deficiencies develop as a result of the installation or use of the encroachment, the permittee, its successors and assigns, shall provide and bear the expenses to adjust, relocate, or reconstruct the facilities, add signs, auxiliary lanes, or other corrective measures reasonably deemed necessary by the Department within a reasonable time after receipt of a written notice of such deficiency. The period within which such adjustments, relocations, additions, modifications, or other corrective measures must be completed will be specified in the notice.
9. Where traffic signals are required as a condition of granting the requested permit or are thereafter required to correct motor vehicular safety deficiencies, as determined by the Department, the costs for signal equipment and installation(s) shall be borne by the permittee, its successors and assigns and the Department in its reasonable discretion and only in accordance with the Department's current policy set forth in the Traffic Operations Manual and Permits Manual. Any modifications to the permittee's entrance necessary to accommodate signalization (including necessary easement(s) on private property) shall be the responsibility of the permittee, its successors and assigns, at no expense to the Department.



KENTUCKY TRANSPORTATION CABINET  
Department of Highways  
PERMITS BRANCH

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**APPLICATION FOR ENCROACHMENT PERMIT**

10. The requested encroachment shall not infringe on the frontage rights of an abutting owner without their written consent as hereinafter described. Each abutting owner shall express their consent, which shall be binding on their successors and assigns, by the submission of a notarized statement as follows, "I (we), \_\_\_\_\_, hereby consent to the granting of the permit requested by the applicant along Route \_\_\_\_\_, which permit does affect frontage rights along my (our) adjacent real property." By signature(s) \_\_\_\_\_, subscribed and sworn by \_\_\_\_\_, on this date \_\_\_\_\_.
11. The permit, if approved, is subject to the agreement that it shall not interfere with any similar rights or permit(s) previously granted to any other party, except as otherwise provided by law.
12. Permittee shall include documentation which describes the facilities to be constructed. Permittee, its successors and assigns, agree as a condition of the granting of the permit to construct and maintain any and all permitted facilities or other encroachments in strict accordance with the submitted and approved permit documentation and the policies and procedures of the Department. Permittee, its successors and assigns, shall not use facilities authorized herein in any manner contrary to that prescribed by the approved permit. Only normal usage as contemplated by the parties and by this application and routine maintenance are authorized by the permit.
13. Permittee, its successors and assigns, at all times from the date permitted work is commenced until such time as all permitted facilities or other encroachments are removed from the right-of-way and the right-of-way restored, **shall defend, protect, indemnify and save harmless** the Department from any and all liability claims and demands arising out of the work, encroachment, maintenance, or other undertaking by the permittee, its successors and assigns, related or undertaken pursuant to the granted permit, due to any claimed act or omission by the permittee, its servants, agents, employees, or contractors. This provision shall not inure to the benefit of any third party nor operate to enlarge any liability of the Department beyond that existing at common law or otherwise if this right to indemnity did not exist.
14. Upon a violation of any provision of the permit, or otherwise in its reasonable discretion, the Department may require additional action by the permittee, its successors and assigns, up to and including the removal of the encroachment and restoration of the right-of-way. In the event additional actions required by the Department under the permit are not undertaken as ordered and within a reasonable time, the Department may in its discretion cause those or other additional corrective actions to be undertaken and the Department shall recover the reasonable costs of those corrective actions from the permittee, its successors and assigns.
15. Permittee, its successors and assigns, shall use the encroachment premises in compliance with all requirements of federal law and regulation, including those imposed pursuant to Title VI of the Civil Right Act of 1964 (42 U.S.C. § 2000d et seq.) and the related regulations of the U.S. Department of Transportation in Title 49 C.F.R. Part 21, all as amended.
16. Permittee, its successors and assigns, agree that if the Department determines it is necessary for the facilities or other encroachment authorized by the permit to be removed, relocated or reconstructed in connection with the reconstruction, relocation or improvement of a highway, the Department may revoke permission for the encroachment to remain under the permit and may order its removal, relocation or reconstruction by the permittee, its successors and assigns, at the expense of the permittee, except where the Department is required by law to pay any or all of those costs.



KENTUCKY TRANSPORTATION CABINET  
Department of Highways  
PERMITS BRANCH

TC 99-1A  
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**APPLICATION FOR ENCROACHMENT PERMIT**

17. Permittee agrees that the authorized permit is personal to the permittee and shall remain in effect until such time as (a) the permittee's rights to the adjoining real property to have benefitted from the requested encroachment have been relinquished, (b) until all permit obligations have been assumed by appropriate successors and assigns, and (c) unless and until a written release from permit obligations has been granted by the Department. The permit and its requirements shall also bind the real property to have benefitted from the requested encroachment to the extent permitted by law. The permit and the related encroachment become the responsibility of the successors and assigns of the permittee and the successors and assigns of each property owner benefitting from the encroachment, or the encroachment may not otherwise permissibly continue to be maintained on the right-of-way. (Does not apply to utility encroachments serving the general public.)
18. If work authorized by the permit is within a highway construction project in the construction phase, it shall be the responsibility of the permittee to make personal contact with the Department's Engineer on the project in order to coordinate all permitted work with the Department's prime contractor on the project.
19. This permit is not intended to, nor shall it, affect, alter or alleviate any requirement imposed upon the permittee, its successors and assigns, by any other agency.
20. Permittee, its successors and assigns, agree to contain and maintain all dirt, mud, and other debris emanating from the encroachment away from the surrounding right-of-way and the travel way of the highway hereafter and at all times that its obligations under the permit remain in effect.
21. Before You Dig: The contractor is instructed to call 1-800-752-6007 to reach KY 811, the One-Call system for information on the location of existing underground utilities. The call is to be placed a minimum of two (2) and no more than ten (10) business days prior to excavation. The contractor should be aware that the owners of underground facilities are not required to be members of the KY 811 One-Call Before U-Dig (BUD) service. The contractor must coordinate excavation with the utility owners, including those whom do not subscribe to KY 811. It may be necessary for the contractor to contact the County Clerk to determine what utility companies have facilities in the area.
22. The undersigned Utility acknowledges ownership and control of the facilities proposed to be installed, modified, or extended by the Applicant/Permittee and agrees to be bound by the requirements and terms of this application and all related documents making up the approved permit, by the Department's Permits Guidance Manual, and by all applicable regulations and statutes in effect on the date of issuance of the permit. This information and application is certified correct to the best knowledge and belief of the undersigned Utility.

East Laurel Water District

UTILITY

Jay Williams

NAME (Utility Representative)

*Jay Williams*  
SIGNATURE (Utility Representative)

Assistant Superintendent

TITLE (Utility Representative)

4-9-24  
DATE



To Submit a Locate Request  
24 Hours a Day, Seven Days a Week:  
Call 811 or 800-752-6007







**Andy Beshear**  
Governor

**COMMONWEALTH OF KENTUCKY**  
**TRANSPORTATION CABINET**  
Department of Highways, District 11 Office  
603 Railroad Avenue  
Manchester, Kentucky 40962  
(606) 598-2145  
[www.transportation.ky.gov/](http://www.transportation.ky.gov/)

**Jim Gray**  
Secretary

October 13, 2022

East Laurel Water District  
1670 Hal Rogers Parkway  
London, Kentucky 40743

Subject: Permit #: 11-2022-00234  
Permit Type: Utilities - Water  
Approval

Dear Applicant:

Attached is your permit approval and documentation for the subject permit.

Be advised that all work must be done in conformity with permit and application conditions. If you have any questions, please contact the Permits Section at this office.

Sincerely,

Chris Harris  
D11 Engineering Support - TEBM

Attachments



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Kentucky Transportation Cabinet  
Department of Highways  
Division of Maintenance  
Permits Branch

TC 99-1 (B)  
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Page 1 of 1

**ENCROACHMENT PERMIT**

**KYTC KEPT #:** 11-2022-00234

**Permittee:** East Laurel Water District

**Permit Type / Subtype:** Utilities / Water

**Work Completion Date:** 10/5/2023

| INDEMNITIES         |                 |                 |
|---------------------|-----------------|-----------------|
| Type                | Amount Required | Tracking Number |
| Performance Bond    | \$0.00          |                 |
| Cash / Check        | \$0.00          |                 |
| Self-Insured        | \$0.00          |                 |
| Payment Bond        | \$0.00          |                 |
| Liability Insurance | \$0.00          |                 |

This permit has been:      **APPROVED** ☒      **DENIED** ☐

|                  |                                |             |
|------------------|--------------------------------|-------------|
| Chris Harris     | D11 Engineering Support - TEBM | 10/12/2022  |
| <b>SIGNATURE</b> | <b>TITLE</b>                   | <b>DATE</b> |

The TC 99-1(B), including the application TC-99 1(A) and all related and accompanying documents and drawings make up the permit. It is not a permit unless both the TC 99-1(A) and TC 99-1(B) are both present.

| LOCATION(S) |                  |           |            |
|-------------|------------------|-----------|------------|
| Description | County - Route   | Latitude  | Longitude  |
|             | Laurel - HR 9006 | 37.142082 | -84.068938 |

## NOTICE OF COMPLETION OF ENCROACHMENT PERMIT WORK

---

### PERMITTEE

Name: East Laurel Water District  
Contact Person:  
Address: 1670 Hal Rogers Parkway  
City: London  
State: Kentucky  
Zip: 40743  
Telephone:

### PROJECT IDENTIFICATION

Permit Number: 11-2022-00234

---

I wish to notify the Department of Highways that the above mentioned permit work and any necessary right-of-way restoration have been completed and are ready for final inspection.

---

Permittee

---

Please return this form to the address below when work is completed and ready for final inspection.

Please Return to: Permit Engineer  
Department of Highways, District 11 Office  
603 Railroad Avenue  
Manchester, Kentucky 40962  
(606) 598-2145  
[www.transportation.ky.gov/](http://www.transportation.ky.gov/)

| LOCATION(S) |                  |           |            |
|-------------|------------------|-----------|------------|
| Description | County - Route   | Latitude  | Longitude  |
|             | Laurel - HR 9006 | 37.142082 | -84.068938 |



KENTUCKY TRANSPORTATION CABINET  
Department of Highways  
PERMITS BRANCH



E-MAILED

10-13-22

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### APPLICATION FOR ENCROACHMENT PERMIT

KYTC KEPT #: 11-2022-00234

#### SECTION 1: APPLICANT CONTACT INFORMATION

|                                                 |                                          |                         |              |
|-------------------------------------------------|------------------------------------------|-------------------------|--------------|
| APPLICANT<br>East Laurel Water District         | ADDRESS<br>1670 Hal Rogers Parkway       |                         |              |
| EMAIL                                           | CITY<br>London                           | STATE<br>KY             | ZIP<br>40741 |
| CONTACT NAME 1<br>Jay Williams                  | EMAIL<br>jaywilliams@woodcreekwater.org  | PHONE #<br>606-878-9420 | CELL #       |
| CONTACT NAME 2 (if applicable)<br>Dewayne Lewis | EMAIL<br>dewaynelewis@woodcreekwater.org | PHONE #<br>606-878-9420 | CELL #       |

#### SECTION 2: PROPOSED WORK LOCATION

|                              |                    |                         |                              |
|------------------------------|--------------------|-------------------------|------------------------------|
| ADDRESS<br>KY 9006           | CITY<br>London     | STATE<br>Kentucky       | ZIP<br>40741                 |
| COUNTY<br>Laurel             | ROUTE #<br>KY 9006 | MILE POINT<br>1.93-2.12 | LONGITUDE (X)<br>37° 08' 31" |
| LATITUDE (Y)<br>-84° 04' 08" |                    |                         |                              |

#### ADDITIONAL LOCATION INFORMATION:

#### FOR KYTC USE ONLY

|              |                                    |                                   |                                               |                                             |                                       |                                |                                   |
|--------------|------------------------------------|-----------------------------------|-----------------------------------------------|---------------------------------------------|---------------------------------------|--------------------------------|-----------------------------------|
| PERMIT TYPE: | <input type="checkbox"/> Air Right | <input type="checkbox"/> Entrance | <input checked="" type="checkbox"/> Utilities | <input type="checkbox"/> Vegetation Removal | <input type="checkbox"/> Other: _____ |                                |                                   |
| ACCESS:      | <input type="checkbox"/> Full      | <input type="checkbox"/> Partial  | <input checked="" type="checkbox"/> by Permit | LOCATION:                                   | <input type="checkbox"/> Left         | <input type="checkbox"/> Right | <input type="checkbox"/> Crossing |

#### SECTION 3: GENERAL DESCRIPTION OF WORK

MP 1.93 to 2.12: Installation of 16" DI waterline parallel to and on NE side of KY 9006.  
MP 1.27: Replace existing Master Meter on N side of KY 9006.

☒ APPROVED

THE UNDERSIGNED APPLICANT(s), being duly authorized representative(s) or owner(s), DO AGREE TO ALL ORIGINAL UNEDITED TERMS AND CONDITIONS ON THE TC 99-1A, pages 1-4.

Jay Williams  
SIGNATURE

9-26-22  
DATE

This is not a permit unless and until the applicant(s) receives an approved TC 99-1B from KYTC. This application shall become void if not approved by the cancellation date. The cancellation date shall be a minimum of one year from the date the applicant submits their application.



## APPLICATION FOR ENCROACHMENT PERMIT

### TERMS AND CONDITIONS

1. The permit, including this application and all related and accompanying documents and drawings making up the permit, remains in effect and is binding upon the Applicant/Permittee, its successors and assigns, as long as the encroachment(s) exists and also until the permittee is finally relieved by the Department of Highways from all its obligations.
2. Applicant shall meet all requirements of the Clean Water Act if the project will disturb one acre or more, the applicant shall obtain a KPDES KYR10 Permit from the Kentucky Division of Water. All disturbed areas shall meet the requirements of the Department of Highway's Standard Specifications, Sections 212 and 213, as amended.
3. **INDEMNITY:**
  - A. **PERFORMANCE BOND:** The permittee shall provide to the Department a performance bond according to the Permits Manual, Section PE-203 as a guarantee of conformance with the Department's Encroachment Permit requirements.
  - B. **PAYMENT BOND:** At the discretion of the department, a payment bond shall be required of the permittee to ensure payment of liquidated damages assessed to the permittee.
  - C. **LIABILITY INSURANCE:** Liability insurance shall be required of the permittee (in an amount approved by the department) to cover all liabilities associated with the encroachment.
  - D. It shall be the responsibility of the permittee, its successors and assigns, to maintain all indemnities in full force and effect until the permittee is authorized to release the indemnity by the Department.
4. A copy of this application and all related documents making up the approved permit shall be given to the applicant and shall be made readily available for review at the work site at all times.
5. Perpetual maintenance of the encroachment is the responsibility of the permittee, its successors and assigns, with the approval of the Department as required, unless otherwise stated.
6. Permittee, its successors and assigns, shall comply with and agree to be bound by the requirements and terms of (a) this application and all related documents making up the approved permit, (b) by the Department's Permits Manual, and (c) by the Manual on Uniform Traffic Control Devices, both manuals as revised to and in effect on the date of issuance of the permit, all of which documents are made a part thereof by this reference. Compliance by the permittee, its successors and assigns, with subsequent revisions to applicable provisions of either manual or other policy of the Department may be made a condition of allowing the encroachment to persist under the permit.
7. Permittee agrees that this and any encroachment may be ordered removed by the Department at any time, and for any reason, upon thirty days written notice to the last known address of the applicant or to the address at the location of the encroachment. The permittee agrees that the cost of removing and of restoring the associated right-of-way is the responsibility of the permittee, its successors and assigns.
8. Permittee, its successors and assigns, agree that if the Department determines that motor vehicular safety deficiencies develop as a result of the installation or use of the encroachment, the permittee, its successors and assigns, shall provide and bear the expenses to adjust, relocate, or reconstruct the facilities, add signs, auxiliary lanes, or other corrective measures reasonably deemed necessary by the Department within a reasonable time after receipt of a written notice of such deficiency. The period within which such adjustments, relocations, additions, modifications, or other corrective measures must be completed will be specified in the notice.
9. Where traffic signals are required as a condition of granting the requested permit or are thereafter required to correct motor vehicular safety deficiencies, as determined by the Department, the costs for signal equipment and installation(s) shall be borne by the permittee, its successors and assigns and the Department in its reasonable discretion and only in accordance with the Department's current policy set forth in the Traffic Operations Manual and Permits Manual. Any modifications to the permittee's entrance necessary to accommodate signalization (including necessary easement(s) on private property) shall be the responsibility of the permittee, its successors and assigns, at no expense to the Department.



KENTUCKY TRANSPORTATION CABINET  
Department of Highways  
PERMITS BRANCH

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**APPLICATION FOR ENCROACHMENT PERMIT**

10. The requested encroachment shall not infringe on the frontage rights of an abutting owner without their written consent as hereinafter described. Each abutting owner shall express their consent, which shall be binding on their successors and assigns, by the submission of a notarized statement as follows, "I (we), \_\_\_\_\_, hereby consent to the granting of the permit requested by the applicant along Route \_\_\_\_\_, which permit does affect frontage rights along my (our) adjacent real property." By signature(s) \_\_\_\_\_, subscribed and sworn by \_\_\_\_\_, on this date \_\_\_\_\_.
11. The permit, if approved, is subject to the agreement that it shall not interfere with any similar rights or permit(s) previously granted to any other party, except as otherwise provided by law.
12. Permittee shall include documentation which describes the facilities to be constructed. Permittee, its successors and assigns, agree as a condition of the granting of the permit to construct and maintain any and all permitted facilities or other encroachments in strict accordance with the submitted and approved permit documentation and the policies and procedures of the Department. Permittee, its successors and assigns, shall not use facilities authorized herein in any manner contrary to that prescribed by the approved permit. Only normal usage as contemplated by the parties and by this application and routine maintenance are authorized by the permit.
13. Permittee, its successors and assigns, at all times from the date permitted work is commenced until such time as all permitted facilities or other encroachments are removed from the right-of-way and the right-of-way restored, **shall defend, protect, indemnify and save harmless** the Department from any and all liability claims and demands arising out of the work, encroachment, maintenance, or other undertaking by the permittee, its successors and assigns, related or undertaken pursuant to the granted permit, due to any claimed act or omission by the permittee, its servants, agents, employees, or contractors. This provision shall not inure to the benefit of any third party nor operate to enlarge any liability of the Department beyond that existing at common law or otherwise if this right to indemnity did not exist.
14. Upon a violation of any provision of the permit, or otherwise in its reasonable discretion, the Department may require additional action by the permittee, its successors and assigns, up to and including the removal of the encroachment and restoration of the right-of-way. In the event additional actions required by the Department under the permit are not undertaken as ordered and within a reasonable time, the Department may in its discretion cause those or other additional corrective actions to be undertaken and the Department shall recover the reasonable costs of those corrective actions from the permittee, its successors and assigns.
15. Permittee, its successors and assigns, shall use the encroachment premises in compliance with all requirements of federal law and regulation, including those imposed pursuant to Title VI of the Civil Right Act of 1964 (42 U.S.C. § 2000d et seq.) and the related regulations of the U.S. Department of Transportation in Title 49 C.F.R. Part 21, all as amended.
16. Permittee, its successors and assigns, agree that if the Department determines it is necessary for the facilities or other encroachment authorized by the permit to be removed, relocated or reconstructed in connection with the reconstruction, relocation or improvement of a highway, the Department may revoke permission for the encroachment to remain under the permit and may order its removal, relocation or reconstruction by the permittee, its successors and assigns, at the expense of the permittee, except where the Department is required by law to pay any or all of those costs.



KENTUCKY TRANSPORTATION CABINET  
Department of Highways  
PERMITS BRANCH

TC 99-1A  
Rev. 10/2020  
Page 4 of 4

**APPLICATION FOR ENCROACHMENT PERMIT**

17. Permittee agrees that the authorized permit is personal to the permittee and shall remain in effect until such time as (a) the permittee's rights to the adjoining real property to have benefitted from the requested encroachment have been relinquished, (b) until all permit obligations have been assumed by appropriate successors and assigns, and (c) unless and until a written release from permit obligations has been granted by the Department. The permit and its requirements shall also bind the real property to have benefitted from the requested encroachment to the extent permitted by law. The permit and the related encroachment become the responsibility of the successors and assigns of the permittee and the successors and assigns of each property owner benefitting from the encroachment, or the encroachment may not otherwise permissibly continue to be maintained on the right-of-way. (Does not apply to utility encroachments serving the general public.)
18. If work authorized by the permit is within a highway construction project in the construction phase, it shall be the responsibility of the permittee to make personal contact with the Department's Engineer on the project in order to coordinate all permitted work with the Department's prime contractor on the project.
19. This permit is not intended to, nor shall it, affect, alter or alleviate any requirement imposed upon the permittee, its successors and assigns, by any other agency.
20. Permittee, its successors and assigns, agree to contain and maintain all dirt, mud, and other debris emanating from the encroachment away from the surrounding right-of-way and the travel way of the highway hereafter and at all times that its obligations under the permit remain in effect.
21. Before You Dig: The contractor is instructed to call 1-800-752-6007 to reach KY 811, the One-Call system for information on the location of existing underground utilities. The call is to be placed a minimum of two (2) and no more than ten (10) business days prior to excavation. The contractor should be aware that the owners of underground facilities are not required to be members of the KY 811 One-Call Before U-Dig (BUD) service. The contractor must coordinate excavation with the utility owners, including those whom do not subscribe to KY 811. It may be necessary for the contractor to contact the County Clerk to determine what utility companies have facilities in the area.
22. The undersigned Utility acknowledges ownership and control of the facilities proposed to be installed, modified, or extended by the Applicant/Permittee and agrees to be bound by the requirements and terms of this application and all related documents making up the approved permit, by the Department's Permits Guidance Manual, and by all applicable regulations and statutes in effect on the date of issuance of the permit. This information and application is certified correct to the best knowledge and belief of the undersigned Utility.

East Laurel Water District

UTILITY

Jay Williams

NAME (Utility Representative)

SIGNATURE (Utility Representative)

Assistant Superintendent

TITLE (Utility Representative)

DATE

9 - 26 - 22

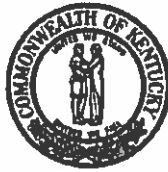


Know what's below. Call before you dig.

To Submit a Locate Request  
24 Hours a Day, Seven Days a Week:  
Call 811 or 800-752-6007







**Andy Beshear**  
Governor

**COMMONWEALTH OF KENTUCKY**  
**TRANSPORTATION CABINET**  
Department of Highways, District 11 Office  
603 Railroad Avenue  
Manchester, Kentucky 40962  
(606) 598-2145  
[www.transportation.ky.gov/](http://www.transportation.ky.gov/)

**Jim Gray**  
Secretary

October 13, 2022

East Laurel Water District  
Jay J. Williams  
1670 Hal Rogers Parkway  
London, Kentucky 40701

Subject: Permit #: 11-2022-00238  
Permit Type: Utilities - Water  
Approval

Dear Applicant:

Attached is your permit approval and documentation for the subject permit.

Be advised that all work must be done in conformity with permit and application conditions. If you have any questions, please contact the Permits Section at this office.

Sincerely,

Chris Harris  
D11 Engineering Support - TEBM

---

Attachments



An Equal Opportunity Employer M/F/D



Kentucky Transportation Cabinet  
Department of Highways  
Division of Maintenance  
Permits Branch

TC 99-1 (B)  
07/2018  
Page 1 of 1

**ENCROACHMENT PERMIT**

**KYTC KEPT #:** 11-2022-00238

**Permittee:** East Laurel Water District

**Permit Type / Subtype:** Utilities / Water

**Work Completion Date:** 10/5/2023

| INDEMNITIES         |                 |                 |
|---------------------|-----------------|-----------------|
| Type                | Amount Required | Tracking Number |
| Performance Bond    | \$0.00          |                 |
| Cash / Check        | \$0.00          |                 |
| Self-Insured        | \$0.00          |                 |
| Payment Bond        | \$0.00          |                 |
| Liability Insurance | \$0.00          |                 |

This permit has been: **APPROVED** ☒ **DENIED** ☐

|                  |                                |             |
|------------------|--------------------------------|-------------|
| Chris Harris     | D11 Engineering Support - TEBM | 10/12/2022  |
| <b>SIGNATURE</b> | <b>TITLE</b>                   | <b>DATE</b> |

The TC 99-1(B), including the application TC-99 1(A) and all related and accompanying documents and drawings make up the permit. It is not a permit unless both the TC 99-1(A) and TC 99-1(B) are both present.

| LOCATION(S) |                 |           |            |
|-------------|-----------------|-----------|------------|
| Description | County - Route  | Latitude  | Longitude  |
|             | Laurel - KY 586 | 37.159634 | -84.022065 |

## NOTICE OF COMPLETION OF ENCROACHMENT PERMIT WORK

---

### PERMITTEE

Name: East Laurel Water District  
Contact Person: Jay J. Williams  
Address: 1670 Hal Rogers Parkway  
City: London  
State: Kentucky  
Zip: 40701  
Telephone: (606) 878-9420

### PROJECT IDENTIFICATION

Permit Number: 11-2022-00238

---

I wish to notify the Department of Highways that the above mentioned permit work and any necessary right-of-way restoration have been completed and are ready for final inspection.

---

Permittee

---

Please return this form to the address below when work is completed and ready for final inspection.

Please Return to: Permit Engineer  
Department of Highways, District 11 Office  
603 Railroad Avenue  
Manchester, Kentucky 40962  
(606) 598-2145  
[www.transportation.ky.gov/](http://www.transportation.ky.gov/)

| LOCATION(S) |                 |           |            |
|-------------|-----------------|-----------|------------|
| Description | County - Route  | Latitude  | Longitude  |
|             | Laurel - KY 586 | 37.159634 | -84.022065 |

---

# APPROVED



KENTUCKY TRANSPORTATION CABINET  
Department of Highways  
PERMITS BRANCH

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10-13-22

## APPLICATION FOR ENCROACHMENT PERMIT



KYTC KEPT #: 11-2022-00238

### SECTION 1: APPLICANT CONTACT INFORMATION

|                                                 |                                          |                      |              |
|-------------------------------------------------|------------------------------------------|----------------------|--------------|
| APPLICANT<br>East Laurel Water District         | ADDRESS<br>1670 Hal Rogers Parkway       |                      |              |
| EMAIL                                           | CITY<br>London                           | STATE<br>KY          | ZIP<br>40741 |
| CONTACT NAME 1<br>Jay Williams                  | EMAIL<br>jaywilliams@woodcreekwater.org  | PHONE # 606-878-9420 |              |
|                                                 |                                          | CELL #               |              |
| CONTACT NAME 2 (if applicable)<br>Dewayne Lewis | EMAIL<br>dewaynelewis@woodcreekwater.org | PHONE # 606-878-9420 |              |
|                                                 |                                          | CELL #               |              |

### SECTION 2: PROPOSED WORK LOCATION

|                   |                   |                                 |                              |
|-------------------|-------------------|---------------------------------|------------------------------|
| ADDRESS<br>KY 586 | CITY<br>London    | STATE<br>Kentucky               | ZIP<br>40741                 |
| COUNTY<br>Laurel  | ROUTE #<br>KY 586 | MILE POINT<br>0-1.12; 3.75-4.61 | LONGITUDE (X)<br>37° 10' 07" |
|                   |                   |                                 | LATITUDE (Y)<br>-84° 02' 56" |

### ADDITIONAL LOCATION INFORMATION:

#### FOR KYTC USE ONLY

PERMIT TYPE: ☐ Air Right ☐ Entrance ☐ Utilities ☐ Vegetation Removal ☐ Other: \_\_\_\_\_

ACCESS: ☐ Full ☐ Partial ☐ by Permit LOCATION: ☐ Left ☐ Right ☐ Crossing

### SECTION 3: GENERAL DESCRIPTION OF WORK

MP 0: Bore and Jack 12" steel encasement pipe across KY 586 to install 4" PVC waterline.  
MP 0 to 1.12: Installation of 6" PVC waterline parallel to and on E side of KY 586.  
MP 0.94: Bore and Jack 12" steel encasement pipe across KY 586 to install 4" PVC waterline.  
MP 1.12: Bore and Jack 14" steel encasement pipe across KY 586 to install 6" PVC waterline.  
MP 3.75 to 4.61: Installation of 6" PVC waterline parallel to and on S side of KY 586.

THE UNDERSIGNED APPLICANT(s), being duly authorized representative(s) or owner(s), DO AGREE TO ALL ORIGINAL UNEDITED TERMS AND CONDITIONS ON THE TC 99-1A, pages 1-4.

  
SIGNATURE

9-26-22  
DATE

This is not a permit unless and until the applicant(s) receives an approved TC 99-1B from KYTC. This application shall become void if not approved by the cancellation date. The cancellation date shall be a minimum of one year from the date the applicant submits their application.



## APPLICATION FOR ENCROACHMENT PERMIT

### TERMS AND CONDITIONS

1. The permit, including this application and all related and accompanying documents and drawings making up the permit, remains in effect and is binding upon the Applicant/Permittee, its successors and assigns, as long as the encroachment(s) exists and also until the permittee is finally relieved by the Department of Highways from all its obligations.
2. Applicant shall meet all requirements of the Clean Water Act if the project will disturb one acre or more, the applicant shall obtain a KPDES KYR10 Permit from the Kentucky Division of Water. All disturbed areas shall meet the requirements of the Department of Highway's Standard Specifications, Sections 212 and 213, as amended.
3. **INDEMNITY:**
  - A. **PERFORMANCE BOND:** The permittee shall provide to the Department a performance bond according to the Permits Manual, Section PE-203 as a guarantee of conformance with the Department's Encroachment Permit requirements.
  - B. **PAYMENT BOND:** At the discretion of the department, a payment bond shall be required of the permittee to ensure payment of liquidated damages assessed to the permittee.
  - C. **LIABILITY INSURANCE:** Liability insurance shall be required of the permittee (in an amount approved by the department) to cover all liabilities associated with the encroachment.
  - D. It shall be the responsibility of the permittee, its successors and assigns, to maintain all indemnities in full force and effect until the permittee is authorized to release the indemnity by the Department.
4. A copy of this application and all related documents making up the approved permit shall be given to the applicant and shall be made readily available for review at the work site at all times.
5. Perpetual maintenance of the encroachment is the responsibility of the permittee, its successors and assigns, with the approval of the Department as required, unless otherwise stated.
6. Permittee, its successors and assigns, shall comply with and agree to be bound by the requirements and terms of (a) this application and all related documents making up the approved permit, (b) by the Department's Permits Manual, and (c) by the Manual on Uniform Traffic Control Devices, both manuals as revised to and in effect on the date of issuance of the permit, all of which documents are made a part thereof by this reference. Compliance by the permittee, its successors and assigns, with subsequent revisions to applicable provisions of either manual or other policy of the Department may be made a condition of allowing the encroachment to persist under the permit.
7. Permittee agrees that this and any encroachment may be ordered removed by the Department at any time, and for any reason, upon thirty days written notice to the last known address of the applicant or to the address at the location of the encroachment. The permittee agrees that the cost of removing and of restoring the associated right-of-way is the responsibility of the permittee, its successors and assigns.
8. Permittee, its successors and assigns, agree that if the Department determines that motor vehicular safety deficiencies develop as a result of the installation or use of the encroachment, the permittee, its successors and assigns, shall provide and bear the expenses to adjust, relocate, or reconstruct the facilities, add signs, auxiliary lanes, or other corrective measures reasonably deemed necessary by the Department within a reasonable time after receipt of a written notice of such deficiency. The period within which such adjustments, relocations, additions, modifications, or other corrective measures must be completed will be specified in the notice.
9. Where traffic signals are required as a condition of granting the requested permit or are thereafter required to correct motor vehicular safety deficiencies, as determined by the Department, the costs for signal equipment and installation(s) shall be borne by the permittee, its successors and assigns and the Department in its reasonable discretion and only in accordance with the Department's current policy set forth in the Traffic Operations Manual and Permits Manual. Any modifications to the permittee's entrance necessary to accommodate signalization (including necessary easement(s) on private property) shall be the responsibility of the permittee, its successors and assigns, at no expense to the Department.



KENTUCKY TRANSPORTATION CABINET  
Department of Highways  
PERMITS BRANCH

TC 99-1A  
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**APPLICATION FOR ENCROACHMENT PERMIT**

10. The requested encroachment shall not infringe on the frontage rights of an abutting owner without their written consent as hereinafter described. Each abutting owner shall express their consent, which shall be binding on their successors and assigns, by the submission of a notarized statement as follows, "I (we), \_\_\_\_\_, hereby consent to the granting of the permit requested by the applicant along Route \_\_\_\_\_, which permit does affect frontage rights along my (our) adjacent real property." By signature(s) \_\_\_\_\_, subscribed and sworn by \_\_\_\_\_, on this date \_\_\_\_\_.
11. The permit, if approved, is subject to the agreement that it shall not interfere with any similar rights or permit(s) previously granted to any other party, except as otherwise provided by law.
12. Permittee shall include documentation which describes the facilities to be constructed. Permittee, its successors and assigns, agree as a condition of the granting of the permit to construct and maintain any and all permitted facilities or other encroachments in strict accordance with the submitted and approved permit documentation and the policies and procedures of the Department. Permittee, its successors and assigns, shall not use facilities authorized herein in any manner contrary to that prescribed by the approved permit. Only normal usage as contemplated by the parties and by this application and routine maintenance are authorized by the permit.
13. Permittee, its successors and assigns, at all times from the date permitted work is commenced until such time as all permitted facilities or other encroachments are removed from the right-of-way and the right-of-way restored, shall defend, protect, indemnify and save harmless the Department from any and all liability claims and demands arising out of the work, encroachment, maintenance, or other undertaking by the permittee, its successors and assigns, related or undertaken pursuant to the granted permit, due to any claimed act or omission by the permittee, its servants, agents, employees, or contractors. This provision shall not inure to the benefit of any third party nor operate to enlarge any liability of the Department beyond that existing at common law or otherwise if this right to indemnity did not exist.
14. Upon a violation of any provision of the permit, or otherwise in its reasonable discretion, the Department may require additional action by the permittee, its successors and assigns, up to and including the removal of the encroachment and restoration of the right-of-way. In the event additional actions required by the Department under the permit are not undertaken as ordered and within a reasonable time, the Department may in its discretion cause those or other additional corrective actions to be undertaken and the Department shall recover the reasonable costs of those corrective actions from the permittee, its successors and assigns.
15. Permittee, its successors and assigns, shall use the encroachment premises in compliance with all requirements of federal law and regulation, including those imposed pursuant to Title VI of the Civil Right Act of 1964 (42 U.S.C. § 2000d et seq.) and the related regulations of the U.S. Department of Transportation in Title 49 C.F.R. Part 21, all as amended.
16. Permittee, its successors and assigns, agree that if the Department determines it is necessary for the facilities or other encroachment authorized by the permit to be removed, relocated or reconstructed in connection with the reconstruction, relocation or improvement of a highway, the Department may revoke permission for the encroachment to remain under the permit and may order its removal, relocation or reconstruction by the permittee, its successors and assigns, at the expense of the permittee, except where the Department is required by law to pay any or all of those costs.



KENTUCKY TRANSPORTATION CABINET  
Department of Highways  
PERMITS BRANCH

TC 99-1A  
Rev. 10/2020  
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**APPLICATION FOR ENCROACHMENT PERMIT**

17. Permittee agrees that the authorized permit is personal to the permittee and shall remain in effect until such time as (a) the permittee's rights to the adjoining real property to have benefitted from the requested encroachment have been relinquished, (b) until all permit obligations have been assumed by appropriate successors and assigns, and (c) unless and until a written release from permit obligations has been granted by the Department. The permit and its requirements shall also bind the real property to have benefitted from the requested encroachment to the extent permitted by law. The permit and the related encroachment become the responsibility of the successors and assigns of the permittee and the successors and assigns of each property owner benefitting from the encroachment, or the encroachment may not otherwise permissibly continue to be maintained on the right-of-way. (Does not apply to utility encroachments serving the general public.)
18. If work authorized by the permit is within a highway construction project in the construction phase, it shall be the responsibility of the permittee to make personal contact with the Department's Engineer on the project in order to coordinate all permitted work with the Department's prime contractor on the project.
19. This permit is not intended to, nor shall it, affect, alter or alleviate any requirement imposed upon the permittee, its successors and assigns, by any other agency.
20. Permittee, its successors and assigns, agree to contain and maintain all dirt, mud, and other debris emanating from the encroachment away from the surrounding right-of-way and the travel way of the highway hereafter and at all times that its obligations under the permit remain in effect.
21. Before You Dig: The contractor is instructed to call 1-800-752-6007 to reach KY 811, the One-Call system for information on the location of existing underground utilities. The call is to be placed a minimum of two (2) and no more than ten (10) business days prior to excavation. The contractor should be aware that the owners of underground facilities are not required to be members of the KY 811 One-Call Before U-Dig (BUD) service. The contractor must coordinate excavation with the utility owners, including those whom do not subscribe to KY 811. It may be necessary for the contractor to contact the County Clerk to determine what utility companies have facilities in the area.
22. The undersigned Utility acknowledges ownership and control of the facilities proposed to be installed, modified, or extended by the Applicant/Permittee and agrees to be bound by the requirements and terms of this application and all related documents making up the approved permit, by the Department's Permits Guidance Manual, and by all applicable regulations and statutes in effect on the date of issuance of the permit. This information and application is certified correct to the best knowledge and belief of the undersigned Utility.

East Laurel Water District

UTILITY

Jay Williams

NAME (Utility Representative)

SIGNATURE (Utility Representative)

Assistant Superintendent

TITLE (Utility Representative)

DATE

9-26-22



Know what's below. Call before you dig.

To Submit a Locate Request  
24 Hours a Day, Seven Days a Week:  
Call 811 or 800-752-6007





**CERTIFICATE OF OWNER’S ATTORNEY AND AGENCY CONCURRENCE**

DATE:

RE:   East Laurel Water District  
      Old Salem Rd./McWhorter Rd. System Improvements – Contract 2

I, the undersigned, \_\_\_\_\_, the duly authorized and acting legal representation of East Laurel Water District, 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  |

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



DOMESTIC PREFERENCE *DE MINIMIS* LIST FORMAT

*DE MINIMIS* COSTING WORKSHEET

Project Name:

Contract Name/# (if more than one):

Contractor (Company Name):

Representative:

Date:

Total Project Costs:

Allowable Total *De Minimis* Costs (5% of project costs):

Total Cost of all *De Minimis* Items:

Remaining Amount Allowed for Future *De Minimis* Items:

| No. | Detailed Description and Manufacturer or Local Source of <i>De Minimis</i> Material | Quantity | Cost Per Item | Total Item Cost |
|-----|-------------------------------------------------------------------------------------|----------|---------------|-----------------|
| 1   |                                                                                     |          |               |                 |
| 2   |                                                                                     |          |               |                 |
| 3   |                                                                                     |          |               |                 |
| 4   |                                                                                     |          |               |                 |
| 5   |                                                                                     |          |               |                 |
| 6   |                                                                                     |          |               |                 |
| 7   |                                                                                     |          |               |                 |
| 8   |                                                                                     |          |               |                 |
| 9   |                                                                                     |          |               |                 |
| 10  |                                                                                     |          |               |                 |
| 11  |                                                                                     |          |               |                 |
| 12  |                                                                                     |          |               |                 |



## **CONTRACTOR'S CERTIFICATION LETTER**

DATE:

RE: East Laurel Water District  
Old Salem Rd./McWhorter Rd. System Improvements – Contract 2

I hereby certify that, to the best of my knowledge and belief, all Iron and Steel products, Manufactured Products, and Construction Materials installed for this project by my company and by any and all subcontractors and Manufacturers my company has contracted with for this project comply with the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act (IIJA), Pub. L. 117-58, §§ 70901-70953 or are the subject of a waiver approved by the Secretary of Agriculture or designee.

---

Name of Contractor Authorized Representative

---

Date

---

Contractor Company Name

---

Contractor Address



## **MANUFACTURER'S CERTIFICATION OF COMPLIANCE**

Date:

Company Name:

Company Address:

Subject: Domestic Preference Requirement for Project (Old Salem Rd./McWhorter Rd. System Improvements – Contract 2), East Laurel Water District.

I, (company representative), hereby certify that the following product(s) and / or material(s) shipped or provided for the subject are in full compliance with the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act (IIJA), Pub. L. 117-58, §§ 70901-70953.

Item, Products and/or Materials, and location of delivery (City, State)

- 1.
- 2.
- 3.

These products and/or materials were manufactured in:

---

City, State

---

Authorized Company Representative

(Note: Authorized signature shall be manufacturer's representative and not the materials distributor or supplier)





## ENGINEER'S CERTIFICATION LETTER

DATE:

RE: East Laurel Water District  
Old Salem Rd./McWhorter Rd. System Improvements – Contract 2

The final Drawings and Specifications, construction Contract Documents, Bidding Documents, procurement documents, and any other final design phase deliverables, comply with all applicable federal requirements including the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act (IIJA), Pub. L. 117-58, §§ 70901-70953, or are the subject of a waiver approved by the Secretary of Agriculture or designee. This includes the following:

- The Engineers Joint Contract Documents Committee (EJCDC) documents have been used, and all acceptable revisions identified in this Bulletin have been made in accordance with the terms of the license agreement, which states in part that the Engineer “will 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).
- Any building(s) designed for this Project will comply with the requirements of the Architectural Barriers Act (ABA) of 1968, the Americans with Disabilities Act (ADA) of 1990, Section 504 of the Rehabilitation Act of 1973, and any federal, state, or local accessibility standards.
- Any building(s) designed for this Project will comply with the Seismic Safety of Federally Assisted New Building Construction requirements of 7 CFR part 1792, and any federal, state, or local standards.
- All referenced Products and Construction Materials in the Drawings, Specifications, and Bidding Documents for the Project comply with BABAA.
- All referenced Products and Construction Materials to be referenced in the Addenda, executed Contracts, and Change Orders will comply with BABAA.

---

Engineering Name and Title

---

Date

---

Engineering Company Name





**Andy Beshear**  
GOVERNOR

**ENERGY AND ENVIRONMENT CABINET**  
**DEPARTMENT FOR ENVIRONMENTAL PROTECTION**

300 Sower Boulevard  
Frankfort, Kentucky 40601  
Phone: (502) 564-2150  
Fax: 502-564-4245

**Rebecca W. Goodman**  
SECRETARY

**Anthony R. Hutton**  
COMMISSIONER

July 5, 2023

Jay Williams  
East Laurel Water District  
1670 E Hal Rogers Pkwy  
London, KY 40741

RE: Old Salem Road - McWhorter Road System  
Improvements  
Laurel County, KY  
East Laurel Water District  
AI #: 33964, APE20230001  
PWSID #: 0630797-23-001

Dear Mr. Williams:

We have reviewed the plans and specifications for the above referenced project. The plans include the construction of approximately 1,045 linear feet (LF) 16-inch DI, 970 LF 16-inch PVC, 22,525 LF 6-inch PVC, 7,200 LF 4-inch PVC, 1,780 LF 3-inch PVC, 20 LF 2-inch PVC waterlines, improvements to the East Pittsburg Pump Station including pumps capable of 2000 GPM at 75 ft TDH, a new duplex pump station (KY 472 Pump Station) with pumps capable of 350 GPM at 90 ft TDH, and a new 139,000-gallon ground storage water tank. 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.

If you have any questions concerning this project, please contact Cassie Campbell at 502-782-6909.

Sincerely,

Terry Humphries, P.E.  
Supervisor, Engineering Section  
Water Infrastructure Branch  
Division of Water

TH:CC

Enclosures

c: Kenvirons Inc  
Laurel County Health Department  
Division of Plumbing



## Distribution-Major Construction

East Laurel Water District

Facility Requirements

Activity ID No.:APE20230001

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**GACT0000000029 (Old Salem Rd - McWhorter Rd System Improvements) 1,045 linear feet (LF) 16-inch DI, 970 LF 16-inch PVC, 22,525 LF 6-inch PVC, 7,200 LF 4-inch PVC, 1,780 LF 3-inch PVC, 20 LF 2-inch PVC waterlines, improvements to the East Pittsburg Pump Station including pumps capable of 2000 GPM at 75 ft TDH, a new duplex pump station (KY 472 Pump Station) with pumps capable of 350 GPM at 90 ft TDH, and a new 139,000-gallon ground storage water tank:**

### Narrative Requirements:

| Condition No. | Condition                                                                                                                                                                                                                                                                                                                                                                          |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T-1           | Construction of this project shall not result in the water system's inability to supply consistent water service in compliance with 401 KAR 8:010 through 8:600. [401 KAR 8:100 Section 5]                                                                                                                                                                                         |
| T-2           | The public water system shall not implement a change to the approved plans without the prior written approval of the cabinet. [401 KAR 8:100 Section 4(3)]                                                                                                                                                                                                                         |
| T-3           | A proposed change to the approved plans affecting sanitary features of design shall be submitted to the cabinet for approval in accordance with Section 2 of this administrative regulation. [401 KAR 8:100 Section 4(2)]                                                                                                                                                          |
| T-4           | During construction, a set of approved plans and specifications shall be available at the job site. Construction shall be performed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 3(1)]                                                                                                                                                         |
| T-5           | Unless construction begins within two (2) years from the date of approval of the final plans and specifications, the approval shall expire. [401 KAR 8:100 Section 3(3)]                                                                                                                                                                                                           |
| T-6           | Upon completion of construction, a professional engineer shall certify in writing that the project has been completed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 4(1)]                                                                                                                                                                       |
| T-7           | The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow. [Recommended Standards for Water Works 8.2.1, Drinking Water General Design Criteria IV.1.a]                                                                                                                          |
| T-8           | Water lines should be hydraulically capable of a flow velocity of 2.5 ft/s while maintaining a pressure of at least 20 psi. [Drinking Water General Design Criteria IV.1.b]                                                                                                                                                                                                        |
| T-9           | The normal working pressure in the distribution system at the service connection shall not be less than 30 psi under peak demand flow conditions. Peak demand is defined as the maximum customer water usage rate, expressed in gallons per minute (gpm), in the pressure zone of interest during a 24 hour (diurnal) time period. [Drinking Water General Design Criteria IV.1.d] |
| T-10          | When static pressure exceeds 150 psi, pressure reducing devices shall be provided on mains or as part of the meter setting on individual service lines in the distribution system. [Drinking Water General Design Criteria IV.1.c]                                                                                                                                                 |

## Distribution-Major Construction

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**GACT0000000029 (Old Salem Rd - McWhorter Rd System Improvements) 1,045 linear feet (LF) 16-inch DI, 970 LF 16-inch PVC, 22,525 LF 6-inch PVC, 7,200 LF 4-inch PVC, 1,780 LF 3-inch PVC, 20 LF 2-inch PVC waterlines, improvements to the East Pittsburg Pump Station including pumps capable of 2000 GPM at 75 ft TDH, a new duplex pump station (KY 472 Pump Station) with pumps capable of 350 GPM at 90 ft TDH, and a new 139,000-gallon ground storage water tank:**

### Narrative Requirements:

| Condition No. | Condition                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T-11          | The minimum size of water main in the distribution system where fire protection is not to be provided should be a minimum of three (3) inch diameter. Any departure from minimum requirements shall be justified by hydraulic analysis and future water use, and can be considered only in special circumstances. [Recommended Standards for Water Works 8.2.2, Drinking Water General Design Criteria IV.2.b] |
| T-12          | Water mains not designed to carry fire-flows shall not have fire hydrants connected to them. [Recommended Standards for Water Works 8.4.1.b]                                                                                                                                                                                                                                                                   |
| T-13          | Flushing devices should be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed. [Recommended Standards for Water Works 8.2.4.b, Recommended Standards for Water Works 8.4.1.b]                                                                                                                                                                   |
| T-14          | No flushing device shall be directly connected to any sewer. [Recommended Standards for Water Works 8.2.4.b, Recommended Standards for Water Works 8.4.1.b]                                                                                                                                                                                                                                                    |
| T-15          | Pipe shall be constructed to a depth providing a minimum cover of 30 inches to top of pipe. [Drinking Water General Design Criteria IV.3.a]                                                                                                                                                                                                                                                                    |
| T-16          | Water mains shall be covered with sufficient earth or other insulation to prevent freezing. [Recommended Standards for Water Works 8.7]                                                                                                                                                                                                                                                                        |
| T-17          | A continuous and uniform bedding shall be provided in the trench for all buried pipe. Backfill material shall be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe. Stones found in the trench shall be removed for a depth of at least six inches below the bottom of the pipe. [Recommended Standards for Water Works 8.7]               |
| T-18          | Water line installation shall incorporate the provisions of the AWWA standards and/or manufacturer's recommended installation procedures. [Recommended Standards for Water Works 8.7]                                                                                                                                                                                                                          |
| T-19          | All materials used for the rehabilitation of water mains shall meet ANSI/NSF standards. [Recommended Standards for Water Works 8.1]                                                                                                                                                                                                                                                                            |
| T-20          | Packing and jointing materials used in the joints of pipe shall meet the standards of AWWA and the reviewing authority. [Recommended Standards for Water Works 8.1]                                                                                                                                                                                                                                            |

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### Narrative Requirements:

| Condition No. | Condition                                                                                                                                                                                                                                                         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T-21          | All tees, bends, plugs and hydrants shall be provided with reaction blocking, tie rods or joints designed to prevent movement. [Recommended Standards for Water Works 8.7]                                                                                        |
| T-22          | All materials including pipe, fittings, valves and fire hydrants shall conform to the latest standards issued by the ASTM, AWWA and ANSI/NSF, where such standards exist, and be acceptable to the Division of Water. [Recommended Standards for Water Works 8.1] |
| T-23          | Water mains which have been used previously for conveying potable water may be reused provided they meet the above standards and have been restored practically to their original condition. [Recommended Standards for Water Works 8.1]                          |
| T-24          | Manufacturer approved transition joints shall be used between dissimilar piping materials. [Recommended Standards for Water Works 8.1]                                                                                                                            |
| T-25          | The minimum size of water main which provides for fire protection and serving fire hydrants shall be six-inch diameter. [Recommended Standards for Water Works 8.2, Drinking Water General Design Criteria IV.2.a]                                                |
| T-26          | Pipes and pipe fittings containing more than 8% lead shall not be used. All products shall comply with ANSI/NSF standards. [Recommended Standards for Water Works 8.1]                                                                                            |
| T-27          | Gaskets containing lead shall not be used. Repairs to lead-joint pipe shall be made using alternative methods. [Recommended Standards for Water Works 8.1]                                                                                                        |
| T-28          | Pipe materials shall be selected to protect against both internal and external pipe corrosion. [Recommended Standards for Water Works 8.1]                                                                                                                        |
| T-29          | Dead end mains shall be equipped with a means to provide adequate flushing. [Recommended Standards for Water Works 8.2]                                                                                                                                           |
| T-30          | The hydrant lead shall be a minimum of six inches in diameter. Auxiliary valves shall be installed on all hydrant leads. [Recommended Standards for Water Works 8.4.3]                                                                                            |
| T-31          | A sufficient number of valves shall be provided on water mains to minimize inconvenience and sanitary hazards during repairs. [Recommended Standards for Water Works 8.3]                                                                                         |

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**GACT0000000029 (Old Salem Rd - McWhorter Rd System Improvements) 1,045 linear feet (LF) 16-inch DI, 970 LF 16-inch PVC, 22,525 LF 6-inch PVC, 7,200 LF 4-inch PVC, 1,780 LF 3-inch PVC, 20 LF 2-inch PVC waterlines, improvements to the East Pittsburg Pump Station including pumps capable of 2000 GPM at 75 ft TDH, a new duplex pump station (KY 472 Pump Station) with pumps capable of 350 GPM at 90 ft TDH, and a new 139,000-gallon ground storage water tank:**

### Narrative Requirements:

| Condition No. | Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T-32          | Wherever possible, chambers, pits or manholes containing valves, blow-offs, meters, or other such appurtenances to a distribution system, shall not be located in areas subject to flooding or in areas of high groundwater. Such chambers or pits should drain to the ground surface, or to absorption pits underground. The chambers, pits and manholes shall not connect directly to any storm drain or sanitary sewer. Blow-offs shall not connect directly to any storm drain or sanitary sewer. [Recommended Standards for Water Works 8.6]                             |
| T-33          | At high points in water mains where air can accumulate provisions shall be made to remove the air by means of air relief valves. [Recommended Standards for Water Works 8.5.1]                                                                                                                                                                                                                                                                                                                                                                                                |
| T-34          | Automatic air relief valves shall not be used in situations where flooding of the manhole or chamber may occur. [Recommended Standards for Water Works 8.5.1]                                                                                                                                                                                                                                                                                                                                                                                                                 |
| T-35          | The open end of an air relief pipe from automatic valves shall be extended to at least one foot above grade and provided with a screened, downward-facing elbow. [Recommended Standards for Water Works 8.5.2.c]                                                                                                                                                                                                                                                                                                                                                              |
| T-36          | Discharge piping from air relief valves shall not connect directly to any storm drain, storm sewer, or sanitary sewer. [Recommended Standards for Water Works 8.5.2.d]                                                                                                                                                                                                                                                                                                                                                                                                        |
| T-37          | Water pipe shall be constructed with a lateral separation of 10 feet or more from any gravity sanitary or combined sewer measured edge to edge where practical. If not practical a variance may be requested to allow the water pipe to be installed closer to the gravity sanitary or combined sewer provided the water pipe is laid in a separate trench or undisturbed shelf located on one side of the sewer with the bottom of the pipe at least 18 inches above the top of the gravity sanitary or combined sewer pipe. [Drinking Water General Design Criteria IV.3.b] |
| T-38          | Water lines crossing sanitary, combined or storm sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sanitary, combined or storm sewer with preference to the water main located above the sanitary, combined or storm sewer. [Drinking Water General Design Criteria IV.3.c]                                                                                                                                                                                                               |
| T-39          | At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. [Recommended Standards for Water Works 8.8.3.b]                                                                                                                                                                                                                                                                                                                                                                                                        |
| T-40          | There shall be no connection between the distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or other contaminating materials may be discharged or drawn into the system. [Recommended Standards for Water Works 8.10.1]                                                                                                                                                                                                                                                                                                                        |



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**GACT0000000029 (Old Salem Rd - McWhorter Rd System Improvements) 1,045 linear feet (LF) 16-inch DI, 970 LF 16-inch PVC, 22,525 LF 6-inch PVC, 7,200 LF 4-inch PVC, 1,780 LF 3-inch PVC, 20 LF 2-inch PVC waterlines, improvements to the East Pittsburg Pump Station including pumps capable of 2000 GPM at 75 ft TDH, a new duplex pump station (KY 472 Pump Station) with pumps capable of 350 GPM at 90 ft TDH, and a new 139,000-gallon ground storage water tank:**

### Narrative Requirements:

| Condition No. | Condition                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T-41          | Water utilities shall have a cross connection program conforming to 401 KAR 8. [Recommended Standards for Water Works 8.10.1]                                                                                                                                                                                                                                                                                 |
| T-42          | Installed pipe shall be pressure tested and leakage tested in accordance with the appropriate AWWA Standards. [Recommended Standards for Water Works 8.7.6]                                                                                                                                                                                                                                                   |
| T-43          | New, cleaned and repaired water mains shall be disinfected in accordance with AWWA Standard C651. The specifications shall include detailed procedures for the adequate flushing, disinfection, and microbiological testing of all water mains. In an emergency or unusual situation, the disinfection procedure shall be discussed with the Division of Water. [Recommended Standards for Water Works 8.7.7] |
| T-44          | A minimum cover of five feet shall be provided over pipe crossing underwater. [Recommended Standards for Water Works 8.9.2]                                                                                                                                                                                                                                                                                   |
| T-45          | Valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair; the valves shall be easily accessible, and not subject to flooding for pipes crossing underwater. [Recommended Standards for Water Works 8.9.2.b]                                                                                                                                         |
| T-46          | Permanent taps or other provisions to allow insertion of a small meter to determine leakage and obtain water samples on each side of the valve closest to the supply source for pipes crossing. [Recommended Standards for Water Works 8.9.2.c]                                                                                                                                                               |
| T-47          | Water storage tanks shall have a minimum 100% turnover rate of once per 72 hours. [Drinking Water General Design Criteria IV.6.a]                                                                                                                                                                                                                                                                             |
| T-48          | Minimum water level for all gravity storage tanks shall maintain a minimum design pressure of 30 psi for all potential points of use supplied by the tank. [Drinking Water General Design Criteria IV.6.b]                                                                                                                                                                                                    |
| T-49          | Separate inlet and outlet is required on storage tanks; and the inlet has to be in the upper half of the tank (unless there is a separate mixing system). [Drinking Water General Design Criteria IV.6.c]                                                                                                                                                                                                     |
| T-50          | The maximum variation between high and low levels in storage structures providing pressure to a distribution system should not exceed 30 feet. [Recommended Standards for Water Works 7.3.1]                                                                                                                                                                                                                  |

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**GACT0000000029 (Old Salem Rd - McWhorter Rd System Improvements) 1,045 linear feet (LF) 16-inch DI, 970 LF 16-inch PVC, 22,525 LF 6-inch PVC, 7,200 LF 4-inch PVC, 1,780 LF 3-inch PVC, 20 LF 2-inch PVC waterlines, improvements to the East Pittsburg Pump Station including pumps capable of 2000 GPM at 75 ft TDH, a new duplex pump station (KY 472 Pump Station) with pumps capable of 350 GPM at 90 ft TDH, and a new 139,000-gallon ground storage water tank:**

### Narrative Requirements:

| Condition No. | Condition                                                                                                                                                                                                                                                                                                                |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T-51          | Finished water storage structures which provide pressure directly to the distribution system shall be designed so they can be isolated from the distribution system and drained for cleaning or maintenance without causing a loss of pressure in the distribution system. [Recommended Standards for Water Works 7.3.2] |
| T-52          | The storage structure drain shall discharge to the ground surface with no direct connection to a sewer or storm drain. [Recommended Standards for Water Works 7.3.2]                                                                                                                                                     |
| T-53          | Adequate controls shall be provided to maintain levels in distribution system storage structures. Level indicating devices should be provided at a central location. [Recommended Standards for Water Works 7.3.3]                                                                                                       |
| T-54          | Pumping facilities shall be elevated to a minimum of three feet above the 100-year flood elevation, or three feet above the highest recorded flood elevation, whichever is higher, or protected to such elevations, [Recommended Standards for Water Works 6.1.1.a]                                                      |
| T-55          | Pumping facilities shall be readily accessible at all times. [Recommended Standards for Water Works 6.1.1.b]                                                                                                                                                                                                             |
| T-56          | Pumping facilities shall be graded around the station so as to lead surface drainage away from the station. [Recommended Standards for Water Works 6.1.1.c]                                                                                                                                                              |
| T-57          | Pumping facilities shall be protected to prevent vandalism and entrance by animals or unauthorized persons. [Recommended Standards for Water Works 6.1.1.d]                                                                                                                                                              |
| T-58          | Raw and finished pump stations shall have adequate space for the installation of additional units if needed, and for the safe servicing of all equipment. [Recommended Standards for Water Works 6.2.a]                                                                                                                  |
| T-59          | Raw and finished pump stations shall have floors that slope to a suitable drain. [Recommended Standards for Water Works 6.2.e]                                                                                                                                                                                           |
| T-60          | Raw and finished pump stations shall provide a suitable outlet for drainage from pump glands without discharging onto the floor. [Recommended Standards for Water Works 6.2.f]                                                                                                                                           |
| T-61          | At least two pumping units shall be provided. With any pump out of service, the remaining pump or pumps shall be capable of providing the maximum pumping demand of the system. [Recommended Standards for Water Works 6.3]                                                                                              |

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### Narrative Requirements:

| Condition No. | Condition                                                                                                                                                                                                                                                |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T-62          | Pumps shall have ample capacity to supply the peak demand against the required distribution system pressure without dangerous overloading. [Recommended Standards for Water Works 6.3.a]                                                                 |
| T-63          | Pumps shall be driven by prime movers able to meet the maximum horsepower condition of the pumps. [Recommended Standards for Water Works 6.3.b]                                                                                                          |
| T-64          | Pumps shall be provided with readily available spare parts and tools. [Recommended Standards for Water Works 6.3.c]                                                                                                                                      |
| T-65          | Pump stations shall have indicating, totalizing, and recording metering of the total water pumped. [Recommended Standards for Water Works 6.6.3]                                                                                                         |
| T-66          | Each pump shall have a standard pressure gauge on its discharge line. [Recommended Standards for Water Works 6.6.3.a]                                                                                                                                    |
| T-67          | Each pump shall have a compound gauge on its suction line. [Recommended Standards for Water Works 6.6.3.b]                                                                                                                                               |
| T-68          | Where two or more pumps are installed, provision shall be made for alternation. [Recommended Standards for Water Works 6.6.5]                                                                                                                            |
| T-69          | Provisions shall be made to prevent energizing the pump motor in the event of a backspin cycle. [Recommended Standards for Water Works 6.6.5]                                                                                                            |
| T-70          | Electrical controls shall be located above grade. [Recommended Standards for Water Works 6.6.5]                                                                                                                                                          |
| T-71          | Equipment shall be provided or other arrangements made to prevent surge pressures from activating controls which switch on pumps or activate other equipment outside the normal design cycle of operation. [Recommended Standards for Water Works 6.6.5] |
| T-72          | Pump stations shall have a power supply provided from at least two independent sources or a standby or an auxiliary source. [Recommended Standards for Water Works 6.6.6]                                                                                |
| T-73          | If standby power is provided by onsite generators or engines, the fuel storage and fuel line must be designed to protect the water supply from contamination. [Recommended Standards for Water Works 6.6.6]                                              |

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### Narrative Requirements:

| Condition No. | Condition                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T-74          | All lubricants which come into contact with the potable water shall be certified for conformance to ANSI/NSF Standard 60. [Recommended Standards for Water Works 6.6.8]                                                                                                                                                                                                                                                                      |
| T-75          | Booster pumps stations shall have a bypass available. [Recommended Standards for Water Works 6.4.e]                                                                                                                                                                                                                                                                                                                                          |
| T-76          | Each booster pumping station shall contain not less than two pumps with capacities such that peak demand can be satisfied with the largest pump out of service. [Recommended Standards for Water Works 6.4.1]                                                                                                                                                                                                                                |
| T-77          | All booster pumping stations shall be fitted with a flow rate indicating and totalizer meter. [Recommended Standards for Water Works 6.4.2]                                                                                                                                                                                                                                                                                                  |
| T-78          | Inline booster pumps shall be accessible for servicing and repairs. [Recommended Standards for Water Works 6.4.3]                                                                                                                                                                                                                                                                                                                            |
| T-79          | Each pump must have an isolation valve on the intake and discharge side of the pump to permit satisfactory operation, maintenance and repair of the equipment. [Recommended Standards for Water Works 6.6.1]                                                                                                                                                                                                                                 |
| T-80          | Each pump shall have a positive?acting check valve on the discharge side between the pump and the shut?off valve. [Recommended Standards for Water Works 6.6.1]                                                                                                                                                                                                                                                                              |
| T-81          | Pump station piping shall be designed so that the friction losses will be minimized, not be subject to contamination, have watertight joints, be protected against surge or water hammer with suitable restraints when necessary, and be such that each pump has an individual suction line or the lines shall be manifolded that they will insure similar hydraulic and operating conditions. [Recommended Standards for Water Works 6.6.2] |
| T-82          | Booster pumps taking suction from storage tanks shall be provided adequate net positive suction head. [Recommended Standards for Water Works 6.4.b]                                                                                                                                                                                                                                                                                          |
| T-83          | Booster pumps shall controlled so that automatic shutoff or low pressure controllers maintain at least 20 psi in the suction line under all operating conditions. [Recommended Standards for Water Works 6.4.c]                                                                                                                                                                                                                              |
| T-84          | Booster pumps taking suction from ground storage tanks shall be equipped with automatic shutoffs or low pressure controllers. [Recommended Standards for Water Works 6.4.c]                                                                                                                                                                                                                                                                  |

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### Narrative Requirements:

| Condition No. | Condition                                                                                                                                                                                                                                                                                                                   |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T-85          | All automatic pump stations should be provided with automatic signaling apparatus which will report when the station is out of service. [Recommended Standards for Water Works 6.5]                                                                                                                                         |
| T-86          | All remote controlled stations shall be electrically operated and controlled and shall have signaling apparatus of proven performance. [Recommended Standards for Water Works 6.5]                                                                                                                                          |
| T-87          | Raw and finished pump stations shall have a floor elevation of at least six inches above finished grade. [Recommended Standards for Water Works 6.2.c]                                                                                                                                                                      |
| T-88          | The minimum storage capacity (or equivalent capacity) for systems not providing fire protection shall be equal to the average daily consumption. [Recommended Standards for Water Works 7.0.1.b]                                                                                                                            |
| T-89          | The system should be designed to facilitate turnover of water in the reservoir. [Recommended Standards for Water Works 7.0.6]                                                                                                                                                                                               |
| T-90          | Excessive storage capacity should be avoided to prevent potential water quality deterioration problems. [Recommended Standards for Water Works 7.0.1.c]                                                                                                                                                                     |
| T-91          | The overflow pipe shall be of sufficient diameter to permit waste of water in excess of the filling rate. [Recommended Standards for Water Works 7.0.7.d]                                                                                                                                                                   |
| T-92          | Finished water storage structures shall be designed with reasonably convenient access to the interior for cleaning and maintenance. [Recommended Standards for Water Works 7.0.8]                                                                                                                                           |
| T-93          | Finished water storage structures shall be vented. Vents shall prevent the entrance of surface water, rainwater, bird, and animals. The overflow pipe shall not be considered a vent. Open construction between the sidewall and roof is not permissible. [Recommended Standards for Water Works 7.0.9]                     |
| T-94          | Finished water storage structures and their appurtenances, especially the riser pipes, overflows, and vents, shall be designed to prevent freezing. Equipment used for freeze protection that will come into contact with the potable water shall meet ANSI/NSF Standard 61. [Recommended Standards for Water Works 7.0.13] |
| T-95          | If a flapper valve is utilized, a screen shall be provide inside the valve. Provisions must be included to prevent the flapper from freezing shut. [Recommended Standards for Water Works 7.0.7.e]                                                                                                                          |

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### Narrative Requirements:

| Condition No. | Condition                                                                                                                                                                                                                                                                                                                                                        |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T-96          | The roof and sidewalls of all water storage structures must be watertight with no openings except properly constructed vents, manholes, overflows, risers, drains, pump mountings, control ports, or piping for inflow and outflow. [Recommended Standards for Water Works 7.0.10]                                                                               |
| T-97          | Any pipes running through the roof or sidewall of a metal storage structure must be welded, or properly gasketed. In concrete tanks, these pipes shall be connected to standard wall castings which were poured in place during the forming of the concrete. [Recommended Standards for Water Works 7.0.10.a]                                                    |
| T-98          | Openings in the roof of a storage structure designed to accommodate control apparatus or pump columns, shall be curbed and sleeved with proper additional shielding to prevent contamination from surface or floor drainage. [Recommended Standards for Water Works 7.0.10.b]                                                                                    |
| T-99          | Valves and controls should be located outside the storage structure so that the valve stems and similar projections will not pass through the roof or top of the reservoir. [Recommended Standards for Water Works 7.0.10.c]                                                                                                                                     |
| T-100         | Every catwalk over finished water in a storage structure shall have a solid floor with sealed raised edges, designed to prevent contamination from shoe scrapings and dirt. [Recommended Standards for Water Works 7.0.14]                                                                                                                                       |
| T-101         | The discharge pipes from water storage structures shall be located in a manner that will prevent the flow of sediment into the distribution system. [Recommended Standards for Water Works 7.0.15]                                                                                                                                                               |
| T-102         | Smooth-nosed sampling tap(s) shall be provided to facilitate collection of water samples for both bacteriological and chemical analyses. The sample tap(s) shall be easily accessible. [Recommended Standards for Water Works 7.0.19]                                                                                                                            |
| T-103         | Sewers, drains, standing water, and similar sources of possible contamination must be kept at least 50 feet from water storage facilities. Gravity sewers constructed of water main quality pipe, pressure tested in place without leakage, may be used at distances greater than 20 feet but less than 50 feet. [Recommended Standards for Water Works 7.0.2.c] |
| T-104         | The roof of the storage structure shall be well drained. Downspout pipes shall not enter or pass through the reservoir. [Recommended Standards for Water Works 7.0.10.d]                                                                                                                                                                                         |
| T-105         | Porous material, including wood and concrete block shall not be used for potable water contact applications. [Recommended Standards for Water Works 7.0.11]                                                                                                                                                                                                      |

## Distribution-Major Construction

East Laurel Water District

Facility Requirements

Activity ID No.:APE20230001

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**GACT0000000029 (Old Salem Rd - McWhorter Rd System Improvements) 1,045 linear feet (LF) 16-inch DI, 970 LF 16-inch PVC, 22,525 LF 6-inch PVC, 7,200 LF 4-inch PVC, 1,780 LF 3-inch PVC, 20 LF 2-inch PVC waterlines, improvements to the East Pittsburg Pump Station including pumps capable of 2000 GPM at 75 ft TDH, a new duplex pump station (KY 472 Pump Station) with pumps capable of 350 GPM at 90 ft TDH, and a new 139,000-gallon ground storage water tank:**

### Narrative Requirements:

| Condition No. | Condition                                                                                                                                                                                                                                                                                                                                      |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T-106         | All finished water storage structures shall have suitable watertight roofs which exclude birds, animals, insects, and excessive dust. [Recommended Standards for Water Works 7.0.3]                                                                                                                                                            |
| T-107         | Fencing, locks on access manholes, and other necessary precautions shall be provided to prevent trespassing, vandalism, and sabotage. [Recommended Standards for Water Works 7.0.4]                                                                                                                                                            |
| T-108         | Ladders, ladder guards, balcony railings, and safely located entrance hatches shall be provided where applicable. [Recommended Standards for Water Works 7.0.12.a]                                                                                                                                                                             |
| T-109         | All water storage structures shall be provided with an overflow which is brought down to an elevation between 12 and 24 inches above the ground surface, and discharges over a drainage inlet structure or a splash plate. All overflow pipes shall be located so that any discharge is visible. [Recommended Standards for Water Works 7.0.7] |
| T-110         | No drain on a water storage structure may have a direct connection to a sewer or storm drain. [Recommended Standards for Water Works 7.0.5]                                                                                                                                                                                                    |
| T-111         | The design shall allow draining the storage facility for cleaning or maintenance without causing loss of pressure in the distribution system. [Recommended Standards for Water Works 7.0.5]                                                                                                                                                    |
| T-112         | No overflow may be connected directly to a sewer or a storm drain. [Recommended Standards for Water Works 7.0.7]                                                                                                                                                                                                                               |
| T-113         | Proper protection shall be given to metal surfaces by paints or other protective coatings, by cathodic protective devices, or by both. [Recommended Standards for Water Works 7.0.17]                                                                                                                                                          |
| T-114         | Paint systems shall meet ANSI/NSF standard 61. [Recommended Standards for Water Works 7.0.17.a]                                                                                                                                                                                                                                                |
| T-115         | Interior paint must be applied, cured, and used in a manner consistent with the ANSI/NSF approval. [Recommended Standards for Water Works 7.0.17.a]                                                                                                                                                                                            |
| T-116         | After curing, the coating shall not transfer any substance to the water which will be toxic or cause taste or odor problems. [Recommended Standards for Water Works 7.0.17.a]                                                                                                                                                                  |

## Distribution-Major Construction

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### Narrative Requirements:

| Condition No. | Condition                                                                                                                                                                                                                                                                                                                                        |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T-117         | Wax coatings for the tank interior shall not be used on new tanks. [Recommended Standards for Water Works 7.0.17.b]                                                                                                                                                                                                                              |
| T-118         | Old wax coating must be completely removed before using another tank coating. [Recommended Standards for Water Works 7.0.17.b]                                                                                                                                                                                                                   |
| T-119         | Finished water storage structures shall be disinfected in accordance with AWWA Standard C652. Two or more successive sets of samples, taken at 24-hour intervals, shall indicate microbiologically satisfactory water before the facility is placed into operation. [Recommended Standards for Water Works 7.0.18.a]                             |
| T-120         | The disinfection procedure specified in AWWA Standard C652 chlorination method 3, section 4.3 which allows use of the highly chlorinated water held in the storage tank for disinfection purposes, is prohibited unless the initial heavily chlorinated water is properly disposed. [Recommended Standards for Water Works 7.0.18.c]             |
| T-121         | The overflow for a ground-level storage reservoir shall open downward and be screened with twenty-four mesh non-corrodible screen. [Recommended Standards for Water Works 7.0.7.b]                                                                                                                                                               |
| T-122         | Each ground level structure manhole shall be elevated at least 24 inches above the top of the tank or covering sod, whichever is higher. [Recommended Standards for Water Works 7.0.8.2]                                                                                                                                                         |
| T-123         | Each ground level structure manhole shall be fitted with a solid water tight cover which overlaps a framed opening and extends down around the frame at least two inches. The frame shall be at least four inches high. Each cover shall be hinged on one side, and shall have a locking device. [Recommended Standards for Water Works 7.0.8.2] |
| T-124         | Ground level structure vents shall open downward with the opening at least 24 inches above the roof or sod and covered with twenty-four mesh non-corrodible screen. [Recommended Standards for Water Works 7.0.9.d]                                                                                                                              |
| T-125         | The area surrounding a ground-level structure shall be graded in a manner that will prevent surface water from standing within 50 feet of it. [Recommended Standards for Water Works 7.0.16]                                                                                                                                                     |
| T-126         | The bottom of ground level reservoirs and standpipes should be placed at the normal ground surface and shall be above the 100 Year Flood or the highest flood of record. [Recommended Standards for Water Works 7.0.2.b]                                                                                                                         |



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### Narrative Requirements:

| Condition No. | Condition                                                                                                                                                                                                                                          |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T-127         | The roof of concrete reservoirs with earthen cover shall be sloped to facilitate drainage. [Recommended Standards for Water Works 7.0.10.e]                                                                                                        |
| T-128         | If the bottom elevation of a storage reservoir must be below normal ground surface, it shall be placed above the groundwater table. At least 50 percent of the water stored should be above grade. [Recommended Standards for Water Works 7.0.2.c] |
| T-129         | The top of a partially buried storage structure shall not be less than two feet above normal ground surface. [Recommended Standards for Water Works 7.0.2.d]                                                                                       |
| T-130         | If a water circulation system is used, it is recommended that the circulation pipe be located separately from the riser pipe. [Recommended Standards for Water Works 7.0.13]                                                                       |
| T-131         | Reservoirs with pre-cast concrete roof structures must be made watertight with the use of a waterproof membrane or similar product. [Recommended Standards for Water Works 7.0.10.f]                                                               |

