

Hartshorne Public Works Authority, OKLAHOMA

Water Distribution Improvements

PROJECT NO: HR-21-01

**PROJECT FUNDED BY:
USDA – RURAL DEVELOPMENT**

VOLUME I

**INFORMATION FOR BIDDERS, BID PROPOSAL, AFFIDAVITS, BONDS, INSURANCE, GENERAL
AND SUPPLEMENTAL CONDITIONS, SPECIAL PROVISIONS, AND MISCELLANEOUS FORMS AND
REQUIREMENTS**

FINAL

**COMPLETED FOR BIDDING OR CONSTRUCTION
PURPOSES (PLANS / SPECIFICATIONS NOT
BEARING THIS NOTE MAY HAVE REVISIONS
AND SHOULD NOT BE USED FOR BIDDING
OR CONSTRUCTION PURPOSES)**



July 2025

**Certificate of Authorization # 6685
Expiration Date: 6/30/2027**



**500 Village Blvd., Suite A
McAlester, OK 74501
(918)420-5500**

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ADVERTISEMENT FOR BIDS
Hartshorne Public Works Authority
Hartshorne, Oklahoma
Water Distribution Improvements

General Notice

Hartshorne Public Works Authority (Owner) is requesting Bids for the construction of the following Project:

Water Distribution Improvements
HR-21-01

Bids for the construction of the Project will be received at the **Hartshorne Public Works Authority** located at **Hartshorne City Hall**, until **7th of August, 2025 at 2:00 p.m.** local time. At that time the Bids received will be **publicly** opened and read.

The Project includes the following Work:

Section A - Install approximately 11,380 LF 12", 36,775 LF 8", & 117,470 LF 6" SDR-21 water line, 7-12", 55 – 8", & 231-6" gate valves, 198 fire hydrants, 1030 LF railroad & highway boring, & 900 service connections.

Section B – Construct a proposed pedeshere, chlorine booster station, recirculation pump, fencing & remove 2 existing water towers.

Bids are requested for the following Contract:

Hartshorne Public works Authority Water Distribution Improvements

The Project has an expected duration of **545** days.

Obtaining the Bidding Documents

The Issuing Office for the Bidding Documents is:

Infrastructure Solutions Group, LLC
500 Village Blvd., Suite A, McAlester, OK 74501

Prospective Bidders may obtain or examine the Bidding Documents at the Issuing Office on Monday through Friday between the hours of **M-Th 8:00 am-5:30 pm, Friday 8:00 am-12:00 pm**, and may obtain copies of the Bidding Documents from the Issuing Office as described below. Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Engineer will be responsible for full or partial sets of Bidding Documents, including addenda, if any, obtained from sources other than the Issuing Office.

Printed copies of the Bidding Documents may be obtained from the Issuing Office by paying a deposit of **\$300.00** for each set.

Bidding Documents may be purchased from the Issuing Office during the hours indicated above. Cost does not include shipping charges. Upon Issuing Office's receipt of payment, printed Bidding Documents or electronic documents USPS or email. The shipping charge amount will depend on the shipping method chosen. Bidding Documents are available for purchase in the following formats:

Format	Cost
Bidding Documents (including 11 x 7 Drawings)	\$300.00

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.

A pre-bid conference for the Project will be held on **Thursday, July 24th, 2025 at 2:00 p.m.** at **Hartshorne City Hall, 1101 Penn Ave., Hartshorne, OK 74547**. Attendance at the pre-bid conference is encouraged but not required.

American Iron and Steel

Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials.

The following waivers apply to this Contract:

De Minimis,

Minor Components,

Pig iron and direct reduced iron, and

[add project specific waivers as applicable].

This Advertisement is issued by:

Owner: **Hartshorne Public Works Authority**

By: **Ashley Faulkner**

Title: **Chairman**

Date: **July 12th & 19th, 2025**

INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

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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.

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 Owner has established a Bidding Documents Website as indicated in the Advertisement or invitation to bid. Owner recommends that Bidder register as a plan holder with the Issuing Office at such website, and obtain a complete set of the Bidding Documents from such website. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.
- 2.04 *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) that is readable by Adobe Acrobat Reader Version **Adobe 9 Pro** or later. 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.

ARTICLE 3—QUALIFICATIONS OF BIDDERS

- 3.01 Bidder is to submit the following information with its Bid to demonstrate Bidder's qualifications to perform the Work:
- 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 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.03 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*
 - 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. *Geotechnical Baseline Report/Geotechnical Data Report*: The Bidding Documents contain a Geotechnical Baseline Report (GBR) and Geotechnical Data Report (GDR).
 - a. As set forth in the Supplementary Conditions, the GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations ("Baseline Conditions"). The GBR is a Contract Document.
 - b. The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.
 - c. Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.
 - d. As set forth in the Supplementary Conditions, the GDR is a Contract Document containing data prepared by or for the Owner in support of the GBR.
- 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. All access to the Site other than during a regularly scheduled Site visit must be coordinated through the following Owner or Engineer contact for visiting the Site: **ISG Engineering, 918-420-5500**. Bidder must conduct the required Site visit during normal working hours.
- D. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- E. 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.
- F. 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.
- G. 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:
 - A. **Crysta Watson, P.E., Crysta.Watson@isgengineering.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 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 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 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 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 Manufacturer's Certification for Compliance with AIS. Refer to the Manufacturer's Certification form 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 AIS requirements of Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents.**
- 10.02 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 The apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work within five days after Bid opening:

A. ~~[[List key categories of the Work. Depending on the Project this might include electrical, fire protection, major equipment items]].~~

11.02 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.

11.03 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 *Sectional Bids*

- A. Bidders may submit a Bid on any individual section or any combination of sections, as set forth in the Bid Form.
- B. Submission of a Bid on any section signifies Bidder's willingness to enter into a Contract for that section alone at the price offered.
- C. If Bidder submits Bids on individual sections and a Bid based on a combination of those sections, such combined Bid need not be the sum of the Bids on the individual sections.
- D. Bidders offering a Bid on one or more sections must be capable of completing the Work covered by those sections within the time period stated in the Agreement.

13.02 *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.

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.

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. For determination of the apparent low Bidder(s) when sectional bids are submitted, Bids will be compared on the basis of the aggregate of the Bids for separate sections and the Bids for combined sections that result in the lowest total amount for all of the Work.

- 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.
- 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 Owner is not exempt from **Oklahoma** state sales and use taxes on materials and equipment to be incorporated in the Work

ARTICLE 22—CONTRACTS TO BE ASSIGNED

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.**
- 23.03 **American Iron and Steel requirements apply to this project.**

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: **Hartshorne Public Works Authority, 1101 Penn Ave., Hartshorne, OK 74547**
- 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. 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.
 - J. Compliance Statement
 - K. Debarment Certification
 - L. RD Instruction 1940-Q
 - M. Business Relationships Affidavit
 - N. Noncollusion Affidavit
 - O. Payroll Affidavit

ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

3.01 *Unit Price Bids*

A. Bidder will perform the following Work at the indicated unit prices:

1. SEE ATTACHED BID SCHEDULE

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—TIME OF COMPLETION

4.01 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.

4.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 5—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

5.01 *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.

5.02 *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.

5.03 *Receipt of Addenda*

A. Bidder hereby acknowledges receipt of the following Addenda: **[Add rows as needed. Bidder is to complete table.]**

Addendum Number	Addendum Date

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Bidder's Representations*

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.

EJCDC® C-410, Bid Form for Construction Contract.

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

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 American Iron and Steel 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.

6.02 *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)

STATEMENT OF QUALIFICATIONS:

Bidder

Address

Address

Email Address

Phone Number

Similar Projects Completed by Bidder:

1. NAME OF PROJECT: _____
OWNER: _____ ADDRESS: _____
DATE STARTED: _____ DATE COMPLETED: _____
APPROX. QUANTITIES OF MAJOR ITEMS: _____

VALUE OF CONTRACT: _____
2. NAME OF PROJECT: _____
OWNER: _____ ADDRESS: _____
DATE STARTED: _____ DATE COMPLETED: _____
APPROX. QUANTITIES OF MAJOR ITEMS: _____

VALUE OF CONTRACT: _____
3. NAME OF PROJECT: _____
OWNER: _____ ADDRESS: _____
DATE STARTED: _____ DATE COMPLETED: _____
APPROX. QUANTITIES OF MAJOR ITEMS: _____

VALUE OF CONTRACT: _____
4. OTHER PROJECT REFERENCES: _____

NOTE: This form is to be submitted with the bid.

BID SCHEDULE

HARTSHORNE PUBLIC WORKS AUTHORITY					
WATER DISTRIBUTION IMPROVEMENTS					
SECTION A					
1	12-inch PVC SDR 21 Water Main	11,380	Linear Feet	\$	\$
2	8-inch PVC SDR 21 Water Main	36,775	Linear Feet	\$	\$
3	6-inch PVC SDR 21 Water Main	117,470	Linear Feet	\$	\$
4	12-inch Gate Valve	7	Each	\$	\$
5	8-inch Gate Valve	55	Each	\$	\$
6	6-inch Gate Valve	231	Each	\$	\$
7	Fire Hydrant Assembly	198	Each	\$	\$
8	Flushing Hydrant Assembly	19	Each	\$	\$
9	Automatic Flushing Hydrant Assembly	3	Each	\$	\$
10	6" PVC Railroad Bore with 12" Steel Casing	110	Linear Feet	\$	\$
11	8" PVC Railroad Bore with 16" Steel Casing	560	Linear Feet	\$	\$
12	6" PVC Highway Bore with 12" Steel Casing	205	Linear Feet	\$	\$
13	8" PVC Highway Bore with 16" Steel Casing	65	Linear Feet	\$	\$
14	12" PVC Highway Bore with 24" Steel Casing	90	Linear Feet	\$	\$
15	6" Minor Channel Crossing	30	Linear Feet	\$	\$
16	Long Service Connections	430	Each	\$	\$
17	Short Service Connections	479	Each	\$	\$
18	Asphalt Surface Repair	7,443	Linear Feet	\$	\$
19	Gravel Surface Repair	5,944	Linear Feet	\$	\$
20	Concrete Surface Repair	5,132	Linear Feet	\$	\$
21	Curb Repair	90	Linear Feet	\$	\$
22	Stone Drainage Repair	55	Linear Feet	\$	\$
23	4' Concrete Sidewalk	2,817	Linear Feet	\$	\$
24	6' Concrete Sidewalk	831	Linear Feet	\$	\$
Total Amount Section A Bid:		\$			
Note: Bids shall include sales tax and all other applicable taxes and fees. If project is bid over budget, the PWA has the authority to remove line items as necessary.					

SECTION A - ADDITIVE ALTERNATE					
1A	12-inch PVC SDR 21 Water Main	3,105	Linear Feet	\$	\$
2A	12-inch Gate Valve	1	Each	\$	\$
3A	Asphalt Surface Repair	65	Linear Feet	\$	\$
4A	Gravel Surface Repair	70	Linear Feet	\$	\$
5A	Concrete Surface Repair	40	Linear Feet	\$	\$
6A	Relocate Master Meter	1	Lump Sum	\$	\$
Total Amount Section A Additive Alternate Bid:		\$			

BID SCHEDULE

SECTION B					
1	Chlorine Booster Station	3	Each	\$	\$
2	Proposed Pedesphere	1	Lump Sum	\$	\$
3	Fencing with Double Gates	400	Linear Feet	\$	\$
4	Remove Existing Water Storage Tank	2	Each	\$	\$
5	Tank Interior and Standard Exterior Painting System	1	Lump Sum	\$	\$
6	Pedesphere Logo	2	Each	\$	\$
Total Amount Section B Bid:		\$			
Note: Bids shall include sales tax and all other applicable taxes and fees. If project is bid over budget, the PWA has the authority to remove line items as necessary.					

SECTION B - ADDITIVE ALTERNATE					
1B	Tank Interior and Fluoropolymer Polyurethane Exterior Painting System	1	Lump Sum	\$	\$
Total Amount Section B Additive Alternate Bid:		\$			
If additive alternate line item 1B is awarded, it will replace line item 5 in the Section B bid.					

BID BOND (PENAL SUM FORM)

Bidder Name: Address <i>(principal place of business)</i> :	Surety Name: Address <i>(principal place of business)</i> :
Owner Name: Hartshorne Public Works Authority Address <i>(principal place of business)</i> : 1101 Penn Avenue Hartshorne, OK 74547	Bid Project <i>(name and location)</i> : Water Distribution Improvements Hartshorne, OK Bid Due Date:
Bond Penal Sum: [Amount] Date of Bond: [Date]	
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
_____ <i>(Full formal name of Bidder)</i>	_____ <i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature) (Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
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.

LIST OF POTENTIAL SUBCONTRACTORS

Bidder

Address

1. NAME: _____
ADDRESS: _____
TASK PERFORMED: _____

2. NAME: _____
ADDRESS: _____
TASK PERFORMED: _____

3. NAME: _____
ADDRESS: _____
TASK PERFORMED: _____

4. NAME: _____
ADDRESS: _____
TASK PERFORMED: _____

5. NAME: _____
ADDRESS: _____
TASK PERFORMED: _____

(ATTACH ADDITIONAL PAGES IF NECESSARY)

LIST OF POTENTIAL SUPPLIERS:

Bidder

Address

1. NAME: _____
ADDRESS: _____
MATERIALS SUPPLIED: _____

2. NAME: _____
ADDRESS: _____
MATERIALS SUPPLIED: _____

3. NAME: _____
ADDRESS: _____
MATERIALS SUPPLIED: _____

4. NAME: _____
ADDRESS: _____
MATERIALS SUPPLIED: _____

5. NAME: _____
ADDRESS: _____
MATERIALS SUPPLIED: _____

(ATTACH ADDITIONAL PAGES IF NECESSARY)

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:	☐ Sole Proprietorship ☐ Partnership ☐ Corporation		
☐ Limited Liability Company ☐ 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?		☐ Yes ☐ No ☐ 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:	☐ Yes ☐ No	Limit of Authority:	\$
Name:		Title:	
Authorized to sign contracts:	☐ Yes ☐ No	Limit of Authority:	\$
Name:		Title:	
Authorized to sign contracts:	☐ Yes ☐ 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
☐ Disadvantaged Business Enterprise		
☐ Minority Business Enterprise		
☐ Woman-Owned Business Enterprise		
☐ Small Business Enterprise		
☐ Disabled Business Enterprise		
☐ Veteran-Owned Business Enterprise		
☐ Service-Disabled Veteran-Owned Business		
☐ HUBZone Business (Historically Underutilized) Business		
☐ Other		
☐ 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:		☐ Attached
Date of Business's most recent audited financial statement:		☐ 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?	☐ Yes ☐ 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? ☐ Yes ☐ No			
Mailing Address (principal place of business):			
Physical Address (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?		☐ Yes ☐ No	
Does provider have an A.M. Best Rating of A-VII or better?		☐ Yes ☐ No	
Mailing Address (principal place of business):			
Physical Address (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? ☐ Yes ☐ No				
Been barred from contracting by any local, state, or federal agency within the last 5 years? ☐ Yes ☐ No				
Been released from a bid in the past 5 years? ☐ Yes ☐ No				
Defaulted on a project or failed to complete any contract awarded to it? ☐ Yes ☐ No				
Refused to construct or refused to provide materials defined in the contract documents or in a change order? ☐ Yes ☐ No				
Been a party to any currently pending litigation or arbitration? ☐ Yes ☐ 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

Project Manager			
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	
Project Superintendent			
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	

Safety Manager			
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	
Quality Control Manager			
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	

COMPLIANCE STATEMENT

This statement relates to a proposed contract with _____

Hartshorne Public Works Authority

,

(Name of borrower or grantee)

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor, I represent that:

1. I ☐ have, ☐ have not, participated in a previous contract or subcontract subject to Executive 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.

2. If I have participated in such a contract or subcontract, I ☐ have, ☐ have not, filed all compliance reports that have been required to file in connection with the contract or subcontract.

If the proposed contract is for \$50,000 or more and I have 50 or more employees, I also represent that:

3. I ☐ have, ☐ have not previously had contracts subject to the written affirmative action programs requirements of the Secretary of Labor.

4. If I have participated in such a contract or subcontract, I ☐ have, ☐ have not developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and wash rooms, restaurants and other eating areas time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

(See Reverse).

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a 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.

**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

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR Part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, Federal Register (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated.

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)

- (1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
- (2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Organization Name

PR/Award Number or Project Name

Name(s) and Title(s) of Authorized Representative(s)

Signature(s)

Date

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 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 transaction,” “debarred,” “suspended,” “ineligible,” “lower tier covered transaction,” “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.

Affiant Signature

Type or Printed Name

Title

Date

oOo

STATE OF OKLAHOMA)
) ss.
COUNTY OF _____)

NOTE: This form is to be submitted with the bid.

NONCOLLUSION AFFIDAVIT

STATE OF _____)
) ss.
COUNTY OF _____)

_____, of lawful age, being first duly sworn, on oath says that (s)he is the agent authorized by the bidder to submit the attached bid. Affiant further states that the bidder has not been a party to any collusion among bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding; or with any state official or employee as to quantity, quality or price in the prospective contract, or any other terms of said prospective contract; or in any discussions between bidders and any state official concerning exchange of money or other thing of value for special consideration in the letting of a contract.

Affiant Signature

Type or Printed Name

Title

Subscribed and sworn to before me this _____ day of _____, 20_____.

Place
Seal
Here

Notary Public

My Commission Expires:_____

NOTE: This form is to be submitted with the bid.

PAYROLL AFFIDAVIT

_____, of lawful age, being first duly sworn, on oath
says that (s)he is the agent authorized by the bidder to submit the attached bid. Affiant further
states that (s)he has submitted or will submit the required payroll information to the Wage and Hour
Division of the Employment Standards Administration of the United States Department of Labor.
Affiant further states that (s)he is in compliance with the requirements of Title 40 O.S. 1981,
Paragraph 196.9a(B), as amended.

Affiant Signature

Type or Printed Name

Title

Subscribed and sworn to before me this _____ day of _____, 20_____.

Place
Seal
Here

Notary Public

My Commission Expires: _____

Note: This form is to be submitted with the bid.

CLAIM OR INVOICE AFFIDAVIT

STATE OF Oklahoma)
) ss.
COUNTY OF Pittsburg)

The undersigned (engineer or supervisory official), of lawful age, being first duly sworn, on oath says that this (invoice, claim, or contract) is true and correct. Affiant further states that the (work, services, or materials) as shown by this invoice or claim have been (completed or supplied) in accordance with the plans, specifications, orders, or requests furnished to the affiant. Affiant further states that (s)he either directly or indirectly, to any elected official, officer, or employee of the State of Oklahoma, of money or any other thing of value to obtain payment or the award of this contract.

Signature of Engineer or Other Supervisory Official

Crysta Watson, P.E.

Type or Print Name

Project Engineer

Title

Subscribed and sworn to before me this _____ day of _____, 20_____.

Place
Seal
Here

Notary Public

My Commission Expires: _____

ENGINEER'S CERTIFICATION OF FINAL PLANS AND SPECIFICATIONS

PROJECT NAME: Hartshorne PWA Water Distribution Improvements

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

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

Crysta Watson, P.E., Project Engineer
Name and Title

Date

NOTICE OF AWARD

Date of Issuance:

Owner: Hartshorne Public Works Authority Owner's Project No.: HR-21-01
Engineer: Crysta Watson, P.E. Engineer's Project No.: HR-21-01
Project: Water Distribution Improvements
Contract Name: Water Distribution Improvements
Bidder:
Bidder's Address:

You are notified that Owner has accepted your Bid dated **[date]** for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

The Contract Price of the awarded Contract is \$**[Contract Price]**. 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.

[Number of copies sent] unexecuted counterparts 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 **[number of copies sent]** counterparts of 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:

Contractor:

By (signature):

By (signature):

Name (printed):

Name (printed):

Title:

Title:

Copy:

Copy: Engineer

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

This Agreement is by and between **Hartshorne Public Works Authority** ("Owner") and **[name of contracting entity]** ("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

Section A - Install approximately 11,380 LF 12", 36,775 LF 8", & 117,470 LF 6" SDR-21 water line, 7-12", 55 – 8", & 231-6" gate valves, 198 fire hydrants, 1030 LF railroad & highway boring, & 900 service connections.

Section B – Construct a proposed pedeshere, chlorine booster station, recirculation pump, fencing & remove 2 existing water towers.

THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows

Section A - Install approximately 11,380 LF 12", 36,775 LF 8", & 117,470 LF 6" SDR-21 water line, 7-12", 55 – 8", & 231-6" gate valves, 198 fire hydrants, 1030 LF railroad & highway boring, & 900 service connections.

Section B – Construct a proposed pedeshere, chlorine booster station, recirculation pump, fencing & remove 2 existing water towers.

ARTICLE 2—ENGINEER

3.01 The Owner has retained **Infrastructure Solutions Group, 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 **[insert "Engineer" if an entity has been identified as such in Paragraph 3.01, and that same entity prepared the design; or indicate by name the entity other than Engineer that prepared the design]**.

ARTICLE 3—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.

EJCDC® C-520, Agreement between Owner and Contractor for Construction Contract (Stipulated Price).

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

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 **[number]** 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 **[number]** days after the date when the Contract Times commence to run.

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 **\$(number)** 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 **\$(number)** 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.

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 4—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 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 quantity of that item).

Unit Price Work					
Item No.	Description	Unit	Estimated Quantity	Unit Price	Extended Price
				\$	\$
				\$	\$
				\$	\$
				\$	\$
				\$	\$
Total of all Extended Prices for Unit Price Work (subject to final adjustment based on actual quantities)					\$

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.

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

ARTICLE 5—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 **20th** 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. **Ninety-five 95** percent of the value of the Work completed (with the balance being retainage).
 - b. **Ninety-five 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 **[number]** percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less **[number]** 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 **[number]** percent per annum.

ARTICLE 6—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).

- c. Maintenance 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 **89** sheets with each sheet bearing the following general title: **Harsthorne Public Works Authority**.
- 7. Addenda (numbers **[number]** to **[number]**, inclusive).
- 9. Exhibits to this Agreement (enumerated as follows):
 - a. **[list exhibits]**
- 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 7—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 **[indicate date on which Contract becomes effective]** (which is the Effective Date of the Contract).

Owner:

Hartshorne Public Works Authority

(typed or printed name of organization)

By:

(individual's signature)

Date:

(date signed)

Name:

Ashley Faulkner

(typed or printed)

Title:

Chairman

(typed or printed)

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:

(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:

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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

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.

52. American Iron and Steel (AIS) Definitions

- a. American Iron and Steel (AIS) - Requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference for "iron and steel products," meaning the following products, if made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials. AIS requirements apply in each of the several states, the District of Columbia, and each federally recognized Tribe, but not the U.S. Territories.
- b. Coating - A covering that is applied to the surface of an object. If a Coating is applied to the external surface of a domestic iron or Steel component, and the application takes place outside of the United States, said product would be considered a compliant product under the AIS requirements. Any Coating processes that are applied to the external surface of Iron and Steel components that would otherwise be AIS compliant would not disqualify the product from meeting the AIS requirements regardless of where the Coating processes occur, provided that final assembly of the product occurs in the United States. This exemption only applies to Coatings on the external surface of Iron and Steel components. It does not apply to Coatings or linings on internal surfaces of Iron and Steel products, such as the lining of lined pipes. All Manufacturing Processes for lined pipes, including the application of pipe lining, must occur in the United States for the product to be compliant with AIS requirements.
- c. Construction Materials - Those articles, materials, or supplies made primarily of iron and/or steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel". Note: Mechanical and electrical components, equipment and systems are not considered Construction Materials. See definitions of Mechanical Equipment and Electrical Equipment.
- d. Contractor's Certification - Documentation submitted by the Contractor upon Substantial Completion of the Contract that all Iron and Steel products installed were Produced in the United States.
- e. De Minimis - Various miscellaneous, incidental low-cost components that are essential for, but incidental to, the construction and are incorporated into the physical structure of the project. Examples of De Minimis components could include

small washers, screws, fasteners (such as “off the shelf” nuts and bolts), miscellaneous wire, corner bead, ancillary tube, signage, trash bins, door hardware etc. Costs for such De Minimis components cumulatively may comprise no more than a total of five percent of the total cost of the materials used in and incorporated into a project; the cost of an individual item may not exceed one percent of the total cost of the materials used in and incorporated into a project.

- f. Electrical Equipment - Typically any machine powered by electricity and includes components that are part of the electrical distribution system. AIS does not apply to Electrical Equipment.
- g. Engineer’s Certification - Documentation submitted by the Engineer that Drawings, Specifications, and Bidding Documents comply with AIS.
- h. Iron and Steel products - The following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials. Only items on the above list made primarily of iron or steel, permanently incorporated into the project must be Produced in the United States. For example, trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. iron or steel.
- i. Manufacturer - A Supplier, fabricator, distributor, materialman, or vendor is an entity with which the Owner, Contractor or any subcontractor has contracted to furnish materials or equipment to be incorporated in the project by the Owner, Contractor or a subcontractor.
- j. Manufacturer’s Certification - Documentation provided by the Manufacturer stating that the Iron and Steel products to be used in the project are produced in the United States in accordance with American Iron and Steel (AIS) Requirements. 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.
- k. Manufacturing Processes - Processes such as melting, refining, pouring, forming, rolling, drawing, finishing, and fabricating. Further, if a domestic Iron and Steel product is taken out of the United States for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a Coating are similarly not covered. Non-iron or Steel components of an Iron and Steel product may come from non-US sources. For

example, for products such as valves and hydrants, the individual non-Iron and Steel components do not have to be of domestic origin. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-U.S. sources.

- I. Mechanical Equipment - Typically equipment which has motorized parts and/or is powered by a motor. AIS does not apply to Mechanical Equipment.
 - m. Minor Components - Components within an iron and/or Steel product otherwise compliant with the American Iron and Steel requirements; this waiver is typically used by Manufacturers. It differs from the De Minimis definition in that De Minimis pertains to the entire project and the minor component definition pertains to a single product. This waiver 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 AIS requirements. This waiver does not exempt the whole product from the AIS requirements only Minor Components within said product and the iron or Steel components of the product must be produced domestically. Valves and hydrants are also subject to the cost ceiling requirements described here. Examples of Minor Components could include items such as pins and springs in valves/hydrants, bands/straps in couplings, and other low-cost items such as small fasteners etc.
 - n. Municipal Castings - Cast iron or Steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and solid waste infrastructure.
 - o. Primarily Iron or Steel - A product is made of greater than 50 percent iron or Steel on a materials cost basis. An exception to this definition is reinforced precast concrete (see Definitions). All technical specifications and applicable industry standards (e.g. NIST, NSF, AWWA) must be met. If a product is determined to be less than 50 percent iron and/or steel, the AIS requirements do not apply. For example, the cost of a fire hydrant includes:
 - The cost of materials used for the iron portion of a fire hydrant (e.g. bonnet, body and shoe); and
 - The cost to pour and cast to create those components (e.g. labor and energy).
- Not included in the cost are:
- The additional material costs for the non-iron or Steel internal workings of the hydrant (e.g. stem, coupling, valve, seals, etc.); and
 - The cost to assemble the internal workings into the hydrant body.

- p. Produced in the United States - The production in the United States of the iron or Steel products used in the project requires that all Manufacturing Processes must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives.
- q. Reinforced Precast Concrete – Reinforced Precast Concrete structures must comply with AIS, regardless of whether or not it consists of at least 50 percent iron or steel. The reinforcing bar and wire must be Produced in the United States and meet the same standards as for any other iron or Steel product. Additionally, the casting of the concrete product must take place in the United States. The cement and other raw materials used in concrete production are not required to be of domestic origin. If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered Construction Materials and must be Produced in the United States.
- r. Steel - An alloy that includes at least 50 percent iron, between 0.02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of Steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of Steel covers carbon steel, alloy steel, stainless steel, tool steel, and other specialty steels.
- s. Structural Steel - Rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees, and zees. Other shapes include but are not limited to, H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

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 copies of the policies (including

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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*

- A. Owner shall furnish to Contractor 1 (one) 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.
- 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. 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, 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 50 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.

C. 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.

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. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- D. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- E. 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.
- F. 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.

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.

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 **1/2 inch (12.7mm)** 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 OSHA guidelines regarding high temperatures.
 - 2) Determination of actual bad weather days during performance of the Work will be based on the weather records measured and recorded by **McAlester, Oklahoma Mesonet Site** weather monitoring station at the McAlester Regional Airport.
 - 3) Contractor shall anticipate the number of foreseeable bad weather days per month indicated in the table below.

NORMAL ADVERSE WEATHER DAYS

MONTH	
JANUARY	9
FEBRUARY	7
MARCH	6
APRIL	4
MAY	4
JUNE	3
JULY	2

AUGUST	2
SEPTEMBER	3
OCTOBER	3
NOVEMBER	5
DECEMBER	8

- 4) In each month, every bad weather day exceeding the number of foreseeable bad weather days established in the table listed above—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.

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.
- 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: **[If there are no such reports, so indicate in the table.]**

1.0 Report Title	2.0 Date of Report	3.0 Technical Data
NO SUCH REPORTS		[Identify Technical Data]

- 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: **[If there are no such drawings, so indicate in the table.]**

4.0 Drawings Title	5.0 Date of Drawings	6.0 Technical Data
NO SUCH REPORTS		[Identify Technical Data]

- 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.

5.04 *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.
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: **[If there are no such reports, so indicate in the table]**

Report Title	Date of Report	Technical Data
NO SUCH REPORTS		[Identify Technical Data]

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: **[If there are no such drawings, so indicate in the table]**

Drawings Title	Date of Drawings	Technical Data
NO SUCH REPORTS		[Identify Technical Data]

- 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.
 - 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).
 - 3. *Required Maintenance Bond:* *The maintenance bond that the Contractor furnishes will be in the form enclosed in the contract documents.*
- B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
 - 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 **1** year 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 **100** percent of the final Contract Price. The warranty bond period will extend to a date **1** year 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.
- 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.
 - 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]
- 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.
- D. *Other Additional Insureds:* As a supplement to the provisions of Paragraph 6.03.C of the General Conditions, the commercial general liability, automobile liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies must include as additional insureds (in addition to Owner and Engineer) the following: **[Here list by legal name (not category, role, or classification) other persons or entities to be included as additional insureds. See GC-6.03.C.]**
- E. *Workers' Compensation and Employer's Liability:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance, including, as applicable, United States Longshoreman and Harbor Workers' Compensation Act, Jones Act, stop-gap employer's liability coverage for monopolistic states, and foreign voluntary workers' compensation (from available sources, notwithstanding the jurisdictional requirement of Paragraph 6.02.B of the General Conditions).

Workers' Compensation and Related Policies	Policy limits of not less than:
Employer's Liability	
Each accident	\$100,000.00
Each employee	\$100,000.00
Policy limit	\$500,000.00

- F. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against claims for:
1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,
 2. damages insured by reasonably available personal injury liability coverage, and
 3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- G. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:
1. Products and completed operations coverage.
 - a. Such insurance must be maintained for three years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
 3. Severability of interests and no insured-versus-insured or cross-liability exclusions.
 4. Underground, explosion, and collapse coverage.
 5. Personal injury coverage.
 6. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.
 7. For design professional additional insureds, ISO Endorsement CG 20 32 07 04 "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- H. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:
1. Any modification of the standard definition of "insured contract" (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).
 2. Any exclusion for water intrusion or water damage.
 3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.
 4. Any exclusion of coverage relating to earth subsidence or movement.
 5. Any exclusion for the insured's vicarious liability, strict liability, or statutory liability (other than worker's compensation).
 6. Any limitation or exclusion based on the nature of Contractor's work.
 7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.
- I. *Commercial General Liability—Minimum Policy Limits*

Commercial General Liability	Policy limits of not less than:
General Aggregate	\$2,000,000.00
Products—Completed Operations Aggregate	\$2,000,000.00
Personal and Advertising Injury	\$1,000,000.00
Bodily Injury and Property Damage—Each Occurrence	\$1,000,000.00

- J. *Automobile Liability:* Contractor shall purchase and maintain automobile liability insurance for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy must be written on an occurrence basis.

Automobile Liability	Policy limits of not less than:
Bodily Injury	
Each Person	\$500,000.00
Each Accident	\$300,000.00
Property Damage	
Each Accident	\$500,000.00
[or]	
Combined Single Limit	
Combined Single Limit (Bodily Injury and Property Damage)	\$1,000,000.00

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.
 - 1. Regular working hours will be defined as any day not including Saturdays, Sundays or legal holidays, in which weather or other conditions, not under the control of the CONTRACTOR, will permit construction of the principal units of the work for a period of not less than seven (7) hours between 7:00 a.m. and 6:00 p.m.
 - 2. Owner's legal holidays are:
 - New Year's Day
 - Birthday of Martin Luther King, Jr.
 - Washington's Birthday
 - Memorial Day
 - Juneteenth National Independence Day
 - Independence Day
 - Labor Day
 - Columbus Day
 - Veterans Day
 - Thanksgiving Day
 - Christmas Day

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.
- D. All Iron and Steel products must meet American Iron and Steel requirements.
- E. For projects utilizing a De Minimis waiver, Contractor shall maintain an itemized list of non-domestically produced iron or steel incidental components and ensure that the cost is less than 5% of total materials cost for project.

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) Deleted.
 - 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. Contractor shall include a Manufacturer's Certification letter for compliance with American Iron and Steel requirements in support data, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

- 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;
 - 3) be suited to the same use as the item specified; and
 - 4. Comply with American Iron and Steel by providing Manufacturer's Certification letter of American Iron and Steel compliance, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

- 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. 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.
- B. Deleted
- 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 may not require that Contractor use a specific replacement. 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, Manufacturers' Certifications, 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, including Manufacturer's Certification letter for any item in the submittal subject to American Iron and Steel requirements and include the Certificate in the submittal. Refer to Manufacturer's Certification Letter provided in these Contract Documents. .
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.
9. Engineer's review and approval of a Shop Drawing or Sample shall include review of Manufacturers' Certifications in order to document compliance with American Iron and Steel requirements, as applicable.

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.
- F. Contractor shall certify upon Substantial Completion that all Work and Materials have complied with American Iron and Steel requirements as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. Contractor shall provide said Certification to Owner. Refer to General Contractor's Certification Letter provided in these Contract Documents.

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.

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 Infrastructure Solutions Group, LLC. The authority and responsibilities of Owner's Site Representative follow: Observe, record and report to Project Engineer.

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.

- 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.

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.
- 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*

- 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.
1. 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.
- 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. For Owner-authorized changes in the Work, the Contractor will provide the Manufacturer's Certification(s) for materials subject to American Iron and Steel requirements except when sole-source is specified, in which case the Engineer will provide the Manufacturer's Certification(s).
- 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.
 - c. Change orders involving materials subject to American Iron and Steel requirements shall include supporting data (name of Manufacturer, city and state where the product was manufactured, description of product, signature of authorized Manufacturer's representative) in the Manufacturer's Certification Letter, as applicable.

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. Deleted
- 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.

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" (Exhibit G of this Bulletin) before Owner submits the executed Contract Documents to Agency for approval.

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 USC 3145) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

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: [*Insert mitigation measures from the Letter of Conditions here*].

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 *American Iron and Steel*

A. Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States. The term “iron and steel products” means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials.

B. The following waivers apply to this Contract:

- 1. *De Minimis,***
- 2. *Minor Components,***
- 3. *Pig iron and direct reduced iron, and***
- 4. *[add project specific waivers as applicable].***

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

~~No suggested Supplementary Conditions in this Article.~~

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 “American Iron and Steel Definitions” immediately after Paragraph 1.01.A.51:

52.a *American Iron and Steel (AIS)* - Requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference for “iron and steel products,” meaning the following products, if made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials. AIS requirements apply in each of the several states, the District of Columbia, and each federally recognized Tribe, but not the U.S. Territories.

52.b *Coating* - A covering that is applied to the surface of an object. If a Coating is applied to the external surface of a domestic iron or Steel component, and the application takes place outside of the United States, said product would be considered a compliant product under the AIS requirements. Any Coating processes that are applied to the external surface of Iron and Steel components that would otherwise be AIS compliant would not disqualify the product from meeting the AIS requirements regardless of where the Coating processes occur, provided that final assembly of the product occurs in the United States. This exemption only applies to Coatings on the *external surface* of Iron and Steel components. It does not apply to Coatings or linings on internal surfaces of Iron and Steel products, such as the lining of lined pipes. All Manufacturing Processes for lined pipes, including the application of pipe lining, must occur in the United States for the product to be compliant with AIS requirements.

52.c *Construction Materials* - Those articles, materials, or supplies made primarily of iron and/or steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered “structural steel”. Note: Mechanical and electrical components, equipment and systems are not considered Construction Materials. See definitions of Mechanical Equipment and Electrical Equipment.

52.d *Contractor’s Certification* - Documentation submitted by the Contractor upon Substantial Completion of the Contract that all Iron and Steel products installed were Produced in the United States.

52.e *De Minimis* - Various miscellaneous, incidental low-cost components that are essential for, but incidental to, the construction and are incorporated into the physical structure of the project. Examples of *De Minimis* components could include small washers, screws, fasteners (such as “off the shelf” nuts and bolts), miscellaneous wire, corner bead, ancillary tube, signage, trash bins, door hardware etc. Costs for such *De Minimis* components cumulatively may comprise no more than a total of five percent of the total cost of the materials used in and incorporated into a project; the cost of an individual item may not exceed one percent of the total cost of the materials used in and incorporated into a project.

52.f *Electrical Equipment* - Typically any machine powered by electricity and includes components that are part of the electrical distribution system. AIS does not apply to Electrical Equipment.

52.g *Engineer's Certification* - Documentation submitted by the Engineer that Drawings, Specifications, and Bidding Documents comply with AIS.

52.h *Iron and Steel products* - The following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials. Only items on the above list made primarily of iron or steel, permanently incorporated into the project must be Produced in the United States. For example, trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. iron or steel.

52.i *Manufacturer* - A Supplier, fabricator, distributor, materialman, or vendor is an entity with which the Owner, Contractor or any subcontractor has contracted to furnish materials or equipment to be incorporated in the project by the Owner, Contractor or a subcontractor.

52.j *Manufacturer's Certification* - Documentation provided by the Manufacturer stating that the Iron and Steel products to be used in the project are produced in the United States in accordance with American Iron and Steel (AIS) Requirements. 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.k *Manufacturing Processes* - Processes such as melting, refining, pouring, forming, rolling, drawing, finishing, and fabricating. Further, if a domestic Iron and Steel product is taken out of the United States for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a Coating are similarly not covered. Non-iron or Steel components of an Iron and Steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-Iron and Steel components do not have to be of domestic origin. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-U.S. sources.

52.l *Mechanical Equipment* - Typically equipment which has motorized parts and/or is powered by a motor. AIS does not apply to Mechanical Equipment.

52.m *Minor Components* - Components *within* an iron and/or Steel product otherwise compliant with the American Iron and Steel requirements; this waiver is typically used by Manufacturers. It differs from the *De Minimis* definition in that *De Minimis* pertains to the entire project and the minor component definition pertains to a single product. This waiver allows use of non-domestically produced miscellaneous Minor Components comprising up to five percent of the total material cost of an

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).

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 AIS requirements. This waiver does not exempt the whole product from the AIS requirements only Minor Components within said product and the iron or Steel components of the product must be produced domestically. Valves and hydrants are also subject to the cost ceiling requirements described here. Examples of Minor Components could include items such as pins and springs in valves/hydrants, bands/straps in couplings, and other low-cost items such as small fasteners etc.

52.n *Municipal Castings* - Cast iron or Steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and solid waste infrastructure.

52.o *Primarily Iron or Steel* - A product is made of greater than 50 percent iron or Steel on a materials cost basis. An exception to this definition is reinforced precast concrete (see Definitions). All technical specifications and applicable industry standards (e.g. NIST, NSF, AWWA) must be met. If a product is determined to be less than 50 percent iron and/or steel, the AIS requirements do not apply. For example, the cost of a fire hydrant includes:

- ☐ The cost of materials used for the iron portion of a fire hydrant (e.g. bonnet, body and shoe); and
- ☐ The cost to pour and cast to create those components (e.g. labor and energy).

Not included in the cost are:

- ☐ The additional material costs for the non-iron or Steel internal workings of the hydrant (e.g. stem, coupling, valve, seals, etc.); and
- ☐ The cost to assemble the internal workings into the hydrant body.

52.p *Produced in the United States* - The production in the United States of the iron or Steel products used in the project requires that all Manufacturing Processes must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives.

52.q *Reinforced Precast Concrete* – Reinforced Precast Concrete structures must comply with AIS, regardless of whether or not it consists of at least 50 percent iron or steel. The reinforcing bar and wire must be Produced in the United States and meet the same standards as for any other iron or Steel product. Additionally, the casting of the concrete product must take place in the United States. The cement and other raw materials used in concrete production are not required to be of domestic origin. If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered Construction Materials and must be Produced in the United States.

52.r *Steel* - An alloy that includes at least 50 percent iron, between 0.02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of Steel for the purpose of enhancing properties such as

corrosion resistance, hardness, or strength. The definition of Steel covers carbon steel, alloy steel, stainless steel, tool steel, and other specialty steels.

52.s Structural Steel - Rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees, and zeeks. Other shapes include but are not limited to, H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

SC-2.01

- A. *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.
- B. *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

Owner shall furnish to Contractor **1** (one) printed copies of the Contract Documents (including one fully signed counterpart of the Agreement), and **one copy** in electronic portable document format (PDF).

A Supplementary Condition regarding conformed documents is necessary only if the Owner intends to provide the Contractor with conformed documents that will serve as binding Contract Documents. The following may be used for that purpose:

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 **1** (one) 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

- A. *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, 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.

C. *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:

~~Did not add 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

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

SC-4.01.A – Delete the last sentence of paragraph.

4.05 *Delays in Contractor's Progress*

SC-4.05 Paragraph is mandatory for WWD projects.

SC-4.05 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 **[threshold precipitation quantity]** 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: **[temperature]** degrees Fahrenheit; or, at 3:00 p.m. the ambient outdoor temperature is equal to or greater than the following high temperature threshold: **[temperature]** 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 **[name of the entity operating the weather station]** weather monitoring station at **[location of the weather monitoring station]**.

- 3) Contractor shall anticipate the number of foreseeable bad weather days per month indicated in the table in Exhibit **[exhibit number]**—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 **[exhibit number]**—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*

Guidance Notes—Reports and Drawings Containing Technical Data (Subsurface; Physical Conditions)

1. This is a mandatory Supplementary Condition. Paragraph 5.03, Subsurface and Physical Conditions, of the General Conditions requires the identification of reports and drawings that contain Technical Data regarding subsurface and physical conditions at or adjacent to the Site. See GC-5.03.A.1 and 2. This will typically include current and recent geotechnical reports, drawings of existing subsurface and surface conditions (including structures such as buildings and foundations), and any other documents that Owner or Engineer has determined to contain reliable Site information. GC-5.03.A.3 requires the identification of the specific Technical Data in the reports and drawings. This is an important task because only the Technical Data is entitled to reliance by Contractor—the remainder of the contents of the reports and drawings does not receive this elevated status.
2. Typical examples of the contents of Site-related reports and drawings that might be categorized by Owner or Engineer as Technical Data for contractual purposes are:
 - a. boring logs;
 - b. recorded measurements of subsurface water levels;
 - c. assessments of the condition of subsurface facilities;
 - d. laboratory test results; and
 - e. mapping based on remote sensing.
3. Use SC-5.03, presented immediately below, for the purpose of identifying the Site condition documents that contain Technical Data, and the specific Technical Data contained in each report and drawing.
4. In a change from the two previous editions of the EJCDC Construction Series documents (2013 and 2007), the user should not list all archival and other documents concerning the Site here in the Supplementary Conditions—as of 2018, for GC/SC-5.03 list in the Supplementary Conditions only those documents determined by Owner or Engineer to contain Technical Data.

5. *Filling in the tables:* SC-5.03.E contains a table for listing reports that contain Technical Data, and identifying that data; and SC-5.03.F contains a table for listing drawings that contain Technical Data. Examples of a completed row from each table follow, for illustrative purposes only:

- 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
Results of Investigation of Subsoil Conditions and Geotechnical Recommendations—Riverside Wastewater Treatment Plant	August 8, 2018	Boring Log, Test Site 1, at page 32 of Report.

- 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
Record Drawings: Route 24 Overpass Abutment Project	November 30, 2012	All information in drawings, with the exception of the contents of Drawings 001 and 005.

6. In addition to requiring the identification of Technical Data in SC-5.03, EJCDC also requires that Owner identify and disclose to Bidders archival and other Site-related documents known to Owner (but that do not contain Technical Data and therefore are not listed here in the Supplementary Conditions), in a list distributed with the Instructions to Bidders. See Instructions to Bidders, Article 5. The Bidders may then review documents of interest, and perhaps glean information useful to them in fashioning a bid and planning the Work. There is no requirement, however, that Bidders or the Contractor review the documents disclosed in the Instructions to Bidders, nor are they held accountable for any data or information in such documents; similarly, Owner has not verified the data or information in these documents, and is not responsible for their accuracy. The requirement that Contractor review and take responsibility for Site information is limited to information in (1) the Contract Documents and (2) the Technical Data.
7. If the Supplementary Conditions neglect to expressly identify the Technical Data entitled to reliance, then certain data in documents such as a geotechnical report, environmental report, or similar investigative report prepared for the current Project are, by default definition, Technical Data upon whose accuracy Contractor may rely. See the default definition of Technical Data, GC-1.01.A.46.b.
8. Paragraph GC-5.03.B clarifies that Underground Facilities are shown or indicated in the Drawings. Requirements with respect to Underground Facilities are set forth in Paragraph GC-5.05.
9. Paragraph GC-5.06 requires disclosure of documents relating to Hazardous Environmental Conditions at the Site. Note that these requirements differ from the requirements regarding disclosure of documents relating to subsurface and physical conditions in GC-5.03, and here in SC-5.03.
10. If Owner elects to furnish a Geotechnical Baseline Report (GBR), use the alternate SC/GBR-5.03 and SC/GBR-5.04 presented in Exhibit C to this document, rather than the SC-5.03 version immediately following. **[Exhibit C is located at the end of C-800.]**

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: **[If there are no such reports, so indicate in the table.]**

Report Title	Date of Report	Technical Data
		[Identify Technical Data]

- 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: **[If there are no such drawings, so indicate in the table.]**

Drawings Title	Date of Drawings	Technical Data
		[Identify Technical Data]

- 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

Guidance Notes—Reports and Drawings Regarding Hazardous Environmental Conditions—This is a mandatory Supplementary Condition. Paragraph 5.06 of the General Conditions contemplates that Owner will identify all known documents regarding Hazardous Environmental Conditions (HEC) that have been identified at or adjacent to the Site. It also requires the identification of Technical Data (upon whose accuracy Contractor may rely) contained in such documents. Use SC-5.06, presented immediately below, to identify the known HEC documents. Refer to Guidance Note 5 preceding SC-5.03 for examples of completed rows of tables similar to the tables in SC-5.06. Also note that if either a geotechnical report or environmental report has been prepared for the Project, and the Supplementary Conditions neglect to expressly identify reports or drawings or reports' or drawings' Technical Data upon whose accuracy Contractor may rely, then the default definition of Technical Data in Paragraph GC-1.01.A.46.b of the General Conditions will apply.

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: **[If there are no such reports, so indicate in the table]**

Report Title	Date of Report	Technical Data
		[Identify Technical Data]

Report Title	Date of Report	Technical Data

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: **[If there are no such drawings, so indicate in the table]**

Drawings Title	Date of Drawings	Technical Data
		[Identify Technical Data]

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 WEP projects.

Guidance Notes—Performance and Payment Bonds

1. *Deletion of Performance/Payment Bond Requirement:* Paragraph 6.01.A of the General Conditions requires that Contractor furnish a performance bond and a payment bond. If performance and payment bonds are not required for a specific Contract, include a Supplementary Condition that deletes the GC-6.01.A requirement.
2. *Performance/Payment Bond Forms:* Paragraph 6.01.C requires that all bonds be “in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract....” Some Owners may have in-house bond forms that must be used, or in some instances state or local law may mandate a specific bond form. In all other cases, EJCDC recommends that its standard performance and payment bond forms, EJCDC® C-610, Performance Bond (2018), and EJCDC® C-615, Payment Bond (2018), be included or specified. These bond forms were developed in collaboration by EJCDC with other principal design, construction, and surety organizations, and as a result contain industry-standard wording, organization, and terminology. (The 2010, 2013, and 2018 editions of these two bonds are essentially identical, and interchangeable.) Most sureties and bond producers have templates of the EJCDC bonds and can issue them readily.
3. If the EJCDC performance and payment bonds are required, EJCDC recommends that prospective Bidders or contractors be given sample copies of the two bond forms (typically as a part of the Bidding Documents), and buttress the requirement with an express Supplementary Condition specifying the use of the standard EJCDC bonds. The Supplementary Condition for that purpose follows.

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.

Guidance Notes—“Other Bonds,” Warranty Bond

1. Other Bonds

Paragraph 6.01.B states that if Contractor is required to provide a bond other than a performance or payment bond, the requirement will be set forth in the Supplementary Conditions. This statement is not relevant or related to a requirement that a Bidder must furnish a Bid Bond: such a requirement (if any) is part of the bidding process that occurs before entry into the construction contract, and the bid bond requirement would be included in the Instructions to Bidders. See Instructions to Bidders, Article 8. Rather, the reference is to any special purpose bond that is required.

2. Warranty Bond

Perhaps the most common “other” or special purpose bond that might be required is the warranty bond (also called a maintenance bond). A warranty bond provides assurance that Contractor (or if necessary the surety) will meet the contractual correction period obligations during a specified period of time after construction has been completed.

SC-6.01.B.1 presents model wording for requiring that Contractor furnish a warranty bond. EJCDC’s standard form for such a bond is EJCDC® C-612, Warranty Bond (2018); if SC-6.01.B.1 is used, the Warranty Bond form should be provided to bidders or prospective contractors with the Supplementary Conditions (typically as a part of the Bidding Documents).

The C-612 Warranty Bond is intended to be used to provide bonding for a period of time greater than one year after Substantial Completion. EJCDC® C-610, Performance Bond (2018) already obligates the surety with respect to the correction of defective Work (C-610, Paragraph 7.1), and has a duration sufficient to allow bond claims based on defects discovered during the standard one-year correction period (GC-6.01.A; C-610, Paragraph 11); and the purchase price charged for the performance bond is based on that bond remaining in effect during the one-year correction period. Thus, a warranty bond is not needed if the correction period remains the standard one year, and indeed would be redundant with the performance bond if used solely to cover that one-year correction period.

To avoid possible conflicts regarding responsibilities between the surety that issues the performance bond and the surety that issues the warranty bond, EJCDC recommends a requirement that the two bonds be issued by the same surety. See SC-6.01.B.3.

Although in theory a warranty bond could be furnished for a very lengthy duration (four or more years beyond Substantial Completion), such a lengthy bond would probably be commercially difficult to obtain and very expensive. EJCDC recommends an endpoint for the warranty bond of either two years after Substantial Completion (essentially extending the bonded coverage by one additional year) or three years after Substantial Completion (extending the bonded coverage by two additional years). These two recommended options are embedded in the C-612 Warranty Bond form.

By its terms the EJCDC warranty bond applies to the contractual correction obligation at GC-15.08. SC-6.01.B.2 extends that contractual correction period beyond its standard one-year duration—the contractual extension should match the Warranty Bond duration. For the sake of clarity, EJCDC recommends a cross-reference to Supplementary Condition SC-15.08.A—see Article 15 below.

Because correction period work is, in total, likely to cost only a modest fraction of the Contract Price, warranty bonds typically have a bond amount that is 10 or 15 percent of the Contract Price. The precise percentage required should be clearly indicated in the Supplementary Condition.

The suggested wording to extend the correction period and require that Contractor furnish a warranty bond follows:

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*

Guidance Notes—Modifying Insurance Company Ratings Requirements—Paragraph 6.02.B of the General Conditions requires that all companies that provide insurance policies required under this Contract must have an A.M. Best rating of A-VII or better, unless a different standard is indicated in the Supplementary Conditions. The A.M. Best ratings are based on the financial strength and size of the insurance company, with A-VII representing a commonly used standard. SC-6.02 is the location for noting any different standard, whether narrower or broader.

In some states, not all worker's compensation insurers obtain A.M. Best ratings. The Owner may wish to include the following optional exception (modified to meet applicable provisions in the state) to the requirement in Paragraph 6.02.B:

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.~~

Guidance Notes—Specifying Insurance to be carried by Subcontractors and Suppliers—GC-6.02.H indicates that Contractor must require its Subcontractors and Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project. This provision intentionally gives

Contractor considerable latitude in risk management with respect to its Subcontractors and Suppliers. In most cases the Contractor will have more familiarity than Owner with the risks associated with particular types of subcontracted work, with the Subcontractors and Suppliers selected, and with the insurance coverage requirements that should be imposed. Occasionally, however, the Owner will choose to establish insurance requirements that apply to some or all Subcontractors or Suppliers. SC-6.02.H.3 may be used for that purpose.

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*

Guidance Notes—Specifying Contractor's Insurance, Including Coverage Limits—This is a mandatory Supplementary Condition, because it is the location for specifying the insurance policies, coverages, and endorsements to be maintained by Contractor (other than builder's risk and other property insurance, which are addressed in SC-6.04), and the minimum coverage limits. However, not all components of SC-6.03 will be used for the specific Contract that is being drafted, and many parts may need to be modified or revised to meet specific insurance requirement objectives. Consultation with risk managers, insurance specialists, and legal counsel is a necessity.

The information set forth in this Supplementary Condition (and in all other contractual provisions regarding bonds and insurance) is typically provided by Owner, either directly or through written instructions given to Engineer (see EJCDC® C-051, Engineer's Letter to Owner Requesting Instructions Concerning Bonds and Insurance (2018), and EJCDC® C-052, Owner's Instructions to Engineer Concerning Bonds and Insurance (2018)).

The user should refer to the following Guidance points with respect to specific features of SC-6.03, including categories of insurance with unique features (such as Umbrella or Excess Liability insurance, SC-6.03.K), or that are required only under specific circumstances (such as Railroad Protective Liability insurance, SC-6.03.O):

1. *Deciding Whether to Require Umbrella/Excess Insurance:* SC-6.03.K, Umbrella or Excess Liability, is a standard insurance provision that requires Contractor to carry an Umbrella or Excess Liability policy. Some Owners do not require that Contractor carry Umbrella/Excess insurance, perhaps viewing the decision to obtain and maintain Umbrella/Excess, and the specific amount of Umbrella/Excess coverage, as risk management choices best left to the Contractor; and presumably in such cases the Owner accepts that the primary policies (most importantly Commercial General Liability), as specified, provide adequate protection.

If Owner revises the standard terms by deleting the requirement that Contractor provide Excess or Umbrella liability insurance, then Owner may wish to consider requiring (in SC-6.03.G, Commercial General Liability—Form and Content) that "The general aggregate limits under SC-6.03.I (Commercial General Liability—Minimum Policy Limits) be maintained fully available for this Contract by obtaining

and maintaining a Designated Construction Project General Aggregate Limit endorsement, or equivalent.”

2. *Allowing the Umbrella/Excess Insurance to Satisfy Underlying Coverage Requirements*

- a. The optional Supplementary Condition SC-6.03.L, Using Umbrella or Excess Liability to Meet CGL and Other Policy Limit Requirements, is used to contractually authorize the common practice in which an Owner allows Contractor to meet the required minimum policy limits for commercial general liability and other primary liability policies by attributing a portion of Umbrella/Excess coverage to the underlying policy or policies. For example, if the Contract requires \$5 million in CGL coverage; SC-6.03.L specifies (in the brackets in the last sentence) that a minimum of \$3 million of the Umbrella must remain unattributed to any underlying policy; and Contractor has a CGL policy of \$3 million and a \$10 million Umbrella policy, then \$2 million of the Umbrella could be attributed to the CGL, to meet the \$5 million CGL minimum. Under that example, such attribution would still leave a “balance” of \$8 million under the Umbrella, thus satisfying the requirement that a minimum of \$3 million of the Umbrella remain unattributed to any underlying policy.
- b. In those cases in which SC-6.03.L, Using Umbrella or Excess Liability Insurance to Meet CGL and Other Policy Limit Requirements, is used, it is important fill in the brackets in the last sentence, specifying the unattributed balance that is the appropriate amount for the specific Contract.
- c. Not all Owners will choose to allow an Umbrella/Excess policy to provide partial satisfaction of a primary liability policy coverage requirement, preferring the simpler approach of Contractor providing an underlying policy (most notably, CGL) in the full amount required. When this is the preference, do not include SC-6.03.L, Using Umbrella or Excess Liability Insurance to Meet CGL and Other Policy Limit Requirements.

3. *Combining Contractor’s Pollution and Professional Liability Policies:* Contractor’s Pollution Liability Insurance (SC-6.03.M) and Contractor’s Professional Liability Insurance (SC-6.03.N) are presented as two distinct required policies. However, Contractor’s Pollution Liability and Contractor’s Professional Liability policies are sometimes sold as a hybrid or combined policy. After consulting with its risk managers, Owner may wish to supplement the two provisions with a statement indicating that Contractor may provide such a combination policy, as an acceptable alternative to providing two separate policies, at a stated policy limit for the combination policy.
4. *Railroad Protective Liability Policy:* If any portion of the Work will take place within 50 feet of railroad-owned or controlled property, the railroad company will likely require that the Contractor obtain a railroad protective liability policy. Use Paragraph SC-6.03.O below if such a policy is required.

A railroad protective liability policy is for the benefit of the railroad company (not the Contractor or Owner), providing the railroad with protection from both liability and property damage it incurs because of the Contractor’s construction activities. The railroad protective policy is site-specific, and applies only when work is in progress—it does not include completed operations coverage.

The standard coverage includes bodily injury or property damage that arises out of the acts or omissions of railroad employees, to the extent the acts or omissions are related to or in connection with the Contractor’s activities. The coverage of physical damage to property should apply to real and personal property that is owned or leased by the railroad, including rolling stock, tracks, trestles, buildings, and structures.

The railroad will usually have specific requirements for the railroad protective policy, including per-claim and aggregate policy limits, coverages, and the formal names of the railroad and other related insureds. In most cases the railroad will require an indemnification from Contractor, in addition to the insurance policy. The Owner or other drafter should include all known railroad requirements here or elsewhere in the Contract, if the requirements are known at the time the Contract is drafted.

5. *Unmanned Aerial Vehicle Liability Insurance:* The use of aerial drones on construction projects is increasingly common. If there is a possibility that Contractor will use drones on the specific Project, Owner may wish to include SC-6.03.P, Unmanned Aerial Vehicle Liability Insurance.
6. *Other Required Insurance:* If Owner or its insurance advisors or risk managers have identified other insurance policies that Contractor should obtain and maintain, based on the Owner's or Project's specific needs, identify the required policies and minimum policy limits at SC-6.03.Q. Note that Builder's Risk insurance is separately addressed in GC/SC-6.04.

SC-6.03 Supplement Paragraph 6.03 with the following provisions after Paragraph 6.03.C:

- D. *Other Additional Insureds:* As a supplement to the provisions of Paragraph 6.03.C of the General Conditions, the commercial general liability, automobile liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies must include as additional insureds (in addition to Owner and Engineer) the following: **[Here list by legal name (not category, role, or classification) other persons or entities to be included as additional insureds. See GC-6.03.C.]**
- E. *Workers' Compensation and Employer's Liability:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance, including, as applicable, United States Longshoreman and Harbor Workers' Compensation Act, Jones Act, stop-gap employer's liability coverage for monopolistic states, and foreign voluntary workers' compensation (from available sources, notwithstanding the jurisdictional requirement of Paragraph 6.02.B of the General Conditions).

Workers' Compensation and Related Policies	Policy limits of not less than:
Workers' Compensation	
State	Statutory
Applicable Federal (e.g., Longshoreman's)	Statutory
Foreign voluntary workers' compensation (employer's responsibility coverage), if applicable	Statutory
Jones Act (if applicable)	
Bodily injury by accident—each accident	\$
Bodily injury by disease—aggregate	\$
Employer's Liability	
Each accident	\$
Each employee	\$
Policy limit	\$

Workers' Compensation and Related Policies	Policy limits of not less than:
Stop-gap Liability Coverage	
For work performed in monopolistic states, stop-gap liability coverage must be endorsed to either the worker's compensation or commercial general liability policy with a minimum limit of:	\$

- F. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against claims for:
1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,
 2. damages insured by reasonably available personal injury liability coverage, and
 3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- G. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:
1. Products and completed operations coverage.
 - a. Such insurance must be maintained for three years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
 2. Blanket contractual liability coverage, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
 3. Severability of interests and no insured-versus-insured or cross-liability exclusions.
 4. Underground, explosion, and collapse coverage.
 5. Personal injury coverage.
 6. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.
 7. For design professional additional insureds, ISO Endorsement CG 20 32 07 04 "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- H. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:

1. Any modification of the standard definition of “insured contract” (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).
2. Any exclusion for water intrusion or water damage.
3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.
4. Any exclusion of coverage relating to earth subsidence or movement.
5. Any exclusion for the insured’s vicarious liability, strict liability, or statutory liability (other than worker’s compensation).
6. Any limitation or exclusion based on the nature of Contractor’s work.
7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.

I. *Commercial General Liability—Minimum Policy Limits*

Commercial General Liability	Policy limits of not less than:
General Aggregate	\$
Products—Completed Operations Aggregate	\$
Personal and Advertising Injury	\$
Bodily Injury and Property Damage—Each Occurrence	\$

- J. *Automobile Liability:* Contractor shall purchase and maintain automobile liability insurance for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy must be written on an occurrence basis.

Automobile Liability	Policy limits of not less than:
Bodily Injury	
Each Person	\$
Each Accident	\$
Property Damage	
Each Accident	\$
[or]	
Combined Single Limit	
Combined Single Limit (Bodily Injury and Property Damage)	\$

- K. *Umbrella or Excess Liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer’s liability, commercial general liability, and automobile liability insurance described in the Paragraphs above. The coverage afforded must be at least as broad as that of each and every one of the underlying policies.

Excess or Umbrella Liability	Policy limits of not less than:
Each Occurrence	\$
General Aggregate	\$

- L. *Using Umbrella or Excess Liability Insurance to Meet CGL and Other Policy Limit Requirements:* Contractor may meet the policy limits specified for employer's liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary insurance policy's policy limits and partial attribution of the policy limits of an umbrella or excess liability policy that is at least as broad in coverage as that of the underlying policy, as specified herein. If such umbrella or excess liability policy was required under this Contract, at a specified minimum policy limit, such umbrella or excess policy must retain a minimum limit of \$[specify amount] after accounting for partial attribution of its limits to underlying policies, as allowed above.
- M. *Contractor's Pollution Liability Insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage, including cleanup costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance must be maintained for no less than three years after final completion.

Contractor's Pollution Liability	Policy limits of not less than:
Each Occurrence/Claim	\$
General Aggregate	\$

- N. *Contractor's Professional Liability Insurance:* If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance must cover negligent acts, errors, or omissions in the performance of professional design or related services by the insured or others for whom the insured is legally liable. The insurance must be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. The retroactive date on the policy must pre-date the commencement of furnishing services on the Project.

Contractor's Professional Liability	Policy limits of not less than:
Each Claim	\$
Annual Aggregate	\$

- O. *Railroad Protective Liability Insurance:* Prior to commencing any Work within 50 feet of railroad-owned and controlled property, Contractor shall (1) endorse its commercial general liability policy with ISO CG 24 17, removing the contractual liability exclusion for work within 50 feet of a railroad, (2) purchase and maintain railroad protective liability insurance meeting the following requirements, (3) furnish a copy of the endorsement to Owner, and (4) submit a copy of the railroad protective policy and other railroad-required documentation to the railroad, and notify Owner of such submittal.

[Insert additional specific requirements, commonly set by the railroad, here.]

Railroad Protective Liability Insurance	Policy limits of not less than:
Each Claim	\$
Aggregate	\$

- P. *Unmanned Aerial Vehicle Liability Insurance:* If Contractor uses unmanned aerial vehicles (UAV—commonly referred to as drones) at the Site or in support of any aspect of the Work, Contractor shall obtain UAV liability insurance in the amounts stated; name Owner, Engineer, and all individuals and entities identified in the Supplementary Conditions as additional insureds; and provide a certificate to Owner confirming Contractor’s compliance with this requirement. Such insurance will provide coverage for property damage, bodily injury or death, and invasion of privacy.

Unmanned Aerial Vehicle Liability Insurance	Policy limits of not less than:
Each Claim	\$
General Aggregate	\$

- Q. *Other Required Insurance:* [Here list additional types and amounts of insurance that Contractor is required to carry.]

6.04 *Builder’s Risk and Other Property Insurance*

Guidance Notes—Owner Purchase of Builder’s Risk Insurance—The General Conditions require the Contractor to purchase and maintain builder’s risk insurance. GC-6.04.A. The detailed requirements for the builder’s risk insurance are set forth here in the Supplementary Conditions, in provisions such as SC-6.04.F, G, and H. (The option of requiring the Contractor to purchase an installation floater, as an alternative to builder’s risk insurance, is presented in the alternate SC-6.04.A that follows the more commonly used builder’s risk clauses.)

In the event that the builder’s risk purchase requirement will be flipped, such that the Owner, rather than the Contractor, will purchase the builder’s risk insurance, use the following SC-6.04.A:

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.

Guidance Notes—Builder’s Risk Insurance Requirements—The standard builder’s risk requirements in this Supplementary Condition may include some items that are not applicable to the specific Project. The user should revise the requirements based on knowledge of the Project, risk management analysis, and consultation with Owner’s insurance advisors and legal counsel. The requirements are intended to be used regardless of whether the Contractor purchases the builder’s risk insurance (the default assumption,

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as stated in GC-6.04.A), or the purchase responsibility is flipped to the Owner (see SC-6.04.A immediately above).

Some coverages, such as coverage of property in temporary storage, or coverage of property in transit, are commonly subject to sublimits—specific monetary caps on the amount of coverage. Although a sublimit may be appropriate (or at least tolerable) for some risk categories, the drafter should consult with an insurance advisor and specify a minimum for each sublimit, to avoid underinsuring the risk of a loss in such a coverage category. The provisions of SC-6.04.F indicate when a coverage category is likely to be subject to a sublimit, and provide a place for specifying an acceptable minimum. See SC-6.04.F.4, 5, and 12. SC-6.04.F.13 provides a location for specifying other sublimits.

SC-6.04.F.5 requires coverage of construction materials “in transit.” Specific policies may define this as being limited to domestic, overland transit, such as rail or truck transit. Because the risk of loss in transit will ultimately be borne by Contractor, a risk that is not within the scope of the specific builder’s risk insurance policy (a loss during shipment from overseas, for example) could be managed separately by Contractor in its purchase agreement with the vendor.

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].

Guidance Notes—Loss of Revenue and “Soft Cost” Coverage—The basic coverage of a builder’s risk policy provides compensation for direct physical loss or damage to the Work. Such loss or damage often has secondary impacts associated with delays in completion of the Work. One significant secondary impact is loss of revenue. Another broad category of secondary impacts is often referred to as “soft costs”—extended financing costs, management and engineering expenses, tax and permit costs, and insurance.

It is usually possible to expand the basic builder’s risk coverage to insure against loss of revenue and soft cost losses. SC-6.04.G provides a starting point for doing so. This clause should be reviewed carefully and supplemented as needed to obtain the coverage needed for the specific Project. Substantial input from Owner, working in conjunction with an insurance broker or consultant, is necessary to identify specific soft cost exposures, and to quantify the scope of possible losses. Without such input, it would be impossible for the builder’s risk underwriters to assess risks and develop an appropriate premium.

For example, if soft cost coverage will extend to loss of revenue of a processing facility if it is completed late (as the result of physical damage from a covered risk, such as a fire), then it will be essential for the builder’s risk insurers or brokers who price out the insurance to have a reasonable estimate of anticipated daily revenue and other financial factors. In a competitive bidding setting, and assuming that the Contractor will procure the builder’s risk insurance (and include or account for the premium in the bid price), this means that such information will need to be furnished to bidders, who can then communicate it to brokers, who will furnish quotes for premiums.

As an alternative, Owner may prefer to solicit bids based on a generic requirement (such as that stated in SC-6.04.G), and then work with the selected Contractor and its insurer to refine the scope of loss of revenue and soft cost coverage and the related premiums, and issue a Change Order to document the precise coverage and any resulting change in Contract Price.

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.

Guidance Notes—Builder’s Risk Deductibles—Paragraph 6.04.A of the General Conditions requires builder’s risk insurance on a completed value basis, subject to such deductible amounts as are provided by the Supplementary Conditions. SC-6.04.H provides a means of identifying a primary deductible; other specific deductibles may also be added. It is common for builder’s risk policies to feature several different deductibles, typically including a primary deductible and specific deductibles applicable to specific types of loss, such as flood and earth movement.

In some cases, the Owner (as the party directing or specifying the content of the insurance-related Supplementary Conditions) will choose not to specify any deductibles, leaving establishment of the

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deductible amounts to the discretion of the purchasing party, which is responsible for payment of the deductibles. Even when a deductible is stipulated, it is typically a maximum amount; the purchaser may choose to purchase a policy with a lower deductible.

The builder's risk policies available for projects in coastal and other high-risk areas may have special deductible provisions for wind and flood damage (hurricanes), earthquakes, and other specific risks. Such deductibles are determined based on a percentage of the property value at the time of loss, rather than being stated as a specific dollar amount. SC-6.04.H should be revised to reflect coastal or other local conditions that change the approach to deductibles.

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.

Guidance Notes—Installation Floater—An installation floater is insurance carried by a specific contractor, covering only the materials and equipment to be incorporated in the contractor's work. It typically does not insure against losses that occur after installation. In most cases, builder's risk insurance offers broader coverage, covers the Owner, Contractor, and Subcontractors, and is the preferred risk management instrument. On some projects, an installation floater may be an acceptable alternative to a builder's risk policy. For example, on a pipeline project it may be sufficient from a risk management standpoint to insure against loss or damage to the piping until installation, at which time there is little further risk from standard insurable perils such as fire or windstorm. Because the Owner will typically not be an insured, the use of an installation floater also assumes a risk management decision that protecting the Contractor's interest in the materials and equipment is sufficient to assure the best interests of the project. See EJCDC® C-001, Commentary on the 2018 EJCDC Construction Documents (2018).

If, after consultation with its risk managers, Owner elects to allow purchase of an installation floater rather than a builder's risk policy, the following SC-6.04.A should be included as a Supplementary Condition; GC-6.04.B, GC-6.04.C, GC-6.04.D, and GC-6.04.E should be retained; SC-6.04.F, Builder's Risk Requirements, should not be included; and SC-6.04.H, Builder's Risk and other Property Insurance Deductibles, should be included. Owner should determine whether soft cost and related coverage is available and warranted, and if so modify the contents of SC-6.04.G, Coverage for Completion Delays, for the installation floater requirement.

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*

Guidance Notes—Defining “Regular Hours” and “Legal Holidays”—Paragraph 7.03.C of the General Conditions restricts Contractor to working during “regular hours” Monday through Friday, and no work is permitted on “legal holidays.” To provide details regarding the meaning of the terms “regular hours” and “legal holidays,” consider specifically defining them by adding the following:

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]**.

Guidance Notes—Days of the Week That May be Worked—To modify the days of the week that Contractor may work, use the following:

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.”

Guidance Notes—Unlimited Work Schedule—If the Owner has no objections to the Contractor working multiple shifts, weekends, and legal holidays, use the following:

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.

Guidance Notes—Responsibility for Overtime Costs—If Contractor is permitted to Work outside regular hours and on weekends and holidays, whether by a contractual provision or by Owner's consent during the course of the Project, then it is good practice to address the issue of whether Owner may charge Contractor for engineering expenses associated with the non-regular schedule. Some Owners may prefer to absorb these costs to incentivize (or at least facilitate) an aggressive schedule and timely completion; and in many cases the net additional expense may be modest. Other Owners may prefer to establish and collect a charge for the engineering services. Add the following as SC-7.03.D, making a policy choice regarding responsibility in the beginning of the sentence:

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.

Guidance Notes—Defining Overtime Costs—If responsibility for costs in SC-7.03.D will be allocated to Contractor, Owner may wish to provide some specificity regarding the potential costs, through the addition of the following:

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]**.

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

- D. All Iron and Steel products must meet American Iron and Steel 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 iron or steel incidental components and ensure that the cost is less than 5% of total materials cost for project.**

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 American Iron and Steel requirements in support data, if applicable. Refer to Manufacturer’s Certification Letter provided in these Contract Documents.

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 American Iron and Steel by providing Manufacturer’s Certification letter of American Iron and Steel compliance, if applicable. Refer to Manufacturer’s Certification Letter provided in these Contract Documents.

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

Guidance Notes—Sales and Use Tax Exemptions—If Owner qualifies for a state or local sales or use tax exemption in the purchase of certain materials and equipment, add the following Supplementary Condition, with any revisions necessary to meet the specific applicable exemption rules.

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If instructions to bidders or proposers are used, confirm that the provisions here are consistent with the corresponding provisions in such instructions. See EJCDC® C-200, Instructions to Bidders for Construction Contracts (2018), Article 21.

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.

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

Manufacturers' Certifications,

7.13 *Safety and Protection*

Guidance Notes—Owner's Safety Programs—Some Owners have written safety programs with which construction contractors must comply. If such is the case, Paragraph 7.13.G of the General Conditions states that the safety program will be identified or included in the Supplementary Conditions or Specifications (and Paragraph 9.12.B requires Owner to provide a copy of such programs to Contractor).

If the identification of the Owner's safety programs will occur in the Supplementary Conditions, use the following SC-7.13. If there is a Specification section (typically in Division 01) that addresses the Owner's safety programs, then SC-7.13 is unnecessary, though it could be retained as a means of providing a cross-reference to the specific location in the Specifications.

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].**

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

, including Manufacturer's Certification letter for any item in the submittal subject to American Iron and Steel requirements and include the Certificate in the submittal. Refer to Manufacturer's Certification Letter 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 in order to document compliance with American Iron and Steel requirements, as applicable.

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

F. Contractor shall certify upon Substantial Completion that all Work and Materials have complied with American Iron and Steel requirements as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. Contractor shall provide said Certification to Owner. Refer to General Contractor’s Certification Letter provided in these Contract Documents.

ARTICLE 8—OTHER WORK AT THE SITE

8.02 *Coordination*

Guidance Notes—Coordinating Other Work at Site—Paragraph 8.02 of the General Conditions requires that if in addition to retaining Contractor, Owner will arrange to have others perform work at the Site, Owner must provide to Contractor specified information regarding coordination of construction activities. (Note that Owner should provide specific information about the other work—nature of the work, scope, schedule, exact location—elsewhere in the Contract Documents or in other documentation.) When applicable, add the following to provide such information:

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*

Guidance Notes—Owner’s Site Representative—The EJCDC Construction series documents assume that the Engineer will be Owner’s representative during construction. See EJCDC® C-520, Agreement Between Owner and Contractor for Construction Contract (Stipulated Price) (2018), Paragraph 3.01, and GC-10.01. On many projects the Engineer will carry out duties at the Site through a Resident Project Representative

(RPR), as addressed in GC-10.03. When that is the case, SC-10.03.C and SC-10.03.D should be included, as modified for the specific Project.

Paragraph 10.03.B of the General Conditions indicates that the Owner may designate a representative or agent who is not Engineer's consultant, agent, or employee, to represent Owner at the Site ("Owner's Site Representative"). In such case the Owner typically would not have the Engineer furnish a Resident Project Representative, and hence SC-10.03.B below would be used to indicate there is no Engineer's Resident Project Representative; and typically SC-9.13 would be used for the identification of the Owner's Site Representative.

Note that the following SC-9.13, if used, must be supplemented by customized text that explains the responsibilities of the Owner's Site Representative, so far as such are relevant to Contractor. The content of Paragraphs SC-10.03.C below may be a helpful starting point in drafting such supplemental text. In addition, if Owner's retention of an Owner's Site Representative will affect other aspects of Engineer's status during construction, other portions of Article 10 and many other parts of the General Conditions will need to be revised. In such cases it is typical for (and Laws and Regulations may require) the design engineer (as engineer of record) to at least retain a role with respect to design intent reviews of submittals and similar aspects of the Work.

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*

Guidance Notes—Engineer's Resident Project Representative (RPR)—As indicated in Paragraph 10.03 of the General Conditions, in those cases in which the Engineer will provide a Resident Project Representative (RPR) during construction, the authority and responsibilities of the RPR with respect to the Contractor must be specified in the Supplementary Conditions. SC-10.03.C and SC-10.03.D, below, provide a mechanism for doing so.

In the alternative, in some cases Engineer will not provide RPR services, either because there will not be an RPR, or because a party other than Engineer will provide the site services. When such is the case, SC-10.03.A.1 below should be used.

As indicated in Paragraph 10.03 of the General Conditions, the Owner may designate a representative or agent who is not Engineer's consultant, agent, or employee, to represent Owner at the Site. In such case, in addition to using SC-10.03.A.1, below, refer to the Guidance Note in Article 9 and use SC-9.13 above.

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.

Guidance Notes—RPR Services—As discussed, the most typical case is that the site representative is Engineer's consultant, agent, or employee, in which case SC-10.03.C and SC-10.03.D are mandatory. SC-10.03.C and SC-10.03.D focus on the role of the Resident Project Representative with respect to the Contractor. The RPR's scope of services and obligations to Owner are typically more extensive than the provisions here in the construction contract; they are spelled out in detail in Exhibit D to EJCDC® E-500, Agreement Between Owner and Engineer for Professional Services. The following should be edited to indicate the specific RPR authority and responsibilities that apply to this Contract.

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

~~No suggested Supplementary Conditions in this Article.~~

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.

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.

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(s) for materials subject to American Iron and Steel requirements except when sole-source is specified, in which case the Engineer will provide the Manufacturer's Certification(s).

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

c. Change orders involving materials subject to American Iron and Steel requirements shall include supporting data (name of Manufacturer, city and state where the product was manufactured, description of product, signature of authorized Manufacturer's representative) in the Manufacturer's Certification Letter, as applicable.

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*

Guidance Notes—Equipment Rental Costs—When Contractor's compensation is determined in whole or in part on the basis of Cost of the Work, equipment rental charges, particularly with respect to Contractor-owned equipment, can sometimes lead to disagreements. GC-13.01.B.5.c.(2) addresses Contractor owned equipment rental costs, indicating that such costs will be governed by a rental rate book specified in the Supplementary Conditions. The following Supplementary Condition is the location to specify the governing rental rate book. As of 2018, commonly used rental rate books include the Rental Rate Blue Book for Construction Equipment, and the AED Green Book: Rental Rates & Specifications for Construction Equipment.

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]**.

Guidance Notes—Defining "Small Tools and Hand Tools"—GC-13.01.C.2 excludes the cost of "small tools and hand tools" from Cost of the Work. Providing more definition of what that term means in a

Supplementary Condition may eliminate or reduce arguments about this aspect of Cost of the Work. One common approach is to define small tools and hand tools based on a price threshold, as follows:

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. [or insert other threshold price.]

SC-13.02.C – Delete paragraph in its entirety and insert “Deleted”.

13.03 *Unit Price Work*

Guidance Notes—Variations from Estimated Quantities, Unit Price Work—GC-13.03.E is a “variation in estimated quantities (VEQ)” clause that applies when the actual quantity of a unit price item varies “materially and significantly” from the estimated quantity. The following Supplementary Condition is a more specific and detailed VEQ clause. By providing a specific threshold for eligible categories of unit prices, and specifically defining the degree by which an actual quantity must vary from the estimated quantity, the Supplementary Condition is intended to simplify and facilitate the administrative resolution of situations where actual quantities of unit price items differ materially and significantly from estimated quantities. When such a VEQ clause is used, a common number for the first blank is 5 percent of the Contract Price (based on estimated quantities), and a common number for the second blank is typically 15, 20, or 25 percent; however, other numbers may be appropriate in both locations.

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

~~No suggested Supplementary Conditions in this Article.~~

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

G. Installation of materials that are non-compliant with American Iron and Steel requirements shall be considered defective work.

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

15.01 *Progress Payments*

Guidance Notes—Coordinating Payments with Actual Progress of the Work—Paragraph GC-15.01.A states that progress payments for “cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.” This contractual provision generally will be sufficient to result in a fair and orderly payment process on cost-plus contracts. However, on some projects the cost-based progress payments may outpace the actual progress of the Work, or may become substantially out of step with respect to the ultimate limits created by a Guaranteed Maximum Price. The following clause may be added to Paragraph 15.01 to allow Owner to require Contractor to adjust its progress payment requests to bring the payment flow back into balance.

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 American Iron and Steel requirements. Manufacturer’s Certification letter

for materials satisfy this requirement. Refer to Manufacturer's Certification Letter 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 American Iron and Steel 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.

Guidance Notes—Modifying the Standard Time in Which Owner Must Make Payments—Paragraph GC-15.01.D states that Owner will pay Contractor within 10 days after receipt of Engineer's recommendation of payment of a progress payment; GC-15.06.E requires Owner to make the final payment within 30 days of the final Application for Payment. The user should confirm that these payment deadlines are acceptable to Owner. See EJCDC® C-050, Bidding Procedures and Construction Contract Documents (2018), Paragraph 5.06. If changes are appropriate, prepare Supplementary Conditions here in Article SC-15 to modify the number of days in which payments are due.

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

15.03 *Substantial Completion*

Guidance Notes—Owner Recovery of Re-inspection Costs—Paragraph 15.03.A of the General Conditions requires Contractor to give notice that the Work is substantially complete; Paragraph 15.03.B requires an inspection of the Work to determine whether Engineer agrees that the Work is substantially complete. If the Work is not substantially complete, and must be inspected again at a later point, then the following

Supplementary Condition, if included in the Contract, would allow Owner to recover the cost of the re-inspection.

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

Contractor shall also submit the General (Prime) Contractor’s Certification of Compliance certifying that to the best of the Contractor’s knowledge and belief all substitutes, equals, and all Iron and Steel products proposed in the Shop Drawings, Change Orders, and Partial Payment Estimates, and those installed for the Project, are either Produced in the United States or are the subject of an approved waiver under Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference.

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*

Guidance Notes—Lengthening the Correction Period—Paragraph 15.08.A of the General Conditions refers to a one-year correction period following Substantial Completion. During that one-year time period, Contractor is obligated to return to the Site to correct defective Work. If a longer correction period is to be imposed, use SC-15.08.G. Note that often the lengthening of the correction period will be tied to the use of a warranty bond. See SC-6.01.B. The extension of the correction period set forth in SC-6.01.B is confirmed in the following Supplementary Condition by reference. In that case the sentence may be terminated after “...years set forth in SC-6.01.B.1.”

If the extension of the correction period is independent of a warranty bond or similar provision, then the user should accomplish the extension by filling in the number where indicated at the end SC-15.08.G.

If SC-15.08.G is not used, the correction period will retain the standard one year duration.

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*

Guidance Notes—Alternatives to Litigation as Final Dispute Resolution Method; Arbitration— Paragraph 17.01.B of the General Conditions provides that for any dispute subject to final resolution under Article 17, Owner or Contractor may invoke the dispute resolution procedure called for in the Supplementary Conditions. Paragraph SC-17.02 is the location to identify any such primary dispute resolution procedure. If no procedure is identified here in the Supplementary Conditions, and the parties do not agree to a specific procedure, then the default resolution procedure will be litigation—the pursuit of rights in a court of competent jurisdiction. Note that before reaching the point of final resolution of disputes, in most cases the Owner and Contractor will already have engaged in the Claim process described in Article 12 of the General Conditions. That process allows for mediation of the dispute.

As an alternative to litigation, there are many other possible dispute resolution procedures, or combinations of procedures. One of the most common procedures for resolving construction disputes is arbitration; wording for an arbitration clause follows. A discussion of the pros and cons of the arbitration process (and there are many advocates on both sides) is beyond the scope of this Guide. Owner should consult with its legal counsel when considering the inclusion of an arbitration clause, or of any other dispute resolution procedure or combination of procedures.

The EJCDC arbitration clause is drafted to use the rules and administration of the American Arbitration Association. The user is free to substitute the rules and services of other dispute resolution organizations, and to customize the arbitration process to suit the needs of the specific Contract.

The arbitration option is as follows:

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

Guidance Notes—Prevailing Party Attorneys' Fees Clause—In most jurisdictions in the United States, as a general matter each party to a dispute is responsible for its own attorneys' fees, unless an express

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

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agreement provides to the contrary. Some legal authorities believe that this general rule encourages claims and disputes, because under the general rule claimants have little concern that they will be forced to pay for the opposing party's fees if the claim fails. Other authorities take the opposite view—that if a prevailing-party attorneys' fee rule is used instead of the general rule, then the enticing prospect of not only prevailing but also of having one's own fees paid by the opponent would encourage overly aggressive pursuit of claims (or overzealous defense against valid claims).

If an exception to the general United States rule is preferred for disputes subject to final resolution under Article 17, then add the following express agreement:

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*

Guidance Notes—Assignment—GC-18.08 restricts the assignment of the Contract by both Owner and Contractor. From the Contractor's perspective, it has elected to work for a specific project Owner, based on an evaluation of the Owner's ability to meet its obligations (especially payment of Contractor), and on Owner's reputation for how it administers construction contracts. From Owner's perspective, it has awarded the Contract to a specific Contractor based in part on that Contractor's eligibility to perform the work with requisite competence, safety, and schedule compliance. GC-18.08 places some limitations on the ability of either party to transfer its duties without the consent of the other party.

If the parties anticipate during the drafting process that an assignment will occur (for example, a local sewer district that knows it soon will be transferring its infrastructure projects to a metropolitan authority), then a Supplementary Condition should be drafted to confirm the anticipated assignment and establish the parties' advance consent to the assignment, thereby avoiding possible disputes about granting consent.

Another possibility is an assignment of a contract or purchase order to the Contractor. This typically happens in the context of Owner's procurement of engineered equipment; if the procurement is in progress when the Contractor is selected, it may make sense to assign the procurement contract to the Contractor. SC-18.08.B may be used to implement such an assignment, and to establish the assignment's basic terms. SC-18.08.B is intended to be coordinated with the EJCDC Procurement Series (P-Series) documents.

The form to be attached as an exhibit to the Contract (meaning the construction contract of which these Supplementary Conditions are a part), as referred to in SC-18.08.B, is the Assignment of Contract; Consent to Assignment; and Acceptance of Assignment form that is attached to EJCDC® P-520, Agreement Between Buyer and Seller (2018).

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 **[insert name of Tribe]** Tribe; 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" (Exhibit G of this Bulletin) before Owner submits the executed Contract Documents to Agency for approval.

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 USC 3145) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

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

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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: *[Insert mitigation measures from the Letter of Conditions here]*.

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 *American Iron and Steel*

A. Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials.

B. The following waivers apply to this Contract:

- 1. *De Minimis,***
- 2. *Minor Components,***
- 3. *Pig iron and direct reduced iron, and***
- 4. *[add project specific waivers as applicable].***

EXHIBIT A—SOFTWARE REQUIREMENTS FOR ELECTRONIC DOCUMENT EXCHANGE

Guidance Notes—Exhibit A—This exhibit is used with the Electronic Documents Protocol (EDP) presented in SC-2.06. If the Project-specific Supplementary Conditions do not include SC-2.06, then do not include Exhibit A. If Exhibit A is included, modify it to conform to Project-specific requirements.

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/ 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/ 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/ Attachment or LFE	PDF	
a.5	Layouts and drawings to be submitted to Owner for future use and modification.	Email w/ Attachment or LFE	DWG	
a.6	Correspondence, reports and Specifications to be submitted to Owner for future word processing use and modification.	Email w/ Attachment or LFE	DOC	
a.7	Spreadsheets and data to be submitted to Owner for future data processing use and modification.	Email w/ Attachment or LFE	EXC	
a.8	Database files and data to be submitted to Owner for future data processing use and modification.	Email w/ 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 A—Software Requirements for Electronic Document Exchange.

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EXHIBIT B—FORESEEABLE BAD WEATHER DAYS

Guidance Notes—Exhibit B—This exhibit is used with SC-4.05.C, which provides a definition of those “abnormal weather conditions” that result from excessive precipitation or extreme temperatures. If the Project-specific Supplementary Conditions do not include SC-4.05.C, then do not include Exhibit B. If Exhibit B is included, fill in the information in the table to establish the Project-specific number of foreseeable Bad Weather Days with respect to precipitation and temperature.

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			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			
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

Guidance Notes—Geotechnical Baseline Reports—This supplement presents optional Supplementary Conditions that are used if Owner elects to issue a Geotechnical Baseline Report (GBR) for a specific Project. Do not include this supplement with a project’s Supplementary Conditions unless the GBR system is used.

Some project owners use a Geotechnical Baseline Report (GBR) for projects (or portions of a project) in which the subsurface conditions will play a significant role. Providing a GBR may result in bids with lower contingencies for subsurface conditions, and simplify the application of the differing site conditions provisions in Article 5 of the General Conditions. Commentary on Geotechnical Baseline Reports is presented in C-001. See also *Geotechnical Baseline Reports for Construction—Suggested Guidelines*, by Randall J. Essex, P.E., ASCE 2007. In many cases it may be advantageous for Owner, Engineer, or the geotechnical engineer to engage a consultant with GBR experience to assist in preparation of the GBR and related documents.

On projects in which a Geotechnical Baseline Report is used, it is typical to also assemble and provide a Geotechnical Data Report (GDR), as a separate, single source of factual geotechnical information regarding the Site. The content of the GDR is in essence what the EJCDC documents define as “Technical Data”—reliable factual information, such as boring logs and laboratory test results. (See the definition of Technical Data in Article 1 of the General Conditions, and the definition of a GDR in Article 1 of these Supplementary Conditions). Some Owners may elect to issue a GBR without compiling a GDR, but regardless of the format it is essential to identify and make all geotechnical data available. Note that a typical general-purpose geotechnical report, usually prepared primarily to assist in the design of the project, often contains not only factual data but also opinions, interpretations, and even speculation regarding the Site’s subsurface conditions. Such a geotechnical report is not suitable to be adopted or identified as a GDR.

Although it is preferable that a GBR be comprehensive with respect to subsurface conditions, in some cases a GBR will establish baselines for a portion of a project, but will not address all subsurface issues. For example, the GBR may establish baseline subsurface conditions along the route of a pipeline, but be silent with respect to conditions underlying an associated pump building. Also, in some cases a project will involve both subsurface construction as well as building modifications or other tasks unrelated to geotechnical investigations, analysis, or interpretations. The SC/GBR provisions that follow retain certain differing site condition provisions of the General Conditions, in part because these may be needed for situations that are outside the scope of the GBR. As noted previously, these SC/GBR provisions contain locations for (1) identifying known reports and drawings regarding the subsurface conditions (a mandatory obligation), and (2) identifying Technical Data upon whose accuracy Contractor may rely (necessary in some but not all GBR projects, depending on the scope of the GBR and GDR documents).

If a GBR is used, it remains important to disclose known reports and tests regarding subsurface conditions; a place for doing so is provided in SC/GBR 5.03. If some Site conditions are outside the scope of the Geotechnical Baseline Report it will continue to be necessary to identify reliable Technical Data contained in such reports and drawings; however, if the Geotechnical Baseline Report or a related Geotechnical Data Report already establish the data that is worthy of reliance, it will not be necessary to make a redundant identification in SC/GBR 5.03.

If a GBR is used, then include the following GBR Supplementary Conditions, and do not use the Paragraph SC-5.03 in the main body of C-800:

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 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.

CERTIFICATE OF OWNER'S ATTORNEY AND AGENCY CONCURRENCE

Notes to User: This exhibit consists of two certificates, on a single page, to be attached to the Contract and signed upon execution. The first is a certificate to be signed by the Owner's attorney and the second is the concurrence to be signed by the State Engineer. This page is to be inserted after the Agreement between Owner and Contractor for Construction Contract (Stipulated Price) (EJCDC C-520, 2018) in the Construction Contract Documents.

CERTIFICATE OF OWNER'S ATTORNEY

PROJECT NAME: Water Distribution Improvements

CONTRACTOR NAME AND CONTRACT NUMBER:

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

Name

Date

AGENCY CONCURRENCE

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

Agency Representative

Date

Name

PERFORMANCE BOND

Contractor Name: [Full formal name of Contractor] Address <i>(principal place of business)</i> : [Address of Contractor's principal place of business]	Surety Name: [Full formal name of Surety] Address <i>(principal place of business)</i> : [Address of Surety's principal place of business]
Owner Name: Hartshorne Public Works Authority Mailing address <i>(principal place of business)</i> : 1101 Penn Avenue Hartshorne, OK 74547	Contract Description <i>(name and location)</i> : Hartshorne PWA Water Distribution Improvements Hartshorne, Oklahoma Contract Price: [Amount from Contract] Effective Date of Contract: [Date from Contract]
Bond Bond Amount: [Amount] Date of Bond: [Date] <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: ☐ None ☐ 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: <i>(Signature)</i>	By: <i>(Signature)(Attach Power of Attorney)</i>
Name: <i>(Printed or typed)</i>	Name: <i>(Printed or typed)</i>
Title:	Title:
Attest: <i>(Signature)</i>	Attest: <i>(Signature)</i>
Name: <i>(Printed or typed)</i>	Name: <i>(Printed or typed)</i>
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: **[Describe modification or enter “None”]**

PAYMENT BOND

Contractor Name: [Full formal name of Contractor] Address <i>(principal place of business)</i> : [Address of Contractor's principal place of business]	Surety Name: [Full formal name of Surety] Address <i>(principal place of business)</i> : [Address of Surety's principal place of business]
Owner Name: Hartshorne Public Works Authority Mailing address <i>(principal place of business)</i> : 1101 Penn Avenue Hartshorne, OK 74547	Contract Description <i>(name and location)</i> : Hartshorne PWA Water Distribution Improvements Hartshorne, Oklahoma Contract Price: [Amount, from Contract] Effective Date of Contract: [Date, from Contract]
Bond Bond Amount: [Amount] Date of Bond: [Date] <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: ☐ None ☐ 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: _____ <i>(Signature)</i>	By: _____ <i>(Signature)(Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
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: **[Describe modification or enter “None”]**

WARRANTY BOND

Contractor Name: [Full formal name of Contractor] Address <i>(principal place of business)</i> : [Address of Contractor's principal place of business]	Surety Name: [Full formal name of Surety] Address <i>(principal place of business)</i> : [Insert address of Surety's principal place of business]
Owner Name: Hartshorne Public Works Authority Address <i>(principal place of business)</i> : 1101 Penn Avenue Hartshorne, OK 74547	Construction Contract Description <i>(name and location)</i> : Hartshorne PWA Water Distribution Improvements Contract Price: [Amount from Contract] Effective Date of Contract: [Date from Contract] Contract's Date of Substantial Completion: [Date from Contract]
Bond Bond Amount: [Amount] Date of Bond: [Date] Modifications to this Bond form: ☐ None ☐ See Paragraph 9	
Bond Period: Commencing 364 days after Substantial Completion of the Work under the Construction Contract, and continuing until [insert number of years, typically either two or three] years after such Substantial Completion.	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth herein, do each cause this Warranty Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal	Surety
<i>(Full formal name of Contractor)</i> By: _____ <i>(Signature)</i>	<i>(Full formal name of Surety) (corporate seal)</i> By: _____ <i>(Signature) (Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
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's Correction Period Obligations. The Construction Contract is incorporated herein by reference.
2. If the Contractor performs the Correction Period Obligations, the Surety and the Contractor shall have no obligation under this Warranty Bond.
3. If Owner gives written notice to Contractor and Surety during the Bond Period of Contractor's obligation under the Correction Period Obligations, and Contractor does not fulfill such obligation, then Surety shall be responsible for fulfillment of such Correction Period Obligations. Surety shall either fulfill the Correction Period Obligations itself, through its agents or contractors, or, in the alternative, Surety may waive the right to fulfill the Correction Period Obligations itself, and reimburse the Owner for all resulting costs incurred by Owner in performing Contractor's Correction Period Obligations, including but not limited to correction, removal, replacement, and repair costs.
4. The Surety's liability is limited to the amount of this Warranty Bond. Renewal or continuation of the Warranty Bond will not modify such amount, unless expressly agreed to by Surety in writing.
5. The Surety shall have no liability under this Warranty Bond for obligations of the Contractor that are unrelated to the Construction Contract. No right of action will accrue on this Warranty Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
6. Any proceeding, legal or equitable, under this Warranty Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and must be instituted within two years after the Surety refuses or fails to perform its obligations under this Warranty Bond.
7. Written notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown in this Warranty Bond.
8. Definitions
 - 8.1. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page of this Warranty Bond, including all Contract Documents and changes made to the agreement and the Contract Documents.
 - 8.2. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
 - 8.3. *Correction Period Obligations*—The duties, responsibilities, commitments, and obligations of the Contractor with respect to correction or replacement of defective Work, as set forth in the Construction Contract's Correction Period clause, EJCDC® C-700, Standard General Conditions of the Construction Contract (2018), Paragraph 15.08, as duly modified.
 - 8.4. *Substantial Completion*—As defined in the Construction Contract.
 - 8.5. *Work*—As defined in the Construction Contract.
9. Modifications to this Bond are as follows: **[Describe modification or enter "None"]**

CERTIFICATE OF LIABILITY INSURANCE		DATE (MM/DD/YYYY)
PRODUCER	FAX	THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.
		INSURERS AFFORDING COVERAGE
		NAIC #
INSURED	INSURER A:	
	INSURER B:	
	INSURER C:	
	INSURER D:	
	INSURER E:	

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT OT ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	Type of Insurance	Policy Number	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
		GENERAL LIABILITY ☐ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS MADE ☐ OCCUR ☐ _____ ☐ _____ GEN'L AGGREGATE LIMIT APPLIES PER ☐ POLICY ☐ PROJECT ☐ LOC				EACH OCCURRENCE \$	
		AUTOMOBILE LIABILITY ☐ ANY AUTO ☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS ☐ HIRED AUTOS ☐ NON-OWNED AUTOS ☐ _____ ☐ _____				DAMAGE TO RENTED PREMISES (Ea occurrence) \$N/A	
						MED EXP (Any one person) \$N/A	
						PERSONAL & ADV INJURY \$	
						GENERAL AGGREGATE \$	
						PRODUCTS – COMP/OP AGG \$	
						COMBINED SINGLE LIMIT (Ea accident) \$	
						OR BODILY INJURY (Per person) \$	
		GARAGE LIABILITY ☐ ANY AUTO ☐				BODILY INJURY (Per accident) \$	
						PROPERTY DAMAGE (Per accident) \$	
						AUTO ONLY – EA ACCIDENT \$N/A	
		EXCESS/UMBRELLA LIABILITY ☐ OCCUR ☐ CLAIMS MADE ☐ DEDUCTIBLE ☐ RETENTION \$				OTHER THAN EA ACC \$N/A	
						AGG \$N/A	
						EACH OCCURRENCE \$	
		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below				WC STATU-TORY LIMITS OTH-ER	
						E.L. EACH ACCIDENT \$	
						E.L. DISEASE – EA EMPLOYEE \$	
						E.L. DISEASE – POLICY LIMIT \$	
		OTHER					
DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS NAME OF PROJECT							

CERTIFICATE HOLDER

Hartshorne Public Works Authority 1101 Penn Avenue Hartshorne, OK 74547	SHOULD ANY OF THE ABOVE-DESCRIBED POLICIES BE MATERIALLY CHANGED OR CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 15 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.
	AUTHORIZED REPRESENTATIVE SIGNED BY AGENT

NOTICE TO PROCEED

Owner: Hartshorne Public Works Authority Owner's Project No.: HR-21-01
Engineer: Infrastructure Solutions Group, LLC Engineer's Project No.: HR-21-01
Contractor: _____ Contractor's Project No.: _____
Project: Water Distribution Improvements
Contract Name: Water Distribution Improvements
Effective Date of Contract: _____

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on **[date Contract Times are to start]** 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 number of days to achieve Substantial Completion is **545** from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of **[date, calculated from commencement date above]**; and the number of days to achieve readiness for final payment is **545** from the commencement date of the Contract Times, resulting in a date for readiness for final payment of **[date, calculated from commencement date above]**.

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

[Note any access limitations, security procedures, or other restrictions]

Owner: Hartshorne Public Works Authority
By (signature): _____
Name (printed): Ashley Faulkner
Title: Chairman
Date Issued: _____
Copy: Engineer

Contractor's Application for Payment

Owner: _____ Engineer: _____ Contractor: _____ Project: _____ Contract: _____	Owner's Project No.: _____ Engineer's Project No.: _____ Contractor's Project No.: _____
Application No.: _____ Application Date: _____	
Application Period: From _____ to _____	

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 (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 + Line 5.c)	\$	-

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:

(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;

(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

(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor: _____	
Signature: _____	Date: _____

Recommended by Engineer By: _____ Title: _____ Date: _____	Approved by Owner By: _____ Title: _____ Date: _____
Approved by Funding Agency By: _____ Title: _____ Date: _____	By: _____ Title: _____ Date: _____

Contractor's Application for Payment

[illegible]

Contractor's Application for Payment

EJCDC C-620 Contractor's Application for Payment
 Lump Sum (c) 2018 National Society of Professional Engineers for EJCDC. All rights reserved. 3 of 6

Contractor's Application for Payment

Owner: _____												Owner's Project No.: _____	
Engineer: _____												Engineer's Project No.: _____	
Contractor: _____												Contractor's Project No.: _____	
Project: _____													
Contract: _____													
Application No.: _____ Application Period: From _____ to _____ Application Date: _____													
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) (\$)	Work Completed and Materials Stored to Date (H + I) (\$)	% of Value of Item (J / F) (%)	Balance to Finish (F - J) (\$)		
		Item Quantity	Units	Unit Price (\$)	Value of Bid Item (C X E) (\$)	Estimated Quantity Incorporated in the Work	Value of Work Completed to Date (E X G) (\$)						
Original Contract													
					-		-		-		-		
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					-		-		-		-		
Original Contract Totals					\$ -		\$ -	\$ -	\$ -		\$ -		

Contractor's Application for Payment

Unit Price

Stored Materials Summary	Contractor's Application for Payment

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

Application No.:						Application Period:					From		to		Application Date:		
A	B	C	D	E	F	G	H	I	J	K	L	M					
Item No. (Lump Sum Tab) or Bid Item No. (Unit Price Tab)	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Description of Materials or Equipment Stored	Storage Location	Application No. When Materials Placed in Storage	Materials Stored			Incorporated in Work			Materials Remaining in Storage (I-L) (\$)					
						Previous Amount Stored (\$)	Amount Stored this Period (\$)	Amount Stored to Date (G+H) (\$)	Amount Previously Incorporated in the Work (\$)	Amount Incorporated in the Work this Period (\$)	Total Amount Incorporated in the Work (J+K) (\$)						
								-			-	-					
								-			-	-					
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								-			-	-					
Totals						\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -					

EXAMPLE OF A MANUFACTURER'S CERTIFICATION LETTER OF COMPLIANCE WITH PROVISIONS OF THE AMERICAN IRON AND STEEL (AIS) REQUIREMENTS OF SECTION 746 OF TITLE VII OF THE CONSOLIDATED APPROPRIATIONS ACT OF 2017 (DIVISION A - AGRICULTURE, RURAL DEVELOPMENT, FOOD AND DRUG ADMINISTRATION, AND RELATED AGENCIES APPROPRIATIONS ACT, 2017) AND SUBSEQUENT STATUTES MANDATING DOMESTIC PREFERENCE

Date:

Company Name:

Company Address:

Subject: AIS Step Certification for Project (X), Owner's Name, and Contract Number

I, (company representative), certify that the (melting, bending, galvanizing, cutting, etc.) processes for (manufacturing or fabricating) the following products and/or material shipped or provided for the subject project is in full compliance with the AIS requirement as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference.

Item, Products and/or Materials, and location of delivery (City, State):

- 1.
- 2.

Such processes for AIS took place at the following location:

(City, State)

This certification is to be submitted upon request to interested parties (e.g. municipalities, consulting engineers, general contractors, etc.)

If any of the above compliance statements change while providing materials to this project, please immediately notify the person(s) who is requesting to use your product(s).

Authorized Company Representative Signature

(Note: *Authorized signature shall be manufacturer's representative not the material distributor or supplier*)

EXAMPLES OF MUNICIPAL CASTINGS (*includes but not limited to*):

Access Hatches;
Ballast Screen;
Benches (Iron or Steel);
Bollards;
Cast Bases;
Cast Iron Hinged Hatches, Square and Rectangular;
Cast Iron Riser Rings;
Catch Basin Inlet;
Cleanout/Monument Boxes;
Construction Covers and Frames;
Curb and Corner Guards;
Curb Openings;
Detectable Warning Plates;
Downspout Shoes (Boot, Inlet);
Drainage Grates, Frames and Curb Inlets;
Inlets;
Junction Boxes;
Lampposts;
Manhole Covers, Rings and Frames, Risers;
Meter Boxes;
Service Boxes;
Steel Hinged Hatches, Square and Rectangular;
Steel Riser Rings;
Trash receptacles;
Tree Grates;
Tree Guards;
Trench Grates; and
Valve Boxes, Covers and Risers.

EXAMPLES OF CONSTRUCTION MATERIALS (*includes but not limited to*):

Wire rod, bar, angles
Concrete reinforcing bar, wire, wire cloth
Wire rope and cables
Tubing
Framing
Joists
Trusses
Fasteners (i.e., nuts and bolts)
Welding rods
Decking
Grating
Railings
Stairs
Access ramps
Fire escapes
Ladders
Wall panels
Dome structures
Roofing
Ductwork
Surface drains
Cable hanging systems
Manhole steps
Fencing and fence tubing
Guardrails
Doors
Stationary screens

EXAMPLES OF NON-CONSTRUCTION MATERIALS – *(includes but not limited to):*
(NOTE: *includes appurtenances necessary for their intended use and operation and are not subject to AIS*)

Pumps
Motors
Gear reducers
Drives (including variable frequency drives (VFDs)
Electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators)
Mixers
Gates (e.g. sluice and slide gates)
Motorized screens (such as traveling screens)
Blowers/aeration equipment
Compressors
Meters (flow and water meters)
Sensors
Controls and switches
Supervisory control Data acquisition (SCADA)
Membrane bioreactor systems
Membrane filtration systems (includes RO package plants)
Filters
Clarifier arms and clarifier mechanisms
Rakes
Grinders
Disinfection systems
Presses (including belt presses)
Conveyors
Cranes
HVAC (excluding ductwork
Water heaters
Heat exchangers
Generators
Cabinetry and housings (such as electrical boxes/enclosures)
Lighting fixtures
Electrical conduit
Emergency life systems
Metal office furniture
Shelving
Laboratory equipment
Analytical instrumentation
Dewatering equipment.

CHANGE ORDER NO.: [Number of Change Order]

Owner:	Hartshorne Public Works Authority	Owner's Project No.:	HR-21-01
Engineer:	Infrastructure Solutions Group, LLC	Engineer's Project No.:	HR-21-01
Contractor:		Contractor's Project No.:	
Project:	Water Distribution Improvements		
Contract Name:	Water Distribution Improvements		
Date Issued:		Effective Date of Change Order:	

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

Description:

[Description of the change]

Attachments:

[List documents related to the change]

Change in Contract Price	Change in Contract Times [State Contract Times as either a specific date or a number of days]
Original Contract Price: \$ _____	Original Contract Times: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] from previously approved Change Orders No. 1 to No. [Number of previous Change Order] : \$ _____	[Increase] [Decrease] from previously approved Change Orders No.1 to No. [Number of previous Change Order] : Substantial Completion: _____ Ready for final payment: _____
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] this Change Order: \$ _____	[Increase] [Decrease] this Change Order: Substantial Completion: _____ Ready for final payment: _____
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ 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: _____

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner: Hartshorne Public Works Authority Owner's Project No.: HR-21-01
Engineer: Infrastructure Solutions Group Engineer's Project No.: HR-21-01
Contractor: Contractor's Project No.:
Project: Water Distribution Improvements
Contract Name: Water Distribution Improvements

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

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

Install approximately 169,940 LF waterline, 291 valves, 195 fire hydrants, 1030 LF boring, 1001 service connections, chlorine booster station, remove two existing water tank, & construct a pedisphere.

Date of Substantial Completion: **[Enter date, as determined by Engineer]**

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:

[List amendments to Owner's Responsibilities]

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

[List amendments to Contractor's Responsibilities]

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

[List attachments such as punch list; other documents]

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: _____

GENERAL (PRIME) CONTRACTOR'S CERTIFICATION OF COMPLIANCE WITH
PROVISIONS OF THE AMERICAN IRON AND STEEL REQUIREMENTS OF SECTION 746
OF TITLE VII OF THE CONSOLIDATED APPROPRIATIONS ACT OF 2017 (DIVISION A -
AGRICULTURE, RURAL DEVELOPMENT, FOOD AND DRUG ADMINISTRATION, AND
RELATED AGENCIES APPROPRIATIONS ACT, 2017) AND SUBSEQUENT STATUTES
MANDATING DOMESTIC PREFERENCE

DATE:

RE: PROJECT NAME
APPLICANT
CONTRACT NUMBER

I hereby certify that to the best of my knowledge and belief all iron and steel products 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 Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference or are the subject of a waiver approved by the Secretary of Agriculture or designee.

This certification is to be submitted upon completion of the project to the project engineer.

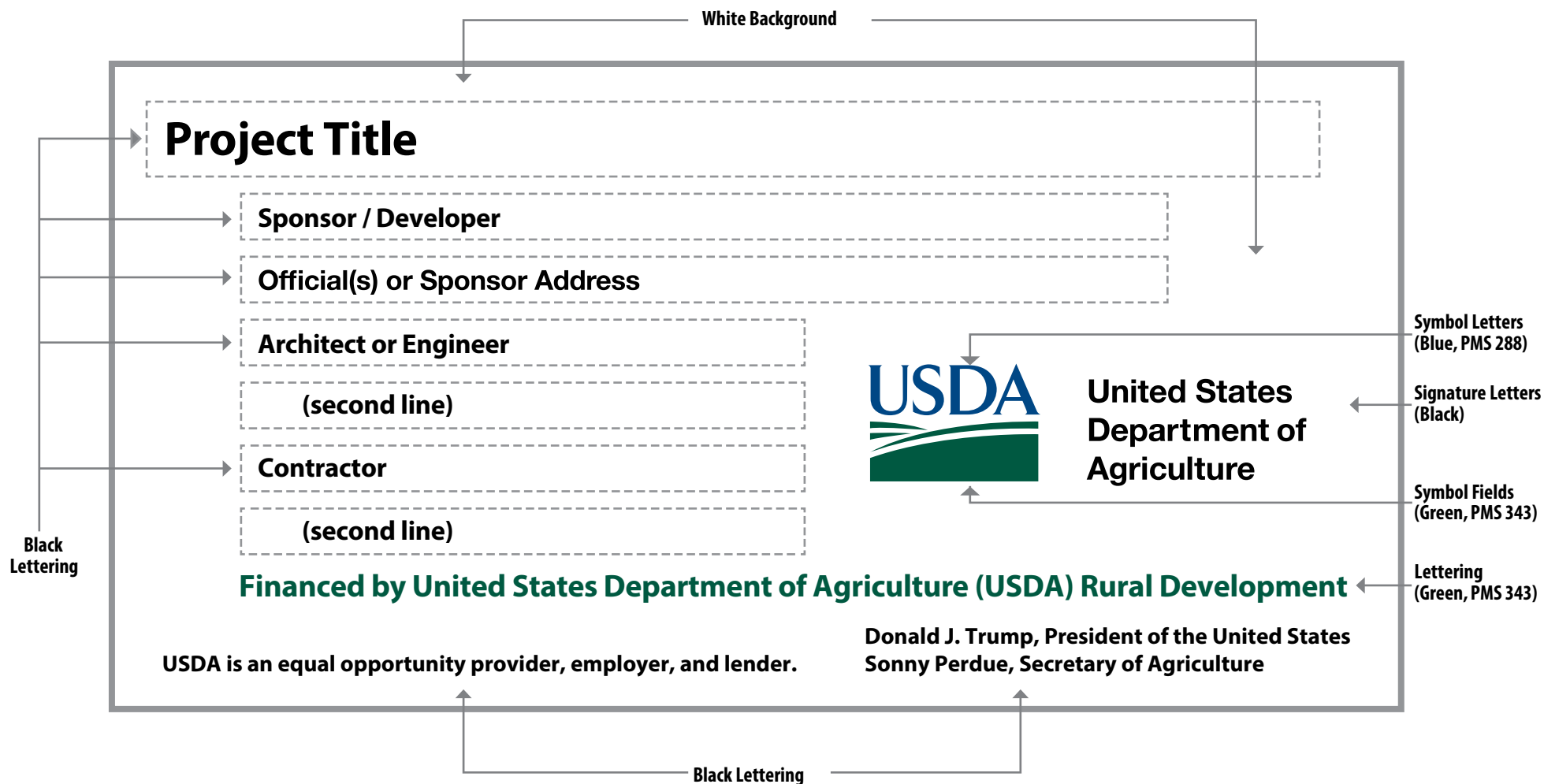
Name of Construction Company (PRINT)

By Authorized Representative (SIGNATURE)

Title

TEMPORARY CONSTRUCTION SIGN FOR RURAL DEVELOPMENT PROJECTS

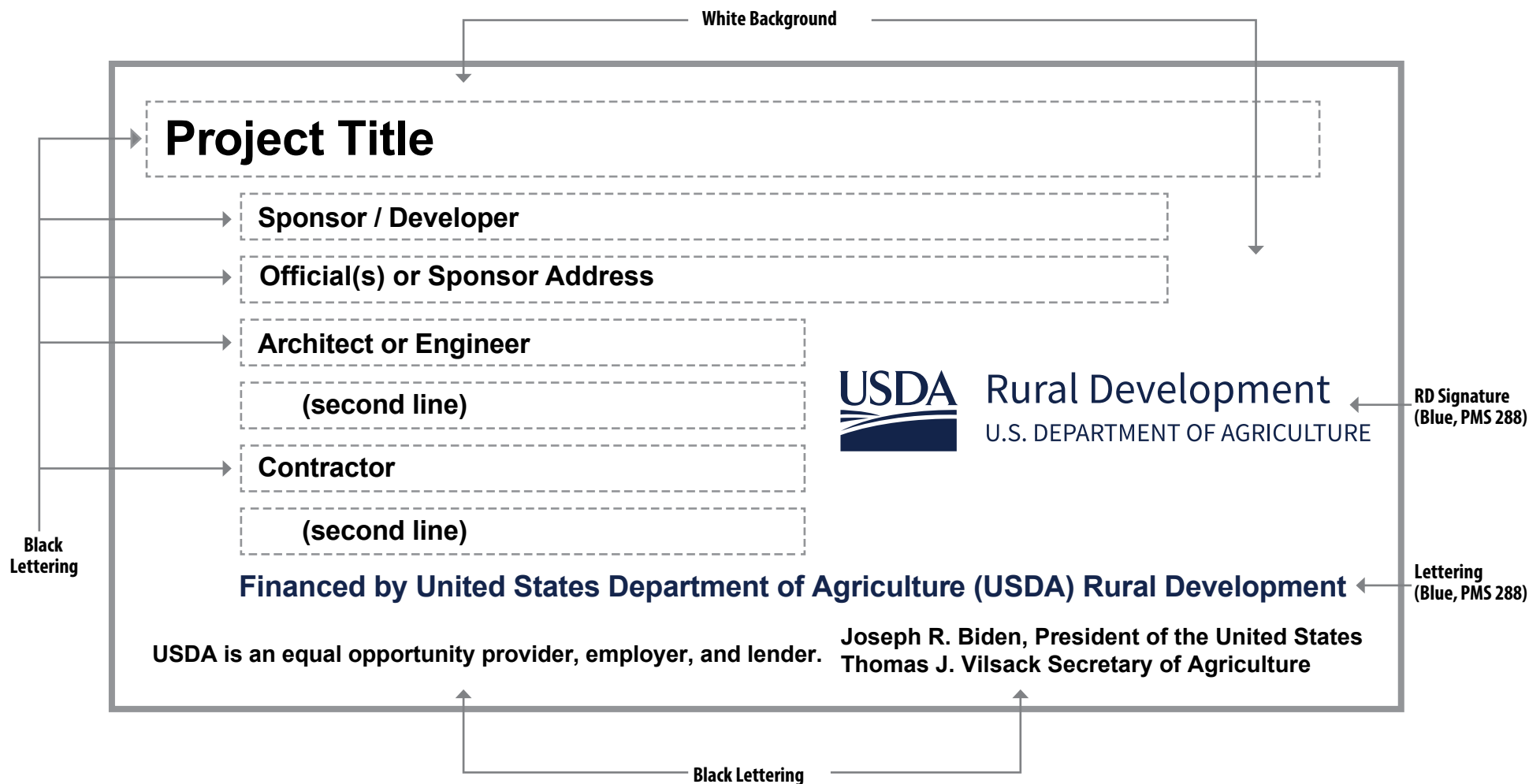
Recommended Fonts: Helvetica, Arial, or Myriad Pro



SIGN DIMENSIONS : 1200 mm x 2400 mm x 19 mm (approx. 4' x 8' x 3/4")
PLYWOOD PANEL (APA RATED A-B GRADE—EXTERIOR)

TEMPORARY CONSTRUCTION SIGN FOR RURAL DEVELOPMENT PROJECTS

Recommended Fonts: Helvetica or Arial



SIGN DIMENSIONS : 1200 mm x 2400 mm x 19 mm (approx. 4' x 8' x 3/4")
PLYWOOD PANEL (APA RATED A-B GRADE-EXTERIOR)

TEMPORARY CONSTRUCTION SIGN FOR RURAL DEVELOPMENT PROJECTS

Recommended Fonts: Helvetica or Arial

Project Title

Sponsor / Developer

Official(s) or Sponsor Address
(second line)

Architect or Engineer
(second line)

Contractor
(second line)

Black Lettering

USDA Rural Development
U.S. DEPARTMENT OF AGRICULTURE

RD Signature
(Blue, PMS 288)

**Financed by United States
Department of Agriculture
(USDA) Rural Development**

Lettering
(Blue, PMS 288)

**Joseph R. Biden, President of the United States
Thomas J. Vilsack Secretary of Agriculture**

Black Lettering

USDA is an equal opportunity provider, employer, and lender.

SIGN DIMENSIONS : 1200 mm x 1800 mm x 19 mm (approx. 4' x 6' x ¾")
PLYWOOD PANEL (APA RATED A-B GRADE—EXTERIOR)

WORK CHANGE DIRECTIVE NO.: [Number of Work Change Directive]

Owner:

Owner's Project No.:

Engineer:

Engineer's Project No.:

Contractor:

Contractor's Project No.:

Project:

Contract Name:

Date Issued:

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:

FIELD ORDER NO.: [Number of Field Order]

Owner:

Owner's Project No.:

Engineer:

Engineer's Project No.:

Contractor:

Contractor's Project No.:

Project:

Contract Name:

Date Issued:

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: _____

Property Owner's Release

I, _____,
(Print Name of Property Owner)

attest that the property known as _____

(Address or Legal Description)

has been left in acceptable condition and do hereby release _____

(Project Owner)

from any and all claims related to work performed on said property.

Property Owner:

(Signature)

(Date)

Witness:

(Signature)

CONTRACTOR'S CERTIFICATION AND GUARANTEE

Date:

Project: Water Distribution Improvements

Owner: Hartshorne Public Works Authority

Contractor:

_____ hereby certifies that all work on the above referenced project has been completed in accordance with the contract documents for the project.

We also certify that all bills have been paid and upon receipt of \$_____, representing final project payment, we do hereby waive our right to lien against the above project.

Furthermore, we guarantee all materials and equipment furnished and Work performed for a period of one (1) year from the effective date of completion, _____.

By: _____

Date: _____

Subscribed and sworn to before me this _____ day of _____, 20____.

Notary Public

My Commission Expires: _____

Date _____

Dear Sir:

Contingent upon the final payment of _____ I hereby acknowledge receipt of _____ dollars (\$ _____) in full payment of my contract, dated _____ for improvement work which I did for you and which is described in my contract.

I certify that I have paid in full for all materials purchased and labor employed in the performance of this contract, and that there are no claims against me under this contract on account of injuries sustained by workers employed by me or by subcontractors thereunder. I hereby release you from any claims arising by virtue of this contract.

I am attaching Form RD 1924-10, "Release of Claimants" signed by all person from whom I have purchased materials and by all subcontractors and all persons employed in connection with my contract with the above-named borrower.

WARNING

The statements and representations made above are made in connection with construction financed in whole or in part by the United States Department of Agriculture (USDA). The statements and representations will be used to determine the release of USDA provided funds. The making of any false statement or misrepresentation herein may be a crime punishable under Title 18 U.S.C. §1001 which provides in part: "Whoever, in any matter within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals or covers up by any trick, scheme, or device a material fact, or makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or statement or entry, shall be fined under [title 18 of the United States code] or imprisoned not more than five years, or both.

Sincerely,

Contractor

Position 6

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information is 0575-0042. The time required to complete this information collection is estimated to average 15 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.

RELEASE BY CLAIMANTS

The undersigned, having received payment in full for all labor, materials, supplies, or equipment supplied to _____, Contractor, or to any subcontractor, in the construction or repair of the improvements upon the property located at:

_____, and furnished in the execution and fulfillment of contract between said Contractor and _____ Owner, dated _____

_____, do (does) hereby release and waive any and all claims, liens, and lien rights, of any kind, nature, or description whatsoever, against said property and the Owner thereof, and against said Contractor.

<i>Lien or Claimant</i>	<i>Work or Materials</i>	<i>Amount</i>	<i>Date</i>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
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_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0575-0042. The time required to complete this information collection is estimated to average 30 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.

NOTICE OF ACCEPTABILITY OF WORK

Owner:	Hartshorne Public Works Authority	Owner's Project No.:	HR-21-01
Engineer:	Infrastructure Solutions Group	Engineer's Project No.:	HR-21-01
Contractor:		Contractor's Project No.:	
Project:	Water Distribution Improvements		
Contract Name:	Water Distribution Improvements		
Notice Date:		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)*: _____

Title: _____

SPECIAL CONDITIONS

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SPECIAL CONDITIONS

1. OWNER. Whenever the term "Owner" appears in these specifications, it shall be understood to mean the Hartshorne Public Works Authority.
2. ENGINEER. The word "Engineer" in these specifications shall be understood as referring to Infrastructure Solutions Group, LLC, 500 Village Blvd., Suite A; McAlester, OK 74501, Engineer of the Owner, or such other Engineer, Supervisor or Inspector as may be authorized by said Owner to act in any particular position.
3. EXAMINATION OF SITE OF PROJECT. Prospective bidders shall make a careful examination of the site of the project, soil and water conditions to be encountered, improvements to be protected, disposal sites for surplus materials not designated to be salvaged materials, and methods of providing ingress and egress to private properties and of handling traffic during construction of the entire project.
4. QUALIFICATION OF LOW BIDDER. Before being awarded a contract, the lowest responsible bidder shall submit such evidence as the Engineer may require to establish his financial responsibility, experience, and possession of such equipment as may be needed to prosecute the work in an expeditious, safe, and satisfactory manner.

Should the low bidder fail to produce evidence satisfactory to the Engineer on any of the foregoing points, he may be disqualified and the work awarded to the next low bidder so qualifying.
5. AWARD OF THE CONTRACT. The Owner, acting through its authorized representatives, will notify the successful bidder, in writing, within ninety (90) calendar days after the date of receiving bids of its acceptance of this proposal. The Contractor shall complete the execution of the required Bond and Contract within fifteen (15) calendar days of such notice.
6. ADDENDA. Bidders desiring further information or interpretation of the Plans or Specifications must make request for such information to the Engineer, prior to 48 hours before the bid opening. Answers to all such requests will be given in writing to all bidders in Addendum form, and all Addenda will be bound with, and made a part of, the Contract Documents. No other explanation or interpretation will be considered official or binding. Should a bidder find discrepancies in, or omission from the Plans, Specifications, or other Contract Documents, or should he be in doubt as to their meaning, he should at once notify the Engineer in order that a written Addendum may be sent to all bidders. Any Addenda issued prior to 24 hours of the opening of bids will may be emailed, mailed or delivered to each Contractor contemplating the submission of a proposal on this work. The proposal as submitted by the Contractor will be so constructed as to include any Addenda if such are issued by the Engineer prior to 24 hours of the opening of bids.

7. BASIS FOR BID AWARD. If no alternates are specified in the bid proposal, award will be made to the lowest responsible, responsive bidder. However, the Owner reserves the right to reject any and all bids and to waive any irregularities as may be deemed best and in the Owner's interest.

8. TIME FOR COMPLETION. The time allowed for completion of all items of work shall be **545 consecutive calendar days**, which time shall begin the tenth (10th) day after issuance of the Notice to Proceed.

9. LIQUIDATED DAMAGES FOR DELAY. Time is of the essence and Owner will suffer financial loss if the Work is not completed within the times specified plus any extensions thereof approved by change order. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner \$500.00 for each calendar day that expires after contract time until construction is complete.

In addition to liquidated damages, the Contractor shall pay the costs of Engineer's construction observation and construction engineering services for all necessary time expended during the period that Contractor is in liquidated damages at the Engineer's normal hourly rates.

10. RIGHTS OF VARIOUS INTERESTS. Wherever work being done by the Owner's employees or by other Contractors is contiguous to work covered by this contract, the respective rights of the various interests involved shall be established by the Engineer to secure the completion of the various portions of the work in general harmony.

11. CORPORATE CONTRACTS. Corporate contractors to be eligible to enter into contract with the Owner shall be qualified to do business in the State of Oklahoma where the work is to be performed. All licensing requirements shall be complied with. Foreign corporations which have not domesticated or otherwise become licensed in the State of Oklahoma where work will be performed shall obtain a permit to do business in the State of Oklahoma pursuant to the State of Oklahoma's requirements. Contractor shall provide evidence of authority to do business in the state or jurisdiction of the Project if requested by the Engineer.

12. PROPOSALS. Proposals must be submitted on forms furnished by the Owner or the Owner's Engineer, Infrastructure Solutions Group, LLC and endorsed as provided in the Contract Documents.

Proposals must be submitted filled out with ink or typewriter and without erasure, interlineations or changes, and if not made in accordance with the General Conditions and other contract documents, will be subject to rejection as irregular, yet the Owner reserves the right to waive any irregularities.

Proposals will be made in the name of the principal and, in a co-partnership, the names of all partners shall be given. Exact post office address shall be given in all cases. If proposals are submitted by an agent, satisfactory evidence of agency authority must accompany the proposal.

13. IRREGULAR PROPOSALS. Proposals shall be considered irregular and may be rejected for the following reasons unless otherwise provided by law:

- a. If the proposal form furnished to the Contractor by the Owner or the Owner's Engineer is not used or is altered;
- b. If there are unauthorized additions or conditional bids, or irregularities of any kind which may tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning;
- c. If the bidder adds any provisions reserving the right to accept or reject any award, or to enter into a contract pursuant to an award;
- d. If the unit or lump sum prices contained in the bid schedule are obviously unbalanced either in excess or below the reasonable cost analysis values;
- e. If the bidder fails to insert a unit price for every pay item indicated except in the case of authorized alternate pay items;
- f. If the bidder fails to complete the proposal in any other particulars where information is requested so bidder's proposal may be properly evaluated.

The Owner reserves the right to reject any or all bids and to waive irregularities as may be deemed best and in the Owner's interest.

14. RETURN OF BID SECURITY. Bid security of the lowest three or more bidders may be retained until a contract is executed or rejection made by the Owner. Other bid security will be returned only after the canvass and tabulation of bids is completed.

15. FAILURE TO EXECUTE CONTRACT. Should the successful bidder fail to execute the contract and furnish bonds satisfactory to the Owner to validate the same within ten (10) calendar days after award of contract, his bid security shall be forfeited to the Owner as liquidated damages.

16. RIGHT-OF-ENTRY. Contractor shall provide the Owner, the Owner's Engineer, or representative of the Federal, State, County, District and Municipal governmental services proper facilities for access to the work wherever it is in preparation or progress.

17. PERMITS AND RIGHT-OF-WAY. The Owner will provide rights-of-way for the purpose of construction without cost to the Contractor by securing permits in areas of public dedication or by obtaining easements across privately owned property. It shall be

the responsibility of the Contractor, forty-eight (48) hours prior to the initiation of construction on easements through private property, to inform the property owner of his intent to begin construction. Before beginning construction in areas of public dedication, the Contractor shall inform the agency having jurisdiction in the areas forty-eight (48) hours prior to initiation of the work.

18. CONSTRUCTION IN PUBLIC ROADWAYS AND PRIVATE DRIVEWAYS. No public road shall be entirely closed overnight. It shall be the responsibility of the Contractor to build and maintain all weather by-passes and detours, if necessary, and to properly light, barricade and mark all by-passes and detours that might be required on and across the road involved in the work included in this contract.

The Contractor shall make every effort to complete construction and allow immediate access to adjacent property at all driveway entrances located along the roads. Owners or tenants of improvements where access and/or entrance drives are located shall be notified at least eight (8) hours prior to the time the construction will be started at their drive-ins or entrances and informed as to the length of time driveways will be closed, which period shall not exceed six (6) hours.

The Contractor shall be responsible for all road and entrance reconstruction, and repairs and maintenance of same for a period of one year from the date of such reconstruction. In the event the repairs and maintenance are not made immediately to the satisfaction of the Engineer, and it becomes necessary for the Owner to make such repairs, the Contractor shall reimburse the Owner for the cost of such repairs.

The Contractor shall at all times keep a sufficient width of the roadway clear of dirt and other material to allow the free flow of traffic. The Contractor shall assume any and all responsibility for damage, personal or otherwise, that may be caused by the construction along public roadways or private driveways.

19. REFERENCE SPECIFICATIONS. Where reference is made in these specifications to specifications compiled by other agencies, organizations or departments, such reference is made for expediency and standardization from the material supplier's point of view, and such specifications referred to are hereby made a part of these specifications. Any reference to standard specifications in any of the Contract Documents shall always imply the latest edition of said standard specification or specifications available at time notice inviting Contractors to bid is published unless otherwise stated.

20. TRADE NAMES AND MATERIALS. No material which has been used by the Contractor for any temporary purpose whatever is to be incorporated in the permanent structure without written consent of the Engineer.

Where materials or equipment are specified by a trade or brand name, it is not the intention of the Owner to discriminate against an equal product of another manufacturer, but rather to set a definite standard of quality of performance, and to establish an equal

basis for the evaluation of bids. Where the words "equivalent", "proper", or "equal to" are used, they shall be understood to mean that the thing referred to shall be proper, the equivalent of, or equal to some other thing, in the opinion or judgment of the Engineer. Unless otherwise specified, all materials shall be the best of their respective kinds and shall be in all cases fully equal to approved samples. Notwithstanding that the words "or equal to" or other such expressions may be used in the specifications in connection with a material, manufactured article or process, the materials, article or process specifically designated shall be used, unless a substitute shall be approved in writing by the Engineer, and the Engineer shall have the right to require the use of such specifically designated material, article or process.

21. QUALITY OF MATERIALS. In the absence of detailed specifications in other sections, all materials shall conform to the latest standards of the American Society for Testing Materials.

22. MATERIALS, SERVICES, AND FACILITIES. It is understood that except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, equipment rental, water, heat, light, fuel, power, transportation, superintendence, temporary construction of every nature and all other services and facilities of every nature whatsoever necessary to execute, complete and deliver the work within the specified time.

23. WORKMANSHIP, MATERIALS, EQUIPMENT, AND STORAGE. All work done and all materials and equipment furnished by the Contractor shall strictly conform to the plans, drawings, and specifications. Competent labor, mechanics, and tradesmen shall be used to supervise the installation of equipment as may be required by the Engineer. Any special tools or equipment which may be required for first class work shall be provided by the Contractor.

The acceptance at any time of materials by or in behalf of the Owner shall not be a bar to future rejection if they are subsequently found to be defective or inferior in quality or uniformity to the material specified, or are not as represented to the Engineer or Owner.

Contractor shall be responsible for the care and storage of materials delivered on the work site or purchased for use thereon. Stored materials shall be carefully and continuously protected from damage or deterioration and so located as to facilitate inspection by the Owner and Engineer. This responsibility for the care and storage of materials shall be with the Contractor whether such materials are furnished by the Contractor or by the Owner.

24. INSPECTION AND TESTING OF MATERIALS.

- a. During the progress of the work, it shall be subject to the inspection and observance of the Engineer, and the contractor shall afford every reasonable facility and assistance to the Engineer to make such inspection thorough and intelligent. If any work is covered up without

approval or consent of the Engineer, it must, if required by the Engineer, be uncovered for examination at the Contractor's expense.

- b. The fact that the Engineer is on the job site shall not be taken as an acceptance of the Contractor's work or any part of it. Contractor shall notify the Engineer upon completion of his contract and the work shall be given final inspection by the Engineer and any tests shall be witnessed by the Engineer. If all parts of the work are acceptable and substantially comply with the intent of the plans, drawings, and specifications, a recommendation of final acceptance will be made by the Engineer to the Owner. If parts of the work are not acceptable and require additional work by the Contractor to complete the project, necessitating additional inspection by the Engineer, the cost of such additional inspections including time, travel, and lodging, shall be paid for by the Contractor to the Owner who will reimburse the Engineer.
- c. Contractor shall submit to the Engineer seven (7) calendar days in advance of construction, and without charge, samples or specifications of materials he proposes to use and shall not use these materials until he has received approval from the Engineer.
- d. The Contractor shall direct and furnish all items necessary for the testing of all materials called for in the specifications. The Contractor shall pay the cost of the tests, including all transportation charges unless otherwise noted in the specifications. The cost of re-testing any failed specimens shall be paid by the Contractor.
- e. All tests, unless otherwise provided, shall be in accordance with the pertinent sections of the latest edition of the standards applicable to the material or devices to be tested. A partial list of the principal societies referred to and their abbreviations follows:

ASTM	American Society for Testing Materials
AISC	American Institute of Steel Construction
ACI	American Concrete Institute
FS	Federal Specifications
AASHTO	American Association of State Highway and Transportation Officials
AWWA	American Water Works Association

- f. All parts of the improvements shall conform to the standard of construction as given in detail under the various items, and in general to the intent thereof, and if they do not conform, shall be made to do so by rebuilding or replacing or otherwise as directed by the Engineer or Owner before acceptance shall be made.

25. BARRICADES, LIGHTS, AND WATCHMEN. Where the work is carried on in or adjacent to any street, alley or public place, the Contractor shall at his own cost and expense furnish and erect such barricades, fences, lights, and danger signals, shall provide such watchmen, and shall provide such other precautionary measures for the protection of persons or property and of the work as are necessary. Barricades shall be painted in a color that will be visible at night. From sunset to sunrise the Contractor shall furnish and maintain at least one light at each barricade and sufficient number of barricades shall be erected to keep vehicles from being driven on or into any work under construction. The Contractor shall furnish watchmen in sufficient numbers to protect the work.

The Contractor will be held responsible for all damage to the work due to failure of barricades, signs, lights, and watchmen to protect it, and whenever evidence is found of such damage, the Engineer may order the damaged portion immediately removed and replaced by the Contractor at his cost and expense. The Contractor's responsibility for the maintenance of barricades, signs, and lights, and for providing watchmen shall not cease until the project shall have been accepted by the Owner.

The Contractor shall use only battery powered lights, enclosed lanterns or other lights satisfactory to the Engineer. Smudge pots or other lights which have an open flame will not be permitted.

26. DISPOSAL OF WASTE AND SURPLUS EXCAVATION. All trees, stumps, slashings, brush or other debris removed from the job site as a preliminary to the construction of the work or its appurtenances shall be removed from the property and disposed of in a manner approved by the Engineer.

All excavated earth in excess of that required for backfilling shall be removed from the job site and disposed of in a satisfactory manner except in locations where, in the judgment of the Engineer, it can be neatly spread over and along the right-of-way.

27. GUARANTY AGAINST DEFECTIVE WORK. The Contractor shall indemnify the Owner against any repairs which may become necessary to any part of the work performed under the contract, arising from defective workmanship or materials used therein, for a period of one year from the date of final acceptance of the work.

28. RESTORATION OF SITE & CLEANUP. Upon completion of the project (or major portions thereof) the Contractor shall restore the site to its original condition or better. Driveways and streets shall be compacted and resurfaced as originally found. All private property disrupted during construction including fences, patios, retaining walls, sidewalks, wooden decks, etc. shall be mended or repaired to their original condition. At the conclusion of the work, all tools, temporary structures and materials belonging to the Contractor shall be promptly removed, and all dirt, rubbish and other foreign substances shall be disposed of.

The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver over such materials and equipment in an undamaged, clean condition.

29. CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE. The Contractor shall not commence work under this contract until he has obtained at his expense all insurance required under this section of the Special Conditions and by the Contract Documents, and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on any subcontract until all similar insurance required of the subcontractor has been so obtained and approved. Such insurance shall remain in full force and effect on all phases of the work, whether or not the work is occupied or utilized by the Owner, until all work under the Contract is completed and has been accepted by the Owner.

Nothing contained in the insurance requirements shall be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from his operations under the Contract.

Any insurance bearing an adequacy of performance will be maintained after completion of the project for the full guarantee period.

The Contractor shall obtain and maintain for the full period of the Contract the following types of insurance in the form, minimum limits and amounts herein specified or as may be otherwise required in the Contract Documents. The Contractor shall automatically renew any policy which expires during the performance of his Contract and notify the Owner and Engineer of such a renewal prior to expiration date.

A. Workmen's Compensation including Occupational Disease, and Employer's Liability Insurance: Before commencement of the work, the Contractor shall take out and maintain during the life of this contract Statutory Workmen's Compensation Insurance and Occupational Disease Disability Insurance for all of his employees to be engaged in work under this Contract, and in case any work is sublet, the Contractor shall require the subcontractor similarly to provide Workmen's Compensation and Occupational Disease Disability Insurance for the latter's employees engaged in such work unless such employees are covered by the protection afforded by the Contractor's insurance. In case any class of employees engaged in hazardous work under the Contractor is not protected under the Workmen's Compensation statute, or in case there is no applicable Workmen's Compensation Statute, the Contractor shall provide, and shall cause each subcontractor to provide adequate insurance for the protection of his employees not otherwise protected. The minimum amount of such insurance shall be as follows unless higher minimum amounts are otherwise required in the Contract Documents:

<u>Workers Compensation and Employers' Liability</u>	
Each Accident	\$100,000.00
Disease – Each employee	\$100,000.00
Disease – Policy Limit	\$500,000.00

B. Public Liability and Property Damage Insurance: (Note "Indemnity" clause hereinafter). Before commencement of the work, the Contractor shall submit written evidence that he and all his subcontractors have obtained for the period of the Contract full Comprehensive General Liability and Property Damage Insurance coverage. This coverage shall protect the Contractor; the Owner; the Engineer, its architects and engineers; and each of their officers, agents and employees; from claims for damages for bodily or personal injury, sickness or disease, including death, and from claims for damages to property, which may arise directly or indirectly out of, or in connection with the performance of work under this Contract by the Contractor, by any of his Subcontractors, or by anyone directly or indirectly employed of either of them, or under the control of either of them, and the minimum amount of such insurance shall be as follows unless higher minimum amounts are otherwise required in the Contract Documents:

General Liability

Each Occurrence	\$1,000,000.00
Personal and Adv. Injury	\$1,000,000.00
General Aggregate	\$2,000,000.00
Products Comp./Ops. Aggregate	\$2,000,000.00

The Property Damage portion of this coverage shall include where applicable explosion, collapse and underground exposure coverage. In addition, where Completed Operation Insurance coverage is applicable, such coverage will be maintained after completion and acceptance of the project for the full guarantee period.

C. Automobile Liability and Property Damage Insurance: Before commencement of the work, the Contractor shall submit written evidence that he and all his subcontractors have obtained Automobile Liability and Property Damage Insurance coverage on all self-propelled vehicles such as cars, trucks, graders, etc. used in connection with the Contract, whether owned, non-owned, or hired. The minimum amount of such insurance shall be as follows unless higher minimum amounts are otherwise required in the Contract Documents:

Automobile Liability

Combined Single Limit (Ea Accident)	\$1,000,000.00
Bodily Injury (Per Person)	\$ 500,000.00
Bodily Injury (Per Accident)	\$ 500,000.00
Property Damage (Per Accident)	\$ 300,000.00

D. Contractual Liability Coverage: Each and every policy for Liability Insurance carried by each Contractor and Subcontractor will include a "Contractual Liability Coverage" endorsement sufficiently broad to insure the provision titled "Indemnity" hereinafter set forth.

E. Indemnity: The Contractor shall defend, indemnify and hold harmless the Owner; the Engineer, its Engineers; and each of their officers, agents, servants and employees; from any and all suits, actions, claims, losses or damage of any character and from all expenses incidental to the defense of such suits, actions or claims, based upon or arising out of or alleged to be based upon or arising out of (1) any injury, disease, sickness or death of any person or persons, (2) any damages to any property including in part loss of use thereof, caused by any act or omission of the Contractor, of any Subcontractor of the Contractor, or by their officers, agents, servants, employees, or anyone else under the Contractor's direction and control, and arising out of, occurring in connection with, resulting from, or caused by the performance or failure of performance of any work or services called for by the Contract or from conditions created by the performance or non-performance of said work or services, but not including the sole negligence of any party herein indemnified.

F. Builder's Risk "All-Risk" Insurance: At the Owner's discretion, in addition to such Fire and extended Insurance coverage which the Contractor or his Subcontractors elect to carry for their own protection, the Contractor, before commencement of the work, shall effect and maintain for the life of his Contract Builder's Risk "All-Risk" Completed Value Insurance coverage upon the full insurable value of all portions of the project which is the subject of this Contract and subject to a loss for which Builder's Risk "All-Risk" Insurance coverage gives protection, and shall include completed work and work in progress. This coverage shall be with an insurance company or companies acceptable to the Owner.

Such insurance shall include as Additional Named Insureds: the Owner; The Engineer, its architects and engineers; and each of their officers, agents, and employees; and any other persons with an insurable interest designated by the Owner as an Additional Named Insured.

Duplicate originals of the policy of insurance required herein shall be furnished to the Engineer as provided under "Evidence of Insurance Coverage" hereinafter.

G. Evidence of Insurance Coverage: Before commencement of any work, the Contractor shall submit written evidence that he and all his Subcontractors have obtained the minimum insurance required by the Contract Documents. Such written evidence shall be in the form of a Certificate of Insurance executed by the Contractor's insurance carrier showing such policies in force for the specified period or by furnishing a copy of the actual policy or policies. The Owner shall be listed as the Certificate Holder on the Certificate of Insurance. Each policy or certificate will bear an endorsement or statement stating in the event of any material change or cancellation of said policies, the company will give fifteen (15) calendar days' written notice to the Owner. Statements such as "will endeavor" and "but failure to notify Owner shall impose no obligation or liability of any kind upon the company" shall not be allowed.

30. SAFETY.

- a. In accordance with generally accepted construction practices, the Contractor alone will be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours.
- b. The duty of the Engineer or Architect to conduct construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures, in, or on, or near the construction site.

31. EXISTING UTILITIES AND SERVICE LINES. The Contractor shall be responsible for the protection of all existing utilities or service lines crossed or exposed by his construction operations. Where existing utilities or service lines are cut, broken or damaged, the Contractor shall replace or repair the utilities or service lines with the same type of original material and construction, or better, at his own cost and expense.

32. DURING CONSTRUCTION. During construction of the work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris, and rubbish as is practicable and shall remove same from any portion of the site, if in the opinion of the Engineer, such material, debris, or rubbish constitutes a nuisance or is objectionable.

The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefore develops.

33. COPIES OF PLANS AND SPECIFICATIONS FURNISHED. Three (3) sets of plans and specifications shall be furnished to the Contractor, at no charge, for construction purposes. Additional copies may be obtained at cost of reproduction upon request.

34. LIGHT AND POWER. The Contractor shall provide, at his own expense, temporary lighting and facilities required for the proper prosecution and inspection of the work.

35. EXISTING STRUCTURES. The plans show the locations of all known surface and subsurface structures. However, the Owner assumes no responsibility for failure to show any or all of these structures on the plans, or to show them in their exact location. It is mutually agreed that such failure shall not be considered sufficient basis for claims for additional compensation for extra work or for increasing the pay quantities in any manner whatsoever, unless the obstruction encountered is such as to necessitate changes in the lines or grades, or requires the building of special work, provisions for which are not made in the plans and proposal, in which case the provisions in these specifications for extra work shall apply.

36. USE OF EXPLOSIVES. Use of explosives will NOT be allowed.

37. SATURDAYS, SUNDAYS, HOLIDAYS, AND OVERTIME. Any work to be performed after regular working hours (as defined in the General Conditions, paragraph 1.07), on Saturdays, Sundays, or legal holidays, shall be performed without additional expense to the Owner and shall have prior written approval from the Engineer. In addition, Engineer shall have the right to deny Contractor's request to perform work after regular working hours (as defined in the General Conditions, paragraph 1.07), on Saturdays, Sundays, or legal holidays, at no additional cost to Owner or Engineer.

38. PAYMENTS NO EVIDENCE OF PERFORMANCE. No progress or final estimate certificate given or payment made under this contract shall be evidence of the performance of this contract or construed to be acceptance of defective work or improper materials, either wholly or in part.

39. TEMPORARY SUSPENSION OF THE WORK. The Engineer shall have authority to suspend the work wholly or in part for such period or periods of time as he may deem necessary due to unsuitable weather or other conditions considered unfavorable for the suitable prosecution of the work; or for the failure of the Contractor to carry out instructions or to perform any provisions of the contract. During periods of suspension, the Contractor shall properly protect the work from possible injury.

40. OWNER'S RIGHT TO DO WORK. If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this contract, the Owner, after seven (7) calendar days written notice to the Contractor, may, without prejudice to any other remedy the Owner may have, make good such deficiency and may deduct the cost thereof from the payment then or thereafter due the Contractor. Any money due the Owner after such deduction shall be paid by the Contractor or his sureties who hereby agree to these provisions.

41. RIGHT OF OWNER TO TERMINATE CONTRACT. Should it appear at any time that the work is not being prosecuted with sufficient competence or rapidity to insure the proper completion of the work within the stipulated time, and, if upon seven (7) calendar days written notice to the Contractor, he fails to increase the quality or the quantity of his work, or both, the Owner reserves the right to annul and cancel this contract and relet the work or any part thereof, or at the Owner's option to complete it by day labor. The Contractor shall not be entitled to any claims for damages on account of such annulment, and he will be held liable for costs and expenses incurred in reletting or completing the work under this contract. All money due the Contractor will be retained until the work is completed and all expenses and costs have been deducted and any money due the Owner, after such deductions have been made, shall be paid by the Contractor or his Sureties who hereby agree to these provisions.

42. TERMINOLOGY. Throughout these specifications, the word "shall" denotes mandatory. The word "may" implies only permission. All other "terms" or "word phrases" shall be interpreted as having the meaning customarily ascribed to them by the several building trades of the United States.

43. CERTIFICATES AND GUARANTEES. Four (4) copies of any manufacturer's guaranty or certificate as may be required by the Contract Documents shall be submitted to the Owner prior to the acceptance of the work by the Owner.

44. COORDINATION WITH OTHERS. In the event other contractors are doing work in the same area simultaneously with this project, the Contractor shall coordinate his proposed construction with that of the other contractors.

45. DEWATERING EXCAVATION. The prospective bidders shall make sufficient subsurface explorations to determine the location of groundwater which might be encountered. The Contractor shall, at his own expense, utilize a pumping system in order to place materials in dewatered excavations.

46. PUBLIC UTILITIES AND OTHER PROPERTY TO BE CHANGED. In case it is necessary to change or move the property of any owner or of a public utility, such property shall not be moved or interfered with until ordered to do so by the Engineer. The right is reserved to the owner of public utilities to enter upon the limits of the project for the purpose of making such changes or repairs of their property that may be made necessary by performance of this Contract.

Any time the Contractor intends to expose, cross, or otherwise work in the area of the existing petroleum pipelines, telephone lines, water lines, etc., the Contractor shall notify the Owner(s) of the respective facilities forty-eight (48) hours in advance.

47. PAY ITEMS. Pay items are listed in the Proposal. All other items necessary to complete the work as shown and specified shall be considered subsidiary obligations of the Contractor.

48. MUTUAL RESPONSIBILITY OF CONTRACTORS. If, through acts or neglect on the part of the Contractor, any other Contractor or Subcontractor shall suffer loss or damage to his work, the Contractor agrees to settle with such other Contractor or Subcontractor by agreement or arbitration, if such other Contractor or Subcontractor will so settle. If such other Contractor or Subcontractor asserts been so sustained, the Owner shall notify the Contractor, who shall indemnify and save harmless the Owner against such claims and for any costs in connection with such claims.

49. PROTECTION OF PROPERTY. The Contractor shall, at no additional expense to the Owner, protect by false work, braces, shoring or other property along his line of work or affected directly by his work, against damage and shall repair the damages or repay the injured Owners if such damage occurs.

The Contractor shall exercise care to protect from injury all water pipes, sanitary sewer pipes, gas mains, telephone cables, electric cables, service pipes, and other utilities or fixtures which may be encountered during the progress of the work. All utilities and other service facilities or fixtures if damaged, shall be repaired by the Contractor without additional compensation.

The Contractor shall personally check and verify utility information on the plans. Where existing utilities or structures are shown on the plans or drawings, they are believed to be accurate but are not guaranteed to such or that these are the only utilities or structures in the construction area. Protection is Contractor's responsibility and he must satisfy himself as to the existence and location of all utilities and structures.

The Contractor shall give notice in writing at least 48 hours before breaking ground, to all persons, superintendents, inspectors, or those otherwise in charge of property, streets, water pipes, gas pipes, sewer pipes, telephone cables, electric cables, railroads or otherwise, who may be affected by the Contractor's operation, in order that they may remove any obstruction for which they are responsible and have a representative on the ground to see that their property is properly protected.

50. EXTENSION OF CONTRACT PERIOD. The Contractor may be granted an extension of time due to Abnormal Weather Conditions, Acts of God, Acts of War, Strikes, or non-delivery of materials provided he submits a request in writing to the Engineer not later than ten (10) calendar days from the date of such occurrence. A separate request must be made for each occurrence.

Abnormal weather conditions are defined as weather which at the time of year it occurs, is unusual for the place in which it occurs.

Extension of time for unusually severe weather will be determined on a monthly basis and will include only those actual adverse weather days in excess of the normal adverse weather days included in the Contract time. Normal adverse weather means adverse weather which, regardless of its severity, is to be reasonably expected for that particular place at that particular time of year. The normal adverse weather days included in the Contract time are based on historical records of temperature and precipitation as shown in Table A.

Actual adverse weather days are those days meeting one or more of the criteria in "1", "2", and "3" below. Time extensions for days meeting more than one criteria will take into consideration only that criteria having the greatest impact. Those actual adverse weather days covered by criteria "1" or "2" that are in excess of the days in Table A will be allowed without regard to when they occur (except prior to mobilization or during suspension for other reasons) or their impact on Contract completion. However, those days covered by criterion "3" will be subject to the limitations as noted.

1. Days with Maximum temperature of +32 degrees Fahrenheit (0 degrees Celsius) or less - one full day allowed.

2. Days when ½ inch (12.7 mm) or more precipitation (rain or snow equivalent) occurs - one full day allowed.
3. Days when weather related conditions exist which prohibit proper performance of work as specified - one full day allowed. Allowance of such days will be subject to the work which is being delayed, being critical to timely Contract completion and the Contractor making every reasonable effort to minimize the adverse impact of the conditions.

NORMAL ADVERSE WEATHER DAYS

MONTH	
JANUARY	9
FEBRUARY	7
MARCH	6
APRIL	4
MAY	4
JUNE	3
JULY	2
AUGUST	2
SEPTEMBER	3
OCTOBER	3
NOVEMBER	5
DECEMBER	8

The number of days for performance allowed in the Contract as awarded is based on the original quantities. If satisfactory fulfillment of the Contract requires performance of work in greater quantities than those set forth in the Proposal, the Contract time allowed for performance may be increased on a basis commensurate with the amount and difficulty of the added work. If the Contractor finds it impossible, for reasons beyond his/her control, to complete the work within the Contract time as specified, he/she may at any time prior to the expiration of the Contract time, as extended, make a written request to the Engineer for an extension of time, setting forth therein the reasons which he/she believes will justify the granting of his/her request. Only additional work or delays beyond the Contractor's control which affect Contractor completion will be considered for time extensions. If the Engineer determines that a time extension is justified, the Contract shall be modified by Change Order. The Contractor's plea that insufficient time was specified in the Proposal and the Contract or that previously unprotested time charges were incorrect shall not be grounds for an extension of time. The extended time for completion shall be in full force and effect the same as though it were the original time for completion. Daily time charges will cease when the Project is completed.

Compensable Delay. Contract time allowed for performance of the work may be extended for delays caused by the Owner. Compensation may be paid only when completion of the delayed work element prevents the start of work on a successive work element and will adversely impact on Project completion. Float time in the scheduling of

successive work elements is a shared commodity and no compensation will be paid to the Contractor for the use of float time.

Notification of Delay. Within ten (10) calendar days of the occurrence of a delay to the prosecution of the work, the Contractor shall notify the Engineer in writing of such a delay.

Procedures Following Notification of Delay. After notifying the Engineer of the request for delay consideration, the Contractor shall keep daily records of all non-salaried labor, material costs, and equipment expenses for all operations that are affected by the delay.

The Contractor shall maintain a daily record of each operation affected by the delay and the station location of the operations affected. The Contractor shall also prepare and submit written reports to the Engineer containing the following information:

1. Number of days behind schedule.
2. A summary of all operations that have been delayed, or will be delayed.
3. In the case of a compensable delay, the Contractor shall explain how the Owner's act or omission delayed each operation, and estimate the amount of time required to complete the Project.

The Contractor shall provide written notice to the Engineer within ten (10) calendar days. Delay costs allegedly incurred prior to notifying the Engineer that operations have been delayed will not be allowed.

Procedures Following Completion of Work Alleged to be Delayed. Within fifteen (15) calendar days of Project completion, or phase of work allegedly delayed, the Contractor shall submit a report to the Engineer containing the following information:

1. A description of the operations that were delayed and the documentation and explanation of the reason for the delay, including all reports prepared for the Contractor by consultants, if utilized, and;
2. An as-built chart, or other graphic depiction of how the operations were delayed, and;
3. An item by item measurement and explanation of extra costs requested for reimbursement due to the delay.

The Engineer will review the data contained in the Contractor's report and the inspection diaries and records and reports available to him/her. A written decision will be provided to the Contractor which will contain notification of any additional time which may have been granted. In the case of compensable delays, if the Engineer determines that the Owner is responsible for delays to the Contractor's operation, the Engineer's written decision will identify the nature and extent of any delay and the compensation which may be due to the Contractor.

All time extensions will be submitted to the Owner for approval.

51. FAILURE TO COMPLETE WORK WITHIN CONTRACT PERIOD. If the Contractor fails to complete his work within the contract period, or any extension thereof, as provided in the "Extension of Contract Period" said contract shall upon written notice to the Contractor and Surety be in default.

The Owner may, at its (his) option, permit the Contractor or his surety to complete the work included in the contract, or may proceed to complete the work in accordance with "Completion of Contract in Default". In either event, the Contractor or his Surety shall be responsible for all costs incidental to the completion of the work and also for the liquidated damages stipulated in the proposal form.

52. CONTRACTS IN DEFAULT. The Owner may declare a contract in default for any one or more of the following reasons:

- a. Failure to complete the work within the contract period or any extension thereof.
- b. Failure or refusal to comply with an order of the Engineer within a reasonable time.
- c. Failure or refusal to remove rejected materials.
- d. Failure or refusal to perform anew any defective or unacceptable work.
- e. Bankruptcy or insolvency, or the making of an assignment for the benefit of creditors.
- f. Failure to provide a qualified superintendent, competent workmen or subcontractors to carry on the work in an acceptable manner or failure to prosecute the work according to the agreed schedule of completion.
- g. Disregard or violation of any other provisions of the Contract Documents as determined by the Engineer.

53. COMPLETION OF CONTRACTS IN DEFAULT. If for any reason, a contract is declared in default, the Owner shall have the right, without process or action at law to take over all or any portion of the work and complete it at its (his) option, either by day labor or by reletting same. Written notice shall be given the Contractor by the Owner that his contract has been declared in default and upon receiving such notice, the Contractor shall peaceably relinquish possession of said work or the parts thereof specified in the notice.

The Owner may, at its (his) option and at a rental which it considers reasonable, retain all materials, equipment, and tools on the work until the work is complete.

Neither the Owner nor the Owner's officers, agents, or employees shall be in any way liable or accountable to the Contractor or his Surety for the method by which the completion of the said work, or any portion thereof, may be accomplished, or for the price paid therefor. Should the cost of completing the work be in excess of the original contract price, the Contractor and his Surety shall be held responsible for such excess cost. Should the cost of such completion including all proper charges, be less than the original contract price, the amount so saved shall be paid to the Contractor. Neither by taking over the work nor by declaring the contract in default shall the Owner forfeit the right to recover damages from the Contractor or his Surety for failure to complete the entire contract. Maintenance of the work shall continue to be the Contractor's and Surety responsibilities as provided for in the Bond and Guaranty of the Contractor.

54. EXCAVATION IN HIGHWAY RIGHTS-OF-WAY. No trench excavation within a highway right-of-way shall be carried closer than 10 feet of all pavement edges. No dirt from trench excavation shall be piled on roadway shoulders, slopes, ditches, and berms shall be restored to their original condition.

The Contractor shall notify the Oklahoma Department of Transportation of his construction schedule not less than five (5) calendar days prior to commencing the work within the right-of-way. The Contractor shall conform to the requirements of the Oklahoma Department of Transportation as to details of construction methods and time of construction.

55. PROVISIONS FOR REROUTING AND DETOUR OF TRAFFIC. The Contractor will be required to furnish all barricades, lights, signs, and flagmen where it becomes necessary to reroute traffic during the time construction is in progress in the City streets or highways. The detour will be determined by the Engineer and approved by the Owner and the Oklahoma Department of Transportation (Highways) and shall be in accordance with Manual of Uniform Traffic Control Devices, latest edition

56. REMOVAL AND REPLACEMENT OF EXISTING PIPE CULVERTS. Existing pipe culverts in conflict with the proposed construction shall be unearthed carefully, disjointed, and stockpiled adjacent to the right-of-way. The pipe culverts shall be cleaned and replaced immediately after construction is clear so as to cause no serious inconveniences to the property owners and to allow access to their property as quickly as possible. Pipe culverts shall be laid to grade on a firm bedding and shall be backfilled and mechanically tamped to a density such that settlement will not occur. Where existing rubble or concrete headwalls are cut, damaged, or removed, they shall be replaced in an equal or better condition as determined by the Engineer.

Removal and replacement of existing pipe culverts will not be measured and paid for each. No separate payments will be made for removing and replacing headwalls on culverts and all costs in connection therewith shall be included in other items listed in the Proposal.

57. SCHEDULE OF WORK SEQUENCE. Upon award and prior to any construction, it shall be the responsibility of the Contractor to present, to the Owner and Engineer for approval, a schedule of the sequence in which the work will be performed. The schedule should include the following information:

- a. The sequence of work in which the construction will be done.
- b. The approximate period of time in constructing and testing of the facilities.
- c. Coordination of work using two (2) or more crews.
- d. Schedule of possible night work in making tie-ins and road crossings.
- e. Define critical path.

58. COST BREAKDOWN. Immediately after being awarded a contract for the work, the Contractor shall furnish the Engineer with a cost breakdown of each lump sum bid. Such a breakdown shall be in sufficient detail to permit its use in the preparation of progress estimates by the Engineer. Progress payments for materials and equipment on hand shall be based on invoice prices and invoice copies must be presented to the Engineer.

59. FINAL FIELD TESTS. Upon completion of the work and prior to final payment, all equipment and appliances installed under this Contract shall be subjected to acceptance tests as specified or required to prove compliance with the Contract Documents.

The Contractor shall furnish labor, fuel, energy, water and all other material, equipment, and instrument necessary for all acceptance tests, at no additional cost to the Owner.

60. WATER FOR CONSTRUCTION. Water used for testing and flushing of the pipe line or any other purpose incidental to this project will be furnished by the Contractor. The Contractor shall make the necessary arrangements for securing and/or transporting such water and shall take such water in a manner and at such times that will not produce a harmful drain on the source of water. The Contractor shall be fully responsible for the draining and disposal of all water used in flushing and testing. The Contractor shall obtain approval of the Owner and Engineer of the manner in which the water will be drained and disposed of.

61. ELECTRICITY FOR CONSTRUCTION. Except as provided elsewhere in these specifications, the Contractor shall provide all electricity required.

62. SPECIAL CONSTRUCTION REQUIREMENTS IN STATE HIGHWAY RIGHT-OF-WAY.

- a. All Highway signs removed or disturbed shall be restored to original condition.
- b. All surplus material shall be removed from right-of-way and the excavation finished flush with surrounding natural ground.
- c. Operation along highways shall be performed in such a manner that all excavated materials be kept off the pavements at all times as well as all operating equipment.
- d. Barricades, warning signs and flagmen shall be provided by the Contractor.

63. CONTRACT DOCUMENTS. The Contract Documents shall consist of all documents contained herein as stated in the Table of Contents including the Notice to Bidders (Advertisement), Special Conditions, Instructions to Bidders, Proposal, signed Agreement, Performance and Payment Bonds (when required), Special Bonds (when required), General Conditions of Agreement, Technical Specifications, Plans, and all modifications thereof incorporated in any of the documents before the execution of the Agreement.

The Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. In case of conflict between any of the Contract Documents, priority of interpretation shall be in the following order: Signed Agreement, Performance and Payment Bonds, Special Bonds (if any), Proposal, Special Conditions of Agreement, Notice to Contractors, Technical Specifications, Plans, and General Conditions of Agreement.

64. POLES, SIGNS, GUY WIRES, ETC. All utility poles, guy wires, private sign posts, signs, and similar private obstructions which interfere with the construction of this project will be removed and replaced by the Contractor at his own expense.

The removal and replacement of City Street sign posts and signs is the responsibility of the Contractor. The Contractor shall be responsible for all damage to street sign posts and signs within the limits of his operations that remain in place or are removed and replaced.

In event street sign posts and signs are injured or destroyed by the Contractor's operations, they shall be replaced by the Contractor. No separate compensation will be paid for this work, but the costs thereof shall be included in such contract pay items as are provided.

65. PROTECTION OF TREES, PLANTS AND SHRUBS. The Contractor shall make every effort to protect all trees, plants, and shrubs encountered during construction and shall notify property owners, as specified above, before removal of any such item. In all cases where questions arise, the Contractor shall request clarification from the Engineer.

66. PROPERTY LINES AND MONUMENTS. The Contractor shall protect all property lines, monuments and stakes encountered in his work. All monuments, and stakes for later use, that are disturbed or destroyed by the Contractor shall be replaced at his expense.

67. CONFINED SPACE ENTRY. The Contractor shall be responsible for compliance with any and all Federal and State confined spaced entry and permitting requirements.

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

Hartshorne Public Works Authority, OKLAHOMA

Water Distribution Improvements

PROJECT NO: HR-21-01

VOLUME II

TECHNICAL SPECIFICATIONS

FINAL

COMPLETED FOR BIDDING OR CONSTRUCTION
PURPOSES (PLANS / SPECIFICATIONS NOT
BEARING THIS NOTE MAY HAVE REVISIONS
AND SHOULD NOT BE USED FOR BIDDING
OR CONSTRUCTION PURPOSES)



July 2025

Certificate of Authorization # 6685
Expiration Date: 6/30/2027



500 Village Blvd., Suite A
McAlester, OK 74501
(918)420-5500

Hartshorne Public Works Authority, OKLAHOMA

Water Distribution Improvements

PROJECT NO: HR-21-01

VOLUME II

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PROJECT ENGINEER / DATE

July 2025

**Certificate of Authorization # 6685
Expiration Date: 6/30/2027**



**500 Village Blvd., Suite A
McAlester, OK 74501
(918)420-5500**

TECHNICAL SPECIFICATION

HR-21-01

DIVISION 1 - GENERAL REQUIREMENTS

Section 01001	Basic Requirements	01001-1
Section 01025	Measurement and Payment	01025-1
Section 01150	Measurement and Payment	01150-1
Section 01200	Price and Payment Procedures	01200-1
Section 01300	Submittal Requirements	01300-1
Section 01330	Submittal Procedures	01330-1
Section 01400	Quality Requirements	01400-1
Section 01500	Temporary Facilities and Controls	01500-1
Section 01600	Product Requirements	01600-1
Section 01700	Execution Requirements	01700-1
Section 01710	Contract Closeout	01710-1
Section 01720	Project Record Documents	01720-1
Section 01730	Operating and Maintenance Data	01730-1

DIVISION 2 - SITE CONSTRUCTION

Section 02100	Site Preparation	02100-1
Section 02200	Earthwork	02200-1
Section 02207	Aggregate Materials	02207-1
Section 02210	Site Preparation and Grading	02210-1
Section 02220	Structure Excavation and Backfill	02220-1
Section 02221	Excavation and Backfill	02221-1
Section 02225	Trench Excavation, Backfill, and Compacting	02225-1
Section 02229	Rock Removal – With Explosives	02229-1
Section 02231	Aggregate Base Course	02231-1
Section 02241	Geotextile Fabric and Geogrid	02241-1
Section 02250	Compaction Control and Testing	02250-1
Section 02370	Temporary Erosion, Sedimentation and Stormwater Pollution Prevention and Control	02370-1
Section 02511	Gravel Surfacing	02511-1
Section 02600	General Piping Requirements	02600-1
Section 02620	Cement-Lined Ductile Iron Pipe and Fittings	02620-1
Section 02630	Polyvinyl Chloride (PVC) Pipe and Fittings	02630-1
Section 02631	Polyvinyl Chloride (PVC) Pipe (C900)	02631-1
Section 02633	HDPE Pipe	02633-1
Section 02646	Flush Hydrant	02646-1
Section 02647	Fire Hydrant	02647-1
Section 02661	Hydrostatic Testing of Water Distribution System	02661-1
Section 02665	Domestic Water System	02665-1
Section 02675	Disinfection of Water Distribution System	02675-1
Section 02676	Disinfection of Water Storage Tank	02676-1
Section 02701	Leakage Tests	02701-1
Section 02702	Disinfection	02702-1
Section 02821	Chain Link Fences and Gates	02821-1
Section 02971	Arkansas-Oklahoma Railroad Procedures	02971-1

DIVISION 3 -**CONCRETE**

Section 03100	Concrete Formwork	03100-1
Section 03200	Concrete Reinforcement	03200-1
Section 03210	Steel Reinforcement	03210-1
Section 03251	Construction Joints and Waterstops	03251-1
Section 03300	Cast-in-Place Concrete	03300-1
Section 03312	Cast-in-Place Concrete (Heavy Structural)	03312-1
Section 03602	Nonmetallic Grout	03602-1

DIVISION 4 -**MASONRY**

Section 04100	Mortar and Masonry Grout	04100-1
Section 04220	Concrete Masonry	04220-1
Section 04300	Unit Masonry System	04300-1

DIVISION 5 -**METALS**

Section 05050	Anchorage and Fasteners	05050-1
Section 05100	Structural Steel	05100-1
Section 05500	Metal Fabrications	05500-1
Section 05710	Miscellaneous Metals	05710-1

DIVISION 7 -**THERMAL AND MOISTURE PROTECTION**

Section 07920	Sealants and Caulking	07920-1

DIVISION 9 -**FINISHES**

Section 09876	Water Tank Paint System (New Tank)	09876-1
Section 09900	Painting	09900-1

DIVISION 11 -**EQUIPMENT**

Section 11004	Pre-Bid Submittal Requirements	11004-1
Section 11005	Equipment Submittals	11005-1
Section 11061	Flow Meter	11061-1
Section 11701	Liquid Chemical Feed Systems	11701-1

DIVISION 13 -**SPECIAL EQUIPMENT**

Section 13000	Instrumentation and Controls	13000-1
Section 13207	Pedosphere Elevated Water Storage Tank	13207-1

DIVISION 15 - MECHANICAL

Section 15010	Basic Mechanical Requirements	15010-1
Section 15076	Pipe Marking	15076-1
Section 15140	Supports and Anchors	15140-1
Section 15150	Gate and Valve Checks	15150-1
Section 15151	Valves	15151-1
Section 15190	Mechanical Identification	15190-1
Section 15260	Piping Insulation	15260-1

DIVISION 16 - ELECTRICAL

Section 16000	Electrical	16000-1
Section 16010	Basic Electrical Requirements	16010-1
Section 16051	Basic Electrical Materials Methods	16051-1
Section 16110	Raceways	16110-1
Section 16120	Conductors	16120-1
Section 16155	Low Voltage Motor Control	16155-1
Section 16451	Grounding	16451-1

OMISSIONS:In the event that the specifications inadvertently omit some of the usual and customary work, auxiliary equipment or materials required for satisfactory installation and operation of all equipment, the contractor shall provide these items as directed by the engineer at his own expense. The contractor will be assumed to be experienced and qualified contractor in this type of work, and to have studied the purpose and operations of the equipment suitable for the work to be done.

In the event that the specifications inadvertently fail to contain a specification for work to be done and material to be furnished, then the standard current specification or requirements of the AWWA, ASTM, ASME, NBFU, or NEC shall apply. Should the above specification not apply, then the work done, equipment or material furnished, shall be as directed by the engineer. Again, the contractor will be assumed to be experienced and qualified contractor in this type of work, and to have studied the purpose and operations of the equipment suitable for the work to be done.

SECTION 01001 BASIC REQUIREMENTS

PART 1 GENERAL

1.1 DEFINITIONS

- A. Wherever in these Documents the word "Engineer" appears, it shall be understood to mean Infrastructure Solutions Group, LLC acting either directly or indirectly as authorized agents of the Owner. In these Documents where the word "Owner" appears, it shall be as defined in the Contract Documents.

1.2 DAMAGE TO EXISTING UTILITIES:

- A. Approximate locations and depths of all known utilities are shown using the best available information. The Contractor is responsible for verifying the existence and location of all utilities shown or not shown on the Plans. The Contractor shall hold the Owner harmless from damages to existing utilities arising from the Contractor's operations. Repair expense and any damages suffered by the utility owner shall be at the Contractor's expense.
- B. The Contractor shall call OKIE and any other affected utility offices 48 hours prior to excavation at (800) 522-6543.

1.3 CUTTING AND PATCHING

- A. Employ a skilled and experienced installer to perform cutting and patching new Work; restore Work with new products.
- B. Submit written request in advance of cutting or altering existing structures or utilities.
- C. Fit work tight to adjacent elements and maintain integrity of existing work.

1.4 CONFERENCES

- A. Engineer will schedule a pre-construction conference after Notice of Award for all affected parties.
- B. Where required in individual Specification Section, convene a pre-installation conference at project site prior to commencing Work of the Section.

1.5 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Where work is performed in residential and commercial areas, cleanup sufficient to permit normal access and use by property owners shall be performed daily. Final cleanup shall be performed after each individual water or sewer extension has been installed. Failure to perform clean-up work as described above may result in retainage of an additional 10 percent of the cost of the work completed until the clean-up work has been completed or non-processing of additional pay requests.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01150

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 MEASUREMENT OF QUANTITIES

The determination of quantities of work acceptably completed under the terms of the contract or as directed by the Engineer, in writing, will be made by the Engineer, based on measurements taken by him or his assistants. The measurements will be taken according to United States Standard Measurements.

1.2 SCOPE OF PAYMENT

The Contractor shall receive and accept the compensation as herein provided in full payment for furnishing all labor, materials, tools, equipment, and incidentals; for performing all work contemplated and embraced under the contract; for all loss or damage arising out of the nature of the work or from the action of the elements; for any unforeseen defects or obstructions which may arise or be encountered during the prosecution of the work, and before its final acceptance by the Engineer; for all risks of every description connected with the prosecution of the work; for all expenses incurred by or in consequence of suspension or discontinuance of such prosecution of the work as herein specified; for any infringement of patents, trademarks, or copyrights and for completing the work in an acceptable manner according to the specifications.

The payment of any current or partial estimate prior to final acceptance of the work by the Owner shall in no way constitute an acknowledgement of the acceptance of the work, nor in any way prejudice or affect the obligations of the Contractor to repair, correct, renew or replace at his expense any defects or imperfections in the construction of the work under this contract, and its appurtenances nor any damage to or attributable to such defects, which defects, imperfections, or damage shall have been discovered on or before the final inspection and acceptance of the work. The Engineer shall be the sole judge of such defects, imperfections, or damage and the Contractor shall be liable to the Owner for failure to correct the same as provided herein.

1.3 PAYMENT FOR EXTRA WORK

The extra work done by the Contractor, as authorized and approved by the Owner with a Change Order, will be paid for in the manner hereinafter described and the compensation thus provided shall be accepted by the Contractor as payment in full for all labor, material, tools, equipment and incidentals and all superintendent's and timekeeper's services, all insurance and all other overhead expense incurred in the

prosecution of the extra work. Payment for extra work will be made by one or more of the following methods:

A. Unit prices agreed in writing by Engineer and Contractor and approved by the Owner **before said work is commenced**, subject to all other conditions of the contract.

B. A lump sum price agreed on in writing by Engineer and Contractor and approved by the Owner **before said work is commenced**, subject to all other conditions of the contract.

1.4 PARTIAL PAYMENTS

On or before the 20th calendar day of each month, the CONTRACTOR shall prepare and submit to the ENGINEER for approval or modification a statement showing as completely as practicable the total value of the work done by the CONTRACTOR up to and including the 15th calendar day of the month; said statement shall also include the value of all sound materials delivered on the site of the work that are to be fabricated into the work.

1.5 PAYMENTS WITHHELD

Should any defective work or materials be discovered or should a reasonable doubt arise as to the integrity of any part of the work completed prior to the final acceptance and payment, they will be deducted from the first estimate rendered after the discovery of such work an amount equal in value to defective or questioned work and this work will not be included in a subsequent estimate until the defects have been remedied or the cause for doubt removed.

The OWNER may, on account of subsequently discovered evidence, withhold or nullify the whole or part of any certificate to such extent as may be necessary to protect himself from loss on account of:

- (1) Defective work not remedied.
- (2) Claims filed or reasonable evidence indicating probable filing of claims.
- (3) Failure of the CONTRACTOR to make payments properly to subcontractors or for material or labor.
- (4) Damage to another contractor.
- (5) Reasonable doubt that the work can be completed for the unpaid balance of the contract amount.
- (6) Reasonable indication that the work will not be completed within the contract time.

Upon completion of any contract and before final acceptance, a final inspection must be made by Engineer to determine whether the work has been completed in accordance with the contract and specifications. All prior partial estimates and payments shall be

subject to correction in the final estimate and payment. When the work has been so completed and certified to the Owner, the work will be considered accepted and the final estimate shall be executed and submitted.

1.6 NON-PAYMENT FOR REJECTED PRODUCTS

A. Payment will not be made for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined to be unacceptable before or after placement.
3. Products not completely unloaded from the transporting vehicle.
4. Products placed beyond the lines and levels of the required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected products.

PART 2 – BID ITEMS

2.1 GENERAL

The work has been divided into bid items described below for the purpose of payment to the Contractor. It is the intent of these plans and specifications to define a project complete and in place. **Any work necessary to complete the project, and not included in a bid item, will be considered to be incidental and no direct payment will be made, but its cost shall be included in the price bid for the bid item.**

Payment will be made at the contract unit price for each item measured, as specified below and such payment shall be for compensation for furnishing all labor, material, equipment, and incidentals necessary to complete the project in a workmanlike manner.

2.2 MEASUREMENT AND PAYMENT

SECTION A

Item No. 1: 12-inch PVC SDR 21 Water Main:

Item No. 2: 8-inch PVC SDR 21 Water Main:

Item No. 3: 6-inch PVC SDR 21 Water Main:

Furnish and install PVC SDR 21 water main in accordance with the plans and specifications including pipe, excavation, trenching, preparation, bedding, off-site material (required), backfilling, testing, disinfection, final clean up and all other incidental work and fittings to construct an acceptable water main.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the length of the mains installed. No additions or deductions will be made for fittings and valves installed in the lines which are not pay items with a defined beginning and ending point.

Payment will be made at the contract unit price bid for each linear foot of pipe actually installed and accepted for the classified item.

Item No. 4: 12-inch Gate Valve:**Item No. 5: 8-inch Gate Valve:****Item No. 6: 6-inch Gate Valve:**

Furnish and install valve, valve box, blocking, restrained joint fittings, concrete apron, plug (if required), and all other incidental work and fittings to install the valve per plans and specifications.

Measurement and Payment:

Measurement for work under this item will be each valve and appurtenances actually installed and accepted.

Payment will be made at the contract unit price bid for each valve and appurtenances actually installed and accepted for the classified item.

Item No. 7: Fire Hydrant Assembly:**Item No. 8: Flushing Hydrant Assembly:****Item No. 9: Automatic Flushing Hydrant Assembly:**

Furnish and install hydrant assembly including all piping, fittings, gate valve, excavation, blocking, bedding, valve boxes, concrete apron, gravel, backfill, and all other incidental work and fittings to install the hydrant assembly per plans and specifications.

Measurement and Payment:

Measurement for work under this item will be each fire hydrant assembly and appurtenances actually installed and accepted.

Payment will be made at the contract unit price bid for each hydrant assembly and appurtenances actually installed and accepted for the classified item.

Item No. 10: 6-inch PVC With 12-inch Steel Casing Railroad Bore:
Item No. 11: 8-inch PVC With 16-inch Steel Casing Railroad Bore:
Item No. 12: 6-inch PVC With 12-inch Steel Casing Highway Bore:
Item No. 13: 8-inch PVC With 16-inch Steel Casing Highway Bore:
Item No. 14: 12-inch PVC With 24-inch Steel Casing Highway Bore:

Furnish and install restrained joint PVC (carrier) water line and steel casing in accordance with the plans and specifications including pipe, casing, rubber boots with clamps, fittings, stiffeners, spacers, pipe marker, casing vent, boring, testing, disinfection, final clean up and all other incidental work and fittings to construct an acceptable water main.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the length of the mains installed. No additions or deductions will be made for fittings and valves installed in the lines which are not pay items with a defined beginning and ending point.

Payment will be made at the contract unit price bid for each linear foot of pipe actually installed and accepted for the classified item.

Item No. 15: 6-inch Minor Channel Crossing:

Furnish and install restrained joint PVC (carrier) water line in accordance with the plans and specifications including pipe, fittings, pipe marker, open trenching, testing, disinfection, final clean up and all other incidental work and fittings to construct an acceptable water main.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the length of the mains installed. No additions or deductions will be made for fittings and valves installed in the lines which are not pay items with a defined beginning and ending point.

Payment will be made at the contract unit price bid for each linear foot of pipe actually installed and accepted for the classified item.

Item No. 16: Long Service Connection:

Reconnect existing water service to proposed water line including fittings, HDPE DR 9 piping, road bore, excavation, bedding, gravel, backfill, and all other incidental work and fittings to install the service connection per plans and specifications.

Measurement and Payment:

Measurement for work under this item will be each service connection actually installed and accepted.

Payment will be made at the contract unit price bid for each service connection actually installed and accepted for the classified item.

Item No. 17: Short Service Connection:

Reconnect existing water service to proposed water line including fittings, HDPE DR 9 piping, excavation, bedding, gravel, backfill, and all other incidental work and fittings to install the service connection per plans and specifications.

Measurement and Payment:

Measurement for work under this item will be each service connection actually installed and accepted.

Payment will be made at the contract unit price bid for each service connection actually installed and accepted for the classified item.

Item No. 18: Asphalt Surface Repair:

Contractor shall repair street surface disturbed during construction in accordance with the plans and specifications. Work shall include saw cutting existing pavement, 24 inches compacted aggregate base above bedding materials, asphalt, compaction, testing and any other incidental work to provide an acceptable surface. Note: Does not include driveways. Driveways shall not be measured for payment and shall be included in the price bid for other items of work.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the surface repair associated with the water main installation. No additions or deductions will be made for width.

Payment will be made at the contract unit price bid for each linear foot actually installed and accepted for the classified item.

Item No. 19: Gravel Surface Repair:

Contractor shall repair street surface disturbed during construction in accordance with the plans and specifications. Work shall include gravel, grading, 24 inches compacted aggregate base above bedding materials, compaction, and any other incidental work to provide an acceptable surface. Note: Does not include driveways.

Driveways shall not be measured for payment and shall be included in the price bid for other items of work.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the surface repair associated with the water main installation. No additions or deductions will be made for width.

Payment will be made at the contract unit price bid for each linear foot actually installed and accepted for the classified item.

Item No. 20: Concrete Surface Repair:

Contractor shall repair street surface disturbed during construction in accordance with the plans and specifications. Work shall include saw cutting existing pavement, 24 inches compacted aggregate base above bedding materials, concrete, compaction, testing and any other incidental work to provide an acceptable surface. Note: Does not include driveways. Driveways shall not be measured for payment and shall be included in the price bid for other items of work.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the surface repair associated with the water main installation. No additions or deductions will be made for width.

Payment will be made at the contract unit price bid for each linear foot actually installed and accepted for the classified item.

Item No. 21: Curb Repair:

Contractor shall repair curb disturbed during construction in accordance with the plans and specifications. Work shall include saw cutting existing curb, concrete, compaction, testing and any other incidental work to provide an acceptable surface.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the curb repair associated with the water main installation. No additions or deductions will be made for width.

Payment will be made at the contract unit price bid for each linear foot actually installed and accepted for the classified item.

Item No. 22: Stone Drainage Repair:

Contractor shall repair stone drainage disturbed during construction in accordance with the plans and specifications. Work shall include stone drainage repair and any other incidental work to provide an acceptable surface.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the drainage repair associated with the water main installation. No additions or deductions will be made for width.

Payment will be made at the contract unit price bid for each linear foot actually installed and accepted for the classified item.

Item No. 23: 4' Concrete Sidewalk Repair:**Item No. 24: 6' Concrete Sidewalk Repair:**

Contractor shall repair concrete sidewalk disturbed during construction in accordance with the plans and specifications. Work shall include concrete repair and any other incidental work to provide an acceptable surface.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the sidewalk repair associated with the water main installation. No additions or deductions will be made for width.

Payment will be made at the contract unit price bid for each linear foot actually installed and accepted for the classified item.

SECTION A ADDITIVE ALTERNATE**Item No. 1A: 12-inch PVC SDR 21 Water Main:**

Furnish and install PVC SDR 21 water main in accordance with the plans and specifications including pipe, excavation, trenching, preparation, bedding, off-site material (required), backfilling, testing, disinfection, final clean up and all other incidental work and fittings to construct an acceptable water main.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the length of the mains installed. No additions or deductions will be made for fittings and valves installed in the lines which are not pay items with a defined beginning and ending point.

Payment will be made at the contract unit price bid for each linear foot of pipe actually installed and accepted for the classified item.

Item No. 2A: 12-inch Gate Valve:

Furnish and install valve, valve box, blocking, restrained joint fittings, concrete apron, plug (if required), and all other incidental work and fittings to install the valve per plans and specifications.

Measurement and Payment:

Measurement for work under this item will be each valve and appurtenances actually installed and accepted.

Payment will be made at the contract unit price bid for each valve and appurtenances actually installed and accepted for the classified item.

Item No. 3A: Asphalt Surface Repair:

Contractor shall repair street surface disturbed during construction in accordance with the plans and specifications. Work shall include saw cutting existing pavement, 24 inches compacted aggregate base above bedding materials, asphalt, compaction, testing and any other incidental work to provide an acceptable surface. Note: Does not include driveways. Driveways shall not be measured for payment and shall be included in the price bid for other items of work.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the surface repair associated with the water main installation. No additions or deductions will be made for width.

Payment will be made at the contract unit price bid for each linear foot actually installed and accepted for the classified item.

Item No. 4A: Gravel Surface Repair:

Contractor shall repair street surface disturbed during construction in accordance with the plans and specifications. Work shall include gravel, grading, 24 inches compacted aggregate base above bedding materials, compaction, and any other incidental work to provide an acceptable surface. Note: Does not include driveways. Driveways shall not be measured for payment and shall be included in the price bid for other items of work.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the surface repair associated with the water main installation. No additions or deductions will be made for width.

Payment will be made at the contract unit price bid for each linear foot actually installed and accepted for the classified item.

Item No. 5A: Concrete Surface Repair:

Contractor shall repair street surface disturbed during construction in accordance with the plans and specifications. Work shall include saw cutting existing pavement, 24 inches compacted aggregate base above bedding materials, concrete, compaction, testing and any other incidental work to provide an acceptable surface. Note: Does not include driveways. Driveways shall not be measured for payment and shall be included in the price bid for other items of work.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the surface repair associated with the water main installation. No additions or deductions will be made for width.

Payment will be made at the contract unit price bid for each linear foot actually installed and accepted for the classified item.

Item No. 6A: Relocate Master Meter:

Relocate master meter and construct vault in accordance with the plans and specifications including pipe, master meter, blocking, restrained joint fittings, concrete apron, concrete, final clean up and all other incidental work and fittings to construct an acceptable master meter and vault.

Measurement and Payment:

Measurement for work under this item will be in lump sum for the master meter and vault relocated. No additions or deductions will be made for fittings and valves installed in the lines which are not pay items with a defined beginning and ending point.

Payment will be made at the contract unit price bid for each master meter and vault actually relocated and accepted for the classified item.

SECTION B

Item No. 1: Chlorine Booster Pump Station and Piping:

Contractor shall install according to the plans and specifications chem-feed skids with pumps and control panels, electric panel, electric, coordinate service feeds with power company, heaters, eye wash station and drain, intake fans, exhaust louvers, drum dolly, drum, liquid measurement device, block building, doors, lights, sink, smooth nose sample tap, earthwork, grading, piping, concrete, bollards, sample lines, chlorine injection vault with gate valves, master meter, strainer, gate valve, chlorine injection point, sample tap location, piping, and all other incidental work and fittings associated with the installation in accordance with the plans and specifications.

Measurement and Payment:

Measurement for work under this item will be each booster station and appurtenances actually installed and accepted.

Payment will be made at the contract unit price bid for each booster station and appurtenances actually installed and accepted for the classified item.

Item No. 2: Proposed Pedesphere:

Contractor shall install pedesphere according to the plans and specifications including pedesphere, piping, concrete, foundation, gravel, overflow and splashpad, altitude valve, control valve, check valve, grading, pressure gauges, electrical, telemetry, recirculation pump and piping, heater, valve vaults and hatches, and all other incidental work and fittings associated with the installation in accordance with the plans and specifications.

Measurement and Payment:

Measurement for work under this item will be each pedesphere and appurtenances actually installed and accepted.

Payment will be made at the contract unit price bid for each pedesphere and appurtenances actually installed and accepted for the classified item.

Item No. 3: Fencing with Double Gates:

Contractor shall furnish and install in accordance with the plans and specifications fencing, gates, 3-strand barbed wire, concrete, compaction, and any other incidental work to provide an acceptable fence.

Measurement and Payment:

Measurement for work under this item will be in linear feet for the fence associated with the water main installation.

Payment will be made at the contract unit price bid for each linear foot actually installed and accepted for the classified item.

Item No. 4: Remove Existing Water Storage Tank:

Contractor shall remove existing water tanks in accordance with the plans and specifications including water storage tank, foundation, piping, and all other incidental work associated with the removal in accordance with the plans and specifications.

Measurement and Payment:

Measurement for work under this item will be each water tank and appurtenances actually removed and accepted.

Payment will be made at the contract unit price bid for each water tank and appurtenances actually removed and accepted for the classified item.

Item No. 5: Tank Interior Coating and Standard Three Coat Exterior Painting System:

Contractor shall paint pedesphere according to the plans and specifications including interior coating system, standard exterior three coat system, surface preparation, testing, and all other incidental work and fittings associated with the installation in accordance with the plans and specifications.

Measurement and Payment:

Measurement for work under this item will be each pedesphere and appurtenances actually painted and accepted.

Payment will be made at the contract unit price bid for each pedesphere and appurtenances actually painted and accepted for the classified item.

Item No. 6: Pedeshpere Logo:

Contractor shall paint pedesphere logo according to the plans and specifications including standard exterior three coat system, surface preparation, testing, and all other incidental work and fittings associated with the installation in accordance with the plans and specifications. Logos to be placed in coordination with Owner's approval.

Measurement and Payment:

Measurement for work under this item will be each pedesphere logo and appurtenances actually painted and accepted.

Payment will be made at the contract unit price bid for each pedesphere logo and appurtenances actually painted and accepted for the classified item.

SECTION B ADDITIVE ALTERNATE**Item No. 1B: Tank Interior Coating and Ultimate Three Coat Exterior Painting System:**

Contractor shall paint pedesphere according to the plans and specifications including interior coating system, ultimate exterior three coat system with fluoropolymer polyurethane, surface preparation, testing, and all other incidental work and fittings associated with the installation in accordance with the plans and specifications.

Measurement and Payment:

Measurement for work under this item will be each pedesphere and appurtenances actually painted and accepted.

Payment will be made at the contract unit price bid for each pedesphere and appurtenances actually painted and accepted for the classified item.

END OF SECTION

SECTION 01200
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 CASH ALLOWANCES

Not used in this contract.

1.2 SCHEDULE OF VALUES

- A. Submit a printed schedule on Contractor's standard form or electronic media printout, as accepted by Owner.
- B. Submit Schedule of Values in duplicate at the Preconstruction Conference.
- C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification section. Identify site mobilization, bonds and insurance.
- D. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- E. Include within each line item, a direct proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, with each Application for Payment.
- G. Include all items detailed in Contract Documents regardless of items having specific pay items.

1.3 APPLICATIONS FOR PAYMENT

- A. Submit six (6) originals of each application on Owner-accepted form to Engineer.
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
- C. Submit an updated construction schedule with each Application for Payment.

- D. Payment Period: Submit at intervals stipulated in the Agreement.
- E. Submit with transmittal letter as specified for Submittals in **Section 01330**.
- F. Submit six (6) waivers.
- G. Substantiating Data: When Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with the application:
 - 1. Current construction photographs as specified.
 - 2. Partial release of liens from major subcontractors and vendors as determined by the Engineer.
 - 3. Record documents as specified for review by the Owner which will be returned to the Contractor.
 - 4. Affidavits attesting to off-site stored products.
 - 5. Construction progress schedules, revised and current as specified.

1.4. RETAINAGE

- A. Public construction contracts provide for partial payment based upon work completed. Five percent (5%) of all partial payments made shall be withheld as retainage.

1.5 CHANGE PROCEDURES

- A. Submittals: Submit name of the individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- B. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Amount or Contract Time by issuing supplemental instructions.
- C. The Engineer may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised Plans and Specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within 10 days.
- D. The Contractor may propose changes by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Amount and Contract Time with full documentation and a statement describing the effect on Work by separate

or other Contractors. Document any requested substitutions in accordance with the Specifications.

- E. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by the Owner, and the Engineer.
- F. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis.
- G. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Engineer will determine the change allowable in Contract Amount and Contract Time as provided in the Contract Documents.
- H. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- I. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.
- J. Change Order Forms: Change Order Form.
- K. Execution of Change Orders: Engineer will issue six (6) original Change Orders for signatures of parties as provided in the Conditions of the Contract.
- L. Correlation of Contractor Submittals:
 - 1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Amount.
 - 2. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
 - 3. Promptly enter changes in Project Record Documents.
- M. Failure of Contractor to provide both verbal and written notices constitutes a waiver of any and all claims that may arise as a result of the alleged change.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01300 SUBMITTAL REQUIREMENTS

PART 1 GENERAL

1.1 SUBMITTALS

- A. The Contractor shall submit to the Engineer by email to the project engineer a PDF copy of all shop drawings, erection drawings, schedules, certified dimension prints, schematic or system diagrams, data sheets, catalog cuts, bulletins, and other descriptive material as is customary or as may be specifically required by the Engineer prior to purchase, fabrication, or shipment to the Project site. A copy will be returned by email to the Contractor with comments noted.
- B. Items requiring a formal submittal as specified above include but are not necessarily limited to the following:
 - 1. Cast-in-place concrete and reinforcing steel;
 - 2. Structural steel, handrails, gratings, miscellaneous fabrication, pipe supports, and all other metal specialties, (submit shop fabrication drawings);
 - 3. Piping, valves, and fittings;
 - 4. Electrical equipment and instrumentation;
 - 5. Paint systems;
 - 6. Specified mechanical equipment;
 - 7. Precast concrete structures;
 - 8. Any other items for which the Contractor wishes confirmation from the Engineer as to the appropriateness of application and suitability for incorporation into the project.
- C. The drawings and data shall have been reviewed and approved by the Contractor prior to submittal and the submittal submitted shall bear the Contractor's approval stamp and signature. Submittal data shall be in such form and so presented that the Engineer may readily review the data.
- D. QUALIFICATIONS
 - 1. The Contractor is directed to specific Specification sections where specific requirements for submittals may be described in more detail. The drawings, other required descriptive material, will be examined and approved, corrected, or rejected by the Engineer with reasonable promptness. All rejected material shall be revised and resubmitted until approval is obtained. Each submittal shall be accompanied by a letter of qualification stating that the proposed

equipment meets the Specifications; or, clearly itemizes and explains any proposed exceptions. Delays caused by such rejections will not be considered cause for extension of the contract time. Approval by Engineer indicates general compliance or acceptability; however, it does not relieve the Contractor of final responsibility for proper dimensions, character, quantity, quality, strength or sufficiency of the items involved. Waivers, or exceptions, to the Plans and Specifications may be validated only in writing by the Engineer. Written validation will specifically identify the feature in question and no such waiver or exception shall be assumed as a result of omissions or oversights in examining and approving the above drawings or other materials.

2. Any equipment installed by the Contractor, not formally approved by the Engineer, shall be at the Contractor's risk if it is found that the installed equipment does not conform to the Specifications and shall be promptly removed from the project site.

1.2 OPERATIONS AND MAINTENANCE MANUALS

- A. The Contractor shall provide two (2) copies and one (1) thumb drive of all required operation and maintenance instructions and manuals for individual equipment items. This information shall be completely up-to-date and reflect actual field installed equipment.
- B. The O&M information shall be furnished in bound sets as described for the Submittals.
- C. Minimum Requirements:
 1. Name, address and phone number of nearest competent service organization who can supply parts and service. If this is not the manufacturer's own service department, then furnish letters confirming that the named organization has been factory authorized to represent the manufacturer of the equipment furnished.
 2. Complete descriptive literature and drawings of all material furnished. This is to include "as built" wiring diagrams of all electrical equipment, "as built" erection drawings providing up-to-date information on the actual construction of the equipment furnished and any field modifications made during installation, start-up and testing.
 3. Installation, operation and maintenance brochures from the original manufacturers of all mechanical components such as gear reducers, drive couplings, etc., incorporated into the completed installation.
 4. Complete Electrical Motor information (name plate data).
 5. Recommended spare parts list.
 6. Guide to "trouble shooting".

7. All required assembly, installation, alignment, adjustment and checking instructions.
 8. All required operating instructions.
 9. All required maintenance instructions including schedules of all required routine maintenance and lubrication checks.
- D. The Owner and Engineer reserve the right to withhold final payment for the project until acceptable information is received for all equipment specified.

END OF SECTION

SECTION 01330 SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Engineer accepted form.
- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- C. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and Specification section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite the Project, and emailed to Engineer. Coordinate submission of related items.
- F. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- G. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of the completed Work.
- I. Provide space for Contractor and Engineer review stamps.
- J. When revised for resubmission, identify all changes made since previous submission.
- K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

1.2 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial schedules at the Preconstruction Conference. After review, resubmit required revised data within ten days.
- B. After review, submit detailed schedules within 15 days modified to accommodate revisions recommended by Engineer.

- C. Submit revised Progress Schedules with each Application for Payment.
- D. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.
- E. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- G. Indicate estimated percentage of completion for each item of Work at each submission.
- H. Provide separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products and products identified under Allowances, and dates reviewed submittals will be required from Engineer. Indicate decision dates for selection of finishes.
- I. Indicate delivery dates for Owner furnished products and products identified under Allowances.
- J. Revisions to Schedules:
 - 1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
 - 2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
 - 3. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including the effect of changes on schedules of separate Contractors.

1.3 PROPOSED PRODUCTS LIST

- A. Within 15 days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.4 PRODUCT DATA

- A. Submit to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents. Provide copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in **Section 01720**.
- B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. After review, distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in **Section 01720**.

1.5 SHOP DRAWINGS

- A. Shop Drawings: Submit to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in **Section 01720**.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Submit the number of reproductions which Contractor requires, plus three copies, two of which will be retained by Engineer and the other forwarded to the Owner.

1.6 SAMPLES

- A. Samples: Submit to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in **Section 01720**.
- B. Samples for Selection as Specified in Product Sections:

1. Submit to Engineer for aesthetic, color, or finish selection.
 2. Submit samples of finishes from the full range of manufacturers' standard colors, in custom colors selected, textures, and patterns for Engineer selection.
 3. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in **Section 01720**.
- C. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- D. Include identification on each sample, with full Project information.
- E. Submit the number of samples specified in individual Specification sections; one of which will be retained by Engineer.
- F. Reviewed samples, which may be used in the work, are indicated in individual Specification sections.
- G. Samples will not be used for testing purposes unless specifically stated in the Specification section.

1.7 DESIGN DATA

- A. Submit for the Engineer's knowledge as contract administrator or for the Owner.
- B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.8 TEST REPORTS

- A. Submit for the Engineer's knowledge as contract administrator or for the Owner.
- B. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.9 CERTIFICATES

- A. When specified in individual Specification sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to Engineer, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer.

1.10 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual Specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for Product Data.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.11 MANUFACTURER'S FIELD REPORTS

- A. Manufacturer's representative shall submit written reports to the Engineer listing observations and recommendations.
- B. Submit reports for the Engineer's benefit as contract administrator or for the Owner.
- C. Submit report in duplicate within 30 days of observation to Engineer for information.
- D. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.12 ERECTION DRAWINGS

- A. Submit drawings for the Engineer's benefit as contract administrator or for the Owner.

- B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.
- C. Data indicating inappropriate or unacceptable Work may be subject to action by the Engineer or Owner.

1.13 CONSTRUCTION PHOTOGRAPHS

- A. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to the Engineer.
- B. Submit photographs electronically with each Pay Estimate.
- C. Take five site photographs from differing directions at all work locations indicating the relative progress of the work, 5 days maximum prior to submitting.
- D. Take photographs as evidence of existing project conditions as follows:
 - 1. Interior views: 10 Minimum
 - 2. Exterior views: 10 Minimum
- E. Each electronic file shall be named with the item being photographed and the date when it was photographed.
- F. The Owner and Engineer reserve the right to withhold final payment for the project until acceptable information is received for all equipment specified.
- I. For large projects or projects that will be ongoing for an extended period of time the Engineer may request a video of the project area prior to the start of construction to establish existing conditions.

END OF SECTION

SECTION 01400 QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 QUALITY CONTROL AND CONTROL OF INSTALLATION

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

1.2 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.3 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

- B. Conform to reference standard by date of issue current on date of Owner-Contractor Agreement when there are no bids, except where a specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. Should specified reference standards conflict with Contract Documents, request clarification from the Engineer before proceeding.
- E. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.4 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining work.
- D. Where mock-up has been accepted by Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Engineer.

1.5 TESTING AND INSPECTION SERVICES

- A. Owner will employ and pay for the specified services of a firm of their choosing to perform inspection services, as required.
- B. Contractor shall employ and pay for services of an independent testing agency or laboratory acceptable to the Owner, and Engineer to perform specified testing.
 - 1. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

3. The testing laboratory will perform tests, and other services specified in individual specification sections and as required by the Engineer.
 4. Laboratory shall be authorized to operate in location in which project is located.
 5. Laboratory shall maintain a full time registered Engineer on staff to review services.
 6. Testing Equipment shall be Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
- D. Testing, inspections and source quality control may occur on or off the project site. Perform off-site testing as required by the Engineer or the Owner.
- E. Reports will be submitted by the Testing Laboratory and Inspector to the Engineer and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- F. Cooperate with Testing Laboratory and Inspector; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
1. Notify Engineer and Testing Laboratory and Inspector 48 hours prior to expected time for operations requiring services.
 2. Make arrangements with Testing Laboratory and pay for additional samples and tests required for Contractor's use.
- G. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- H. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer. Payment for re-testing or re-inspection will be charged to the Contractor.
- I. Contractor shall budget testing adequately during bidding to cover all testing costs throughout the project period. No change orders will be allowed to increase the amount budgeted by the Contractor during the bidding process.

1.6 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer subject to approval of Engineer.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Refer to **Section 01330 - SUBMITTAL PROCEDURES, MANUFACTURERS' FIELD REPORTS** article.

PART 2 EXECUTION

2.1. EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

2.2. PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

SECTION 01500
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SCOPE

- A. The facilities specified in this section are considered minimum for the project. The Contractor may provide additional facilities and controls, which he considers necessary for the proper execution of the work and to meet his responsibilities for protection of persons and property.

1.2 UTILITIES

- A. The Contractor shall provide temporary electrical power required during entire construction period. Provide sufficient capacity for all equipment on the project, providing all necessary temporary wiring, panels, use outlets, switches and lighting.
- B. Potable water may or may not be available at project site. Contractor shall make arrangements with owner or otherwise to provide water for own use.
- C. The Contractor shall provide all power and fuel for equipment tests.
- D. Sanitation
 - 1. Provide and maintain sanitary conveniences to satisfy requirements of local, state and federal authorities, ordinances and laws. Obtain approval for location, seclude from public view and maintain in clean and sanitary condition.
 - 2. Personnel on this work will not be permitted to use the Owner's facilities normally used by Owner's staff and occupants.

1.3 PROJECT SITE

- A. Access and parking at the site are limited by available space.
- B. Furnish, install, and maintain suitable barriers and protection to prevent public entry, and to protect the work, existing facilities, trees and plants from construction operations.
- C. Furnish, install, and maintain required construction aids required by personnel as needed to facilitate the execution of the work. This shall include: Scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes, and other such facilities and equipment.

- D. Signs, other than those specified, will not be permitted on the project site without the Engineer's approval.
- E. Prior to final inspection, remove all temporary buildings, sanitary conveniences, signs and other items. Remove or restore, as required, all temporary roads and parking areas. Clean up the entire area and remove all unused construction materials.

END OF SECTION

SECTION 01600 PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 PRODUCTS

- A. Provide products of qualified manufacturers suitable for intended use. Provide products of each type by a single manufacturer unless specified otherwise.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- C. Provide interchangeable components of the same manufacturer for components being replaced.
- D. Unless otherwise specified, **all products shall be manufactured in the United States**. Foreign products shall be unacceptable unless it is determined on a case by case basis that the product is unavailable domestically.

1.2 PRODUCT DELIVERY REQUIREMENTS

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

1.3 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.

- E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.4 PRODUCT OPTIONS

- A. Products Specified by Reference Standards: Select any product meeting standards, by any manufacturer.
- B. Products Specified by Naming Several Products or Manufacturers: Select any product and manufacturer named.

1.5 PRODUCT SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during the bidding period to requirements specified in this section.
- B. Engineer will consider requests for Substitutions only within 15 days after date of Owner-Contractor Agreement.
- C. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- D. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- E. A request constitutes a representation that the Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - 2. Will provide the same warranty for the substitution as for the specified product.

3. Will coordinate installation and make changes to other work which may be required for the work to be complete with no additional cost to Owner.
 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 5. Will reimburse Owner and Engineer for review or redesign services associated with re-approval by authorities.
- F. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- G. Substitution Submittal Procedure:
1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
 2. Submit Shop Drawings, Product Data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 3. The Engineer will notify Contractor in writing of decision to accept or reject request.

END OF SECTION

SECTION 01700 EXECUTION REQUIREMENTS

PART 1 GENERAL

1.1 CLOSEOUT PROCEDURES

- A. See **Section 01710**

1.2 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean interior and exterior surfaces exposed to view.
- C. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- D. Clean debris from drainage systems.
- E. Clean site; sweep paved areas, rake clean landscaped surfaces.
- F. Remove waste and surplus materials, rubbish, rocks and construction facilities from the site.
- G. Assure all construction areas are well graded and free from rocks or tracks.

1.3 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Engineer seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions, which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative and Contractors' personnel in accordance with manufacturers' instructions.

- G. When specified in individual specification sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with **Section 01300** that equipment or system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of final inspection.
- B. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- E. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

1.5 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

1.6 PROJECT RECORD DOCUMENTS

A. See **Section 01720**.

1.7 OPERATION AND MAINTENANCE DATA

A. See **Section 01730**.

1.8 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of work. Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Engineer comments. Revise content of all document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within 10 days after final inspection.
- E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured products.
- F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- H. Additional Requirements: As specified in individual product specification sections.

- I. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.9 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of work. Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Engineer comments. Revise content of all document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within 10 days after final inspection.
- E. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications by label machine.
- G. Include color coded wiring diagrams as installed.
- H. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- J. Provide servicing and lubrication schedule, and list of lubricants required.
- K. Include manufacturer's printed operation and maintenance instructions.

- L. Include sequence of operation by controls manufacturer.
- M. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- N. Provide control diagrams by controls manufacturer as installed.
- O. Provide Contractor's coordination drawings, with color-coded piping diagrams as installed.
- P. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- Q. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- R. Include test and balancing reports as specified in **Section 01400**.
- S. Additional Requirements: As specified in individual product specification sections.
- T. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Provide spare parts, maintenance, and extra products in quantities recommended by the equipment manufacturer.
- B. Deliver to project site and place in location as directed; obtain receipt prior to final payment.

1.11 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.
- B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
- C. Verify that documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.

- E. Provide Table of Contents and assemble in three D side ring binder with durable plastic cover.
- F. Submit prior to final Application for Payment.
- G. Time of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 - 2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty or bond period.

1.12 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections during the warranty period.
- B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01710 CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 RELATED SECTIONS

- A. **Section 01300** – Submittal Requirements.
- B. **Section 01730** - Operating and Maintenance Data.

1.2 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection.
- B. Submit executed Consent of Surety to Final Payment.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- D. Provide submittals to Engineer that are required by Governing or other authorities.
- E. Make all submittals not previously made.

1.3 FINAL CLEANING

- A. See Section 1.2 of **Section 01700**

1.4 PROJECT RECORD DOCUMENTS

- A. See **Section 01720**

1.5 WARRANTIES

- A. Provide duplicate notarized copies.
- B. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.

- C. Provide Table of Contents and assemble in three D side ring binder with durable cloth cover.
- D. Submit prior to final Application for Payment.
- E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

END OF SECTION

SECTION 01720
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SCOPE

- A. Prepare and maintain record documents for the project to accurately reflect the construction as built. Documents must be submitted upon completion as a condition of final acceptance.

1.2 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintain at the job site, one copy of:
 - 1. Contract drawings.
 - 2. As-built drawings.
 - 3. Specifications.
 - 4. Addenda.
 - 5. Reviewed Shop drawings.
 - 6. Change orders and field orders.
 - 7. Other contract modifications.
 - 8. Field test records.
 - 9. Manufacturers Certifications.
 - 10. Correspondence.
- B. Store record documents in an approved location apart from documents used for construction. Do not use record documents for construction purposes. Provide files and racks for orderly storage. Maintain documents in clean, dry, legible condition. Make documents and samples available at all times for inspection by the Engineer.

1.3 RECORDING

- A. Legibly mark contract drawings to record actual construction including but not limited to:
 - 1. Depths of various elements of foundation in relation to the baseline and project benchmark.
 - 2. Horizontal and vertical location of underground and underslab utilities and appurtenances referenced to permanent surface improvements.
 - 3. Location of internal utilities and appurtenances referenced to permanent surface improvements.
 - 4. Field changes of dimension and detail.

5. Changes made by change order or field order.
6. Details not on original contract drawings.

B. Legibly mark specifications and addenda to record:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed;
2. Changes made by change order or field order;
3. Other matters not originally specified.

1.4 SUBMITTAL

A. At project completion, deliver record documents to the Engineer. Place all letter-sized material in a 3-ring binder, neatly indexed. Bind contract drawings and shop drawings in rolls of convenient size for ease of handling.

B. Accompany the submittal with a transmittal letter containing:

1. Date.
2. Project title and number.
3. Contractor's name and address.
4. Title and number of each record document.
5. Certification that each document as submitted is complete and accurate.
6. Signature of Contractor.

C. Sufficient retainage will be withheld from final payment until acceptable Project Record Documents are submitted to the Engineer.

END OF SECTION

SECTION 01730
OPERATING AND MAINTENANCE DATA

PART 1 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Submittal Requirements: **Section 01300.**
- B. Contract Closeout: **Section 01710.**

1.2 REQUIREMENTS

- A. Compile product data and related information appropriate for owner's maintenance and operation of products furnished under the contract and provide six (6) original bound sets.
 - 1. Prepare operating and maintenance data as specified in this section and as referenced in other pertinent sections of specifications.
- B. Instruct Owner's personnel in the maintenance of products and in the operation of equipment and systems.

1.3 QUALITY ASSURANCE

- A. Preparation of data shall be done by personnel:
 - 1. Trained and experienced in maintenance and operation of the described products.
 - 2. Completely familiar with requirements of this Section.
 - 3. Skilled as a technical writer to the extent required to communicate essential data.
 - 4. Skilled as a draftsman competent to prepare required drawings.

1.4 FORM OF SUBMITTALS

- A. Prepare data in the form of an instructional manual for use by owner's personnel.
- B. Format:
 - 1. Size: 8-1/2 in. x 11 in.
 - 2. Paper: 20 pound minimum, white, for typed pages.
 - 3. Test: Manufacturer's printed data, or neatly typewritten.

4. Drawings:
 - a. Provide reinforced punched binder tab, bind in with text.
 - b. Fold larger drawings to the size of the text pages.
5. Provide fly-leaf for each separate product, or each piece of operating equipment.
 - a. Provide typed description of product, and major component parts of equipment.
 - b. Provide indexed tabs.
6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS."
List:
 - a. Title of Project.
 - b. Identity of separate structure as applicable.
 - c. Identity of general subject matter covered in the manual.

C. Binders:

1. Commercial quality three-ring binders with durable and cleanable plastic covers.
2. Maximum ring size: 1-1/2".
3. When multiple binders are used, correlate the data into related consistent groupings.

1.5 CONTENT OF MANUAL

- A. Neatly typewritten table of contents of each volume, arranged in a systematic order.
- B. Contractor, name of responsible principal, address and telephone number.
- C. A list of each product required to be included, indexed to the content of the volume.
- D. List, with each product, the name, address and telephone number of:
 1. Subcontractor or installer.
 2. Maintenance Contractor, as appropriate.
 3. Identify the area of responsibility of each.
 4. Local source of supply for parts and replacement.
- E. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
- F. Product Data:

1. Include only those sheets which are pertinent to the specific product.
2. Annotate each sheet to:
 - a. Clearly identify the specific product or part installed.
 - b. Clearly identify the data applicable to the installation.
 - c. Delete references to inapplicable information.

G. Drawings:

1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of equipment and systems.
 - b. Control and flow diagrams.
2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
3. Do not use project Record Documents as maintenance drawings.

H. Written text, as required to supplement product data for the particular installation:

1. Organize in a consistent format under separate headings for different procedures.
2. Provide a logical sequence of instructions for each procedure.

I. Copy of each warranty, bond and service contract issued.

1. Provide information sheet for Owner's personnel, give:
 - a. Proper procedures in the event of failure.
 - b. Instances which might affect the validity of warranties or bonds.

J. All instructions, product data, and drawings must be marked to delete nonapplicable information.

1.6 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Content, for each unit of equipment and system, as appropriate:

1. Description of unit and component parts.
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of all replaceable parts.
2. Operating Procedures:

- a. Start-up, break-in, routine and normal operating instructions, regulation and control, shutdown, and emergency conditions.
 - b. Regulation, control, stopping, shut-down and emergency instructions.
 - c. Summer and winter operating instructions.
 - d. Special operating instructions.
3. Maintenance Procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting"
 - c. Disassembly, repair and reassembly.
 - d. Alignment, adjusting and checking.
4. Servicing and lubrication schedule.
 - a. List of lubricants required.
5. Manufacturer's printed operating and maintenance instructions.
6. Description of sequence of operation by control manufacturer.
7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
 - a. Predicted life of parts subject to wear.
 - b. Items recommended to be stocked as spare parts.
8. As-installed control diagrams by controls manufacturer.
9. Each Contractor's coordination drawings.
 - a. As-installed color coded piping diagrams.
10. Charts of valve tag numbers, with the location and function of each valve.
11. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
12. Other data as required under pertinent sections of specifications.

B. Content, for each electric and electronic system, as appropriate:

1. Description of system and component parts.
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
2. Circuit directories of panel boards.
 - a. Electrical service.
 - b. Controls.
 - c. Communications.
3. As-installed color coded wiring diagrams.
4. Operating Procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair and reassembly.

- d. Adjustment and checking.
 - 5. Manufacturer's printed operating and maintenance instructions.
 - 6. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 - 7. Other data as required under pertinent sections of specifications.
- C. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.
- D. Additional requirements for operation and maintenance data is given in the respective sections of specifications.
- E. For each item of equipment, 8-1/2" x 11 data cards shall be furnished giving the following information:

EQUIPMENT DATA CARD

Equipment number:

Name:

Location/structure No.:

Specification Section No.:

Manufacturer:

Address:

Telephone:

Vendor:

Address:

Representative:

Telephone No.:

Emergency Telephone No.:

Function:

Description: (Model No., Serial No., etc.)

Electrical Characteristics:

- F. For each item of equipment, 8-1/2" x 11" preventative maintenance schedule cards shall be furnished, giving the following information:

PREVENTIVE MAINTENANCE CARD

Equipment No. _____ Name _____ Location _____

<u>TASK</u> (List)	<u>TOOLS & LUBRICANTS REQUIRED</u> (List)	<u>FREQUENCY</u> (List)

- G. For each item of equipment, 8-1/2" x 11" special tool and recommended spare parts list cards shall be furnished, giving the following information:

SPECIAL TOOL & SPARE PARTS
RECOMMENDED INVENTORY

Equipment No. _____ Name _____ Location _____

<u>PART NO.</u> (List)	<u>DESCRIPTION OF PART OR TOOL</u> (List)	<u>REMARKS</u> (List)

- H. Provide complete information for all products specified.

1.7 SUBMITTAL SCHEDULE

- A. Submit six (6) copies of completed data in final form fifteen days prior to final inspection.

END OF SECTION

SECTION 02100 SITE PREPARATION

PART 1 GENERAL

1.1 SUMMARY

- A. Remove interfering or objectionable material.
- B. Preserve vegetation and existing objects designated to remain from injury or defacement.
- C. Site shall be cleared and grubbed to limits shown on plans.
- D. Demolition and disposal of designated structures.

1.2 DEFINITIONS

- A. Clearing:
 - 1. Cutting, removing, and disposing of trees, snags, stumps, shrubs, brush, limbs, and other vegetation growth.
 - 2. Removing evidence of their presence from the surface, inclusive of sticks and branches greater than 2 inches in diameter or thickness.
 - 3. Removing and disposing of trash piles, rubbish, and fencing.
- B. Grubbing:
 - 1. Removing and disposing of wood or root matter below the ground surface remaining after clearing.
 - 2. Includes stumps, trunks, roots, or root systems greater than 2 inches in diameter or thickness to a depth of 18 inches below the ground surface.

PART 2 MATERIALS

2.1 GENERAL

- A. Provide materials, suitable and in adequate quantity, required to accomplish Work of this Section.

PART 3 EXECUTION

3.1 PREPARATION

- A. Review with Engineer's representative the location, limits, and methods to be used prior to commencing Work under this Section.

3.2 CUTTING TIMBER

- A. Exercise care when clearing near the clearing limits to avoid damage to existing trees, vegetation, structures, or utilities which are outside of the clearing limits.
- B. Trees shall to be leveled into the area to be cleared.
- C. Flush cut stumps not designated for grubbing by cutting to within 2 inches of the ground surface.
- D. Timber is the property of the Contractor.
- E. Dispose of stumps, limbs, brush, snags, non-marketable timber, and other vegetative growth off-site.

3.3 PRESERVATION OF TREES, SHRUBS, AND OTHER VEGETATION

- A. Protect trees, shrubbery, and other vegetation from damage that is not designated for removal.
- B. Cut and remove tree branches only where, in the opinion of the Engineer, that cutting is necessary to effect construction operation.
- C. Remove branches other than those required to affect the Work to provide a balanced appearance of any tree, as approved prior to removal.
- D. Treat scars resulting from the removal of branches with an approved tree sealant.

3.4 CLEARING AND GRUBBING LIMITS

- A. Clear and grub areas within the limits of construction.
- B. Clear and grub in stages as the construction area is increased to avoid unnecessary clearing and grubbing.

3.5 DISPOSAL OF CLEARING AND GRUBBING DEBRIS

- A. Haul the material from the Work site and dispose of in accordance with state, federal, and local laws. Off-site disposal shall be at the Contractor's sole expense.

END OF SECTION

SECTION 02200 EARTHWORK

PART 1 GENERAL

1.1 SCOPE

- A. This section covers the requirements for performance earthwork for the project.

1.2 RELATED SECTIONS

- A. **Section 01001** – Basic Requirements.
- B. **Section 02100** – Site Preparation.
- C. **Section 02225** – Trench Excavation, Backfill and Compacting.

1.3 REFERENCES

- A. Oklahoma Department of Transportation, Standard Specifications for Highway Construction, 1999.
 - 1. Section 202
 - 2. Section 703
- B. American Society for Testing and Materials, 1916 Race St. Philadelphia, PA 19103.
 - 1. ASTM D698 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb. Rammer and 12-in. Drop.
 - 2. ASTM D1556 – Test Method for Density of Soil Place by the Sand-Cone Method.
 - 3. ASTM D1557 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 10 lb. Rammer and 18-in. Drop.
 - 4. ASTM D2216 – Method for Laboratory Determination of Water Content of Soil, Rock, and Soil-Aggregate Mixtures.
 - 5. ASTM D2922 – Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 - 6. ASTM D3017 – Test Method for Moisture Content of Soil and Soil-Aggregate in Place of Nuclear Methods (Shallow Depth).
- C. Occupational Safety and Health Administration (OSHA) Standard for Excavation and Trenches Safety System, 29 CFR 1926, Subpart P = Excavations.

D. Oklahoma Statute 291 of 1993.

1.4 DEFINITIONS

A. Relative Compaction:

1. The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by the Standard Proctor Test, ASTM D698, or as determined by the Modified Proctor Test, ASTM D1557, as applicable.
2. Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the Engineer.

B. Optimum Moisture Content:

1. Moisture content of the material for which the maximum dry density is obtained as determined by ASTM D698 or D1557.
2. Field moisture contents shall be determined on the basis of the fraction passing the $\frac{3}{4}$ -inch sieve.

C. Completed Course:

1. A course or layer that is ready for the next layer or the next phase of construction.

1.5 SUBMITTALS

A. Submit in accordance with **Sections 01300 and 01330**.

B. Provide the following:

1. Samples of imported material.
2. Samples of onsite material to be used as fill.
3. Certification that imported materials conform to the Specification requirements along with copies of the test results from a qualified commercial testing laboratory.
4. Proctor curves on fill material as prepared by approved laboratory.

1.6 PROJECT CONDITIONS

A. Beginning work of this Section means acceptance of existing conditions.

PART 2 PRODUCTS

2.1 FILL

- A. Free from roots, organic matter, trash, and debris with maximum particle size of 1-1/2 inches.
- B. It is intended that structural backfill material be obtained from on site to the maximum extent possible.
- C. Conform to ODOT Section 202.

2.2 GRANULAR BACK FILL

- A. Provide granular fill beneath structures as noted on Drawings.
- B. Conform to the ODOT Section 703.05 as designated on the Drawings.

2.3 TOPSOIL

- A. Selected topsoil at the site shall be properly stored and protected, free from roots, sticks, hard clay, and stones which will not pass through a 2-inch square opening.
- B. Provide imported topsoil of equal quality if required to accomplish the work.

2.4 COMPACTION EQUIPMENT

- A. Provide compaction equipment of suitable type and adequate to obtain the densities specified.
- B. Operate compaction equipment in strict accordance with the manufacturer's instructions and recommendations.
- C. Hand-operated equipment shall be capable of achieving the specified densities.

2.5 MOISTURE CONTROL EQUIPMENT

- A. Provide equipment for applying water of a type and quality adequate for the work; it shall not leak; and be equipped with a distributor bar or other approved device to assure uniform application.
- B. Provide equipment for mixing and drying out material consisting of blades, discs, or other approved equipment.

2.6 WATER REMOVAL EQUIPMENT

- A. Provide and operate equipment adequate to keep excavation and trenches free of water.

2.7 IMPORTED MATERIAL ACCEPTANCE

- A. Import only if insufficient material is available on-site.
- B. Locate and arrange use of a site near the construction area for obtaining borrow material.
- C. Additional tests required at the borrow area:
 - 1. Standard Proctor.
 - 2. Remolded permeability
 - 3. Atterberg limits.
- D. Upon completion of removal of borrow material, grade the site to drain, place topsoil on disturbed areas, and establish grass.
- E. Costs shall be the responsibility of the Contractor.

2.8 SELECTED MATERIAL ACCEPTANCE

- A. Provide samples, for the testing representative, of the actual material to be installed in the work. Take samples from each 2,000 cubic yards of material stockpiled. Depending on the uniformity of the material, Engineer may request more frequent samples.
- B. Forward test results to the Engineer at least 10 days before the material is required for use. If tests indicate that the material does not meet Specification requirements, the material shall not be installed in the work.
- C. Material which is placed in the work but does not conform to the Specification requirements shall be removed and replaced at the Contractor's sole expense.

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

- A. Complete clearing and grubbing work in conformance with ODOT Section 201 prior to beginning work in this Section.

3.2 STRIPPING TOPSOIL

- A. Remove existing grass and overburden before excavating topsoil.
- B. Prior to beginning excavation or fill, strip the topsoil to a depth of at least 6 inches or to a depth sufficient to remove organic material and stockpile for future use.
- C. In general, remove topsoil where structures are to be built, trenches dug, and roads, parking lots, walks, and similar improvements constructed within the area presently covered with topsoil.
- D. Store topsoil clear of the construction area.
- E. Take reasonable care to prevent the topsoil from becoming mixed with subsoil or eroding.

3.3 STRUCTURAL EXCAVATION

- A. Contractor shall be solely responsible for trench and excavation safety systems in accordance with ACT 291 of 1993 and OSHA requirements.
- B. Identify required lines, levels, and grades.
- C. Identify known underground utilities. Contractor will be responsible for locating utilities.
- D. The method of excavation is optional; however, no equipment shall be operated in a manner that will endanger existing structures and their integrity.
- E. Use excavation support system such as sheet piling wherever necessary.
- F. Allow for forms, working space, granular base, and finish topsoil where shown on Drawings or required.
- G. Do not carry excavation for footings and slab deeper than the elevation shown on Drawings after allowing for base material.

- H. If undercutting occurs below the planned dirt grade, the same fill material as specified for backfill shall be placed and compacted to 95 Percent Standard Proctor Density as defined in this Section up to the planned dirt grade in 8 inch lifts. Do not attempt to over compact excessively wet soil. Allow to dry first by scarifying and aerating before remolding.
- I. Perform all work in accordance with ODOT Section 501.

3.4 DEWATERING EXCAVATION

- A. Remove water during periods when concrete is being deposited, pipe is being laid, and placing of backfill unless water settling is required, and at other times as required for efficient and safe execution of the work.
- B. Accomplish removal of groundwater in a manner that will preserve the strength of the foundation soils, will not cause instability of the excavation slopes, and will not result in damage to existing structures.
- C. Where necessary to these purposes, lower the water level in advance of excavation, utilizing wells, well points, or similar methods.
- D. Maintain the water level in the gravel stratum as measured in piezometers, a minimum of 3 feet below the prevailing excavation level or as needed to prevent bottom heave of the excavation.
- E. Open pumping, sumps, and ditches: If these result in boils, loss of fines, softening of the ground or instability of slopes, areas shall not be accepted.
- F. Install wells and well points with suitable screens and filters so that continuous pumping of fines does not occur.
- G. Operate well points continuously to prevent boils and loss of consolidation.
- H. Arrange discharge to facilitate collection of samples by Engineer.
- I. Avoid settlement or damage to adjacent property.
- J. Dispose of water in a manner that will not damage adjacent property, as approved.

3.5 GRANULAR BACK FILL UNDER FACILITIES

- A. Place fill granular material as specified in Part 2.2 within the influence area beneath slabs, walks, structures, roads, and parking areas, and as shown on the Drawings.

- B. Do not exceed loose lifts of 6 inches.
- C. Compact each lift to not less than 95 percent Modified Proctor Density.
- D. Place and compact a 6-inch layer of granular fill to at least 95 percent Modified Proctor density immediately beneath spread footings, slabs on grade, or other concrete structures.
- E. Moisten material as required to aid compaction ($\pm$ 2 percent optimum moisture).
- F. Place material in horizontal lifts and in a manner to avoid segregation.
- G. Correct and repair subsequent damage to slabs, piping, concrete structures, facilities, or other structures caused by settlement of fill material.

3.6 BACKFILL AND STRUCTURES

- A. Remove form materials and trash from excavation before placing backfill.
- B. Do not operate earth-moving equipment within a distance equal to the height of the backfill above the top of the footing of walls of concrete structures for the purpose of depositing or compacting backfill material.
- C. Compact backfill adjacent to concrete walls with hand-operated tampers or similar equipment that will not damage the structure.
- D. Backfill water-holding basins only after satisfactory leakage tests have been conducted.
- E. Place earth fill in areas not designated to be structural fill or granular fill.
- F. Deposit material in maximum 6-inch loose lifts, and compact each lift to not less than 95 Percent Standard Proctor.
- G. Perform all work in accordance with ODOT Section 501.

3.7 FILL NOT BENEATH STRUCTURES OR FACILITIES

- A. Place earth fill to the lines and grades shown.
- B. Place fill material in maximum 6-inch loose lifts and compact each lift to not less than 95 Percent Standard Proctor.
- C. Make proper allowance for topsoil where required.

3.8 MOISTURE CONTROL

- A. During compacting operations, maintain optimum practicable moisture content required for compaction purposes in each lift of fill.
- B. Maintain moisture content uniform throughout the lift.
- C. Add water to the material at the site of excavation. Supplement, if required, by sprinkling the fill.
- D. At the time of compaction, maintain the water content of the material at optimum moisture content, (12.0%), except as otherwise specified for embankments.
- E. Do not attempt to compact fill material that contains excessive moisture.
- F. Aerate material by blading, discing, harrowing, or other methods, to hasten the drying process.

3.9 FIELD DENSITY TESTS

- A. Test Methods: ASTM D2922, D1556, D2216, and D3017.
- B. Cooperate with testing work by leveling small test areas designated by the Engineer.
- C. Backfill test areas.
- D. Field density test shall be performed for every 3,000 cubic yards of fill material placed.
- E. Engineer may order testing of lift of fill at any time, location, or elevation.

3.10 SITE GRADING

- A. Perform earthwork to lines and grades as shown on Drawings with proper allowance for topsoil where specified or shown on Drawings.
- B. Shape, trim, and finish slopes to conform with the lines, grades, and cross sections shown.
- C. Slopes shall be free of loose exposed roots and stones exceeding 3-inch diameter.
- D. Round tops of banks to circular curbs, in general, not less than a 6-foot radius.

E. Neatly and smoothly trim rounded surfaces; over-excavating and backfilling to the proper grade are not acceptable.

F. Finish site grading shall be reviewed by the Engineer.

3.11 DISPOSAL OF EXCESS EXCAVATION

A. Dispose of excess excavated materials, not required or suitable for use as backfill or fill, outside of the area of work.

B. Compact excess material as specified for fill, dress the completed disposal area to slopes no greater than 4:1 (horizontal:vertical), and slope to drain.

3.12 SETTLEMENT

A. Settlement in backfill, fill, or in structures built over the backfill or fill, that may occur within the 1-year guarantee period in the General Conditions shall be considered to be caused by improper compaction methods.

B. Restore structures damaged by settlement to original condition.

END OF SECTION

SECTION 02207
AGGREGATE MATERIALS

PART 1 GENERAL

1.1 SCOPE

- A. This Section covers the requirements for aggregate materials used in the work.

1.2 RELATED SECTIONS

- A. **Section 01400** - Quality Requirements.
- B. **Section 02221** – Excavation and Backfill.

1.3 UNIT PRICES - MEASUREMENT AND PAYMENT

- A. Measurement and Payment shall be made as specified in the Contract Documents.

1.4 REFERENCES

- A. AASHTO - M147 - Materials for Aggregate and Soil-Aggregate.
- B. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb. Rammer and an 18-inch Drop.
- C. ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- D. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb Rammer and 12-inch Drop.
- E. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb Rammer and 18-inch Drop.
- F. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- G. ASTM D2487 - Classification of Soils for Engineering Purposes.
- H. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in place by Nuclear Methods (Shallow Depth).

- I. ASTM D3017 - Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- J. ASTM D4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.5 SUBMITTALS

- A. Do not request submittals if Plans sufficiently describe the products of this section. The review of submittals increases the possibility of unintended variations to drawings.
- B. All Submittals shall conform to **Sections 01300 and 01330**.
- C. The following submittals are intended for review and approval by Architect/Engineer.
 - 1. Submit either one 5 lb sample, in an air-tight container, of each type of aggregate to be used in the work to the testing laboratory, or an approved laboratory certification of the material.
- D. The following Submittals are intended for the Engineer's information.
 - 1. Submit name and address of imported materials suppliers.

1.7 QUALITY ASSURANCE

Perform Work in accordance ODOT Standard Specifications for Highway Construction – Section 303. Maintain one copy on site.

PART 2 PRODUCTS

2.1 SCOPE

- A. This item shall consist of a foundation course for surface course, for other base courses, or for pavements. It shall be constructed on the prepared subgrade or other completed base course in accordance with these specifications and in substantial conformity with the lines, grades, compacted thickness, and typical cross section shown on the plans.

2.2 MATERIALS

- A. Aggregate base course shall be either gravel and/or crushed stone so proportioned as to meet the requirements for a class of aggregate specified in Table 303-c, except for classes 7 and 8, which shall be crushed stone.

- B. The Contractor shall have the option of using any higher numbered class Aggregate Base Course than that specified, provided that payment will be for the class specified on the plans.
- C. Material furnished for Aggregate Base Course, Class 3 through Class 8, shall have a percent of wear by the Los Angeles Test not greater than 45 as determined by AASHTO T 96.
- D. When it is necessary to blend two or more materials, each material shall be proportioned separately through mechanical feeders to insure uniform production. Premixing or blending to avoid separate feeding will be not be permitted. Blending materials on the roadway in order to obtain a mixture that will comply with the requirements specified herein will not be permitted.
- E. For the purpose of this specification, shale and slate are not considered to be gravel or stone. The material furnished shall be reasonably free from shale, slate, and other objectionable, deleterious, or injurious matter.
- F. For Class 1 and 2 material, the fraction passing the #200 sieve shall not be greater than three-fourths of the fraction passing the #40 sieve. For Classes 3 through 8, the fraction passing the #200 sieve shall not be greater than two-thirds of the fraction passing the #40 sieve. For Classes 3 through 8 the fraction passing the #40 sieve shall have a liquid limit not greater than 25.
- G. In order to insure that gravel is uniformly graded, the percent passing the retained on the various sieves shall be as follows for Classes 3, 4, and 5:

SIEVE		
Passing	Retained	Percent
$\frac{3}{4}$ "	$\frac{3}{8}$ "	5 Min.
$\frac{3}{8}$ "	#4	5 Min.
#4	#10	5 Min.
#10	#40	4 Min.

When the material contains aggregate larger than that specified above for the class called for in the proposal, it must be removed by screening or by screening and crushing. The removal of large size aggregate by hand methods will not be permitted.

2.3 CONSTRUCTION REQUIREMENTS

- A. The base course material shall be placed on a completed and approved subgrade or existing base that has been bladed to substantially conform to the grade and cross section shown on the plans.
- B. The subgrade shall be prepared as specified in ODOT Section 310 and shall be free from an excess or deficiency of moisture at the time of placing base course material. The subgrade shall also comply, where applicable, with the requirements of other items that may be contained in the contract that provides for the construction, reconstruction, or shaping of the subgrade or the reconstruction of the existing base course.
- C. Base course material shall not be placed on a frozen subgrade or subbase.
- D. The aggregate shall be placed on the subgrade or other base course material and spread uniformly to such depth and lines that when compacted it will have the thickness, width, and cross section shown on the plans.
- E. If the specified compacted depth of the base course exceeds 7", the base shall be constructed in two or more layers of approximately equal thickness.
- F. The material shall be spread the same day that it is hauled. Spreading shall be performed in such manner that no segregation of coarse and fine particles nor nests or hard areas caused by dumping the aggregate on the subgrade will exist. Care shall be taken to prevent mixing of subgrade or unspecified material with the base course material in the blading and spreading operation.
- G. When the base course is placed adjacent to an existing or newly constructed asphalt surface course or Portland cement concrete pavement, the aggregate shall not be dumped or mixed on the pavement surface. Mechanical spreading equipment shall be used, if necessary, to place the base course on the subgrade.
- H. If sufficient working space is not available to allow proper aeration or addition or water to the base, the base material shall be mixed by any satisfactory method prior to placement.
- I. Each course shall be thoroughly mixed for the full depth of the course and shall be compacted by any satisfactory method that will produce the density hereinafter specified. The aggregate shall be maintained substantially at optimum moisture ($\pm 20\%$) during the mixing, spreading, and compacting operations, water being added or the material aerated as may be necessary. The specified grade and cross section shall be maintained by blading throughout the compaction operation. The material in each course shall be

compacted to a density, as determined by AASHTO T 191 or T 238, of not less than 100% of the maximum density determined in the laboratory by AASHTO T 180. The aggregate shall be compacted across the full width of application.

- J. The compacted base course shall be tested for depth and any deficiencies corrected by scarifying, placing additional material, mixing, reshaping, and recompacting to the specified density, as directed.
- K. Where neither prime coat nor surfacing is provided in the same contract with the base course, the material in the base course shall be uniformly compacted, stable, and free of segregated areas.
- L. The Contractor shall maintain the base course in a satisfactory condition until accepted.

TABLE 2207-1
Aggregate Base Course Grading

<u>SIEVE</u>	<u>CLASS 1</u>	<u>CLASS 2</u>	<u>CLASS 3</u>	<u>CLASS 4</u>	<u>CLASS 5</u>
<u>PERCENT PASSING</u>					
3"	100	100	100		
2"	95-100	95-100	95-100		
1-1/2"			85-100	100	100
1"					
3/4"	60-100	60-100	60-100	60-100	60-100
3/8"	40-80	40-80	40-80	40-80	40-80
#4	30-60	30-60	30-60	30-60	30-60
#10	20-50	20-50	20-50	20-50	20-50
#40	10-35	10-35	10-35	10-35	10-35
#200	3-15	3-15	3-12	3-12	3-12
Max. Plasticity Index (Minus #40 Matl.)					
	13	10	6	6	6
Min. % Crushed Retained on #4 Sieve					
					15
Min. % Crusher-Run Material					

2.3 SOURCE QUALITY CONTROL

- A. **Section 01400** - Quality Requirements.
- B. Coarse Aggregate Material - Testing and Analysis: Perform in accordance with ASTM D698, ASTM D1557, AASHTO T180, ASTM D2167, ASTM D2922, ASTM D3017, ASTM D4318, ASTM C136.
- C. If tests indicate materials do not meet specified requirements, change material or material source and retest.
- D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.1 STOCKPILING

- A. Stockpile materials on site at locations designated by Owner.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Direct surface water away from stockpile site so as to prevent erosion or deterioration of materials.

3.2 STOCKPILE CLEANUP

- A. Leave unused materials in a neat, compact stockpile.
- B. If a borrow area is indicated, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 02210 SITE PREPARATION AND GRADING

PART 1 GENERAL

1.1 SCOPE

- A. Work covered by this Specification consists of furnishing all labor, tools, materials and equipment and performing all operations in connection with clearing, grubbing, stripping topsoil, excavation, construction of fills, borrow, rough grading, finish site grading, and disposal of excess material.

1.2 LAYOUT

- A. Plans indicate the existing and the finished grades required for the construction of project. Contractor shall stake out the units and establish their elevations, and do all other layout work required. Property corner markers, if disturbed or destroyed, shall be replaced in their original horizontal location.

1.3 PROTECTION OF FACILITIES

- A. Existing utility lines (either overhead or underground), pavement designated on the drawings, shown to Contractor or mentioned in the specifications, shall be kept free of damage from Contractor's operations. If damaged, any utilities or pavement shall be restored at the Contractor's expense. Any utility not known as above in time to prevent damage, and if inadvertently damaged during operations, the Contractor shall notify Engineer and Owner of said utility at once so that emergency repair may be made.

PART 2 EXECUTION

2.1 CLEARING

- A. Remove all building foundations, slabs, fences, and other structure from within the project limits as required by the plans. Vegetation and all underbrush shall be stripped and removed from the site. Remove all trees that are required for construction. Trees that will not conflict with construction shall remain, as directed by the Engineer. All underbrush shall be removed.

2.2 GRUBBING

- A. Roots, stumps and other debris shall be removed from site. Depressions resulting from removal of stumps, roots and debris shall be filled with

suitable materials and compacted to make surface conform to surrounding ground.

2.3 DISPOSAL OF CLEARED GRUBBED MATERIAL

- A. Timber, logs, stumps, roots, brush and other refuse from clearing and grubbing operations shall be disposed of by the Contractor in a manner approved by the Engineer.

2.4 EXCAVATION

- A. Excavation of every description and of whatever material encountered within the grading limits of the project shall be performed to the lines and grades as shown on the drawing. Suitable excavated materials shall be transported to and placed in embankments or fills within the limits of work, as specified and as shown on the drawings. Excavation over and above the amount required to construct the fills shall be waste excavation and shall be disposed of by the Contractor within the site as directed by the Engineer.
- B. During construction, excavation and filling shall be performed in a manner and sequence that will provide drainage at all times.
- C. In cut areas, excavation shall be made to subgrade a minimum of 1 foot outside the proposed edge of paving slab or curb.
- D. If the material of the subgrade for paved areas is of unstable character and unfit for foundation, the Contractor shall make such additional excavation as the Engineer may direct, and refill with approved material.

2.5 PREPARATION OF GROUND SURFACE FOR EMBANKMENTS OR FILLS

- A. For site grading, all embankments or fill areas shall be scarified to a depth of 6" before the fill is started. In all cases where embankment or fill is to be placed on ground surface steeper than 1 vertical to 4 horizontal, the surface shall be plowed, benched or broken up in such a manner that fill material will bind with the existing surface.

2.6 CONSTRUCTION OF EMBANKMENTS AND FILLS

- A. Embankments and fills shall be constructed at the locations and to the lines and grades indicated on the drawings. Completed fill shall correspond to the shape of typical cross section or contour as shown on plans whichever method is used to show shape, size, line and grade of the completed work.
- B. All material shall be reasonably free from roots or other organic material,

trash, frozen material, and from all stones having a maximum dimension greater than 6 inches. Stones larger than 4 inches (maximum dimension) shall not be permitted in the upper 6 inches of fill or embankment. Material shall be placed in horizontal layers not to exceed 6 inches in loose depth and compacted prior to placing each following layer.

- C. Compaction shall be accomplished by sheepsfoot rollers, pneumatic rollers, vibrators or other equipment approved by the Engineer. Contractor shall add moisture or dry by aeration each layer as may be necessary to meet the requirements for compaction. Materials shall not be placed in embankments or fills when the moisture content is outside 12% of the optimum moisture content for that material. Compaction of fills and embankments shall be to a density of not less than 95% maximum dry density as measured by AASTHO Method T-99 except as described below.

2.7 PROTECTION OF FINISH GRADING

- A. During construction, embankment and excavation shall be kept shaped and drained.
- B. Ditches and drains shall be maintained in such manner as to drain effectively at all times. Graded areas shall be protected against action of elements prior to acceptance of the work. Settlement or washing that may have occurred shall be repaired and grades shall be re-established to the required elevations and slopes.

END OF SECTION

SECTION 02220
STRUCTURE EXCAVATION AND BACKFILL

PART 1 GENERAL

1.1 SCOPE

- A. This Section covers requirements and procedures for excavation and backfill for structures including materials, backfilling, compaction, sub-grade preparation, and final grading.

1.2 QUALITY ASSURANCE

- A. Compaction shall be in accordance with **Section 02225**.
- B. Materials in question, pending test results, shall not be used in the work. The Contractor shall remove all materials that fail to comply with the requirements of the specifications, whether in stockpiles or in place.
- C. Fills, embankments, backfills or sub-grades which do not comply with the specification requirements shall be removed or re-compacted until the requirements are satisfied.

1.3 PROTECTION

- A. Protection of existing improvements, utilities, and site barricading shall be in accordance with the Contract Documents.

1.4 JOB CONDITIONS

- A. Classification of Excavation
 - 1. No classification has been made to differentiate the various surface and subsurface conditions that the Contractor may encounter during his performance under this contract.
 - 2. It is the Contractor's responsibility to verify the site surface and subsurface conditions.
- B. Dewatering
 - 1. Excavation and backfilling shall be performed in such manner that the site and the area immediately surrounding the site will be continually and effectively drained by gravity or temporary pumps.
 - 2. Water shall not be permitted to accumulate in excavations or other areas of the site.

3. The excavation shall be drained by methods which prevent the softening of sub-grades and embankments.

PART 2 PRODUCTS

2.1 SUITABLE MATERIALS

- A. Suitable materials for fill and backfill include those that are free of debris, roots, organic or frozen materials, stones having a maximum dimension of four (4) inches in the upper six (6) inches of fill or six (6) inches in the remainder of fill and have a plasticity index of 12 or less.
- B. Unsuitable materials include those materials that are determined to be inadequate for providing a stable slope, fill, sub-grade or foundation for structure.
- C. Materials which contain excess moisture content will be classified as unsuitable unless they can be dried by manipulation, aeration or blending with other materials and conform to requirements for suitable materials.
- D. Expansive clay soils shall be classified as unsuitable unless treated or mixed in an approved manner. All structural fill and backfill materials shall have a liquid limit of less than 40 percent and a plasticity index less than 18 percent. Granular fill shall have at least 15 percent fines passing the No. 200 sieve.

2.3 SELECTION OF BORROW MATERIAL

- A. If there are inadequate supplies of suitable excavated materials on site to allow the grading of the site as indicated on the Drawing, the Contractor shall obtain suitable materials from another source at no additional cost to the Owner. Before obtaining materials from off site, the Contractor shall submit a soil analysis of the materials to the Engineer for approval. Unsuitable material to be wasted, by the Contractor by spreading in areas designated for sludge disposal or for borrow.

2.4 DEFINITIONS OF MATERIAL TYPES

- A. Type 1 (Select Fill)
 1. Type 1 material shall consist of homogenous soils free of organic matter and rocks larger than 6" in diameter and possessing an Atterburg Plasticity Index (P.I.) from 3% to 15%, and with a liquid limit of 30% or less, or as shown on the plans. P.I. from 12% to 20% is required under building slabs and major structures.
- B. Type 2 (Sand)

1. Type 2 material shall be a select, granular material free from organic matter and, when tested in accordance with ASTM D 422, shall conform to the following requirements

<u>U.S. Standard Sieve Size</u>	<u>Percent by Weight Passing</u>
3/4"	100
#4	95 to 100
#8	80 to 100
#16	50 to 85
#30	25 to 60
#50	10 to 30
#100	2 to 10

C. Type 3 (Impervious Soils)

1. Type 3 material shall be clay with at least 95% of the particles passing a No.200 sieve and a plasticity index greater than 20.

D. Type 4 (Drain Rock/Gravel)

1. Drain rock, as shown on the drawings, under structures, and behind retaining walls, shall be clean, washed, sound, and durable well-graded rock, crushed gravel, or gravel. When tested in accordance with ASTM D 422, this material shall conform to the following requirements:

<u>U.S. Standard Sieve Size</u>	<u>Percent by Weight</u>
1"	100
3/4"	90 to 100
3/8"	20 to 55
#4	0 to 10
#8	0 to 5

2. This material conforms to ASTM C 33, Size No. 67, coarse aggregate, 3/4" to #4 in size.

E. Type 5 (Topsoil)

1. Topsoil shall consist of soils suitable for the growth of cover crop. Topsoil may be that material stripped and stockpiled from site preparation or hauled in from off site.

2. Topsoil shall be free from roots, rocks, and other extraneous matter which exceeds one inch in any one direction, free from noxious weeds, and consisting of the following by weight.

Sand	- Minimum of 60%
Silt	- Maximum of 30%

- Clay - Maximum of 10%
 - Organic Matter - 6% to 20%
- 3. The above minimum-maximum percentages are based on oven dried material and percentages shall be determined by either the pipette or hydrometer method of soil analysis. The pH range shall be from 6.0 to 7.5.
- 4. Composition
 - a. Sand shall be clean natural sand, free from roots, rocks, or other extraneous matter. Particle size range shall be 2.0 mm to 0.05 mm.
 - b. Silt shall have a particle size range of 0.05 mm to 0.002 mm.
 - c. Clay shall have a particle size range of 0.002 mm minus.
 - d. Organic matter shall be partially decomposed residue of plants and animals and the tissues of living and dead micro-organisms and shall be medium in texture containing no material that exceeds 1/2" in any one direction.
 - e. Submit test data showing topsoil source, percent by weight of consisting materials, particle size of constituent materials, and pH for all topsoil hauled in from off site.
- F. Type 6 (Undisturbed Firm Native Soil Subgrade)
 - 1. Undisturbed soils shall be those remaining in place after excavating that are suitable for slab subgrades and have not been disturbed or overexcavated. Where subgrade soils are soft, loose, or otherwise unsatisfactory, the soils shall be recompacted or replaced with select fill as determined by the Engineer.
- G. Type 7 (Common Fill)
 - 1. Common Fill shall be unclassified material obtained from excavation or from any other source. The material shall be free from peat, wood, roots, bark, debris, garbage, trash or other extraneous material.
- H. Type 8 (Rip Rap)

Stone used for riprap shall be durable field or quarry stone of approved quality. It shall be sound, hard dense, and free of seams, cracks, or other structural defects.

 - 1. Light Riprap: Light riprap shall be of a size and shape acceptable to the Engineer, shall be well graded, and shall range in weight from approximately 25 to 150 lbs. Not less than 50% of the total volume shall consist of pieces weighing more than 60 lbs.
 - 2. Heavy Riprap: Heavy riprap shall be of a size and shape acceptable to the Engineer, shall be well graded, and range in weight up to 500 lbs. Not less than 50% of the total volume of pieces shall weight more than

200 lbs., and not more than 20% of the total volume shall consist of pieces weighing 40 lbs or less.

The use of heavy or light riprap shall be called out on the plans or as determined by the Engineer.

PART 3 EXECUTION

3.1 EXCAVATION

- A. Excavation, regardless of material encountered, shall conform to the dimensions and elevations indicated on the Drawings for each building and structure, and shall include trenching for utility and foundation drainage systems to a point five (5) feet beyond the building line of each building and structure.
- B. Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms, installation of services, and for inspection, 'except where the concrete for walls and footings is authorized by the Owner's Representative to be deposited directly against excavated surfaces.
- C. Suitable excavated material shall be transported to and placed to fill areas within the limits of the work.
- D. Unsuitable materials encountered within the limits of the work shall be excavated below grade and replaced with suitable materials except that concrete footings shall be increased in thickness to the bottom of the over-depth excavations and over-break in rock excavation.
- E. Waste Material
 - 1. Excavated material shall not be wasted without the authorization of the Owner's Representative.
 - 2. Surplus excavated material and unsuitable material may be wasted by spreading in locations designated for sludge disposal or for borrow.
 - 3. Material authorized to be wasted shall be disposed of in such manner as not to obstruct the flow characteristics of any stream or to impair the efficiency or appearance of any structure.
- F. Excavated material shall not be deposited in a manner that may endanger a partly finished structure by direct pressure or by overloading banks contiguous to the operations or that may otherwise be detrimental to the completed work.

G. Dewatering

1. The Contractor shall, during the excavation period and as long thereafter as the condition of the work may require, provide and maintain, in good operating condition, pumping equipment fully adequate in capacity to promptly remove all water entering any excavation or other parts of the work.
2. All excavation shall be kept dry and water pumped or drained from the work shall be disposed of in such a manner as to prevent damage to adjacent property or to other work under construction. Any and all damage, or whatever nature, caused by dewatering the work shall be promptly repaired or remedied by the Contractor at his own expense. This shall include the cleaning and flushing of existing drainage pipe lines where such are used.
3. The Contractor shall at all times have on hand sufficient pumping equipment and machinery in good working condition for all ordinary emergencies, and shall have available at all times competent workmen for the operation of the pumping equipment. The dewatering systems shall not be shut down between shifts, on holidays, or weekends, or during the work stoppages without written permission from the Engineer. The control of groundwater shall be such that softening of the bottom of excavations or formation of "quick" conditions or "boils" shall be prevented. Dewatering systems shall be designed and operated so as to prevent the removal of the natural soils.
4. During excavation, construction of structures, and back filling, excavations shall be kept free of water. The static water level shall be drawn down below the bottom of the excavation so as to maintain the undisturbed state of the natural soils and allow the placement of any fill or backfill to the required density. The dewatering system shall be provided so that the groundwater level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property. The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbances of compacted fill or backfill, and prevent flotation or movement of all structures and pipelines.

H. Excess Excavated Material

1. Excess excavation from all sources shall be placed in accordance with the site grading plans. Materials placed under access and parking areas shall be compacted according to the applicable specifications. Excavated material in excess of the requirements of

the grading plan may be placed on the plant property if a proposed grading plan is approved by Engineer. If not approved, excess excavation material shall be disposed of off-site.

2. Material shall be spread and thoroughly compacted at optimum moisture to densities specified. Topsoil shall be stockpiled as required for landscaping.

I. Shoring, Sheeting, and Bracing

1. As may be necessary for the safety of workmen and to prevent shifting of material with possible damage to existing uncompleted structures, trenches and other excavations shall be properly shored, sheeted, and braced as the nature of the ground may require or prudence dictate. Bracing shall be arranged so as not to place any strain on portions of completed work until the general construction has proceeded far enough to provide ample strength.
2. In general, the sheeting and bracing shall be removed as the trench or excavation is backfilled, and in such a manner as to avoid the caving in of the bank or disturbance of adjacent areas or structures. The void left by the withdrawal of sheeting shall be filled by jetting, or as approved by the Engineer.
3. Removal of sheeting, shoring, or bracing, shall be subject to approval by the Engineer, but such approval by the Engineer shall not relieve the Contractor from the responsibility for injury to any structure or to other property or persons from failure to leave such sheeting, shoring or bracing in place.
4. Such shoring and sheeting as may be required during excavation shall be installed to protect adjacent structures and utilities.
5. Excess material from excavation, not required for backfill, shall be deposited, spread, and graded in accordance with the grading plan.

J. Unauthorized Excavation

1. Whenever, through neglect of the Contractor, the excavation is carried below or beyond the lines and grades as given by the Engineer or as shown on the Plans, except as specified above, all such excavated space shall be refilled with such material and in such a manner as may be directed by the Engineer, so as to insure the stability of the affected structure. Beneath all structures, space excavated without authority shall be refilled by the Contractor, at his own expense, with 2500 psi concrete or as directed by the Engineer.

3.2 PREPARATION OF GROUND SURFACE FOR FILL

- A. Areas upon which fills are to be placed shall be cleared and grubbed before the fill is started. Stripping depth shall be a minimum of 9 inches.

- B. Sloped ground surfaces steeper than one (1) vertical to four (4) horizontal on which fill is to be placed shall be plowed, stepped or benched, or broken up in such a manner that the fill material will bond with the existing surface.
- C. Surfaces on which fills are to be placed, the ground surface shall be broken up, pulverized, and compacted to 95% of maximum dry density at optimum moisture content.
- D. When the sub-grade is part fill and part excavation, the excavated portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill.

3.3 FILL AND BACKFILL

- A. Fills and backfills shall conform to the dimensions and elevations indicated on the Drawings for each building and structure.
- B. Placing Fill and Backfill
 - 1. Suitable material shall be placed in successive horizontal uniformly spread layers of loose material not more than nine (9) inches thick, except that in areas not accessible or permitted for the use of self-propelled rollers or vibrators, the loose layer shall be four (4) inches thick.
 - 2. Fills and backfills shall not be placed in wet or frozen areas.
- C. Backfill
 - 1. Backfill shall not begin until construction below finish grade has been completed, underground utility systems have been inspected and tested, forms removed, and the excavation cleaned of trash and debris.
 - 2. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted by power-driven hand tampers suitable for the material being compacted.
 - 3. Backfill shall be placed carefully around pipes to avoid damage to coatings.
 - 4. Backfill shall not be placed against foundation walls prior to 7 days after placement of the walls.
 - 5. As far as practical, backfill shall be brought up evenly on each side of the wall and sloped to drain away from the wall.

6. Where fill or backfill is placed and compacted against structure walls, the walls shall be supported laterally as necessary to prevent damaging or displacing the walls. Any wall so damaged as a result of the Contractor's operation shall be replaced in its entirety and at the Contractor's sole expense.

3.4 COMPACTION

- A. Compaction densities and moisture contents are specified in **Section 02250**.
- B. Compaction shall be accomplished by sheep's-foot rollers, pneumatic-tired rollers, steel-wheeled rollers, or power-driven hand tampers well suited to the soil being compacted. Material shall be aerated or moistened to maintain the required moisture content.
- C. Fine aggregate backfill shall be compacted with a minimum of two (2) passes of a power-driven hand tamper.

3.6 FINISH GRADING

- A. Excavated and filled sections, and adjacent transition areas, shall be uniformly smoothly graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes.
- B. The surface of fills or excavated areas for slabs-on-grade shall not vary more than 0.05 foot from the established grade.
- C. Other finished surfaces shall not vary more than 0.15 foot from the established grade and cross section and shall be free of depressed areas where water would pond.

END OF SECTION

SECTION 02221
EXCAVATION AND BACKFILL

PART 1 GENERAL

1.1 SCOPE

- A. The work under this section shall consist of all labor, equipment, appliances, and materials, as required or necessary for site preparation, excavation and backfill, fills, and underdrain systems.

1.2 SUBMITTALS

- A. The Contractor shall submit test reports prepared by a certified testing laboratory acceptable to the Engineer for all material. No material shall be used unless it has been accepted by the Engineer.

1.3. Testing

- A. The standard test to define maximum densities of all compaction work shall be ASTM D698. All densities shall be expressed as a relative density in terms of the maximum density obtained in the laboratory by the foregoing standard procedure.
- B. Periodically throughout the job the Engineer will request compaction tests on fills and backfills as placed by the Contractor. The Contractor shall permit sample, test, and inspect in-place materials at times selected by the Engineer and without additional compensation or additional time.

PART 2 MATERIALS

2.1 DEFINITIONS OF MATERIAL TYPES

- A. Type 1 (Select Fill)
 - 1. Type 1 material shall consist of homogenous soils free of organic matter and rocks larger than 6" in diameter and possessing an Atterburg Plasticity Index (P.I.) from 3% to 15%, and with a liquid limit of 30% or less, or as shown on the plans. P.I. from 12% to 20% is required under building slabs and major structures.
- B. Type 2 (Sand)
 - 1. Type 2 material shall be a select, granular material free from organic matter and, when tested in accordance with ASTM D 422, shall

conform to the following requirements

<u>U.S. Standard Sieve Size</u>	<u>Percent by Weight Passing</u>
3/4"	100
#4	95 to 100
#8	80 to 100
#16	50 to 85
#30	25 to 60
#50	10 to 30
#100	2 to 10

C. Type 3 (Impervious Soils)

1. Type 3 material shall be clay with at least 95% of the particles passing a No.200 sieve and a plasticity index greater than 20.

D. Type 4 (Drain Rock/Gravel)

1. Drain rock, as shown on the drawings, under structures, and behind retaining walls, shall be clean, washed, sound, and durable well-graded rock, crushed gravel, or gravel. When tested in accordance with ASTM D 422, this material shall conform to the following requirements:

<u>U.S. Standard Sieve Size</u>	<u>Percent by Weight</u>
1"	100
3/4"	90 to 100
3/8"	20 to 55
#4	0 to 10
#8	0 to 5

2. This material conforms to ASTM C 33, Size No. 67, coarse aggregate, 3/4" to #4 in size.

E. Type 5 (Topsoil)

1. Topsoil shall consist of soils suitable for the growth of cover crop. Topsoil may be that material stripped and stockpiled from site preparation or hauled in from off site.
2. Topsoil shall be free from roots, rocks, and other extraneous matter which exceeds one inch in any one direction, free from noxious weeds, and consisting of the following by weight.

Sand	- Minimum of 60%
Silt	- Maximum of 30%

- Clay - Maximum of 10%
- Organic Matter - 6% to 20%
- 3. The above minimum-maximum percentages are based on oven dried material and percentages shall be determined by either the pipette or hydrometer method of soil analysis. The pH range shall be from 6.0 to 7.5.
- 4. Composition
 - a. Sand shall be clean natural sand, free from roots, rocks, or other extraneous matter. Particle size range shall be 2.0 mm to 0.05 mm.
 - b. Silt shall have a particle size range of 0.05 mm to 0.002 mm.
 - c. Clay shall have a particle size range of 0.002 mm minus.
 - d. Organic matter shall be partially decomposed residue of plants and animals and the tissues of living and dead micro-organisms and shall be medium in texture containing no material that exceeds 1/2" in any one direction.
 - e. Submit test data showing topsoil source, percent by weight of consisting materials, particle size of constituent materials, and pH for all topsoil hauled in from off site.

F. Type 6 (Undisturbed Firm Native Soil Subgrade)

- 1. Undisturbed soils shall be those remaining in place after excavating that are suitable for slab subgrades and have not been disturbed or overexcavated. Where subgrade soils are soft, loose, or otherwise unsatisfactory, the soils shall be recompacted or replaced with select fill as determined by the Engineer.

G. Type 7 (Common Fill)

- 1. Common Fill shall be unclassified material obtained from excavation or from any other source. The material shall be free from peat, wood, roots, bark, debris, garbage, trash or other extraneous material.

H. Type 8 (Rip Rap)

Stone used for riprap shall be durable field or quarry stone of approved quality. It shall be sound, hard dense, and free of seams, cracks, or other structural defects.

- 1. Light Riprap: Light riprap shall be of a size and shape acceptable to the Engineer, shall be well graded, and shall range in weight from approximately 25 to 150 lbs. Not less than 50% of the total volume shall consist of pieces weighing more than 60 lbs.
- 2. Heavy Riprap: Heavy riprap shall be of a size and shape acceptable to the Engineer, shall be well graded, and range in weight up to 500

lbs. Not less than 50% of the total volume of pieces shall weight more than 200 lbs., and not more than 20% of the total volume shall consist of pieces weighing 40 lbs or less.

The use of heavy or light riprap shall be called out on the plans or as determined by the Engineer.

PART 3 EXECUTION

3.1 EXCAVATION

A. General:

1. The Contractor shall, during the excavation period and as long thereafter as the condition of the work may require, provide and maintain, in good operating condition, pumping equipment fully adequate in capacity to promptly remove all water entering any excavation or other parts of the work.
2. All excavation shall be kept dry and water pumped or drained from the work shall be disposed of in such a manner as to prevent damage to adjacent property or to other work under construction. Any and all damage, or whatever nature, caused by dewatering the work shall be promptly repaired or remedied by the Contractor at his own expense. This shall include the cleaning and flushing of existing drainage pipe lines where such are used.
3. The Contractor shall at all times have on hand sufficient pumping equipment and machinery in good working condition for all ordinary emergencies, and shall have available at all times competent workmen for the operation of the pumping equipment. The dewatering systems shall not be shut down between shifts, on holidays, or weekends, or during the work stoppages without written permission from the Engineer. The control of groundwater shall be such that softening of the bottom of excavations or formation of "quick" conditions or "boils" shall be prevented. Dewatering systems shall be designed and operated so as to prevent the removal of the natural soils.
4. During excavation, construction of structures, and back filling, excavations shall be kept free of water. The static water level shall be drawn down below the bottom of the excavation so as to maintain the undisturbed state of the natural soils and allow the placement of any fill or backfill to the required density. The dewatering system shall be provided so that the groundwater level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property. The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils,

prevent disturbances of compacted fill or backfill, and prevent flotation or movement of all structures and pipelines.

B. Removal of Obstructions

1. The Contractor shall remove all heavy sods, heavy growths of grass, and all decayed vegetable matter where the proper construction and completion of the work require their removal. The Contractor shall also remove all rock, stones, debris, and all obstructions of whatsoever kind or character, whether Natural or artificial, encountered in the work. Material shall be removed from the site of the work and disposed of in a manner acceptable to the Engineer.

C. Excess Excavated Material

1. Excess excavation from all sources shall be placed in accordance with the site grading plans. Materials placed under access and parking areas shall be compacted according to the applicable specifications. Excavated material in excess of the requirements of the grading plan may be placed on the plant property if a proposed grading plan is approved by Engineer. If not approved, excess excavation material shall be disposed of off-site.
2. Material shall be spread and thoroughly compacted at optimum moisture to densities specified. Topsoil shall be stockpiled as required for landscaping.

D. Shoring, Sheet piling, and Bracing

1. As may be necessary for the safety of workmen and to prevent shifting of material with possible damage to existing uncompleted structures, trenches and other excavations shall be properly shored, sheeted, and braced as the nature of the ground may require or prudence dictate. Bracing shall be arranged so as not to place any strain on portions of completed work until the general construction has proceeded far enough to provide ample strength.
2. In general, the sheet piling and bracing shall be removed as the trench or excavation is backfilled, and in such a manner as to avoid the caving in of the bank or disturbance of adjacent areas or structures. The void left by the withdrawal of sheet piling shall be filled by jetting, or as approved by the Engineer.
3. Removal of sheet piling, shoring, or bracing, shall be subject to approval by the Engineer, but such approval by the Engineer shall not relieve the Contractor from the responsibility for injury to any structure or to other property or persons from failure to leave such sheet piling, shoring or bracing in place.
4. Such shoring and sheet piling as may be required during excavation

- shall be installed to protect adjacent structures and utilities.
5. Excess material from excavation, not required for backfill, shall be deposited, spread, and graded in accordance with the grading plan.

E. Unauthorized Excavation

1. Whenever, through neglect of the Contractor, the excavation is carried below or beyond the lines and grades as given by the Engineer or as shown on the Plans, except as specified above, all such excavated space shall be refilled with such material and in such a manner as may be directed by the Engineer, so as to insure the stability of the affected structure. Beneath all structures, space excavated without authority shall be refilled by the Contractor, at his own expense, with 2500 psi concrete or as directed by the Engineer.

F. Excavation for Structures

1. Unless otherwise specified, any method of excavation within the work limits shown may be employed which, in the opinion of the Contractor, is considered best. At those locations where the excavation extends below the static groundwater level, the Contractor shall take whatever precautions are necessary to maintain the undisturbed state of either the natural soils or the compacted fill at and below the bottom of the excavation.
2. Where, in the opinion of the Engineer, the condition of the exposed soils is inadequate for the support of the planned structure, the Engineer shall require the Contractor to overexcavate to adequate soils and refill the excavated space to the proper elevation with select fill.
3. Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms, installation of services, and for inspection; except, where concrete is authorized to be deposited directly against excavated surfaces.
4. Where pipelines enter a structure, the requirement for trench excavation shall be complied with up to the excavation line of the structure, unless specified or required otherwise.

G. Backfill

1. Trenches and excavations for structures shall be backfilled to original ground level, or to such other grades as the Engineer may direct. All backfilling shall be carried along in an orderly manner and expeditiously as is consistent with the project scheduling.
2. Before backfilling around structures, all lumber, rubbish, braces, and refuse shall be removed from the excavation and disposed of in a manner satisfactory to the Engineer.

3. The backfill around and within 10 ft. of the exterior wall of all structures shall be structural backfill, as specified, brought up in horizontal lifts of uniform thickness. Except for around the aeration basin inlet and outlet boxes. Backfill for these structures shall be impervious soil.
4. The method of compaction for berms, levees, and fill areas shall be by equipment and methods approved by the Engineer and shall attain a density equal to or greater than 95% maximum density, $\pm 2\%$ optimum moisture.
5. The method of compaction of backfill outside the 10 ft. zone around structures and except as specified for backfill of pipeline trenches shall be at the option of the Contractor and shall attain a density equal to or greater than 95% maximum density.

H. Structural Backfill

1. Structural backfill shall be constructed at the locations and to the lines and grades indicated on the plans. Unless otherwise indicated, structural backfill shall be Type 1 material. The material shall be placed in horizontal layers not exceeding 6" in loose depth and shall be moisture conditioned to $\pm 2\%$ of optimum moisture such that the required degree of compaction may be obtained.
2. Each layer shall be compacted by power-operated tampers, rollers, or other suitable equipment at a dry density equal to 95% of maximum. Each layer shall be compacted to the specified density prior to placing subsequent layers. The thickness of the loose layer may be increased when in-place density tests satisfactory to the Engineer show that the specified density can be obtained. Dewatering must be maintained during the placement of compacted backfill. When backfill is subgrade for walks, roadways, foundations, or slabs, it shall be structural backfill compacted to a dry density equal to 95% of maximum. Compaction shall be done in a manner that will not damage adjacent or buried facilities. In place, field density tests shall be conducted to verify compaction.

END OF SECTION

SECTION 02225
TRENCH EXCAVATION, BACKFILL, AND COMPACTING

PART 1 GENERAL

1.1 SUMMARY

- A. Work of this Section also includes:
1. Replacing topsoil that contains regenerative material.
 2. Disposal of trees, stumps, brush, roots, limbs, and other waste materials from clearing operations.
 3. Imported topsoil.
 4. Crush rock backfill required by over-excavation.
 5. Imported pipe zone material.
 6. Trench settlement repair, including replacing roadway surfacing, sidewalk, or other structures.
 7. Replacing damaged culverts.
- B. Trench excavation is classified as common excavation and includes removal of material of whatever types encountered to depths shown or as directed by Engineer.
- C. Pipe zone includes full width of excavated trench from 4 inches below bottom of pipe to a point 12 inches above top outside surface of pipe barrel.
- D. Conform to federal, state, and local codes governing safe loading of trenches with excavated material.
- E. The right is reserved to modify the use, location, and quantities of the various types of backfill during construction as Engineer considers to be in the best interest of Owner.
- F. There shall be no additional payment for rock excavation.

1.2 REFERENCES

- A. American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.
1. ASTM D448 – Classifications for Standard Sizes of Aggregate and Bridge Construction.
 2. ASTM D698 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, using 5.5-lb. (2.49-kg.) Rammer and 12-inch (304.8-mm) Drop.

3. ASTM D1557 – Test Methods for Moisture –Density Relations of Soils and Soil-Aggregate Mixtures, Using 10-lb. (4.54-kg.) Rammer and 18-inch (457-mm) Drop.
 4. ASTM D2922 – Test Methods for Density of Soils and Soil-Aggregates in Place by Nuclear Method.
- B. Occupational Safety and Health Administration (OSHA) Standard for Excavation and Trenches Safety System, 29 CFR 1926, Subpart P = Excavations.
- C. The Contractor shall be solely responsible for trench and excavation safety systems in accordance with Act 291 of 1993.

PART 2 PRODUCTS

2.1 FOUNDATION STABILIZATION

- A. Crushed gravel or crushed rock, free from dirt, clay balls, or organic material, well graded from coarse to fine, containing sufficient finer material for proper compactions, and meeting ASTM D448 Size No. 67 (Concrete Aggregate).

2.2 PIPE ZONE MATERIAL

- A. Standard bedding material, Class B or as specified on the Drawings.
1. General Requirements: Standard bedding material shall be sand, stone, screenings, or select sandy soil, and it shall be free of the following: organic material, stones larger than 3 inches in greatest dimension, frozen lumps, or moisture in excess of that permitting the specified compaction.
 2. Gradation: Class B bedding material shall conform to the following gradation requirements:

<u>Sieve Size</u>	<u>Percent Passing</u>
3/8 inch (9.5 mm)	100
No. 200 (75 µm)	0-10

3. Sampling and Testing: Tests shall be in accordance with the latest revision of the AASHTO Methods except as noted:

Los Angeles Abrasion	T 96
Sieve Analysis	T 27
Sampling	T 2
Determining Plastic Limit & Pasticity Index	T 90
Fractures Faces	OHD L-18
Method of Preparation of Samples	T 87
Determining Liquid Limit	T 89
Standard Density	T 180 Method D
Aggregate Durability Index	T 210
Material Passing No. 200 (75 µm) Sieve	T 11
Dust Coating (Plus No. 8 (2.36 mm) material after dry sieving)	T 11
Soft Particles	OHD L-38

B. Granular back fill or as specified on drawings

1. General Requirements: All granular backfill material shall be free from organic or other deleterious materials.
2. Physical Properties: The granular backfill material shall be substantially free of shale or other soft, poor durability particles, and the granular backfill shall have an aggregate durability index greater than or equal to 30.
3. Gradation: The granular backfill material shall be well graded and conform to the following gradation requirements.

<u>Sieve Size</u>	<u>Percent Passing</u>
3 inch (75 mm)	100
1 inch (25.0 mm)	90 - 100
No. 40 (425 µm)	0 - 45
No. 200 (75 µm)	0 – 10

Plasticity Index	Non-Plastic

4. Sampling and Testing: Tests shall be in accordance with the latest revision of the AASHTO Methods except as noted:

Los Angeles Abrasion	T 96
Sieve Analysis	T 27
Sampling	T 2
Determining Plastic Limit & Pasticity Index	T 90
Fractures Faces	OHD L-18
Method of Preparation of Samples	T 87
Determining Liquid Limit	T 89
Standard Density	T 180 Method D

Aggregate Durability Index	T 210
Material Passing No. 200 (75 µm) Sieve	T 11
Dust Coating (Plus No. 8 (2.36 mm) material after dry sieving)	T 11
Soft Particles	OHD L-38

2.3 COMMON FILL MATERIALS

- A. Material shall not contain pieces larger than 3 inches, and shall be free of roots, debris, or organic matter.

2.4 TRENCH BACKFILL

- A. Granular Backfill:

1. Natural or artificial mixture of gravel and soil mortar uniformly well graded from coarse to fine.
2. General Requirements: All granular backfill material shall be free from organic or other deleterious materials.
3. Physical Properties: The granular backfill material shall be substantially free of shale or other soft, poor durability particles, and the granular backfill shall have an aggregate durability index greater than or equal to 30.
4. Gradation: The granular backfill material shall be well graded and conform to the following gradation requirements.

<u>Sieve Size</u>	<u>Percent Passing</u>
3 inch (75 mm)	100
1 inch (25.0 mm)	90 - 100
No. 40 (425 µm)	0 - 45
No. 200 (75 µm)	0 - 10

Plasticity Index	Non-Plastic

5. Sampling and Testing: Tests shall be in accordance with the latest revision of the AASHTO Methods except as noted:

Los Angeles Abrasion	T 96
Sieve Analysis	T 27
Sampling	T 2
Determining Plastic Limit & Plasticity Index	T 90
Fractures Faces	OHD L-18
Method of Preparation of Samples	T 87
Determining Liquid Limit	T 89

Standard Density	T 180 Method D
Aggregate Durability Index	T 210
Material Passing No. 200 (75 µm) Sieve	T 11
Dust Coating (Plus No. 8 (2.36 mm) material after dry sieving)	T 11
Soft Particles	OHD L-38

2.5 PVC GRAVITY PIPE TRENCH

- A. Refer to Plans for trench details.

2.6 COMPACTION EQUIPMENT

- A. Suitable type and adequate to obtain the amount of compaction specified.
- B. Operate in strict accordance with manufacturer's instructions and recommendations and maintain conditions so that it delivers manufacturer's rated compactive effort.

2.7 IMPORTED TOPSOIL

- A. Suitable sandy loam from an approved source.
- B. Possess friability and a high degree of fertility.
- C. Free of clods, roots, gravel, and other inert material.
- D. Free of any noxious vegetation and seed.

PART 3 EXECUTION

3.1 PREPARATION

- A. Where clearing or partial clearing of right-of-way is necessary, complete prior to start of trenching.
- B. Cut trees and brush as near to surface of ground as practicable, remove stumps, and pile for disposal.
- C. Do not permit excavated materials to cover brush or trees prior to disposal.

3.2 DISPOSAL OF CLEARED MATERIAL

- A. Dispose of cleared materials in a manner approved by the Owner and that meets or exceeds requirements of state, county, and local regulations regarding health, safety, and public welfare.

- B. Dispose of nonflammable and flammable material off the construction site in an approved location.
- C. Do not leave material on the Project site, shove onto abutting private properties, or bury in embankments or trenches.

3.3 REMOVAL OF OBSTRUCTIONS

- A. Remove obstructions within trench area or adjacent to trench area, such as tree roots, stumps, abandoned piling, logs, and debris.
- B. Engineer may, if requested, make changes in the trench alignment to avoid major obstructions, if such alignment changes can be made within the easement or right-of-way without adversely affecting the intended function of the facility.
- C. Dispose of obstructions in accordance with this Section.

3.4 REMOVAL AND REPLACEMENT OF TOPSOIL

- A. Where trenches cross lawns, garden areas, pasture lands, cultivated fields, or other areas on which reasonable topsoil conditions exist, remove topsoil for a depth of 6 inches for full width of trench to be excavated.
- B. Use equipment capable of removing a uniform depth of material.
- C. Stockpile removed topsoil at regular intervals, and do not mix with other excavated material.
- D. Locate stockpiles so that material of one ownership is not transported and stockpiled on property of another ownership.
- E. Minimum Finished Depth of Topsoil over Trenches: 5 inches.
- F. Imported topsoil may be substituted for stockpiling and replacing topsoil.
- G. Maintain finished grade of topsoil level with area adjacent to trench until final acceptance by Engineer.
- H. Repair damage to adjacent topsoil caused by work operations.
 - 1. Remove rock, gravel, clay, and other foreign materials from the surface.
 - 2. Regrade.
 - 3. Add topsoil and seed, sod, or hydromulch as required.

3.5 TRENCH WIDTH

- A. Minimum width of unsheeted trenches where pipe is to be laid shall be 18 inches greater than the outside diameter of the pipe or as approved.
- B. Maximum width at top of trench shall not be limited, except where excess width of excavation would cause damage to adjacent structures or property or cause undue stresses on the pipe.
- C. Confine trench widths to dedicated rights-of-way or construction easements, unless special written agreements have been made with affected property owners.

3.6 EXCAVATION

- A. Material excavated is defined as unclassified excavation regardless of the material encountered.
- B. Excavate trench to lines and grades shown or as established by Engineer with proper allowance for pipe thickness and for pipe base or special bedding when required.
- C. If trench is excavated below required grade, correct with foundation stabilization material.
- D. Place material over full width of trench in compacted layers not exceeding 6 inches deep to established grade with allowance for pipe base or special bedding.

3.7 PREPARATION OF TRENCH – LINE AND GRADE

- A. Do not deviate more than ½ inch from line or ½ inch from grade. Measure for grade at the pipe invert, not at the top of the pipe, because of permissible variation in pipe wall thickness.
- B. Grade the bottom of the trench by hand to the line and grade where the pipe is to be laid, with proper allowance for pipe thickness and for pipe base when specified or indicated.
- C. Remove hard spots that would prevent a uniform thickness of bedding.
- D. Check the grade with a straightedge and correct irregularities found.
- E. The trench bottom shall form a continuous and uniform bearing and support for the pipe at every point between bell holes, except that the grade may be disturbed for the removal of lifting tackle.

3.8 SHORING, SHEETING, AND BRACING OF TRENCHES

- A. Sheet and brace trench when necessary to prevent caving during excavation in unstable material or to protect adjacent structures, property, workers, and the public.
- B. Increase trench widths accordingly by the thickness of the sheeting.
- C. Maintain sheeting in place until pipe has been placed and backfilled at pipe zone.
- D. Remove shoring and sheeting as backfilling is done in a manner that will not damage pipe or permit voids in backfill.
- E. Conform to safety requirements of federal, state, or local public agency having jurisdiction for sheeting, shoring, and bracing of trenches; the most stringent of these requirements shall apply.

3.9 LOCATION OF EXCAVATED MATERIALS

- A. Place excavated material only within construction easement, right-of-way, or approved working area.
- B. Do not obstruct private or public traveled roadways or streets.

3.10 REMOVAL OF WATER

- A. Provide and maintain ample means and devices to promptly remove and dispose of water entering trench during time trench is being prepared for pipe laying, during laying of pipe, and until backfill at pipe zone is completed.
 - 1. These provisions apply during the noon hour as well as overnight.
 - 2. Provide necessary means and devices, as approved, to positively prevent under water from entering the construction area of another contractor.
- B. Dispose of water in a manner to prevent damage to adjacent property.
- C. Drainage of trench water through the pipeline under construction is prohibited.

3.11 FOUNDATION STABILIZATION

- A. When existing material in bottom of trench is unsuitable for pipe, excavate unsuitable material.
- B. Backfill trench to subgrade of pipe base with foundation stabilization material specified.
- C. Place foundation stabilization material over the full width of trench and compact in layers not exceeding 6 inches deep to required grade by making passes with a vibratory compactor (or equivalent).
- D. Material shall be considered unsuitable when it contains more than 5 percent organic material by volumetric sampling or when it will not support a reading of 1.5 on a hand penetrometer.

3.12 ROCK IN PIPE TRENCH

- A. Where rock is encountered in bottom of trench, support pipe on bedding material.
- B. Minimum Bedding Thickness: 6 inches.
- C. Extend bedding up pipe sides a minimum of one sixth of outside diameter of the pipe.
- D. Backfill over pipe according to pipe zone type.

3.13 PIPE ZONE BACKFILL

- A. Depth of the pipe zone above pipe barrel varies with pipe material.
- B. Particular attention shall be given to area of pipe zone from flow line to centerline of pipe to ensure firm support is obtained to prevent lateral movement of pipe during final backfilling of pipe zone.
- C. Backfill area of pipe zone from bottom of pipe to horizontal centerline of pipe by hand-placing material around pipe in 4-inch layers.
- D. Achieve continuous support beneath pipe haunches by “walking in” and slicing with shovel.
- E. Backfill area of pipe zone from horizontal centerline to top of pipe zone with pipe zone material as shown in trench details on Drawings.

3.14 TRENCH BACKFILL ABOVE PIPE ZONE

- A. When backfill is placed mechanically, push backfill material onto slope of backfill previously placed and allow to slide down into trench.
- B. Do not push backfill into trench in a way to permit free fall of material until at least 2 feet of cover is provided over top of pipe.
- C. Under no circumstances allow sharp, heavy pieces of material to drop directly onto pipe or tamped material around pipe.
- D. Do not use backfill material of consolidated masses larger than $\frac{1}{2}$ cubic foot.

3.15 EXCESS EXCAVATED MATERIAL

- A. Dispose of excess excavated material off project site in an approved area.

3.16 DRAINAGE CULVERTS

- A. Replace drainage culverts that are removed on near right angles to pipe centerline.
- B. If pipe cannot be reused or is damaged during removal, dispose of it and provide new pipe.
- C. Protect culverts from damage or restore to equivalent condition.
- D. Replace culverts to existing lines and grades.
- E. Do not replace culverts until proposed pipeline is installed and backfill of trench has been completed to subgrade of culvert.

3.17 PIPE COVER

- A. Place select material from excavation over pipe to provide minimum coverage, as shown on Drawings or as directed by Engineer.

3.18 DRAINAGE DITCH RESTORATION

- A. Undercrossings of minor drainage ditches not covered in another Specification Section shall be backfilled so that upper 1 foot of material in ditch between ditch banks is clay.
- B. Compact material for full ditch width by 6 passes of vibratory compactor (or equivalent).

- C. Where indicated on Drawings, provide concrete arch, or rip rap on ditch banks.

3.19 SETTLEMENT

- A. Correct settlement noted in backfill, fill, or in structures built over backfill or fill within warranty period.

3.20 IMPORTED TOPSOIL

- A. Should regenerative material be present in soil, remove both surface and root that appears within 1 year following acceptance of Project in a manner satisfactory to Owner.

END OF SECTION

SECTION 02229 ROCK REMOVAL

PART 1 GENERAL

1.1 SCOPE

- A. This section covers removal of identified and discovered rock during excavation and the use of expansive tools and explosives to assist rock removal.

1.2 RELATED SECTIONS

- A. **Section 02225** – Trench Excavation, Backfill and Compacting.

1.3 MEASUREMENT AND PAYMENT

- A. Rock Removal: Includes preparation of rock for removal, explosive and/or mechanical disintegration of rock, removal from position, loading and removing from site. **Payment will not be made for excavation of rock nor for replacement materials.**
- B. Trench Rock Removal: Includes preparation of rock for removal, explosive and/or mechanical disintegration of rock, removal from position, loading and removing from site. **Payment will not be made for excavation of rock nor for replacement materials.**

1.4 REFERENCES

- A. NFPA 495 - Code for Manufacture, Transportation, Storage, and Use of Explosive Materials.

1.5 DEFINITIONS

- A. Site Rock: Solid mineral material with a volume in excess of ½ cubic yard or solid material that cannot be removed with a ¾ cubic yard capacity power shovel without drilling or blasting.
- B. Trench Rock: Solid mineral material with a volume in excess of 1/3 cubic yard or solid material that cannot be removed with a 1/3 cubic yard capacity power shovel without drilling or blasting.

1.6 SUBMITTALS FOR REVIEW

- A. Submit Shop Drawings indicating the proposed method of blasting, delay pattern, explosive types, type of blasting mat or cover, and intended rock removal method.

1.7 QUALITY ASSURANCE

- A. Seismic Survey Firm: Company specializing in seismic surveys with five years documented experience.
- B. Explosives Firm: Company specializing in explosives for disintegration of rock, with five years documented experience.

1.8 REGULATORY REQUIREMENTS

- A. Conform to applicable code for explosive disintegration of rock and to NFPA 495 for handling explosive materials.
- B. Obtain permits from authorities having jurisdiction before explosives are brought to site or drilling is started. **Verify if local Authority, City or County, has any special permits or approvals needed.**

1.9 PROJECT CONDITIONS

- A. Conduct survey and document conditions of buildings near locations of rock removal, prior to blasting, and photograph existing conditions identifying existing irregularities.
- B. Advise owners of adjacent buildings or structures in writing, prior to executing seismographic survey. Explain planned blasting and seismic operations.
- C. Obtain a seismic survey prior to rock excavation to determine maximum charges that can be used at different locations in area of excavation without damaging adjacent properties or other work.

1.10 SCHEDULING

- A. Schedule Work to avoid working hours of and disruption to occupied buildings nearby.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Explosives shall be Type recommended by explosive firm following seismic survey and required by authorities having jurisdiction.
- B. Delay Device shall be Type recommended by explosives firm.
- C. Blast Mat Materials shall be Type recommended by explosives firm.
- D. Mechanical Disintegration Compound: Grout mix of materials that expand on curing.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions and note subsurface irregularities affecting work of this section.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.

3.3 ROCK REMOVAL BY A MECHANICAL METHOD

- A. Excavate and remove rock by the mechanical method.
- B. Drill holes and utilize expansive tools, wedges, mechanical disintegration compound to fracture rock, or cut with saws as required.
- C. Cut away rock at bottom of excavation to form level bearing.
- D. Remove shaled layers to provide sound and unshattered base.
- E. In utility trenches, excavate to 6 inches below invert elevation of pipe and 12 inches wider than pipe diameter.
- F. Remove excavated materials from site.
- G. Correct unauthorized rock removal in accordance with backfilling and compacting requirements.

3.4 ROCK REMOVAL BY EXPLOSIVE METHODS

- A. If rock is uncovered requiring the explosives method for rock disintegration, notify the Engineer in writing.
- B. **Obtain Permits and approval from State and Local Authority.**
- C. Provide seismographic monitoring during progress of blasting operations.
- C. Drill blasting holes within 12 feet of finished slope.
- D. Disintegrate rock and remove from excavation.
- E. Remove rock at excavation bottom to form level bearing.
- F. Remove shaled layers to provide a sound and unshattered base.
- G. In utility trenches, excavate to 6 inches below invert elevation of pipe and 12 inches wider than pipe diameter.
- H. Remove excavated material from site.
- I. Correct unauthorized rock removal in accordance with backfilling and compacting requirements.
- J. Cover blast area as required to prevent flying rock and debris.

3.5 FIELD QUALITY CONTROL

- A. Provide for visual inspection of foundation bearing surfaces and cavities formed by removed rock.

END OF SECTION

SECTION 02250 COMPACTION CONTROL AND TESTING

PART 1 GENERAL

1.1 SCOPE

- A. Requirements and procedures for compaction control and testing of soils and base courses.

1.2 DEFINITIONS

- A. Non-Cohesive Materials

- 1. Non-Cohesive materials shall be clean, free-draining, variously graded gravels and sands with little or no fines. The portion passing the No. 200 sieve shall be limited to 12% and shall have a plasticity index of 0.
 - 2. Non-Cohesive materials shall be classified according to ASTM D 2487 as GW, GP, SW or SP.

- B. Cohesive Materials

- 1. Cohesive materials shall be classified according to ASTM D 2487 as GM, GC, SM, SC, CL and CH.
 - 2. Materials classified according to ASTM D 2487 as ML, OL, MH, OH and PT shall be unsatisfactory.

1.3 QUALITY ASSURANCE

- A. Test Specifications

- 1. Laboratory Tests
 - a. Moisture - density relations of soils (compaction test) - ASTM D1557, Method D
 - b. Liquid limit of soils - AASHTO T 89
 - c. Plastic limit and plasticity index of soils - AASHTO T 90
 - d. Particle size analysis of soils (gradation test) - AASHTO T 88
 - 2. Field Tests
 - a. Density of soil in-place by the rubber-balloon method - ASTM D 2167.
 - b. Determination of moisture in soils by means of a calcium carbide gas pressure moisture tester - AASHTO T 217

- c. Density of soil and soil aggregate in-place by nuclear methods - ASTM D 2922.

B. Laboratory Tests Required

- 1. The following tests shall be performed for each principal type of material or combination of materials encountered or utilized.
 - a. Compaction test
 - b. Liquid limit test
 - c. Plastic limit test (and determination of plasticity index)
 - d. Gradation test
- 2. The tests listed above shall be performed on additional samples as directed by the Owner's Representative.
- 3. Results of these tests shall be the basis of control for compaction.

C. Field Tests Required

- 1. Structure Excavation, Filling and Backfilling
 - a. One (1) in-place density test and one (1) in-place moisture test per 600 square yards per lift, but no more than 10 tests per lift and no less than one (1) test per lift.
 - b. One (1) in-place density test and one (1) in-place moisture test per 600 square yards per lift in sub-areas enclosed by interior grade beams or interior stem walls prior to placement of fill, but not less than one (1) per lift.
 - c. In-place density and moisture tests within the structure (a) may be utilized as the in-place density and moisture tests indicated in (b) if they happen to coincide within the sub-area.
- 2. Trench Excavation and Backfilling
 - a. One (1) in-place density test and one (1) in-place moisture test per 100 linear feet of trench per lift under structures and paved areas.
 - b. One (1) in-place density test and one (1) in-place moisture test per 300 linear feet of trench per lift under grassed or non-traffic areas.
- 3. Site Grading:
 - a. Excavation, filling and raw sub-grade and base course preparation under paved areas: One (1) in-place density test and one (1) in-place moisture test per 2,000 square yards per lift.
 - b. Excavation, filling and raw sub-grade preparation under grassed or non-traffic areas: One (1) in-place density test and one (1) in-place moisture test per 3,000 square yards per lift.

- c. Additional in-place moisture-density tests and relative density tests shall be performed as directed by the Owner's Representative.

- D. Samples for laboratory and field tests shall be taken at locations designated by the Owner's Representative.

PART 2 PRODUCTS

Not applicable

PART 3 EXECUTION

3.1 COMPACTION

- A. Each lift shall be compacted to not less than the percentage of maximum density specified below.

Percent Maximum Density

Cohesive Material

Fill embankment, backfill, and trench backfill,	95

Under equipment slabs, building slabs-on-grade, other structures and sidewalks, under pavement or other surfaces, driveways, curbs, gutters, steps, and similar use areas (including adjacent shoulder areas):	95

Grassed or landscaped areas:	95

Pond embankment and liner (natural or bentonite):	95

- B. Moisture Content

- 1. Each lift of fill, embankment, backfill and trench backfill shall be compacted at $\pm 2\%$ optimum moisture content.

3.2 COMPACTION DEFICIENCIES

- A. Apparent negligence or carelessness during any portion of the earthwork operations will require that additional tests be performed on that portion of the work.
- B. Fills, embankments, backfills, trench backfills, sub-grades or base courses that do not meet the specification requirements shall be removed or re-compacted until the requirements are satisfied.

END OF SECTION

SECTION 02370
TEMPORARY EROSION, SEDIMENTATION AND STORMWATER
POLLUTION PREVENTION AND CONTROL

PART 1 GENERAL.

1.1 SCOPE

- A. This item shall govern the control measures necessary to prevent and control soil erosion, sedimentation and stormwater pollution which may degrade receiving waters including rivers, streams, lakes, reservoirs, groundwater and wetlands. The control measures contained herein shall be installed and maintained throughout the construction contract and coordinated with the permanent or existing temporary pollution control features specified elsewhere in the Plans and Specifications to assure effective and continuous water pollution control throughout the construction and post construction period. These control measures shall not be used as a substitute for the permanent pollution control measures unless otherwise directed by the Engineer in writing. The controls may include silt fences, sediment filters, dikes, dams, berms, sediment basins, mats, soil retention blankets, temporary seeding, mulch, channel liners, slope drains or other structural or nonstructural water pollution controls.

1.2 MATERIALS

- A. The items, quantities, types and locations of the control measures shall be presented in the Storm Water Pollution Prevention Plan.

1.3 CONSTRUCTION METHODS

- A. General. Prior to the start of the construction, the Contractor shall have readily available schedules for accomplishment of the pollution control measures in accordance with the Storm Water Pollution Prevention Plan. The Contractor shall have proposed methods of pollution control in areas which may be outside the construction limits such as construction and haul roads, field offices, equipment and supply areas, and material sources, as well as plan for disposal of waste materials. Work on the project shall not begin until the schedules for implementation of the controls and methods of operations.
- B. The maximum disturbed surface area exposed by construction operations may be limited as directed by the Engineer.
- C. The Contractor shall provide control measures to prevent or minimize impact to receiving waters.

- D. In any disturbed area where construction activities have ceased, permanently or temporarily, the Contractor shall stabilize the area by the use of seeding, mulching, soil retention blankets or other appropriate measures within 14 days, unless construction activities are scheduled to resume within 21 days.
- E. The Contractor shall effectively prevent and control erosion and sedimentation on the site at the earliest practicable time as outlined in the schedule. Control measures, where applicable, will be implemented prior to the commencement of each construction operation or immediately after the area has been disturbed.
- F. The Contractor shall limit the amount of disturbed earth to the areas shown on the Plans. If the Contractor is not able to effectively control soil erosion and sedimentation resulting from construction operations, every effort shall be made to limit the amount of disturbed area at any given time.
- G. Should the control measures fail to function effectively, the Contractor shall act immediately to bring the erosion and sedimentation under control by maintaining existing controls or by providing additional controls. When in the opinion of the Engineer the site is adequately stabilized, the control measures shall be removed and properly disposed of by the Contractor.
- H. The Contractor shall also conform to the following practices and controls. All labor, tools, equipment and incidentals to complete the work will not be paid for directly but shall be considered as subsidiary work to the various items included in the contract.
 - 1. Disposal areas, stockpiles and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, waterbody or streambed. Construction roads may not be located in or cross any waterbody or streambed without prior approval of the Engineer and shall be done in compliance with applicable rules and regulations.
 - 2. Construction operations in rivers, streams, lakes, wetlands and other waterbodies shall be restricted to those areas where it is necessary to perform the work shown on the Plans. Wherever streams are crossed, temporary bridges, timber mats or other structures shall be used, as directed by the Engineer. The use of a work road within a stream channel shall be minimized to the greatest extent practicable.
 - 3. Protected storage for paints, chemicals, solvents, fertilizers and other potentially toxic materials will be provided by the Contractor and on the location.

4. Construction staging areas and vehicle maintenance areas shall be constructed by the Contractor in a manner to minimize the runoff of pollutants and their location. The Contractor shall prevent pollution of receiving waters with petroleum products or other hazardous or regulated substances. When work areas of material sources are located adjacent to a waterbody, control measures such as dikes, gabions or rock berms shall be used to keep sediment and other contaminants from entering the adjacent waterbody. Care shall be taken during the construction and removal of such barriers to minimize down-gradient sedimentation.
 5. All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.
 6. Disturbance of existing vegetation shall be minimized and limited to only those areas approved by the Engineer.
 7. Construction entrances shall be stabilized by the use of rock, timber matting or other acceptable techniques to minimize the off-site vehicle tracking of sediment.
- I. The project will not be accepted until, in the opinion of the Engineer, the Contractor has established a uniform perennial vegetative cover with a density of 70 percent in all areas not covered by permanent structures, or that equivalent permanent or temporary stabilization measures (such as riprap, gabions, soil retention blankets, mulching or geotextiles) have been employed.

1.4 MEASUREMENT AND PAYMENT.

- A. Temporary erosion, sedimentation and stormwater pollution prevention and control will not be measured for payment but shall be included in other items of work.
- B. Removal of all control measures not incorporated as permanent control measures shall be performed subsidiary to the various bid items.
- C. In case of failure on the part of the Contractor to prevent and control soil erosion, sedimentation and water pollution which may degrade receiving water, the Engineer reserves the right to employ outside assistance or to use State forces to provide the necessary corrective measures. Such incurred direct costs plus project engineering costs will be deducted from any monies due or to become due to the Contractor.
- D. Pollution control measures may be applicable to construction work outside the right of way where such work is necessary as a result of roadway related construction such as material source operations, haul roads and equipment

storage sites. Pollution control measures outside the right-of-way will not be measured for payment but shall be performed at the Contractor's expense.

PART 2 TEMPORARY SEDIMENT CONTROL SLOPE DRAINS

2.1 SCOPE

- A. This work shall consist of the construction, maintenance and removal of temporary slope drains and diversion dikes at locations shown on the Plans.

2.2 MATERIALS

- A. Materials used for construction of slope drains may be flexible tubing, plastic sheeting, plastic screen, burlap, asphalt, pipe or as shown on the Plans. Inlet materials may be wood, pipe end sections or other solid material. Outlets may be constructed of loose rock, brush, straw, waste concrete or pipe and sections.

2.3 CONSTRUCTION METHODS

- A. Diversion dikes shall be constructed in fill sections at the end of each days operation. At points along the diversion dikes as specified on the Plans or by the Engineer, the Contractor shall construct or extend slope drains at the end of each days operations. Slope drains shall be constructed from the toe of slope in order that they may be extended as additional fill is completed. Inlets shall be provided with each slope drain. The type of outlet control will be determined by existing conditions and materials available.
- B. Slope drains on backslopes shall be placed on the slope as the excavation of the cut area progresses, until the final grade is obtained and permanent controls are in place.

PART 3 TEMPORARY SEDIMENT CONTROL BARRIERS

3.1 SCOPE

- A. This work shall consist of the construction, maintenance and removal of temporary barriers at locations shown on the Plans or determined by the Engineer. Barriers shall be used to trap sediment at the toes of slopes, or across ditches and defined waterways.

3.3 CONSTRUCTION METHODS

- A. As slope barriers, the barriers shall be placed end to end and staked down, a maximum distance of 3 feet out from the toe of the slope.

- B. As ditch checks, the barriers shall be placed in a staggered position across the defined waterways and staked in place. The barriers shall be placed up the slope on either side of the flow line, higher than the elevation of the center of the waterway.
- C. The Contractor shall keep the barrier in good condition by replacing broken or damaged material immediately after damage occurs. Barriers may be removed or left in place at the discretion of the Engineer.

PART 4 TEMPORARY SILT FENCE

4.1 SCOPE

- A. This work shall consist of the furnishing, installation, maintenance, and removal of geotextile barrier fence designed to remove Suspended soil particles from water passing through the fence. It shall be installed as soon as practical around the toe of fill slopes to prevent siltation off right-of-way.

4.2 MATERIALS

- A. The temporary silt fence shall be a woven, polypropylene, polyester or polyamide material that shall be resistant to ultraviolet degradation mildew and rot. The edges of woven fabrics shall be sealed or selvaged to prevent raveling. Fabric shall be at least 3 feet wide with 6 inches of the width buried in a trench to prevent undercutting.

4.3 CONSTRUCTION METHODS

- A. The Contractor shall install a temporary silt fence as shown on the plans. Construction shall be adequate to handle the stress from hydraulic and sediment loading. Geotextile shall be buried as indicated on the details. The trench shall be backfilled and the soil compacted over the geotextile. Fabric ends shall be spliced together with hog rings, locking plastic ties or other approved methods.
- B. Posts may be wood, steel or synthetic material with a minimum length of 3 feet and be of sufficient strength to resist damage during installation and strong enough to support applied loads. Spacing between posts shall not exceed 5 feet and posts will be embedded into the ground at least 300 millimeters. The geotextile will be securely fastened to the posts in a manner that will withstand pressure during storm events.
- C. It is the Contractor's responsibility to maintain the integrity of silt fences as long as they are necessary to contain sediment runoff. The Contractor shall inspect all temporary silt fences immediately after each rainfall and at least daily during prolonged rainfall. Any deficiencies shall be immediately

corrected by the Contractor. In addition, the Contractor shall make a daily review of the location of temporary silt fences in areas where construction activities have changed the natural contour and drainage runoff to ensure that they are properly located for effectiveness.

- D. When the accumulated silt reaches a depth of 6 inches, the Contractor shall remove the sediment and deposit it at approved sites in a manner that will not contribute to additional siltation. The fences shall remain in place until the Engineer approves removal. The effected area shall be graded and dressed to the satisfaction of the Engineer after removal of fences.

PART 5 TEMPORARY SEDIMENT CONTROL FILTERS

5.1 SCOPE

- A. This work shall consist of the construction, maintenance, and removal of temporary sediment filters. Sediment filters shall be constructed to trap silt and debris prior to its entry into any drainage inlet or other similar structure which empties into a waterway or its subsidiary.

5.2 MATERIALS

- A. Materials for Type II sediment filter may be any type of non-erodible material available such as loose rock, broken concrete, or other salvageable materials.

5.3 CONSTRUCTION METHODS

- A. Sediment filters shall be constructed in accordance of standard designs as soon as the inlets are completed sufficiently to receive runoff water, at locations shown on the Plans or determined by the Engineer.
- B. The bales for Types I-A and I-B shall be placed and staked tightly together in such a manner to cause the waterflow to be slowed and go over the bales, prior to entering the inlet.
- C. The nonerodable filter material shown for Type II shall be placed around the inlet, between the inlet and the flow of water. The placement of this material shall be in such a manner that the water will be slowed and then flow over and through the material prior to entering the inlet.
- D. The Contractor shall keep the filters in good condition by repairing any damage or break in the filters immediately.
- E. Sediment filters may be removed as determined by the Engineer.

PART 6 TEMPORARY SEDIMENT CONTROL BASINS

6.1 SCOPE

- A. This work shall consist of the construction, maintenance, and removal of temporary sediment basins at locations shown on the Plans or determined by the Engineer. The approximate size, shape, and type shown on the Plans may vary depending on the soil type, the drainage area, and available right-of-way at the exact construction locations or selected by the Engineer.

6.2 MATERIALS

- A. Materials used for both the inlet and outlet flows of the sediment basins may be loose rock of sufficient size to withstand anticipated water velocity displacement or other nonerrodible materials. When Type I sediment basins are specified the outflow pipe shall be at least a 12 inch pipe.

6.3 CONSTRUCTION METHODS

- A. Inlets shall be shaped to confine the water to the defined channel as it enters the basin. Outlets shall be constructed to slow the velocity of water so sediment will be retained in the sediment basin. Material excavated shall be used on the sediment basin dikes or stockpiled.
- B. Sediment basins shall be maintained by the Contractor until permanent erosion control has been completed and effectively operational.

PART 7 TEMPORARY SEDIMENT CONTROL

7.1 SCOPE

- A. This work shall consist of removing sediment which has become trapped by the various temporary or permanent erosion and sediment control devices.

7.2 CONSTRUCTION METHODS

- A. Sediment shall be removed at the direction of the Engineer from the control devices. After sediment removal has been completed, the Control device shall be left in the operable condition for which it was designed. Any damage to the control devices shall be replaced at the Contractor's expense. Materials removed shall be disposed of at locations and in a manner approved by the Engineer.

PART 8 NYLON EROSION CONTROL MAT

8.1 SCOPE

- A. This work shall consist of furnishing and installing a nylon erosion control mat for ditch lining and slope protection in accordance with these Specifications and within reasonable close conformity with the lines and dimensions shown on the Plans or established by the Engineer.

8.2 EQUIPMENT

- A. The Contractor shall furnish equipment required for satisfactory progress and completion of acceptable work.

8.3 CONSTRUCTION METHODS.

A. Placing Mat.

1. General. All surfaces to be protected with nylon erosion control mat shall be graded, shaped and finished so that the surfaces are stable, firm and free of rocks or obstructions which would prevent the mat from lying in direct contact with the soil surface.
2. Ditches.
 - a. Three widths of mat will be required for the standard ditch placement. The center width placed first, then the two side widths. Lap joints of 3 inches shall be used.
 - b. At the terminal ends of the ditch, the mat shall be buried at least 12 inches vertically in an anchor slot dug into the soil. The mat shall be secured in the anchor slot-by fasteners prior to backfilling the slot. The backfilled soil, shall be firmly compacted in the anchor slot.
 - c. On ditches with grades exceeding 6 percent, a 6 inches deep check slot shall be installed every 2.5 feet and the mat secured in the check slots by fasteners.
 - d. Seeding, Ditches Only. When mats are installed and approved during the normal "out of planting season", common Bermuda grass seed at the rate of 35 lbs per acre shall be uniformly seeded on the exposed areas of soil beneath the mat. During the "planting season", the specified plant material (sodding, sprigging or seeding) shall be completed prior to placing the mat in ditches.
3. Slopes.
 - a. When placing mat on slopes, the top end shall be buried at least 12 inches vertically in an upper anchor slot and the bottom end shall be buried at least 12 inches in the lower anchor slot. The mat shall be secured in the anchor slots by

fasteners, prior to backfilling the slot. The backfill soil shall be firmly compacted in the anchor slots. Lower anchor slots will not be used when the ditch is lined with concrete or other type of materials.

- b. The mat shall be installed in a manner that will allow the downgrade edge to overlap the previously laid strip. Lap joints of 3 inches shall be used.
 - c. On slopes exceeding 60 feet in slope length, a 12 inch deep check slot shall be installed every 40 feet and the mat secured in the check slot by fasteners.
 - d. During the "planting season", the specified plant material shall be completed prior to placing the mat on the slopes. During the "out of planting the season", the mat shall be placed as temporary and permanent protection until the specified plant material can be applied during the proper season, or used as permanent protection.
4. End of Roll. The ends of the roll of the mat shall overlap 3 feet with the upslope end on top.

- B. Fastening the Mat. The normal spacing for fastening the mat shall be 3 feet along the edge lap joint and down the center of each width of mat. The center fasteners shall be offset 18 inches from the edge fasteners. The mat shall be held firmly in place with fasteners. Fasteners shall be pressed firmly against the mat and securely driven into the underlying soil. The mat shall be fastened across the width in anchor slots, in check slots and end overlaps on centers.
- C. Seeding. When seeding is required in ditches, due to the "out of planting season", it shall be applied by hand broadcasting.
- D. Maintenance. The Contractor shall be responsible for the proper maintenance of the area until the entire project has been completed. This shall include refilling of washed out areas, reseeding, and replacing mat.

PART 9 DITCH LINER PROTECTION

9.1 SCOPE

- A. This work shall consist of furnishing and installing excelsior mat or solid slab sod as ditch liner protection in accordance with these Specifications and in reasonably close conformity with the areas and locations shown on the Plans or established by the Engineer.

9.2 CONSTRUCTION METHODS.

- A. Excelsior Mat. The mat shall be placed as shown on the Plans so that the fibers are in contact with the soil and the netting is on the top. A single strip of mat shall be placed parallel to each side of the ditch liner.
- B. Fastening the Mat. After placement, the excelsior mat shall be held firmly in place with fasteners per manufacturer's recommendation. Fasteners shall be pressed firmly against the mat and securely driven into the underlying soil.
- C. Repairs. If the ditch liner protection material becomes damaged, it shall be replaced in kind promptly. If the soil beneath or surrounding the ditch liner becomes eroded, the area shall be restored to the original condition and grade prior to placement of the protection material.

PART 10 SODDING AND SPRIGGING

10.1 SCOPE

- A. This work shall consist of furnishing and planting viable Bermuda grass sod or sprigs in accordance with these Specifications and in reasonably close conformity with the areas and locations shown on the Plans or as established by the Engineer.

10.2 MATERIALS

- A. Water shall be free from harmful quantities of toxic salts or other substances that might interfere with the establishment of future subsistence of turf or plants.

10.3 EQUIPMENT

- A. The Contractor shall furnish the following equipment.
 - 1. Rolling Equipment. Unless otherwise approved by the Engineer, the machine for compacting mulch sodding shall be equipped with a single or tandem axle corrugated roller. It shall weigh not less than 400 lbs or more than 1000 lbs of rolling width for each axle. It shall be operated approximately parallel to the contour of slopes.
 - 2. Watering Equipment. Equipment shall apply water as specified on plans without operating on the slopes. A calibrated meter will be provided by the contractor to measure water.

10.4 CONSTRUCTION METHODS.

A. Broadcast Sprigging Operations.

1. Broadcast Sprigging Method A. Preparation of areas for broadcast sprigging method A shall consist of tillage with either a tandem disk plow, or an offset disk plow until the areas are suitable for sprig planting. The depth of tillage shall be approximately 4 inches. If rains or other conditions should pack the soil before being planted, the tillage shall be repeated. At least 125 feet per acre of sprigs shall be planted per hectare unless otherwise shown on the Plans. The sprigs shall be broadcast evenly and uniformly on the soil surface. Within two hours after the sprigs have been planted, the areas shall be disked to a depth of approximately 3 inches with either a tandem or offset disk plow.
2. Broadcast Sprigging Method B. At least 15 feet of sprigs shall be thoroughly incorporated into 100 cubic yards of stockpiled method B salvaged topsoil. A method approved by the Engineer shall be used to meter and distribute the sprigs into the stockpiled topsoil. During the mixing operation, both the soil and sprigs shall be kept moist. Preparation of areas for broadcast sprigging method B shall consist of scarifying on the contour, with approved equipment, the designated areas shown on the Plans prior to placing the soil sprig mixture. The soil sprig mixture shall be spread on the designated areas 5 inches thick, within 4 hours of manipulation.
3. Fertilizing, Rolling and Watering. The following procedures shall be used for both method A and method B of broadcast sprigging:
 - a. Fertilizer shall be applied in accordance with ODOT specifications.
 - b. The planted areas shall be rolled and compacted. Rolling of slopes shall be along approximate contour lines and, in a manner, approved by the Engineer.
4. The sprigged areas shall be watered within 24 hours after placement. Watering operations shall conform to ODOT specifications.

B. Planting Season and Weather Restrictions.

1. Erosion control operations shall be performed during the seasonal periods shown on the Plans. With written approval of the engineer, the contractor may perform permanent erosion control operations out of season if the contractor guarantees at least 70% cover at the beginning of the next planting season. As cut and fill sections are brought to grade and constructed to the lines and dimensions shown on the typical sections, the salvaged topsoil shall be promptly placed, finished and the specific erosion control item or items shall be constructed, if in accordance with seasonal limitations, as shown on

the Plans. Regardless of the dates specified, the work shall be suspended during excessively wet or dry weather conditions that would cause unsatisfactory results.

2. This work shall begin promptly and shall proceed without undue delay until completed or until interrupted by the "out-of-season period". When construction of an operation is interrupted by the "out-of-season period", construction shall be resumed immediately with the beginning of the "in season period" for that operation. If the contractor elects to place permanent erosion control out of season, the responsibility for repair and maintenance shall be at the contractor's expense.
3. Temporary erosion control operations shall be applied on all cuts, fills, and other disturbed erodible areas where the permanent operation was interrupted-by seasonal limitations. This work shall begin immediately after placement of topsoil or as otherwise directed by the Engineer and shall continue without undue delay.

C. Soil Moisture Requirements.

1. Soil moisture shall exist throughout the zone from 1 inch below the surface to at least 6 inches below the surface at the time of planting. The required moisture content of the soil may be estimated and judged closely by the hand-squeeze test. The soil should readily form a tight cast when squeezed in the hand. The cast should break into two pieces without crumbling and without leaving excess water on the hand after casting.
2. Sodded or sprigged areas shall be watered for 30 days after planting unless otherwise directed. The depth of watering with moving equipment shall be carried out on short sections until the soil is moist throughout the top 1 inch.
3. The application rate and fineness of the spray shall be adjusted according to wind velocity to provide uniform infiltration without appreciable erosion or excessive runoff.

D. Fertilizer Operations.

1. Fertilizer shall not be placed on hard or glazed surfaces. Fertilizer shall be applied at the rates shown on the Plans.
2. When satisfactory results can be obtained, disking for soil preparation, weed removal and incorporation of fertilizer may be accomplished in one operation.
3. If a fertilizer containing phosphorous is specified, the fertilizer shall be applied before placement of solid slab sod, mulch sod, row sprigging or broadcast sprigging and shall then be incorporated into the soil by disking.

4. Fertilizer containing nitrogen only shall be applied after the sodding and sprigging operations have been completed.
- E. Repair and Maintenance. The Contractor shall be responsible for repairs and maintenance of areas designated for sodding or sprigging until all work on the Contract or designated portion thereof has been completed and approved for final acceptance.
1. Repair. This work shall include recovery, replacement and compaction of soil that has been removed by erosion, filling and reshaping eroded areas, cleaning ditches, and refinishing slopes and medians to the approximate typical grading section shown on the Plans or as determined by the Engineer. Repair shall include resodding or sprigging, refertilizing, and watering damaged areas, which shall be performed during the specified planting season.
 2. Maintenance. This work shall consist of weed control by mowing, hand cutting, herbicides, or other approved methods. Weed growth on sodded areas shall be removed as often as determined by the Engineer. If herbicides are used, they shall be used in accordance with label instructions and shall have prior approval from the Engineer.

END OF SECTION

SECTION 02511 GRAVEL SURFACING

PART 1 GENERAL

1.1 SCOPE

- A. Gravel paving course, compacted.

1.2 RELATED SECTIONS

- A. **Section 02210** – Site Preparation and Grading.
- B. **Section 02225** – Trench Excavation, Backfill, and Compacting.

1.3 REFERENCES

- A. ASTM C136 – Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ODOT Standard Specifications for Highway Construction – Section 303.

1.4 TESTS

- A. Graduation of stone materials will be performed in accordance with ASTM C136.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Natural and artificial mixture of gravel and soil mortar.
- B. Gravel:
 - 1. Crushed or uncrushed stone.
 - 2. Free from objectionable, deleterious, or other injurious matter.
 - 3. Graded to ODOT designations Class 3 or Class 4.
 - 4. Class 7 may be used for non-levee roads.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify compacted subgrade is dry and ready to receive Work of this Section.

- B. Verify gradients and elevations of subgrade are correct.
- C. Beginning of installation means acceptance of existing conditions.

3.2 PLACING GRAVEL PAVING

- A. Spread gravel material over prepared base to a total compacted thickness of 6 inches, minimum.
- B. Level surfaces to elevations and gradients indicated.
- C. Compact placed gravel materials to achieve 95 percent Modified Proctor density at $\pm 2\%$ optimum moisture content in accordance with ASTM D1557 and **Section 02225**.
- D. Perform hand tamping in areas inaccessible to compaction equipment.

END OF SECTION

SECTION 02600
GENERAL PIPING REQUIREMENTS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section provides requirements for furnishing and installing piping for water and wastewater. Refer to related work specified in other sections to coordinate the complete installation.

1.2 RELATED WORK

- A. Division 1 - General
 Division 2 - Site Work

1.3 PROJECT RECORD DOCUMENTS

- A. Upon completion of all work, furnish prints and tracings showing locations and principal details and modifications of piping systems as built.
- B. Furnish all information on buried piping and utilities encountered during construction.

1.4 SUBMITTALS

- A. Submit product data and shop drawings on each type of pipe, valves, fittings and accessories in accordance with **Section 01300**.

1.5 WELDERS CERTIFICATION

- A. Employ welders qualified by current certification in the positions required, to perform welding operations. Contractor shall submit documentation for all welders on the job.

PART 2 PRODUCTS

2.1 PIPING

- A. Ductile Iron Pipe
 - 1. Ductile iron pipe shall conform to the requirements of AWWA C 150 and AWWA C 151. Use thickness Class 53 (minimum) for flanged or grooved end pipe.
 - 2. Ductile iron pipe shall be standard-thickness cement mortar lined in

accordance with AWWA C 104. Provided manufacturer's standard bituminous coating outside all ductile iron pipe unless otherwise noted.

3. All buried pipe and fittings shall be encased in poly wrap.

B. Steel Pipe

1. Black steel pipe for pressure less than 150 psi ambient temperatures shall be ASTM A 53 (ANSI B 125.1) or ASTM A 135 (ANSI B125.3), grade B seamless (smaller than 24 inches) or electric-resistance welded (for 24-inch and larger) black steel or hot dipped galvanized standard weight unless otherwise noted.
2. Stainless steel pipe shall be ASTM A 312 (ANSI B 135), Grade TP 304L seamless and welded stainless pipe.

C. Polyvinyl Chloride Pipe (PVC)

1. PVC pipe shall be Type 1, grade 1, manufactured in accordance with ASTM D 1785 (ANSI B72.7) and ASTM D 1784.
2. All PVC pipe shall be manufactured from virgin plastic.

2.2 PIPE JOINTS AND COUPLINGS

A. Screwed Joints

1. Make screwed joints using machine-cut ANSI taper pipe threads. All thread nipples are not permitted.

B. Welded Joints

1. Make welded joints as recommended by the standards of the American Welding Society or AWWA M11. Ensure complete penetration of deposited metal with base metal. Provide filler metal suitable for use with base metal. Keep inside of fittings free from accumulation of weld metal. Do not use mitered joints unless approved by the Engineer.

C. Flanged Joints

1. Use flat face companion flanges only with flat faced fittings, valves or equipment. Use flat faced flanges for cast iron and ductile iron pipe and raised-face flanges for all steel pipe unless otherwise noted. Use flange material to match pipe material. Use gasket material to match flanges type and application.
2. Use ASTM A 307, Grade B hex bolts and heavy hex nuts conforming to ANSI B18.2.1 and B18.2.2, respectively. 2. Use

ASTM A 307, Grade B hex bolts and heavy hex nuts conforming to ANSI B18.2.1 and B18.2.2, respectively. All bolts and nuts shall have Xylan (Fluoropolymer) coating.

3. Flanges shall be generally where indicated on drawings and shall conform to the following specifications:
 - a. Carbon steel flanges shall conform to ANSI B16.5 with materials conforming to ASTM A 105 or ASTM A 181, Grade II, 150 psi service.
 - b. Stainless steel flanges shall conform to ANSI B16.5 with materials conforming to ASTM A 182, Grade F 304L, 150 psi service.
 - c. Gray iron and ductile flanges shall be rated for 250 psi service and drilled with 125-pound bolt circle, conforming to ANSI B16.1 with materials conforming to AWWA C115.
 - d. Polyvinyl chloride (PVC) flanges shall be manufactured from Schedule 80, PVC, Type 1, Grade 1, with material conforming to ANSI D1784, 150-pound service, and dimension conforming to ANSI B16.5.
4. Flanges for ductile iron pipe may be cast integrally with the pipe, or they may be screwed or threaded ends of the pipe. Screwed-on flanges shall be attached to the pipe in the shop and, after attachment, the faces of the flanges and the ends of the pipe will be refaced so that the ends of the pipe will be even with the faces of the flanges, and the faces of the flanges will be perpendicular to the axis of the pipe.
5. Flanges for steel pipe with screwed joints shall be cast iron companion flanges in accordance with ANSI B16.1, Class 125. Welding flanges for steel pipe shall be steel flanges in accordance with AWWA C207, Class D, or slip-on flanges conforming to ANSI B16.5, Class 150, with a flat face.

D. Polyvinyl Chloride (PVC) Joints

1. In accordance with applicable ASTM Standards D 2564, and D 3213.
2. With Schedule 80 or heavier, use threaded joints. Provide sharp, clean pipe dies and Teflon thread tape. Make joints in strict accordance with manufacturer's recommendations.
3. With Schedule 40 or lighter, use solvent cement method in strict accordance with manufacturer's recommendations.
4. Flanged joints may be used in larger pipe sizes, 3 inches and up, in lieu of threaded joints or where specified. Flanges shall be as specified.

E. Flexible (Dresser-Type) Couplings

1. Flexible couplings shall be installed where shown on the drawings or

elsewhere where allowed by the Engineer for the Contractor's convenience. Flexible couplings shall be galvanized when on galvanized pipe or on pipe which is epoxy or cement lined, or when underground. Gaskets for flexible couplings shall be neoprene or Buna-N.

2. For ductile iron pipe, sleeve-type flexible coupling shall be Dresser Style 53, Rockwell 430 Series, or equal. For steel pipe, sleeve-type flexible coupling shall be Dresser Style 39, Rockwell type 411, or equal.
3. Flanged adapter couplings for ductile iron pipe shall be Dresser Style 127, Rockwell Type 912, or equal; flanged adapter couplings for steel pipe shall be Dresser Style 128, Rockwell Type 913, or equal. Flanged adapter couplings shall have not less than two anchor studs each.
4. Where flexible couplings are installed underground, Type 316 stainless steel bolts shall be used. The entire coupling shall be given a 20-mil coat of T.C. Mastic as manufactured by the Tape Coat Company, Inc., Bitumastic No. 50 as manufactured by Koppers Company, Inc., or equal.

F. Grooved-End (Victaulic) Couplings

1. The Contractor may use grooved end pipe and fittings with grooved end couplings in lieu of flanged or mechanical joints. Victaulic or grooved-end type couplings shall not be allowed in pipe systems with positive displacement pumps or pulsating flow characteristics.
2. Grooved end couplings shall be galvanized when used on galvanized pipe. When used on piping which is to be coal-tar epoxy coated, the inner and outer surfaces of the couplings shall receive a protective coating of coal-tar epoxy prior to installation if necessary.
3. Grooved-end couplings for use with ductile iron pipe shall be Victaulic. Couplings for use with steel pipe shall be Victaulic.
4. Bolts and nuts for grooved-end couplings shall be heat-treated carbon steel. When galvanized couplings are used, bolts and nuts shall be galvanized or 304 stainless steel. For grooved-end couplings installed in sewage Type 316 stainless steel bolts and nuts shall be provided.
5. Gaskets for grooved-end couplings shall be Buna-N. Use flush-seal gaskets with ductile iron pipe; gaskets for use with cement-lined steel pipe shall be captured between the ends of the pipe to protect the exposed metal from corrosion.

G. Restrained Joint:

1. Provide a restrained joint of push-on design in accordance with ANSI/AWWA C111/A21.11. Joints as manufactured by U.S. Pipe

(TR Flex), American Pipe (Lok-Fast and Lok-Set), or approved equal. Retainer glands and locking gaskets will not be acceptable. Any exposed or buried bolts and hardware to be Zylan coated or stainless-steel Type 316 steel unless otherwise specified on the plans.

H. Mechanical Joints

1. Provide a stuffing box type mechanical joint adapted to use gasket, cast iron gland and bolts. Use joints conforming to AWWA C111-72.

I. Push on Type Joints

1. Use push-on joints for cast iron and ductile iron pipe in accordance with AWWA C111-72 (ANSI A21.11-1972).

2.3 FITTINGS

A. General

1. Use fittings of same size as pipe they serve. Reducers are not permitted to facilitate an off-size fittings. Reducing bushings are also prohibited. Reduction in piping size will be made by reducing fittings. Fittings shall be lined and coated as specified for pipe they serve. Fittings for use with galvanized pipe shall be galvanized in accordance with ASTM A 153.

B. Screwed Fittings

1. Fittings for use with steel pipe with threaded joints shall be 150 pound malleable iron screwed fittings in accordance with ANSI B16.3. Provide pipe with American Standard Taper pipe threads. Drainage fittings for use with drain lines and other lines which are required to be graded shall be cast iron drainage screwed fittings in accordance with ANSI B16.12.

C. Flanged Fittings

1. Fittings for use with flanged joints on ductile iron pipe or on steel pipe shall be cast iron or ductile iron fittings conforming to ANSI B16.1. or AWWA C110. Flanges shall be faced and drilled in accordance with ANSI B16.1, Class 125. All fittings shall be double-thickness cement mortar lined.

D. Butt Welded Fittings

1. ASTM A 105 or A 350 forged steel butt fittings manufactured in accordance with ANSI B16.9. For stainless steel pipe, use ASTM A 403, Grade 304L butt welded fittings.

E. Grooved End Fittings

1. Grooved-end fittings for use with ductile iron pipe with grooved ends (victaulic-type joints) shall be rigid radius grooved and shall be cast iron conforming to ASTM A 48, Class 30-A, or ductile iron conforming to ASTM A 536, Grade 60-45-10. Fittings shall conform to the dimensional requirements of AWWA C110, except for end preparation.
2. Grooved-end fittings for use with steel pipe with grooved ends shall be cut grooved and shall be malleable iron conforming to ASTM A 47, Grade 32510, or ductile iron conforming to ASTM A 536, Grade 60-45-10, or forged steel conforming to ASTM A 106, Grade B.
3. Grooved end fittings shall be manufactured by the grooved end coupling manufacturer.
4. All grooved end fittings shall be cement mortar lined unless otherwise noted.

F. Polyvinyl Chloride (PVC) Fittings

1. Type I, Schedule 80, unless otherwise noted. Material shall meet the requirements of ASTM D 1784 and ASTM D 1785, fittings shall be in accordance with applicable ASTM Standards D 2464, D 2467 and D 3311.

G. Restrained Joint Fittings

1. Restrained joint fittings shall be ductile iron in accordance with applicable requirements of ANSI/AWWA C110/A21.10 with the exception of the manufacturer's proprietary design dimensions. Push-on joints for such fittings shall be in accordance with ANSI A21.11 and AWWA C111. Lining and seal coating of fittings shall be in accordance with specification section **02620**.

H. Mechanical or Push-on Fittings

1. Fittings for use with mechanical joint or push-on joint ductile iron pipe shall be cast iron or ductile iron fittings conforming to AWWA C153 with joints conforming to AWWA C111, unless specified otherwise. All fittings shall be double thickness cement mortar lines.

2.4 BRANCH CONNECTIONS

A. Galvanized Steel Pipe

1. Use threaded or grooved coupled straight size reducing tee, hot-dipped galvanized. When branch is smaller than header, a hot-dipped galvanized nipped and reducing coupling or swagged nipple may be used.

B. Black Steel Pipe

1. For pipe 22 inches and smaller, use threaded straight size reducing tee. When branch is smaller than header, a nipple and reducing coupling or swaged nipple may be used.
2. For 3 inches and larger welding pipe, when branch size is the same size as header, use welding tee. When the branch is smaller than the header, use weldolets. For threaded branch connections, use 3000-pound threadolets.

C. Cast or Ductile Iron Pipe

1. For 2 inches and smaller, use branch connections for drain tapplings in conformance with ANSI B16.1-1967. For all other branch connections, use fittings make-up.

2.5 UNIONS

A. Malleable Iron Unions

1. Use 150-pound standard (300-pound WOG) malleable iron, ground joint unions with bronze seat. Provide flanged union joints on piping 2-1/2 inches and larger. Use service galvanized unions for galvanized pipe. Use insulating unions where indicated or required where joining dissimilar metals.

B. Polyvinyl Chloride (PVC) Unions

1. Use Schedule 80 threaded PVC unions .

2.6 GASKETS

A. Provide gaskets of neoprene, unless otherwise noted.

B. Provide full face gaskets or flat faced and ring gaskets for raised face flanges. Use 1/16 inch thick gaskets for pipe and smaller than 6 inches and 1/8 inch thick gaskets for pipe 6 inches and larger. Gasket dimension shall conform to ANSI B16.21.

C. Provide insulating flange gasket kit where indicated or required where

joining dissimilar metals or pipe materials.

PART 3 EXECUTION

3.1 PIPE LAYOUT AND INSTALLATION

A. Layout and Preparation

1. Make piping layout and installation as shown on the plan documents, but also taking into consideration the most advantageous use of headroom, valve access, opening and equipment clearance and clearance for other work.
2. Do not cut or weaken any structural member.
3. Cut pipes accurately to measurement determined at the site. After cutting pipe, ream it to remove burrs to full inside diameter.

B. Installation

1. Install piping neatly, free from unnecessary traps and pockets. Work into place without springing or forcing. Use fittings to make all changes in direction. Field bending is prohibited. Make all connections to equipment using flanged joints, unions or grooved coupled joints. Make reducing connections with reducing fittings only.
2. Install all other pipe according to manufacturer's recommendations using the recommended tools.

C. Handling

1. Handle pipe, fittings and accessories in a manner that will ensure their installation in the work in sound, undamaged condition. In unloading, reloading, hauling and laying pipe and fittings, use proper equipment, tools and methods to prevent damage. Hooks inserted in ends of pipe must have broad, well-padded contact surfaces.

D. Cutting Pipe

1. Perform cutting of cast iron pipe in a neat manner, without damage to pipe or to the cement lining. Cut pipe smooth, straight and at right angles to pipe axis with mechanical pipe cutters. In locations where use of mechanical cutters would be difficult or impractical, existing pipe may be cut with diamond point chisels, saws, or other tools which will cut pipe without damaging impact or shock.

E. Cleaning

1. Clean interior of all pipe and fittings thoroughly of all foreign matter before installing and keep clean until the work has been accepted. Remove all lumps, blisters and excess coating from exterior spigot and interior bell surfaces. wire brush such surfaces and wipe clean and dry, free from oil and grease, before placing spigot into bell. Keep joint contact surfaces clean until joining is completed. Take every precaution to prevent foreign material from entering pipe while it is being installed. Do not place debris, tools, clothing or other materials in pipe.

F. Laying Pipe

1. Protect pipe from lateral displacement by means of pipe embedment material installed as provided in trench backfill specification.
2. Do not under any circumstances lay pipe in water or in unsuitable weather or trench conditions.
3. Lay pipe with bell ends facing direction of laying except when making closures.
4. Lay pipe on bedding as specified in the section on Excavation, Trenching and Backfilling for utilities, as required in individual pipe material specification.
5. Excavate trenching for underground piping to the required depth to ensure 3 feet minimum cover over the pipe unless otherwise indicated on the drawings. Excavation and backfill shall be performed in accordance with Division 2.

G. Plastic Pipe

1. Installation shall be in accordance with applicable ASTM Standards D 2774, D 2855 and F 402.

3.2 PIPE JOINT INSTALLATION

A. Dissimilar Materials

1. Make joints between dissimilar metal pipe and equipment using insulating unions or insulating flange gasket assembly. Joints between above ground piping and below-ground piping are to be considered the same dissimilar metal pipe.

B. Screwed Joints

1. Make up all threaded joints a suitable joint lubricating compound applied to male threads only. Thoroughly ream all field cuts and carefully make all connections so that thread engagement will be secured.

C. Welded Joints

1. Weld and fabricate piping in accordance with ANSI Standard B31.1, latest edition, Code for Pressure Piping. Machine beveling in shop is preferred. Field beveling may be done by flame cutting to acceptable standards.
2. Align piping and equipment so that no part is offset more than 1/15 inch. Set all fittings and joint square and true preserve alignment during welding operation. Use of alignment rods inside pipe is prohibited.
3. Do not permit any weld to project within the pipe so as to restrict it. Tack welds, if used, must be of the same material and made by the procedure as the completed weld. Otherwise, remove tack welds during welding operation.
4. Do not split, bend, flatten or otherwise damage piping before, during or after installation.
5. Remove dirt, scale and other foreign matter from inside piping before tying in sections, fittings, valves or equipment.

D. Flanged Joints

1. Prior to installation of bolts, accurately center and align flanged joints to prevent mechanical prestressing of flanges, pipe and equipment. Align bolt holes to straddle the vertical, horizontal, or north-south center line.
2. Install proper gaskets, suitable for intended service and factory cut to proper dimensions. Secure with a suitable gasket cement.
3. Tighten bolts progressively to prevent unbalanced stress. Draw bolts tight to ensure proper seating of gaskets.
4. Take special care when attaching suction and discharge piping to jumping equipment to ensure that no stresses are transmitted or imposed on pump suction and discharge flanges by the connected piping. Install and permanently support all such piping to accurately match bolt holes and to provide uniform contact over entire installation of bolts in flanges. In addition, pump connection piping shall be free to move parallel to its longitudinal center line while bolts in pump connection flanges are tightened.

3.3 OFFSET AND FITTINGS

- A. Because of the small scale of drawings, the indication of all offsets and fittings is not possible. Carefully investigate the structural and finish conditions affecting the work and take such steps as may be required to meet such conditions.
- B. Provide proper space for covering and removal of pipe, and special clearances for offsets and fittings.

3.4 SECURING AND SUPPORTING

A. General

- 1. Support piping as required to maintain line and grade, with due provisions for expansion and contraction. Use approved hot-dipped galvanized hangers, rollers, anchors and guides properly connected to structural members. Do not support piping from other piping. Use non-metallic and stainless steel hangers where indicated on the plans.

B. Hangers and Straps

- 1. Place hangers not more than 6 feet apart on 1/2-inch and 3/4-inch pipes or 10 feet apart on larger pipes. Place hangers not more than 6 feet apart for all sizes of PVC pipe.
- 2. Support vertical risers with hot-dipped galvanized steel strap pipe clamps properly supported at every floor unless otherwise shown on drawings.
- 3. Perforated bar hangers, straps, wires or chains are not permitted.

C. Unistrut Pipe Supports

- 1. Provide standard Unistrap metal framing members and appurtenances for pipe support when applicable. Mult-A-Frame and Power-Strut pipe support systems also are acceptable. Hot-dip galvanize all such members and appurtenances.

D. Anchors

- 1. Provide anchors as indicated or required. Unless otherwise detailed on drawings, use pipe anchors consisting of heavy steel collars with lugs and bolts for clamping to pipe and attaching to anchor braces. Install anchor braces in the most effective manner to secure desired results.
- 2. Do not install supports, anchors or similar devices where they will damage construction during installation or because of the weight or

the expansion of the pipe.

E. Pipe Guides

1. For plant piping, provide pipe alignment guides as required by pipe manufacturer.
2. Guide expansion joints with two guides on the side opposite the anchor.

F. Substitution

1. Locations other than trenches: Provide blocking, struts, anchorages or other supports for fittings installed in fills or other unstable reaction ground above grade or exposed within structures as required by drawings or as directed by Engineer.
2. Protection of Metal Surfaces: Adequately protect all steel clamps, rods, bolts and other metal accessories used in reaction anchorages, or joint harness subject to submergence or contact with earth or fill material and not encased in concrete from corrosion with not less than two coats of bitumastic, heavy coal-tar coating material applied to clean, dry metal surfaces. First coat shall be dry and hard before second coat is applied. Paint metal surfaces exposed above grade or within structures with two coats (in addition to a primer coat) of a paint.

3.5 PIPE SLEEVES

A. Sleeves

1. Unless shown as wall pipe on the plans, fit with sleeves all pipes passing through masonry and concrete construction. Fabricate sleeves of hot dipped galvanized steel pipe unless otherwise indicated. Size sleeve for minimum clearance between pipe or insulation and sleeve.
2. Extend each sleeve through the floor or wall. Cut the sleeve flush with each surface, except that in exposed locations, extend floor sleeves 2 inches above finished floor line.
3. Calk all sleeves watertight and airtight. Seal annular space between pipes and sleeves with a Thunderline Link-Seal or equal.

3.6 ISOLATION VALVES, DRAIN VALVES AND INSTRUMENT TAPS

A. Isolation Valves

1. Provide piping systems with line-size shutoff valves located at the risers, at main branch connections to mains for all equipment, and at

other locations as indicated and required.

B. Drain Valves

1. For plant services, install drain valves where shown.

C. Instrument Taps

1. Instrument Taps for Liquid Process Service. Provide 3/4" size tap process pipe branch connection as specified with 3/4 inch nipple terminated with a 3/4 inch shutoff valve. The nipple and shutoff valve shall be as specified in the individual piping material specifications.
2. Location of instrument taps shall be generally as shown on piping drawings.

3.7 CLEANING OF PIPING SYSTEMS

A. General

1. Clean piping system thoroughly. Purge pipe of construction debris and contamination before placing the systems in service. Use whatever temporary connections are required for cleaning, purging and circulating.

B. Strainer

1. For each system when specified in that system, install temporary strainers in front of pumps, tanks, water still, solenoid valves, control valves and other equipment where permanent strainers are not indicated. Keep these strainers in service until the equipment has been tested, then remove either entire strainer or straining element only. Fit strainers with a blowoff valve.

END OF SECTION

SECTION 02620
CEMENT-LINED DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.1 SCOPE

- A. Provide cement-lined ductile iron pipe and gray cast iron or ductile iron fittings specified. Pipe and fittings shall be manufactured in the United States. Foreign made products shall be unacceptable.

1.2 RELATED SECTIONS

- A. **Section 02225** – Trench Excavation, Backfilling, and Compacting.

1.3 REFERENCES

- A. ANSI A21.11 – Standard for Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
- B. ANSI A21.14 – Ductile Iron Fittings 3 in. through 24 in., for Gas.
- C. ANSI A21.15 – Standard for Flanged Ductile Iron Pipe with Threaded Flanges.
- D. ANSI A21.4 – Standard for Cement-Mortar Lining for Ductile Iron Pipe and Fittings.
- E. ANSI A21.50 – Standard for Polyethylene Encasement for Ductile Iron Pipe.
- F. ANSI B16.1 – Standard for Cast Iron Pipe Flanges and Flanged Fittings.
- G. ANSI B16.21 – Nonmetallic Flat Gaskets for Pipe Flanges.
- H. ASTM A307 – Specifications for Carbon Steel Externally Threaded Standard Fasteners.
- I. ASTM A563 – Specifications for Carbon and Alloy Steel Nuts.
- J. ASTM D1248 – Specification for Polyethylene Plastic Molding and Extrusion Materials.
- K. AWWA C110 – Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in., for Water and Other Liquids.

- L. AWWA C111 – Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.
- M. AWWA C115 – Standard for Flanged Ductile-Iron Pipe with Threaded Flanges.
- N. AWWA C153 – Ductile iron compact fittings for water service.
- O. AWWA C207 – Standard for Steel Pipe Flanges for Waterworks Service, Sizes 4 in. through 144 in.

PART 2 PRODUCTS

2.1 PIPE

- A. Pipe shall be Class 250 and comply with applicable requirements of ANSI A21.50. Flanged pipe shall meet ANSI/AWWA C115/A21.15.
- B. Pipe shall be jointed with push-on mechanical, flanged, restrained, or flexible joints meeting applicable requirements of ANSI A21.11-72 and ANSI 21.15-75.
- C. Ductile iron pipe shall receive standard thickness cement lining and bituminous seal coat in conformance with ANSI 2.14-74.
- D. Ductile iron pipe shall be coated on the exterior with either coal tar or asphalt base material approximately 1 mil thick.
- E. Flexible Joint (Ball and Socket) Pipe: Class 58.

2.2 FITTINGS

- A. Gray or ductile iron, 250 psi pressure class, cement-lined and seal-coated. Where taps are shown on fittings, tapping bosses shall be provided.
 - 1. Flanged Joint: ANSI/AWWA C110 and ANSI B16.1, faced and drilled 125-pound ANSI standard.
 - 2. Mechanical Joint: ANSI/AWWA C153 and ANSI/AWWA C111.
- B. Cement Linings: In accordance with ANSI A21.4.
- C. Fittings shall receive an exterior coating of 1 mil thick bituminous material in accordance with ANSI A21.4.

- D. Fittings shall have distinctly cast on them the manufacturer's identification, pressure rating, nominal diameter of openings, and the number of degrees or fraction of the circle on bends.

2.3 FLANGES

- A. ANSI A21.15/AWWA C115, threaded, 250 psi working pressure, ANSI 125-pound drilling.

2.4 BOLTS

- A. For Class 125 FF flanges use carbon steel, ASTM A307, Grade A hex head bolts and ASTM A563, Grade A hex head nuts. **Bolts and nuts shall be coated with Xylan coating.**
- B. For Class 250 RF flanges use carbon steel, ASTM A307, Grade B hex head bolts and ASTM A563, Grade A heavy hex head nuts. **Bolts and nuts shall be coated with Xylan coating.**

2.5 GASKETS

- A. Gaskets for mechanical joints shall be rubber, conforming to ANSI A21.11, AWWA C111.
- B. Gaskets for flanged joints shall be 1/8-inch thick neoprene for pipe 6" and larger and 1/16-inch thick for smaller than 6" conforming to applicable parts of ANSI B16.21.
- C. Gasket Material: Free from corrosive alkali or acid ingredients and suitable for use in potable waterlines.
- D. Gaskets shall be full-face type for 125-pound FF flanges.

2.6 LUBRICANT

- A. Lubricant for push-on or mechanical joint end piping shall be manufacturer's standard.

2.7. Mechanical Joint Restraint

Restraint devices for mechanical joint fittings and appurtenances shall be used on all connections and shall conforming to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53, shall conform to the following:

- A. Design

1. Restraint devices for nominal pipe sizes 3 inch through 48 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.
2. The devices shall have a working pressure rating of 350 psi for 3-16 inch and 250 psi for 18-48 inch. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.

B. Material

1. Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.
2. Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.
3. Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.
4. Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

C. Traceability

1. An identification number consisting of year, day, plant and shift (YYDDD)(plant designation)(Shift number), shall be cast into each gland body.
2. All physical and chemical test results shall be recorded such that they can be accessed via the identification number on the casting. These Material Traceability Records (MTR's) are to be made available, in hard copy, to the purchaser that requests such documentation and submits his gland body identification number.
3. Production pieces that are too small to accommodate individual numbering, such as fasteners and wedges, shall be controlled in segregate inventory until such time as all quality control tests are passed. These component parts may then be released to a general inventory for final assembly and packaging.
4. All components shall be manufactured and assembled in the United States. The purchaser shall, with reasonable notice, have the right to plant visitation at his/her expense.

D. Approvals

1. Restraint devices shall be Listed by Underwriters Laboratories (3" through 24" inch size) and Approved by Factory Mutual (3" through 12" inch size).

E. Restraint Coating System

Coating for restraint devices shall consist of the following:

All wedge assemblies and related parts shall be processed through a phosphate wash, rinse and drying operation prior to coating application. The coating shall consist of a minimum of two coats of liquid thermoset epoxy coating with heat cure to follow each coat.

All casting bodies shall be surface pretreated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.

PART 3 EXECUTION

3.1 HANDLING PIPE

- A. Do not damage the cement lining when handling pipe.

3.2 INSTALLATION

- A. All ductile iron pipe shall be installed per AWWA C600-05 standards.

3.3 RELATION TO SEWER LINE

- A. Laying water main, follow Oklahoma Department of Environmental Quality requirements. Maintain 10-foot horizontal separation and 24-inch vertical separation in crossing.

3.4 CUTTING PIPE

- A. Cut pipe with milling type cutter, rolling pipe cutter, or abrasive saw cutter. Do not flame cut.

3.5 DRESSING CUT ENDS

- A. Dress cut ends of pipe in accordance with the type of joint to be made.
- B. Dress cut ends of mechanical joint pipe to remove sharp edges or projections, which may damage the rubber gasket.
- C. Dress cut ends of pipe for flexible couplings and flanged coupling adapters as recommended by the coupling or adapter manufacturer.

3.6 Installation

- A. Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly.
- B. Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.

3.7 FABRICATION OF FLANGED PIPE AND FITTINGS

- A. Flanged pipe and fittings shall be fabricated in the shop, not in the field, and delivered to the job site with flanges in place and properly faced.
- B. Threaded flanges shall be individually fitted and machine tightened on the threaded pipe by the manufacturer.
- C. Flanges shall be faced after fabrication in accordance with ANSI A21.15/AWWA C115.

3.8 JOINTING FLANGED PIPE

- A. Prior to connecting flanged pipe, the faces of the flanges shall be thoroughly cleaned of oil, grease, and foreign material.
- B. The rubber gaskets shall be checked for proper fit and thoroughly cleaned.
- C. Care shall be taken to assure proper seating of the flanged gasket.
- D. Bolts shall be tightened so that the pressure on the gasket is uniform.
- E. Torque-limiting wrenches shall be used to ensure uniform bearing insofar.
- F. If joints leak when the hydrostatic test is applied, the gaskets shall be removed and reset and bolts retightened.

3.9 TESTING

- A. Lines shall be hydrostatically or pneumatically tested. Test procedures shall be as specified in **Section 02661**.

END OF SECTION

SECTION 02630
POLYVINYL CHLORIDE (PVC) PRESSURE PIPE AND FITTINGS

PART 1 GENERAL

1.1 SCOPE

- A. Provide polyvinyl chloride (PVC) pipe and fittings.

1.2 REFERENCES

- A. ASTM D1784 – Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- B. ASTM D2241 – Specifications for Poly (Vinyl Chloride (PVC) Pressure – Rated Pipe (SDR Series).
- C. ASTM D3139 – Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
- D. ASTM F477 – Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- E. AWWA C110/A21.10 – American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in. For Water and Other Liquids.

PART 2 PRODUCTS

2.1 PIPE

- A. PVC pressure pipe, Class 200, SDR-21 in compliance with ASTM D1784 and manufactured from virgin PVC compound with a cell classification of 12454 with gasket joints and integral bell for buried pressure piping.
- B. PVCO pressure pipe, Class 200 in compliance with ASTM F1483 and manufactured from virgin PVC compound with a cell classification of 12454 with gasket joints and integral bell for buried water piping.
- C. **Pipe and fittings shall be manufactured in the United States. Foreign made products shall be unacceptable.**
- D. Pipe shall be permanently marked at 5-foot intervals with the following information:
 - 1. Nominal Size.
 - 2. Material code designation.
 - 3. Manufacturer's name or trademark and production record code.
 - 4. ASTM or AWWA certification.

5. SDR designation.
6. Plastic pipe must bear the seal of the National Sanitation Foundation.

E. Warranty:

1. Manufacturer of the pipe shall warrant product for a period of not less than one (1) year.
2. Forward copies of warranty to the Owner.
3. Replace defective materials at no extra cost to the Owner.

2.2 JOINTS

- A. Buried Pipe: Gasketed slip joint.
- B. Comply with ASTM D3139.

2.3 FITTINGS

- A. Fittings 2 Inches and Larger: Gray or ductile iron, 250-psi pressure class, cement-lined and seal-coated. Where taps are shown on fittings, tapping bosses shall be provided.
 1. Flanged Joint – ANSI/AWWA C153 and ANSI B16.1, faced and drilled 125-pound ANSI standard.
 2. Mechanical Joint: ANSI/AWWA C153 and ANSI/AWWA C111.
- B. Cement Linings: In accordance with ANSI A21.4.
- C. Fittings shall receive an exterior coating of 1 mil thick bituminous material in accordance with ANSI A21.4.
- D. Fittings shall have distinctly cast on them the manufacturer's identification, pressure rating, nominal diameter of openings, and the number of degrees or fraction of the circle on bends.
- E. Fittings Smaller than 2 Inches: PVC.

2.4 GASKETS

- A. As recommended by pipe manufacturer to conform to pipe.
- B. Comply with ASTM F477.

2.5 MARKING TAPE

- A. Install on pressure systems.

2.6 MECHANICAL JOINT RESTRAINT

Restraint devices for mechanical joint fittings and appurtenances conforming to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53, shall conform to the following:

A. Design

1. Restraint devices for nominal pipe sizes 3 inch through 36 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.
2. The devices shall have a working pressure rating equal to that found in the most current product brochure. Ratings are for water pressure and must include a minimum safety factor of 2:1 in all sizes.

B. Material

1. Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.
2. Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.
3. Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

B. Traceability

1. An identification number consisting of year, day, plant and shift (YYDDD) (plant designation) (Shift number), shall be cast into each gland body.
2. All physical and chemical test results shall be recorded such that they can be accessed via the identification number on the casting. These Material Traceability Records (MTR's) are to be made available, in hard copy, to the purchaser that requests such documentation and submits his gland body identification number.
3. Production pieces that are too small to accommodate individual numbering, such as fasteners and wedges, shall be controlled in segregate inventory until such time as all quality control tests are passed. These component parts may then be released to a general inventory for final assembly and packaging.
4. All components shall be manufactured and assembled in the United States. The purchaser shall, with reasonable notice, have the right to plant visitation at his/her expense.

D. Approvals

1. Mechanical Joint Restraints shall be Listed by Underwriters Laboratories in the 2 inch through 12 inch sizes.
2. Mechanical Joint Restraints shall be Factory Mutual Approved in the 2 inch through 12 inch sizes.
3. Mechanical Joint Restraints, 2 inch through 36 inch, shall meet or exceed the requirements of ASTM F1674 of the latest revision.
4. Mechanical joint restraint shall be American made.

E. Restraint Coating System

Coating for restraint devices shall consist of the following:

All wedge assemblies and related parts shall be processed through a phosphate wash, rinse and drying operation prior to coating application. The coating shall consist of a minimum of two coats of liquid thermoset epoxy coating with heat cure to follow each coat.

All casting bodies shall be surface pretreated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.

PART 3 EXECUTION

3.1 INSTALLATION

- A. All PVC pipe shall be installed per AWWA C605-05 standards.

3.2 GENERAL

- A. Rigid PVC pipe shall be cut, made up, and installed in accordance with the pipe manufacturer's recommendations.
- B. Offset shall be as recommended by the manufacturer for the maximum temperature variation between time of installation and final use.

3.3 TRACE WIRE

- A. Furnish and install a 14-gauge, CCS, Copper Clad Steel trace wire insulated with 30 Mil HDPE insulation with PVC pressure pipe.
- B. Run wire continuous from valve box to valve box, meter box, air release vault, cleanout, or other access points.
- C. Bring wire up inside boxes and vaults in an accessible method.

- D. Bring wire around or tape wire to each pipe section.
- E. Pipe testing shall include following trace wire.
- F. Wire breaks shall be repaired at no additional expense to the Owner.

3.4 MARKING TAPE

- A. Marking tape shall be installed 12 inches, minimum above the top of pipe or service line.
- B. The tape shall be in addition to the trace wire specified.

3.5 THRUST BLOCKS

- A. Install 2,500-psi concrete thrust blocks at bends, wyes, or other thrust points on pressure piping.
- B. Block to bear against undisturbed soil and shall be of size and with bearing area as shown on Drawings.

3.6 TESTING

- A. Pressure lines shall be hydrostatically tested at the pressures listed in Section 02661.
- B. Use pipe-locating equipment to test continuity of trace wire.
- C. Engineer or representative shall observe and document trace wire and pressure test.

3.7 INSTALLATION

- A. Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly.
- B. Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.

3.8 SEPARATION

- A. Horizontal separation.

1. Measure the separation distance edge to edge.

2. Locate water mains at least 10 feet horizontally from any existing or proposed storm sewers, raw water lines, petroleum product lines, natural gas lines, and other buried utility lines.
3. Locate cast iron waterlines at least 10 feet from any gasoline storage tank and lines and PVC water lines at least 50 feet horizontally from any gasoline storage tank and lines.
4. Locate waterlines at least 15 feet from all parts of septic tanks and absorption fields, or other sewage treatment and disposal systems.

B. Vertical Separation.

1. Measure the separation distance from edge to edge.
2. Arrange the piping so that joints in a 20-foot length of PVC or 18-foot length of cast iron sewer pipe will be equidistant from the water main. Where a water main crosses under a sewer, provide adequate structural support for the sewer to prevent damage to the water main.
3. Maintain a 2-foot vertical separation between waterlines and any existing or proposed storm sewers, raw water lines, petroleum product lines, natural gas lines, and other buried utility lines.

C. Special Conditions.

1. When it is impossible to obtain proper horizontal and vertical separation as stipulated in (1) and (2) of this subsection, design and construct the other line equal to water pipe, and pressure test it to assure water tightness of joints adjacent to the water line prior to backfilling.

END OF SECTION

SECTION 02631
POLYVINYL CHLORIDE (PVC) PIPE (C900/C905)

PART 1 GENERAL

1.1 SCOPE

- A. Provide polyvinyl chloride (PVC) pipe and fittings in accordance with AWWA standards.

1.2 RELATED SECTIONS

- A. **Section 02225** - Trench Excavation, Backfill, and Compacting.
- B. **Section 02620** - Cement Lined Ductile Iron Pipe and Fittings
- C. **Section 02661** - Hydrostatic Testing of Water Distribution System.

1.3 REFERENCES

- A. ASTM D1784 – Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- B. ASTM D2241 – Specifications for Poly (Vinyl Chloride (PVC) Pressure – Rated Pipe (SDR Series).
- C. ASTM D3139 – Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
- D. ASTM F477 – Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- E. AWWA C110/A21.10 – American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in. For Water and Other Liquids.
- F. ANSI/AWWA C-900-16 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-inch through 60-inch, for Water Distribution.

PART 2 PRODUCTS

2.1 PIPE

- A. AWWA C-900 PVC Pipe: (4"-60") The pipe shall be **DR 60** (minimum) Class 235psi, cast iron pipe o.d. base that meets all the requirements of AWWA C-900, ASTM D1784, and ASTM D2241. All pipe shall be suitable for use as a pressure conduit at a maximum hydrostatic working pressure of 150 psi at 73°F. Provisions must be made for expansion and contraction at each joint with an elastomeric ring and integral thickened bell as part of each joint. The dimensions of the gasket joint shall meet the requirements provided in ASTM D3139 when measured in accordance with ASTM D2122.
- B. **All Pipe and fittings shall be manufactured in the United States. Foreign made products shall be unacceptable.**
- C. Pipe shall be permanently marked at 5-foot intervals with the following information:
 - 1. Nominal Size.
 - 2. Material code designation.
 - 3. Manufacturer's name or trademark and production record code.
 - 4. ASTM or AWWA certification.
 - 5. DR designation.
 - 6. Plastic pipe must bear the seal of the National Sanitation Foundation.
- D. Warranty:
 - 1. Manufacturer of the pipe shall warrant product for a period of not less than one (1) year.
 - 2. Forward copies of warranty to the Owner.
 - 3. Replace defective materials at no extra cost to the Owner.

2.2 JOINTS

- A. Buried Pipe: Gasketed slip joint.
- B. Comply with ASTM D3139.

2.3 FITTINGS

- A. Refer to **Specification 02620**

2.4 GASKETS

- A. As recommended by pipe manufacturer to conform to pipe.
- B. Comply with ASTM F477.

2.5 MARKING TAPE

- A. Install on pressure systems.
- B. Terra Tape "Extra Stretch" or approved equal.

2.6 Mechanical Joint Restraint (All Fittings)

Restraint devices for mechanical joint fittings and appurtenances conforming to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53, shall conform to the following:

A. Design

- 1. Restraint devices for nominal pipe sizes 3 inch through 36 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.
- 2. The devices shall have a working pressure rating equal to that found in the most current product brochure. Ratings are for water pressure and must include a minimum safety factor of 2:1 in all sizes.

B. Material

- 1. Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.
- 2. Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.
- 3. Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

C. Traceability

- 1. An identification number consisting of year, day, plant and shift (YYDDD) (plant designation) (Shift number), shall be cast into each gland body.
- 2. All physical and chemical test results shall be recorded such that they can be accessed via the identification number on the casting. These Material Traceability Records (MTR's) are to be made available, in

hard copy, to the purchaser that requests such documentation and submits his gland body identification number.

3. Production pieces that are too small to accommodate individual numbering, such as fasteners and wedges, shall be controlled in segregate inventory until such time as all quality control tests are passed. These component parts may then be released to a general inventory for final assembly and packaging.
4. All components shall be manufactured and assembled in the United States. The purchaser shall, with reasonable notice, have the right to plant visitation at his/her expense.

D. Approvals

1. Mechanical Joint Restraints shall be Listed by Underwriters Laboratories in the 4 inch through 60 inch sizes.
2. Mechanical Joint Restraints shall be Factory Mutual Approved in the 4 inch through 60 inch sizes.
3. Mechanical Joint Restraints, 4 inch through 60 inch, shall meet or exceed the requirements of ASTM F1674 of the latest revision.
4. Mechanical joint restraint shall be Series 2000PV produced by EBAA Iron Inc. or approved equal.

E. MEGA-BOND® Restraint Coating System

Coating for restraint devices shall consist of the following:

All wedge assemblies and related parts shall be processed through a phosphate wash, rinse and drying operation prior to coating application. The coating shall consist of a minimum of two coats of liquid thermoset epoxy coating with heat cure to follow each coat.

All casting bodies shall be surface pretreated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.

The coating system shall be MEGA-BOND by EBAA Iron, Inc. or approved equal. Requests for approved equal must submit coating material and process details for review prior to bid.

For more information regarding MEGA-BOND, refer to the MEGA-BOND brochure or visit www.ebaa.com.

PART 3 EXECUTION

3.1 GENERAL

- A. Rigid PVC pipe shall be cut, made up, and installed in accordance with the pipe manufacturer's recommendations.
- B. Offset shall be as recommended by the manufacturer for the maximum temperature variation between time of installation and final use.

3.2 TRACE WIRE

- A. Furnish and install a 14-gauge, CCS, Copper Clad Steel trace wire insulated with 30 Mil HDPE insulation with PVC pressure pipe.
- B. Run wire continuous from valve box to valve box, meter box, air release vault, cleanout, or other access points.
- C. Bring wire up inside boxes and vaults in an accessible method.
- D. Bring wire around or tape wire to each pipe section.
- E. Pipe testing shall include following trace wire.

3.3 THRUST BLOCKS

- A. Install 2,500-psi concrete thrust blocks at bends, wyes, or other thrust points on pressure piping.
- B. Block to bear against undisturbed soil and shall be of size and with bearing area as shown on Drawings.

3.4 TESTING

- A. Pressure lines shall be hydrostatically tested at the pressures listed in **Section 02661**.
- B. Use pipe-locating equipment to test continuity of trace wire.
- C. Engineer shall observe and document trace wire test.

3.5 SEPARATION

- A. Field Verify and maintain 10 feet horizontal and / or 2 feet vertical separation between sanitary sewer and potable water lines. All other piping shall maintain a minimum separation of 6 inches.

- B. If field conditions cannot meet paragraph A, Construct the sewer line pipe equal to pressure water line pipe with pressure testing to assure water tightness of joints adjacent to the water line, prior to backfilling. Sewer lines may not be laid in the same trench as water lines, regardless of pipe material used.

END OF SECTION

SECTION 02633 HDPE PIPE

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. The work performed under this section includes, but is not limited to, the supply and installation of High Density Polyethylene (HDPE) Pipe, Tubing and fittings as shown.
 - 1. Provide HDPE pipe and fittings complete with all necessary jointing facilities and materials, specials, mechanical joint adapter kits and other appurtenances required for installation in and completion of the water pipelines to be constructed.
 - 2. Provide HDPE service tubing complete with all necessary jointing facilities and materials, and other appurtenances required for installation in and completion of the water services to be constructed.

1.2 QUALITY ASSURANCE

- A. References, American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), Federal Specifications (FS), International Standards Organization (ISO), and manufacturer's printed recommendations.
- B. CONTRACTOR or SUBCONTRACTOR performing any fusion (heat or electrofusion) on the HDPE pipe shall be able to provide evidence and references for satisfactory service in at least 3 projects of similar pipe diameter and with similar service types. These references may be asked for and approved before the contract is awarded.

1.3 SUBMITTALS

- A. Shop drawings and manufacturer's literature for all CONTRACTOR supplied materials shall be promptly submitted to the OWNER for approval.
- B. The following items shall be submitted before delivery of HDPE pipe, tubing or fittings:
 - 1. Pipe: Certification by the manufacturer that the HDPE material and pipe was manufactured and tested in accordance with American National Standards Institute (ANSI) / American Water Works Association (AWWA), C-906.

2. Service Tubing: Certification by the manufacturer that the HDPE material and tubing was manufactured and tested in accordance with ANSI/AWWA, C-901.
3. All water main piping and components shall be certified for conformance to ANSI / National Sanitation Foundation (NSF) International Standard 14, and NSF Standard 61, Drinking Water System Components – Health Effects, except Section 9, Mechanical Plumbing Product. The piping and components must display the ANSI/NSF 61 seal.
4. Manufacturer's installation instruction and literature to the CONTRACTOR so that manufacturer's recommended procedure and practice of installing pipe and fittings are followed.

1.4 MANUFACTURERS

- A. HDPE Pipe. HDPE pipe shall be as manufactured by Performance Pipe, North American Pipe Company, CSR Poly Pipe Industries, Charter plastics, W. L. Plastics, Flying W. Plastics, J.M. Eagle.

1.5 PRODUCT HANDLING

- A. Handle pipe and fittings to insure delivery in a sound undamaged condition.

1.6 JOB CONDITIONS

- A. Do not lay pipe when trenches or weather conditions are not suitable for such work.

PART 2 PRODUCTS

2.1 PIPE MATERIAL

- A. HDPE Pipe. HDPE pipe shall conform to the latest edition of ANSI/AWWA C901 and C906. Material used in the manufacture of HDPE pipe shall conform to the HDPE Standard Code PE4710. All HDPE pipe DR11 shall have the same outside diameter as DI pipe.
 1. **Dimensions**. The pipe shall have ductile iron pipe (DIP) equivalent outside dimensions for the nominal size indicated.
 2. **Working Pressure Rating (WPR)**. The pipe shall have a wall thickness dimension ratio (DR) 11 for pipe 6-inch through 24-inch in diameter.
 3. **Pipe Identification**. Each pipe length shall be marked in

accordance with AWWA C906 and shall be black in color with blue striping.

4. **Pipe Section Lengths.** Pipe sections proposed to be fused together shall be a minimum of 20 feet in length unless otherwise approved by the OWNER.

2.2 FITTINGS

- A. Pipe Fittings. All standard fittings (tees, bends, etc) shall be ductile iron conforming to ANSI/AWWA C110/A21.
- B. All ductile iron fittings shall be connected to the HDPE main by a means of mechanical restraint as noted in Section 2.3. Mechanical Joints, including accessories, shall conform to ANSI/AWWA C111/A21.11. All mechanical joints shall be made with megalugs.
- C. HDPE Fittings. HDPE Fittings shall be made from the same resins and material designations, cell classifications, pressure class (minimum of 200 psi) and dimensions as the HDPE pipe. Permitted HDPE fittings are listed below:
 1. Electrofusion Service Saddle. For service connections to a HDPE main. Saddle must be fused (electrofusion) to the HDPE main, and may NOT be mechanically attached. Saddle shall also accommodate standard corporations.
 2. Mechanical Joint Adapters. For mechanical connections on an HDPE mainline. MJ adapters shall be butt fused onto the HDPE main.
 3. Fuse – A Corp. For 1.5” or larger service or connections to a HDPE main.
- D. Stainless Steel Insert/Stiffener. All non fused connections shall require the use of stainless steel inserts inside the end of the HDPE pipe. Inserts shall be as follows:
 1. HDPE Pipe. At HDPE pipe connections to fittings and/or other pipe materials, the inside of the HDPE pipe shall be reinforced by inserting a two piece wedge style stainless steel stiffener/insert. Insert shall be properly sized and approved by the manufacturer for actual HDPE pipe diameter and wall thickness (DR) being utilized.

2.3 PIPE AND FITTING JOINTING/CONNECTIONS

- A. Butt Fusion. The Butt (or Heat) Fusion technique shall be used to join all HDPE pipe sections and connect HDPE fittings to the HDPE pipe. The joints shall conform to ASTM D2657 and shall be performed in strict

accordance with the pipe manufacture's recommendations. The butt fusion equipment should be capable of meeting all conditions recommended by the manufacturer, including but not limited to, temperature requirements of 400 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 psi. The fusion joining shall produce a joint weld strength equal to or greater than the tensile strength of the pipe itself.

B. Sidewall Fusion. The Sidewall (or Heat) Fusion technique shall be used to connect HDPE fittings to the HDPE pipe. The joints shall conform to ASTM D2657 and shall be performed in strict accordance with the pipe manufacture's recommendations. The sidewall fusion heating irons shall have an inside diameter equal to the outside diameter of the HDPE pipe and shall be ¼ inch wider than the size of the fitting being attached. The fusion joining shall produce joint weld strength equal to or greater than the tensile strength of the pipe itself.

C. Pipe Mechanical Joining. Mechanical joining shall be used to make connections to ductile iron fittings and/or non HDPE pipe. Permitted methods of HDPE joining are listed below.

1. HDPE to be joined using HARVEY TYPE ADAPTERS. Fitting shall have a pre-positioned stiffener and shall offer full axial restraint.

PART 3 EXECUTION

3.1 HAULING, UNLOADING AND DISTRIBUTING PIPE

A. During loading, transportation and unloading, every precaution shall be taken to prevent injury to the pipe. No pipe shall be dropped from cars or trucks, or allowed to roll down slides without proper retaining ropes. During transportation each pipe shall rest on suitable pads, strips, skids or blocks securely wedged or tied in place. Any pipe damaged shall be replaced.

3.2 FUSION

A. Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400-450 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint with weld strength equal to or greater than the tensile

strength of the pipe itself. All welds, on pipe 18 inches and larger, will be made using a Data Logger to record temperature, fusion pressure, with a graphic representation of the fusion cycle shall be part of the Quality Control records.

- B. Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE pipe and fitting manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be 1/4" inch larger than the size of the outlet branch being fused.
- C. Mechanical joining will be used where the butt fusion method can not be used. Mechanical joining will be accomplished by either using a HDPE flange adapter with a ductile iron back-up ring or HDPE Mechanical Joint adapter with a ductile iron back-up ring.
- D. Socket fusion, hot gas fusion, threading, solvents, and epoxies will not be used to join HDPE pipe.

3.4 INSPECTION

- A. Inspect the pipe for defects before installation and fusion. Defective, damaged or unsound pipe will be rejected.

3.5 TRACE WIRE

- A. Furnish and install a 14-gauge insulated copper trace wire with PVC pressure pipe.
- B. Run wire continuous from valve box to valve box, meter box, air release vault, cleanout, or other access points.
- C. Bring wire up inside boxes and vaults in an accessible method.
- D. Bring wire around or tape wire to each pipe section.
- E. Pipe testing shall include following trace wire.
- F. Wire breaks shall be repaired at no additional expense to the Owner.

3.6 MARKING TAPE

- A. Marking tape shall be installed 12 inches, minimum above the top of pipe or service line.
- B. The tape shall be in addition to the trace wire specified.

3.7 TESTING

- A. Pressure lines shall be hydrostatically tested at the pressures listed in Section 02661.
- B. Use pipe-locating equipment to test continuity of trace wire.
- C. Engineer or representative shall observe and document trace wire and pressure test.

3.8 SEPARATION

A. Horizontal separation.

- 1. 50-feet from petroleum product tanks.
- 2. 300-feet from a public water supply well.
- 3. 50-feet from a private water well.
- 4. Locate sewer force main at least 10-feet from any existing or proposed water mains.
- 5. Locate water line at least 10-feet from any existing or proposed sewer mains.
- 6. 5-feet from electrical lines and petroleum lines.
- 7. Locate waterlines at least 15 feet from all parts of septic tanks and absorption fields, or other sewage treatment and disposal systems.

B. Vertical Separation.

- 1. Measure the separation distance from edge to edge.
- 2. Maintain 10 foot horizontal and or 2-foot vertical separation between sanitary sewer and potable water lines.
- 3. Where a water main crosses under a sewer, provide adequate structural support for the sewer to prevent damage to the water main.
- 4. Maintain a 2-foot vertical separation between waterlines and any existing or proposed storm sewers, raw water lines, petroleum product lines, natural gas lines, and other buried utility lines.

C. Special Conditions.

- 1. When it is impossible to obtain proper horizontal and vertical separation as stipulated in (1) and (2) of this subsection, design and construct the other line equal to water pipe, and pressure test it to assure water tightness of joints adjacent to the water line prior to backfilling.

END OF SECTION

SECTION 02647 FIRE HYDRANTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire hydrants.

1.2 REFERENCES

A. American Water Works Association:

1. AWWA C502 Dry-Barrel Fire Hydrants.
2. AWWA C509 Resilient-Seated Gate Valves for Water-Supply Service.
3. AWWA C550 Protecting Epoxy Interior Coating for Valves and Hydrants.

1.3 SUBMITTALS

A. **Section 01330 - Submittal Procedures:** Requirements for submittals.

1.4 QUALIFICATIONS

A. Manufacturer: Hydrants shall be one of the brands and models listed, or Engineer pre-approved equal.

1.5 DELIVERY, STORAGE AND HANDLING

- A. **Section 01600 - Product Requirements:** Requirements for transporting, handling, storing and protecting products.
- B. Prepare valves, hydrants and accessories for shipment according to AWWA Standards and seal valve, hydrant and ends to prevent entry of foreign matter into product body.
- C. Store products in areas protected from weather, moisture, or possible damage; do not store products directly on ground; handle products to prevent damage to interior or exterior surfaces.

1.6 MAINTENANCE MATERIALS

- A. Furnish one tee wrench to Owner; standard length.

PART 2 PRODUCTS

- A. All products shall manufactured in the United States. Foreign made products shall be unacceptable.

2.1 FIRE HYDRANTS

- A. Dry-barrel Break-away Type: AWWA C502; cast-iron body, compression type valve.
 - 1. Bury Depth: As indicated on the Drawings.
 - 2. Inlet Connection: 6 inches.
 - 3. Valve Opening: 5-1/4 inches diameter.
 - 4. Ends: Mechanical Joint or Bell End.
 - 5. Bolts and Nuts: Corrosion resistant.
 - 6. Coating: AWWA C550; interior.
 - 7. Direction of Opening: Counterclockwise unless otherwise indicated.
- B. One pumper, two hose nozzles.
 - 1. Obtain thread type and size from local fire department.
 - 2. Attach nozzle caps by separate chains.
- C. Finish: Primer and two coats of enamel, color in accordance with fire department requirements.

2.2 ACCESSORIES

- A. Concrete for Thrust Restraints: Concrete type specified on drawings.
- B. Aggregate: Aggregate for hydrant drainage.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Determine exact location and size of valves and hydrants from Drawings; obtain clarification and directions from Engineer prior to execution of work.
- B. Verify invert elevations of existing work prior to excavation and installation of valves and fire hydrants.

3.2 PREPARATION

- A. Identify required lines, levels, contours and datum locations.
- B. Locate, identify, and protect utilities to remain from damage.
- C. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.
 - 1. Notify Engineer not less than seven days in advance of proposed utility interruption.
- D. Perform trench excavation, backfilling and compacting in accordance with **Section 02225**.

3.3 INSTALLATION

- A. Fire Hydrants:
 - 1. Install fire hydrants; provide support blocking and drainage gravel; do not block drain hole.
 - 2. Set hydrants plumb with pumper nozzle facing roadway; set hydrants with centerline of pumper nozzle 18 inches above finished grade and safety flange not more than 4 inches nor less than 2 inches above grade.
 - 3. Paint hydrants in accordance with local color scheme.
 - 4. After hydrostatic testing, flush hydrants and check for proper drainage.

3.4 FIELD QUALITY CONTROL

- A. Perform pressure test on domestic site water distribution system in accordance with AWWA C600.

END OF SECTION

SECTION 02661
HYDROSTATIC TESTING OF PRESSURE PIPE

PART 1 GENERAL

1.1 SCOPE

- A. This Section covers test for water appurtenances and piping.

PART 2 MATERIALS

2.1 WATER FOR HYDROSTATIC TESTING OF PRESSURE LINES

- A. Furnish water from the Owner's water distribution system.

PART 3 EXECUTION

3.1 HYDROSTATIC AND LEAK TESTING OF PRESSURE LINES

- A. Upon completion of installation, thoroughly clean new pipe.
 - 1. Flush with water to remove dirt, stones, pieces of wood, or other obstructions that may have entered pipe during construction.
 - 2. Flush pipelines at a minimum rate of 2.5 feet per second for a duration suitable to Engineer.
- B. Upon completion of installation, pressure test water pipelines.
 - 1. Conduct test in presence of Engineer.
 - 2. Minimum Pressure: 150 psig or 50 percent above normal operating pressure, whichever is greater measured at the lowest elevation of the line.
 - 3. Duration: 2 hours.
 - 4. Repair visible leaks regardless of the amount of leakage.
- C. Provide water into pipeline for testing and flushing, including necessary:
 - 1. Pumps, gages (increment at 10 psi or less), and meters.
 - 2. Plugs and caps.
 - 3. Temporary blowoff piping to discharge water.
 - 4. Reaction blocking to prevent pipe movement during testing.
- D. Water source for the pump suction shall be potable water from the Owner's distribution system; vessel used shall be approved by the Engineer.

- E. Prevent contamination of the Owner's water distribution system.
- F. After pipelines or isolated sections of pipelines have been filled with water, increase the pressure to test pressure by means of a pump.
- G. Test pressure shall be 150 psi or 50 percent above normal operating pressure, whichever is greater.
- H. Duration of hydrostatic leakage test shall be 2 hours, or as specified by Engineer.
- I. Open interior valves, including fire hydrants and other appurtenances, during tests.
- J. After the specified test pressure has been applied, the entire pipeline shall be checked in the presence of the Engineer giving particular attention to parts of the pipeline and the appurtenances that are exposed.
- K. If leaks are apparent, perform corrective work and replace material that is required to remedy the defect and stop the leaks at no extra cost to the Owner.
- L. For pressure pipelines installed in the ground, the rates of leakage shall be defined in AWWA C600 or C605.
- M. Leakage and Hydrostatic tests shall be performed in conformance with AWWA C600 or C-605 most current edition, with the exception of "leakage shall be defined as the quantity of water that must be supplied into the pipe section being tested to maintain a pressure within 1 psi of the specified leakage-test pressure after the pipe has been filled with water and the air has been expelled".

END OF SECTION

SECTION 02665
DOMESTIC WATER SYSTEM

PART 1 GENERAL

1.1 SUMMARY

- A. Furnish and install pressure pipe, fittings, and appurtenances of the sizes and classes indicated for potable water service.

1.2 RELATED SECTIONS

- A. **Section 02225** – Trench Excavation, Backfill, and Compacting.

1.3 REFERENCES

- A. American Water Works Association, 6666 West Quincy Avenue, Denver, Colorado 80235.
 - 1. AWWA C651-Standard for Disinfecting Water Mains.

1.4 QUALITY ASSURANCE

- A. Polyvinyl Chloride Pipe:
 - 1. Stamp with the NSF seal of approval.
 - 2. Test in accordance with ASTM D2241.
- B. Testing Laboratory: Oklahoma Dept. of Environmental Quality.

PART 2 MATERIALS

2.1 FIRE HYDRANTS

- A. Fire Hydrants:
 - 1. Meet or exceed AWWA C502.
 - 2. Rated Working Pressure: 150 psi.
 - 3. Test Pressure: 300 psi.
 - 4. Main valve opening shall not be less than 5- 1/4" and designed so that all working parts can be removed through the top of the hydrant.
 - 5. The opening nut, main stem, coupling, and main valve assembly shall be capable of withstanding input torque of 200 ft. lbs. In opening or closing direction.

6. Nozzle section of hydrant shall be designed to permit field replacement of damaged threads without special tools, excavation or disturbing ground line.
7. Pump nozzle diameter shall meet the Owners requirements.

2.2 WATER FOR HYDROSTATIC TESTING OF PRESSURE LINES

- A. Furnish water from the nearest hydrant or other suitable source for testing purposes.

2.3 CONCRETE FOR THRUST BLOCKING AND ENCASEMENT

- A. Concrete for Thrust Blocking and Encasement: Minimum compressive strength of 2,500 psi at 28 days.

PART 3 EXECUTION

3.1 PREPARATION OF TRENCH

- A. Refer to **Section 02225**.

3.2 RELATION TO SEWER LINE

- A. Laying water main, follow Health Department requirements. Maintain 10-foot horizontal separation and 24-inch vertical separation in crossing.

3.3 INSTALLATION

- A. Install pipe, fittings, and valves in accordance with manufacturer's written instructions.
- B. Thrust Blocking:
 1. Take care not to over excavate in the areas where thrust blocks are to be poured.
 2. Remove water from the excavation.
 3. Construct suitable forms to obtain shapes that will provide full bearing surfaces against undisturbed earth, as indicated.
 4. Install 2,500 psi concrete thrust blocks at bends, wyes, or other thrust points on pressure piping.
 5. Block to bear against undisturbed soil and shall be of size and with bearing area illustrated by the details on the Drawings.
 6. Pour thrust blocking against undisturbed earth.
 7. Cure thrust blocks a minimum of 5 days before conducting hydrostatic and air tests.

3.4 HYDROSTATIC AND LEAK TESTING OF PRESSURE LINES

- A. Upon completion of installation, thoroughly clean new pipe:
 - 1. Flush with water to remove dirt, stones, pieces of wood, or other obstructions which may have entered pipe during construction.
 - 2. Flush pipelines at a minimum rate of 2.5 feet per second for a duration suitable to Engineer.
- B. Upon completion of installation, pressure test water pipelines:
 - 1. Conduct test in presence of Engineer and Owner.
 - 2. Duration: 2 hours.
 - 3. Repair visible leaks regardless of the amount of leakage.
- C. Provide water into pipeline for testing and flushing, including necessary:
 - 1. Pumps, gages (increment at 10 psi or less), and meters.
 - 2. Plugs and caps.
 - 3. Temporary blowoff piping to discharge water.
 - 4. Reaction blocking to prevent pipe movement during testing.
- D. Water source for the pump suction shall be potable water from the Owner's distribution system; vessel used must be approved by the Engineer.
- E. Adequate steps shall be taken to prevent contamination of the Owner's system by the Contractor's actions.
- F. After pipelines or isolated sections of pipelines have been filled with water, increase the pressure to test pressure by means of a pump.
- G. Test pressure shall be 100 psi or 50 percent above normal operating pressure, whichever is greater.
- H. Duration of hydrostatic leakage test shall be 2 hours, or as specified by Engineer.
- I. Open interior valves, including fire hydrants and other appurtenances, open during tests.
- J. After the specified test pressure has been applied, the entire pipeline shall be checked in the presence of the Engineer giving particular attention to parts of the pipeline and the appurtenances that are exposed.
- K. If leaks are apparent, the Contractor shall, at his expense, perform work and replace material that is required to remedy the defect and stop the leaks.

- L. If no leaks were apparent or after corrective work has been completed, the pipelines shall be subjected to a leakage test at the pressure specified with a meter inserted in the test pump discharge line.
- M. The maximum leakage per hour for ductile iron, PVC, and concrete pipe shall be as calculated from the following formula:

Rubber gasket or O-ring joints (iron, PVC, and concrete)

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

L = Allowable leakage (gallons per hour)
N = Number of joints in pipeline tested
D = Nominal diameter (inches)
P = Test pressure (psi)

- N. If test of pipe laid discloses leakage greater than the allowable leakage as calculated from the above formula, locate the leak or leaks and perform work and replace material that is required in order to remedy the defect and stop the leak.
- O. Corrective work must be approved by Engineer.

3.5 DISINFECTION

- A. Sterilize pipeline connected to and forming a part of the water supply after pipe has been flushed and passed hydrostatic test, in accordance with the requirements of:
 - 1. AWWA C651.
 - 2. The State of Oklahoma Department of Environmental Quality.
 - 3. Local municipality.
- B. Sterilization:
 - 1. Fill piping with 100 parts per million of chlorine.
 - 2. Hold in contact for not less than 24 hours.
- C. Final tests shall show minimum residual chlorine content of 25 PPM in parts of the system.
- D. Furnish certificates of satisfactory bacteriological test.

- E. Thoroughly flush out chlorine solution prior to placing new sections in service.
- F. Perform chlorine residual tests after flushing to assure that residual is not in excess of 1 PPM at any point in system.

END OF SECTION

SECTION 02675
DISINFECTION OF WATER DISTRIBUTION SYSTEM

PART 1 GENERAL

1.1 SCOPE

- A. This section covers disinfection of potable water distribution system and test and Report results.

1.2 REFERENCES

- A. AWWA C651 – Standard for Disinfection Water Mains (Latest Edition).

1.3 QUALITY ASSURANCE

- A. Testing Laboratory: Oklahoma Department of Environmental Quality.

1.4 REGULATORY REQUIREMENTS

- A. AWWA C651-14 or latest version
- B. Oklahoma Department of Environmental Quality Regulations.

1.5 PROJECT RECORD DOCUMENTS

- A. The Disinfection Report shall accurately record:
 - 1. Type and quantity of disinfectant used.
 - 2. Date and time of start and completion of disinfectant injection.
 - 3. Test locations.
 - 4. Initial, 24-hour, and 48-hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
 - 5. Date and time of start and completion of flushing.
 - 6. Disinfectant residual after flushing in ppm for each outlet tested.
- B. The bacteriological report shall accurately record:
 - 1. Date issued, project name, and testing laboratory name, address, and telephone number.
 - 2. Time and date of water sample collection.
 - 3. Name of person collecting samples.
 - 4. Test locations.
 - 5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
 - 6. Coliform bacteria test results for each outlet tested.

7. Certification that water conforms, or fails to conform, to bacterial standards of Oklahoma Department of Environmental Quality.
8. Bacteriologist's signature.

1.7 STORAGE AND HANDLING

- A. The Contractor is reminded that chlorine is a powerful oxidant and reacts readily with foreign substances.
- B. Chlorine compounds shall be handled and stored in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.1 CALCIUM HYPOCHLORITE

- A. Granular form or 5 gram tablets containing 65 percent available chlorine by weight.

2.2 SODIUM HYPOCHLORITE

- A. Liquid form containing approximately 5 to 15 percent available chlorine.

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify that piping system has been cleaned, inspected, and pressure tested.
- B. Perform scheduling and disinfection activity with startup, testing, adjusting, and balancing, and demonstration procedures, including coordination with related systems.

3.2 EXECUTION

- A. Provide and attach equipment required to execute Work of this Section.
- B. Utilize fire hydrants as blow-off points when possible.
- C. Fire hydrants shall not be used for sample points.
- D. Sample points constructed shall be ¾ inch or 1 inch copper riser pipe that shall extend adequately above the ground surface.

- E. During application of chlorine solution, prevent solution from flowing back into the distribution system.
- F. Disinfect piping system by one of the three following methods:
 - 1. Tablet Method:
 - a. Use this method only if water line can be kept clean and dry during installation.
 - b. Place calcium hypochlorite tablets in water line during installation to provide a chlorine dose of 25 mg/l.
 - c. Fill water line with potable water after completion of installation at a rate so that water within the water line will flow at a velocity no greater than 1 ft./sec.
 - d. Allow water to remain in pipe for a minimum of 24 hours for water temperature above 40 degrees F., and 48 hours for water temperature at or below 40 degrees F.
 - 2. Continuous Feed Method:
 - a. Calcium hypochlorite granules may be placed in the water line during installation as option to the tablet method. Provide a chlorine dosage of 25 mg/l.
 - b. After installation flush water line to remove particles. Velocity in the water line shall not be less than 2.5 ft./sec.
 - c. Fill water line with water dosed with chlorine. Chlorine concentration shall not be less than 25-mg/l free chlorine.
 - d. Retain chlorinated water in water line for 24 hours. Operate valves and hydrants during this time to disinfect.
 - e. Chlorine residual in water shall not be less than 10 mg/l at the end of the 24-hour period.
 - 3. Slug Method:
 - a. Place calcium hypochlorite granules in the water line during installation. Provide a chlorine dosage of 25 mg/l.
 - b. After flushing water line to remove particles, slowly fill water line with water dosed with a 100-mg/l concentration of chlorine.
 - c. Retain chlorinated water in water line for 3 hours.
 - d. Measure the free chlorine residual in the water line as it is filled. If dosage drops below 50 mg/l during this time, stop flow and relocate chlorination equipment to the reduced level of where chlorine was detected. As flow is resumed, apply chlorine to restore the free chlorine in the water to not less than 100 mg/l.
 - e. Operate valves and hydrants during this time to disinfect.

G. Final Flushing:

1. Flush water from waterline until chlorine measurements are no higher than the chlorine residual that are found in the existing distribution system.
2. Inspect environment where the chlorinated water is to be discharged. Add a neutralizing chemical as the chlorinated water is being discharged if area is in threat of environmental damage from the chlorinated water.

H. Bacteriological Tests:

1. After final flushing and prior to the new water line being connected to the existing distribution system, two sets of acceptable water samples collected from the new water line and taken on consecutive days shall be submitted by the Contractor to bacteriological laboratory at the Oklahoma Department of Environmental Quality in Oklahoma City, Oklahoma.
2. Samples shall be tested for bacteriological quality in accordance with Standard Methods for the Examination of Water and Wastewater per the American Public Health Association, AWWA, and Water Environment Association (latest edition) and shall show the absence of Coliform organisms.
3. If samples collected are positive, the disinfecting procedures and samples shall be repeated until two consecutive day samples are tested safe.

END OF SECTION

SECTION 02676
DISINFECTION OF WATER STORAGE TANK

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Disinfection of potable water storage tank.
- B. Test and report results.

1.2 REFERENCES

- A. American Water Works Association, 6666 West Quincy Avenue, Denver, Colorado 80235.
 - 1. AWWA C652 – Disinfection of Water Storage Facilities.

1.4 QUALITY ASSURANCE

- A. Testing Laboratory: Oklahoma Department of Environmental Quality.

1.5 REGULATORY REQUIREMENTS

- A. Conform to Oklahoma Department of Environmental Quality regulations for Work of this Section.

1.6 PROJECT RECORD DOCUMENTS

- A. Submit 3 copies of reports in accordance with **Section 01001**.
- B. Disinfection report; accurately record:
 - 1. Type and quantity of disinfectant used.
 - 2. Date and time of start and completion of disinfectant injection.
 - 3. Test Locations.
 - 4. Initial, 24-hour, and 48-hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
 - 5. Date and time of start and completion of flushing.
 - 6. Disinfectant residual after flushing in ppm for each outlet tested.
- C. Bacteriological Report (For Each Outlet Tested):

1. Send samples and reports to the Oklahoma Department of Environmental Quality by overnight delivery service, UPS or Federal Express.
2. List on form for each sample the following:
 - a. Month, day, year, and time of day when first and second samples are taken.
 - b. Location of Sample: _____. (**Location of Tank**)
 - c. County: _____
 - d. Sample Collected By: _____.
 - e. Send Report to: Mr. _____,
Address _____
 - f. Water System ID: _____ (**Required by OK DEQ**)

1.7 STORAGE AND HANDLING

- A. The Contractor is reminded that chlorine is a powerful oxidant and reacts readily with foreign substances.
- B. Handle and store chlorine compounds in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.1 CALCIUM HYPOCHLORITE SOLUTION

- A. Calcium hypochlorite containing 65 percent available chlorine by weight.

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify that the tank has been cleaned and inspected.
- B. Perform scheduling and disinfection activity with startup, testing, adjusting, and balancing, and demonstration procedures, including coordination with related systems.

3.2 DISINFECTION

- A. Fill water tank with enough water, containing 50-ppm chlorine, so when the tank is filled to the overflow, the resulting chlorine residual is a minimum of 2 ppm.
- B. Allow initial filling of water containing 50-ppm chlorine to stand in tank for at least 6 hours prior to filling the tank to the overflow.

- C. Allow the full tank containing a minimum of 2 ppm chlorine to stand for 24 hours, after which the tank may be put into service without draining, provided the chlorine residual after 24 hours is not less than 2 ppm.
- D. Avoid over chlorinating the water to the extent of rendering the water unsatisfactory for return to the distribution system.

3.3 SAMPLING POINTS

- A. Engineer shall approve sample points.

3.4 SAMPLING

- A. The tank shall not be considered acceptable until 2 consecutive days samples are reported as safe by the Oklahoma Department of Environmental Quality.
- B. Collect samples and deliver them to the Oklahoma Department of Environmental Quality.
- C. If either one of the samples collected is positive, the disinfecting procedures shall be repeated as directed by the Engineer until two consecutive days samples are reported as safe by the Oklahoma Department of Environmental Quality.

END OF SECTION

SECTION 02701 LEAKAGE TESTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Requirements for performing leakage tests.
- B. All structures required to be watertight and all pressure and gravity piping and pipelines shall be tested by the Contractor. All tests shall be conducted in a manner to minimize interference with the progress of the work.
- C. The Contractor shall notify the Engineer when the work is ready for testing and tests shall be conducted as soon as possible thereafter. All labor, equipment, water and materials, including meters and gauges, shall be furnished by the Contractor at his expense.

PART 2 PRODUCTS

Not applicable.

PART 3 EXECUTION

3.1 STRUCTURES

- A Structures shall be tested before backfilling by filling with water to overflowing, or other level as directed by the Engineer and observing the water surface level twenty-four hours thereafter. Exterior surfaces shall be examined for leakage. Leakage is within allowable limits for structures when there is no visible sign of leakage from walls or from under the structure and where the water surface does not drop more than one (1) inch during the twenty-four hours leakage test. Dampness on the exterior wall surface during the test period will not be considered as leakage, except in the case of prestressed concrete structures.
- B. If the leakage exceeds the allowable limit, the work shall be repaired and retested.

3.2 PRESSURE PIPING

- A. Piping and other equipment designed to carry fluids under pressure shall be tested as a whole, or in sections valved or bulkheaded at the ends. Testing shall be under a hydrostatic pressure equal to the design

pressure, or at a higher test pressure specified in the piping schedule. Testing shall be in accordance with AWWA standard specifications and the design working pressure must not exceed 2/3 of the rated pressure.

- B. Test pressure shall be applied by means of a tap in the pipe or plug. The rate of leakage shall be determined at 15-minute intervals, by means of volumetric measurement of the water added during the test, until the rate has stabilized at a constant value for four consecutive 15 minute periods. Test pressure shall be maintained for a period of at least one hour.
- C. All joints in exposed piping shall be examined during the tests and all leaks shall be satisfactorily stopped and retested.
- D. All pipelines for compressed air, fuel, and gas shall be tested with air. After the tests are complete, fuel and gas lines shall be flushed out with nitrogen or carbon dioxide.
- E. Precautions shall be taken to protect control equipment in or attached to pipelines to prevent damage.
- F. Tests of insulated and/or concealed piping shall be made before the piping is covered or concealed.
- G. No leakage will be allowed under the above tests for process piping.
- H. Leakage and Hydrostatic tests shall be performed in conformance with AWWA C600 or C-605 most current edition.

3.3 SEWERS AND DRAINS

- A. Tests to be made for leakage and infiltration of water into sewers shall be made prior to making connections with other sewers, pipes or drains.
- B. Upon completion of the work of any sewer, it shall be tested for water-tightness and shall meet the requirements set forth below before final acceptance of the work of the Contract.
 - 1. Tests shall be made by filling the sewer with water and measuring the quantity of leakage from the sewer. The head of water during the tests shall be maintained at least ten feet above the highest section of the work being tested. At the Contractor's option a suitable air test of the lines meeting the requirements of the Oklahoma Department of Environmental Quality may be used to determine the water-tightness of the system.

2. All localized or spurting leaks detected in sewers or in floor or walls of appurtenant structures shall be permanently stopped. Should any leaks, defective joints or defective construction be found, they shall be promptly corrected and should any defective pipes or specials be discovered, they shall be removed and replaced in a satisfactory manner at the Contractor's expense.

END OF SECTION

SECTION 02702 DISINFECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Disinfection of treated water pipelines, distribution system connections, new & old clearwells, new & old filters and filter effluent piping.

1.2 SUBMITTALS

- A. Submit reports of bacteriological tests performed by Oklahoma State Department of Environmental Quality showing freedom from coliform bacteria.
- B. Contractor to pay cost of testing.

1.3 REFERENCE STANDARDS

- A. ANSI/AWWA C653, AWWA Standard for Disinfection of Water Treatment Plants.
- B. AWWA B100 - Standard for Filtering Material.
- C. AWWA B300 - Standard for Hypochlorites.
- D. AWWA B301 - Standard for Liquid Chlorine.
- E. AWWA C651 - Standard for Disinfecting Water Mains.
- F. AWWA C652 - Standard for Disinfection of Water – Storage Facilities.

PART 2 PRODUCTS

2.1 DISINFECTANT

- A. Liquid Chlorine, Sodium Hypochlorite or Calcium Hypochlorite.

PART 3 EXECUTION

3.1 STRUCTURE CLEANING

- A. Filters and Clearwells

All scaffolding, planks, tools, rags, and other material not part of the structural or operating facilities of the tank shall be removed. Then the surfaces of the walls, floor, and operating facilities of the storage facility shall be cleaned thoroughly using a high-pressure water jet, sweeping,

scrubbing, or equally effective means. All water, dirt, and foreign material accumulated in this cleaning operation shall be discharged from the storage facility or otherwise removed.

B. Prevention of Contamination

Following the cleaning operation, the vent screen, overflow screen, and any other screened openings shall be checked and put in satisfactory condition to prevent birds, insects, and other possible contaminants from entering the facility. Any material to be in the storage facility that could not feasibly be present during the cleaning shall be placed in the storage facility in a clean and neat manner to minimize the introduction of dirt or other foreign material.

3.2 CHLORINATION OF FINISHED WATER STORAGE

A. See **Section 13500**.

3.3 DISINFECTION OF FILTERS

- A. Cleaning shall be provided in accordance with Paragraph 3.1 above.
- B. Subsequent to cleaning of the filter basin, filter media shall be placed in the basin with all reasonable precautions to maintain cleanliness.
- C. Following placement, the filter media shall be backwashed and prepared for service in accordance with AWWA B100-80.
- D. Introduce chlorine into the filter influent water to produce a free residual of not less than 25 mg/l. When water with 25 mg/l (or more) free chlorine residual reaches the filter effluent, the flow of water shall be stopped and the filter shall be held full of chlorinated water for a period of not less than 12 hours. At the end of the 12-hour contact time the chlorinated water shall be tested for free residual. A minimum of 15 mg/l is required to pass or the process must be repeated. Sufficient tests should be made from the top of the units and from the underdrains to ensure that the residual readings measure the lowest chlorine level existing at the end of the contact period. The Contractor shall provide corporation cocks, taps, and sample piping as required to sample the effluent of each filter without opening the valve to the pump suction well.
- E. After successful chlorination and freedom from coliform bacteria is shown by testing, the filter shall be backwashed to remove the highly chlorinated water.

3.4 BACTERIOLOGICAL SAMPLING

- A. Take repeat samples at least 24 hours apart until consecutive samples do not show the presence of coliform.
- B. If any samples show the presence of coliform, rechlorinate until consecutive samples do not show the presence of coliform.

3.5 PIPELINES

- A. Connect to distribution system, plant potable water service (interior and exterior).
- B. Disinfection shall be provided in accordance with AWWA C651.

END OF SECTION

SECTION 02821 CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fence framework, fabric, and accessories.
 - 2. Excavation for post bases.
 - 3. Concrete foundation for posts and center drop for gates.
 - 4. Manual gates and related hardware.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Fencing:
 - 1. Basis of Measurement: By linear foot to fence height specified, based on specified post spacing.
 - 2. Basis of Payment: Includes posts, rails, tension wire, fabric, accessories, attachments, post footings, gates and hardware.

1.3 REFERENCES

- A. ASTM International:
 - 1. ASTM A121 - Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
 - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 3. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 4. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
 - 5. ASTM A491 - Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric.
 - 6. ASTM A585 - Standard Specification for Aluminum-Coated Steel Barbed Wire.
 - 7. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 8. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - 9. ASTM B429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
 - 10. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
 - 11. ASTM F567 - Standard Practice for Installation of Chain-Link Fence.

12. ASTM F668 - Standard Specification for Poly (Vinyl Chloride) (PVC)-Coated Steel Chain Link Fence Fabric.
13. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates.
14. ASTM F934 - Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials.
15. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.
16. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
17. ASTM F1184 - Standard Specification for Industrial and Commercial Horizontal Slide Gates.

- B. Chain Link Fence Manufacturers Institute:
1. CLFMI - Product Manual.

1.4 SYSTEM DESCRIPTION

- A. Fence Height: six (6) feet nominal as indicated on Drawings.
- B. Line Post Spacing: At intervals not exceeding ten (10) feet.
- C. Fence Post and Rail Strength: Conform to ASTM F1043 Light Industrial Fence quality.

1.5 SUBMITTALS

- A. **Section 01330** - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.
- C. Product Data: Submit data on fabric, posts, accessories, fittings and hardware.

1.6 QUALITY ASSURANCE

- A. Perform installation in accordance with ASTM F567.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver fence fabric and accessories in packed cartons or firmly tied rolls.
- B. Identify each package with manufacturer's name.
- C. Store fence fabric and accessories in secure and dry place.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Framing Steel: ASTM F1083 Schedule 40 galvanized steel pipe, welded construction, minimum yield strength of twenty-five (25) ksi; coating conforming to ASTM F1043 Type A on pipe exterior and interior.
- B. Fabric Wire Steel: ASTM A392 zinc coated wire fabric.
- C. Barbed Wire: ASTM A121 galvanized steel; twelve (12) gage thick wire, 3 strands, 4 points at 3 inches on center.

2.2 COMPONENTS

- A. Line Posts: 2-3/8 inch diameter, SCH 40.
- B. Corner, Terminal and Pull Posts: 3 inch diameter SCH 40.
- C. Gate Posts: 3 inch diameter for less than 6 foot gates, 4 inch for greater than 6 foot gate. All SCH 40.
- D. Top and Brace Rail: 1-5/8 inch diameter, SCH 40, plain end, sleeve coupled.
- E. Fabric: 2 inch diamond mesh interwoven wire, 11 gage thick, top salvage knuckle end closed, bottom salvage [knuckle end closed.
- F. Tension Wire: 6 gage thick steel, single strand.
- G. Tie Wire: Aluminum alloy steel wire.

2.3 ACCESSORIES

- A. Caps: Cast steel galvanized or Galvanized pressed steel; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; galvanized steel.

- C. Extension Arms: Cast steel galvanized or Galvanized pressed steel, to accommodate 3 strands of barbed wire, single arm, vertical.
- D. Gate Hardware: Fork latch with gravity drop or Center gate stop and drop rod, Mechanical keepers; two 180 degree gate hinges for each leaf and hardware for padlock.

2.4 GATES

- A. General:
 - 1. Gate Types, Opening Widths and Directions of Operation: As indicated on Drawings.
 - 2. Factory assemble gates.
 - 3. Design gates for operation by one person.
- B. Swing Gates:
 - 1. Fabricate gates to permit 180 degree swing.
 - 2. Gates Construction: ASTM F900 with welded corners. Use of corner fittings is not permitted.

2.5 FINISHES

- A. Components and Fabric: Galvanized to ASTM A123/A123M for components; ASTM A153/A153M for hardware; ASTM A392 for fabric.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install framework, fabric, accessories and gates in accordance with ASTM F567.
- B. Set intermediate, terminal, corner gate and pull posts plumb, in concrete footings 1 inch above finish grade. Slope top of concrete for water runoff.
- C. Brace each gate, corner, terminal and pull post to adjacent line post with horizontal center brace rail and diagonal truss rods as required. Install brace rail one bay from end and gate posts.
- D. Install top rail through line post tops and splice with 6 inch long rail sleeves.
- E. Install center and bottom brace rail on corner gate leaves.
- F. Place fabric on outside of posts and rails.
- G. Do not stretch fabric until concrete foundation has cured 7 days.

- H. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
- I. Position bottom of fabric 2 inches above finished grade.
- J. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.
- K. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
- L. Install bottom tension wire stretched taut between terminal posts.
- M. Install support arms and attach barbed wire; tension and secure. If required.
- N. Support gates from gate posts. Do not attach hinged side of gate from building wall.
- O. Install gate with fabric to match fence. Install three hinges on each gate leaf, latch, and catches.
- P. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.
- Q. Connect to existing fence at existing terminal post or new terminal post. If Existing line post shall be converted to terminal post by installation of brace rails and brace rods.
- R. Install posts with 6 inches maximum clear opening from end posts to buildings, fences and other structures.
- S. Excavate holes for posts to diameter and spacing indicated on Drawings without disturbing underlying materials.
- T. Center and align posts. Place concrete around posts, and vibrate or tamp for consolidation. Verify vertical and top alignment of posts and make necessary corrections.
- U. Extend concrete footings 1 inch above grade, and trowel, forming crown to shed water.
- V. Allow footings to cure minimum 7 days before installing fabric and other materials attached to posts.

END OF SECTION

SECTION 02971
ARKANSAS-OKLAHOMA RAILROAD PROCEDURES
HARTSHORNE PWA HR-21-01

PART 1 GENERAL

1.1 SUMMARY

A. This is not meant to be an all-inclusive list of the requirements. Please refer to AOK for steps and requirements.

B. Contractor shall adhere to and bare all cost associated with the construction of the attached Agreements for Mile Post 352.06, 351.78, and 351.28 which includes but not limited to the following:

1. Pipeline Crossing Agreement Mile Post 352.06
2. Exhibit A – Detail
3. Exhibit B – General Terms and Conditions

1. Pipeline Crossing Agreement Mile Post 351.78
2. Exhibit A – Detail
3. Exhibit B – General Terms and Conditions

1. Pipeline Crossing Agreement Mile Post 351.28
2. Exhibit A – Detail
3. Exhibit B – General Terms and Conditions

END OF SECTION

PIPELINE CROSSING AGREEMENT

MILE POST 352.06
HARTSHORNE, OK

THIS AGREEMENT (“Agreement”) is made and entered into as of Jan. 28, 2025 (“Effective Date”), by and between **ARKANSAS–OKLAHOMA RAILROAD COMPANY**, an Oklahoma Corporation, (“Licensor”) and **CITY OF HARTSHORNE, OKLAHOMA** to be addressed at [1101 Penn Ave. Hartshorne, OK 74547 (“Licensee”).

IT IS MUTUALLY AGREED TO BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:

ARTICLE 1. LICENSOR GRANTS RIGHT.

- A.** In consideration of the license fee paid by Licensee set forth below, and in further consideration of the covenants and agreements to be performed by Licensee, Licensor hereby grants to Licensee the right to construct, and thereafter, during the term hereof, maintain and operate pipeline crossing underground only, including any appurtenances required for the operation of said pipeline (collectively, “Licensee’s Facilities”) across Licensor’s real property, trackage, or other facilities located in or near Hartshorne, Oklahoma (“Railroad Property”). The specific specifications and limited purpose for Licensee’s Facilities on, along, across and under Railroad Property are described in, and shown on, the Print and Specification attached hereto as **EXHIBIT A**, and made a part hereof.
- B.** Licensee represents and warrants that Licensee’s Facilities will (i) only be used for pipeline crossing underground, and (ii) not be used to convey any other substance, any fiber optic cable, or for any other use, whether such use is currently technologically possible, or whether such use may come into existence during the life of this Agreement.
- C.** Licensee acknowledges that if it or its contractor provides Licensor with digital imagery depicting Licensee’s Facilities (“Digital Imagery”), Licensee authorizes Licensor to use the Digital Imagery in preparing **Exhibit A**. Licensee represents and warrants that through a license or otherwise, it has the right to use the Digital Imagery and to permit Licensor to use the Digital Imagery in said manner.

ARTICLE 2. LICENSE FEE.

Licensor elects not to charge a license fee to licensee in this case. Other applicable fees for flagging and right of entry will continue to apply.

ARTICLE 3. TERM.

This Agreement shall take effect as of the Effective Date first herein written and shall continue in full force and effect until terminated as provided in the "TERMINATION: REMOVAL OF LICENSEE'S FACILITIES" Section of **EXHIBIT B**.

ARTICLE 4. LICENSEE'S COMPLIANCE WITH GENERAL TERMS.

Licensee represents and warrants that all work on Licensee's Facilities performed by Licensee or its contractors will strictly comply with all terms and conditions set forth herein, including the General Terms and Conditions, attached hereto as Exhibit B and made a part hereof.

ARTICLE 5. INSURANCE.

- A. During the term of this Agreement, Licensee shall fully comply or cause its contractor(s) to fully comply with the insurance requirements described in **EXHIBIT C**, attached hereto and made a part hereof. Upon request only, Licensee shall send copies of all insurance documentation (e.g., certificates, endorsements, etc.) to Licensor at the address listed in the "NOTICES" Section of this Agreement.
- B. If Licensee is subject to statute(s) limiting its insurance liability and/or limiting its ability to obtain insurance in compliance with **Exhibit C** of this Agreement, those statutes shall apply.

ARTICLE 6. DEFINITION OF LICENSEE.

For purposes of this Agreement, all references in this Agreement to Licensee will include Licensee's contractors, subcontractors, officers, agents, and employees, and other acting under its or their authority (collectively, a "Contractor"). If a Contractor is hired by Licensee to perform any work on Licensee's Facilities (including initial construction and subsequent relocation, maintenance, and/or repair work), then Licensee shall provide a copy of this Agreement to its Contractor(s) and require its Contractor(s) to comply with all terms and conditions of this Agreement, including the indemnification requirements set forth in the "INDEMNITY" Section of **Exhibit B**. Licensee shall require any Contractor to release, defend, and indemnify Licensor to the same extent and under the same terms and conditions as Licensee is required to release, defend, and indemnify Licensor herein.

ARTICLE 7. ATTORNEY'S FEES, EXPENSES, AND COSTS

If litigation or other court action or similar adjudicatory proceeding is undertaken by Licensee or Licensor to enforce its rights under this Agreement, all fees, costs, and expenses, including, without limitation, reasonable attorney's fees and court costs, of the prevailing Party against whose interest the judgment or decision is rendered. The provisions of this Article shall survive the termination of this Agreement.

ARTICLE 8. WAIVER OF BREACH.

The waiver by Licensor of the breach of any condition, covenant, or agreement herein contained to be kept, observed and performed by Licensee shall in no way impair the right of Licensor to avail itself of any remedy for any subsequent breach thereof.

ARTICLE 9. ASSIGNMENT.

A. Licensee shall not assign this Agreement, in whole or in part, or any rights herein granted, without the written consent of Licensor, which must be requested in writing by Licensee. Any assignment or attempted transfer of this Agreement or any of the rights herein granted, whether voluntary, by operation of law, or otherwise, without Licensor's written consent, will be absolutely void and may result in Licensor's termination of this Agreement pursuant to the "TERMINATION; REMOVAL OF LICENSEE'S FACILITIES" Section of **Exhibit B**.

B. Upon Licensor's written consent to any assignment, this Agreement will be binding upon and insure to the benefit of the parties thereto, successors, heirs, and assigns, executors, and administrators.

ARTICLE 10. SEVERABILITY.

Any provision of this Agreement which is determined by a court of competent jurisdiction to be invalid or unenforceable shall be invalid or unenforceable only to the extent of such determination, which shall not invalidate or otherwise render ineffective any other provision of this Agreement.

ARTICLE 11. NOTICES.

Except Licensee's commencement of work notice(s) required under **Exhibit B**, all other notices required by this Agreement must be in writing, and (i) personally served upon the business address listed below ("Notice Address"), (ii) sent overnight via express delivery by a nationally recognized overnight delivery service such as Federal Express Corporation or United Parcel Service to the Notice Address, or (iii) by certified mail, return receipt requested to the Notice Address. Overnight express delivery notices will be deemed to be given upon receipt. Certified mail notices will be deemed to be given three (3) days after deposit with the United States Postal Service.

If to Licensor: Arkansas-Oklahoma Railroad Company
Att: Brandon Crouch, Real Estate Mgr.
116 West Main Street
Wilburton, OK 74578

If to Licensee: **City of Hartshorne**
1101 Penn Ave.
Hartshorne, OK 74547

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the date first herein written.

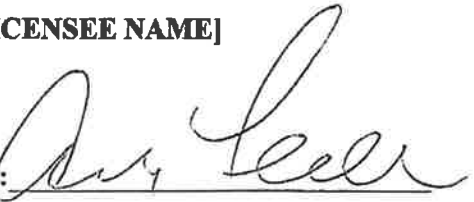
ARKANSAS-OKLAHOMA RAILROAD

[LICENSEE NAME]

BY:


Brandon Crouch
Dir. Projects
1/28/25

BY:



MAIL FALTE NUNCI

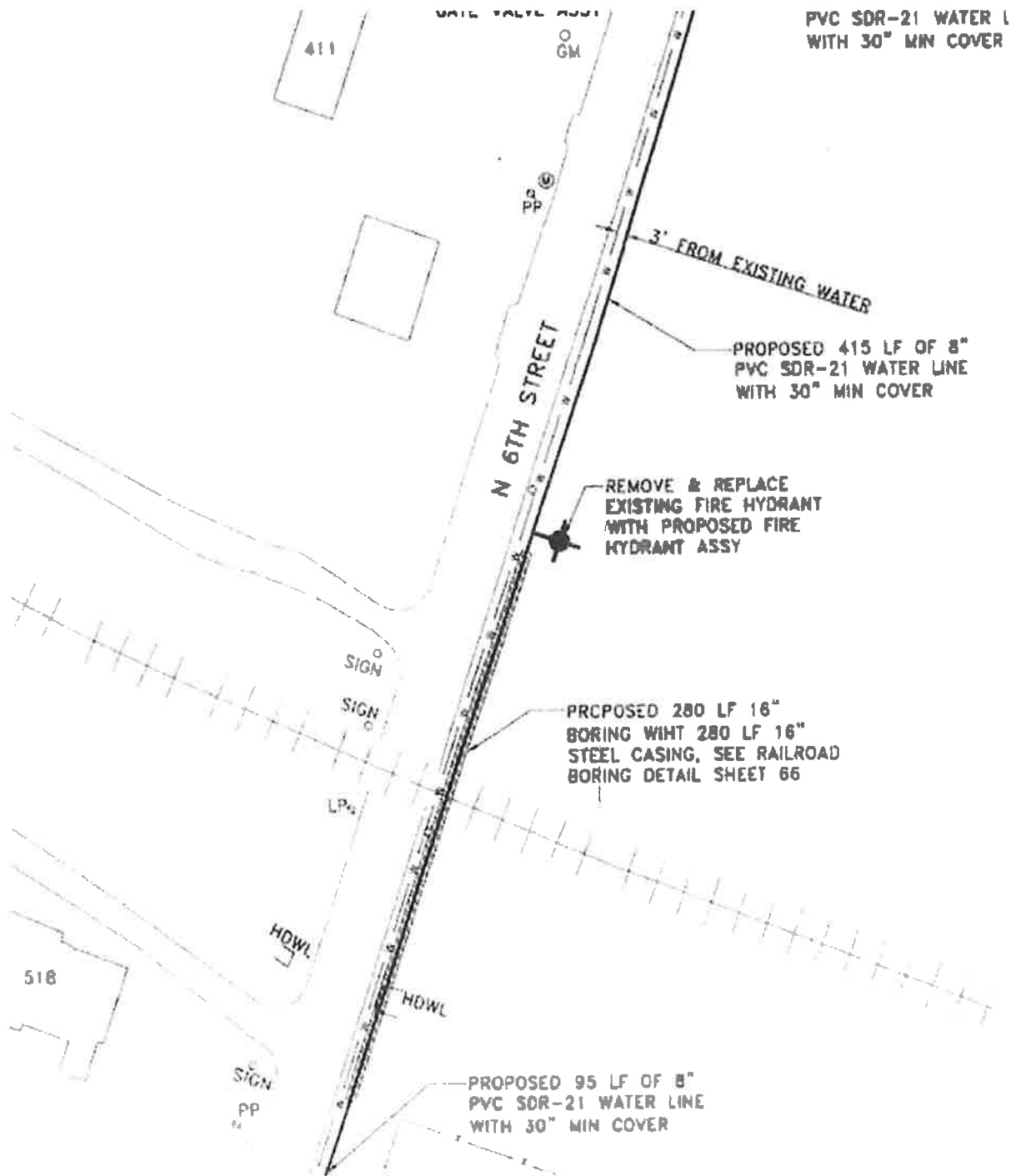


EXHIBIT B

GENERAL TERMS & CONDITIONS

Section 1. LIMITATION AND SUBORDINATION OF RIGHTS GRANTED.

- A.** The foregoing grant is subject and subordinate to the prior and continuing right and obligation of Licensor to use and maintain its entire property, including the right and power of Licensor to construct, maintain, repair, renew, use, operate, change, modify, or relocate railroad tracks, signal, communications, fiber optics, or other wirelines, pipelines, and other facilities upon, along, or across any or all parts of its property, all or any of which may be freely done at any time or times by Licensor without liability to Licensee, or to any other party for compensation or damages.
- B.** The foregoing grant is also subject to all outstanding superior rights (including those in favor of licensees and lessees of Railroad Property) and the right of Licensor to renew and extend the same, and is made without covenant of title, or for quiet enjoyment. It shall be Licensee's sole obligation to obtain such additional permission, license, and grants necessary on account of any such existing rights.

Section 2. ENGINEERING REQUIREMENTS; PERMITS

- A.** Licensee's Facilities will be designed, constructed, operated, maintained, repaired, renewed, modified, reconstructed, removed, or abandoned in place on Railroad Property by Licensee or its contractor(s) to Licensor's satisfaction and in strict conformity with: (i) Licensor's current engineering standards and specifications, including those for shoring and cribbing to protect Licensor's railroad operations and facilities (AOKRR Specifications), except for variances approved in written advance by Licensor's Chief Engineer or its authorized representative ("AOKRR Engineering Representative"); (ii) such other additional safety standards as Licensor, in its sole discretion, elects to require, including, without limitation, American Railway Engineering and Maintenance-of-Way Association ("AREMA") standards and guidelines (collectively, "AOKRR Additional Requirements"); and (iii) all applicable laws, rules, and regulations, including any applicable Federal Railroad Administration and Federal Energy Regulatory Commission regulations and enactments (collectively, "Laws"). If there is any conflict between AOKRR Specifications, AOKRR Additional Requirements, and Laws, the most restrictive will apply.
- B.** Licensee shall keep the soil over Licensee's Facilities thoroughly compacted, and maintain the grade over and around Licensee's Facilities even with the surface of the adjacent ground.

- C. If needed, Licensee shall secure, at Licensee's sole cost and expense, any and all necessary permits required to perform any work on Licensee's Facilities.

Section 3. NOTICE OF COMMENCEMENT OF WORK; EMERGENCIES

- A. Licensee and its contractors are strictly prohibited from commencing any work associated with Licensee's Facilities without Licensor's written approval that the work will be in strict compliance with the "ENGINEERING REQUIREMENTS; PERMITS" Section of this Exhibit B. Upon Licensor's approval, Licensee shall contact Licensor's field representatives at least ten (10) days before commencement of any work on Licensee's Facilities.
- B. Licensee shall not commence any work until: (1) Licensor has determined whether flagging or other special protective or safety measures ("Safety Measures") are required for performance of the work pursuant to the "FLAGGING" Section of this **Exhibit B** and provide Licensee written authorization to commence work; and (2) Licensee has complied with the "PROTECTION OF FIBER OPTIC CABLE SYSTEMS" Section of this **Exhibit B**.
- C. If, at any time, an emergency arises involving Licensee's Facilities, Licensee or its contractor shall immediately contact Licensor's Emergency Response Line at 1-855-838-3830.

Section 4. FLAGGING

- A. Following notice of Licensee's notice to Licensor's Field Representatives required under "NOTICE OF COMMENCEMENT OF WORK; EMERGENCIES" Section of this **Exhibit B**, Licensor shall inform Licensee if Safety Measures are required for performance of the work by Licensee or its contractor on Railroad Property. If Safety Measures are required, no work of any kind may be performed by Licensee or its contractor(s) until arrangements for the Safety Measures have been made and scheduled. If no Safety Measures are required, Licensor will give Licensee written authorization to commence work.
- B. If any Safety Measures are performed or provided by Licensor, including but not limited to flagging, Licensor shall bill Licensee for such expenses incurred by Licensor, unless Licensor and a federal, state, or local government entity have agreed that Licensor is to bill such expenses to the federal, state, or local entity. Additional information regarding the submission of such expenses by Licensor, and payment thereof by Licensee, can be found in the "LICENSEE'S PAYMENT OF EXPENSES" Section of this **Exhibit B**. If Licensor performs any Safety Measures, Licensee agrees that Licensee is not relieved of any responsibilities or liabilities set forth in this Agreement.
- C. For flagging, all rates of pay and other associated costs for flagging services will be in accordance with the Licensor's current Flagging Tariff found on page 12 of Licensor's Right of Entry packet. Flagging charges for any day flagging services are required will include all prep and driving time to and from Licensee's worksite, including, but not limited to placement of red boards and other precautionary measures required to control traffic and insure a safe worksite.

- D. Flagging performed on Saturdays and/or Sundays will be charged at a rate of one and one half times the normal rate.
- E. Flagging performed on holidays or observed-holidays will be charged at a rate of two and one half times the normal rate.

Section 5. SAFETY.

- A. Safety of personnel, property, rail operations, and the public is of paramount importance in the prosecution of any work on Railroad's Property performed by Licensee or its contractor, and takes precedence over any work on Licensee's Facilities to be performed by Licensee or its contractors. Licensee shall be responsible for initiating, maintaining, and supervising all safety operations and programs in connection with any work on Licensee's Facilities. Licensee and its contractor shall, at a minimum, comply with Licensor's then-current safety standards, which can be found in the Licensor's Right of Entry packet.
- B. Licensee shall keep the job site on the Railroad Property free from safety and health hazards and ensure that their employees are competent and adequately trained in all safety and health aspects of the work.
- C. Licensee represents and warrants that all parts of Licensee's Facilities within and outside of the limits of Railroad Property will not interfere whatsoever with the constant, continuous, and uninterrupted use of the tracks, property, and facilities of Licensor, and nothing shall be done or suffered to be done by Licensee at any time that would in any manner impair the safety thereof.
- D. Licensor's operations and work performed by Licensor's personnel may cause delays in Licensee's or its contractor's work on Licensee's Facilities. Licensee accepts this risk and agrees that Licensor shall have no liability to Licensee or any other person or entity for any such delays. Licensee must coordinate any work on Railroad Property by Licensee or any third party with Licensor's Field Representatives in strict compliance with the "NOTICE OF COMMENCEMENT OF WORK; EMERGENCIES" Section of this **Exhibit B**.
- E. Licensor shall have the right, if it so elects, to provide any support it deems necessary for the safety of Licensor's operations and trackage during Licensee's or its contractor's construction, maintenance, repair, renewal, modification, relocation, reconstruction, or removal of Licensee's Facilities. In the event Licensor provides such support, Licensor shall invoice Licensee, and Licensee shall pay Licensor as set forth in the "LICENSEE'S PAYMENT OF EXPENSES" Section of this **Exhibit B**.
- F. Licensee may use unmanned aircraft systems ("UAS") to inspect Licensee's Facilities only upon the prior authorization from and under the direction of Licensor's Field Representatives. Licensee represents and warrants that its use of UAS on Railroad Property will comply with Licensor's then-current Unmanned Aerial Systems Policy and all applicable law, rules, and regulations, including any applicable Federal Aviation Administration regulations and enactments pertaining to UAS.

Section 6. PROTECTION OF FIBER OPTIC CABLE SYSTEMS.

- A. Fiber optic cable systems may be buried on Railroad Property. Protection of the fiber optic cable systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits.

Section 7. LICENSEE'S PAYMENT OF EXPENSES.

- A. Licensee shall bear the entire cost and expense of the design, construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities.
- B. Licensee shall fully pay for all materials joined, affixed to and labor performed on Railroad Property in connection with the construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities, and shall not permit or suffer any mechanic's or materialman's lien of any kind or nature to be enforced against the property for any work done or materials furnished thereon at the instance or request or on behalf of Licensee. Licensee shall promptly pay or discharge all taxes, charges, and assessments levied upon or in respect to, or on account of Licensee's Facilities, to prevent the same from becoming a charge or lien upon any property of Licensor, and so that the taxes, charges, and assessments levied upon or in respect to such property shall not be increased because of the location, construction, or maintenance of Licensee's Facilities or any improvement, appliance, or fixture connected therewith placed upon such property, or on account of Licensee's interest therein. Where such tax, charge, or assessment may not be separately made or assessed to Licensee but shall be included in the assessment of the property of Licensor, then Licensee shall pay to Licensor an equitable proportion of such taxes determined by the value of Licensee's property upon property of Licensor as compared with the entire value of such property.
- C. As set forth in the "FLAGGING" Section of this **Exhibit B**, Licensor shall have the right, if it so elects, to provide any Safety Measures Licensor deems necessary for the safety of Licensor's operations and trackage during Licensee's or its contractor's construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities, including, but not limited to supervision, inspection, and flagging services. In the event Licensor provides such Safety Measures, Licensor shall submit an itemized invoice to Licensee's notice recipient listed in the "NOTICES" Article of this Agreement. Licensee shall pay to Licensor the total amount listed on such invoice within thirty (30) days of Licensee's receipt of such invoice.

Section 8. MODIFICATIONS TO LICENSEE'S FACILITIES.

- A. This grant is subject to Licensor's safe and efficient operation of its railroad, and continued use and improvement of Railroad Property (collectively, "Railroad Use"). Accordingly, Licensee shall, at its sole cost and expense, modify, reconstruct, repair, renew, revise, relocate, or remove (individually, "Modification", or collectively, "Modifications") all or any portion of Licensee's Facilities as Licensor may designate or identify, in its sole discretion, in the furtherance of Railroad Use.

- B.** Upon any Modification of all or any portion of Licensee's Facilities to another location on Railroad Property, Licensors and Licensee shall execute a Supplemental Agreement to this Pipeline Agreement to document Modification(s) to Licensee's Facilities on Railroad Property. If the Modifications result in Licensee's Facilities moving off of Railroad Property, this Agreement will terminate upon Licensee's completion of such Modification(s) and all requirements contained within the "TERMINATION; REMOVAL OF LICENSEE'S FACILITIES" Section of this **Exhibit B**. Any such Modification(s) off of Railroad Property will not release Licensee from any liability or other obligation of Licensee arising prior to and upon completion of any such Modifications to the Licensee's Facilities.

Section 9. RESTORATION OF RAILROAD PROPERTY.

- A.** In the event Licensee, in any manner, moves or disturbs any property of Licensors in connection with the construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities, then Licensee shall, as soon as possible and at Licensee's sole cost and expense, restore Licensors' property to the same condition as the same were before such property was moved or disturbed.

Section 10. INDEMNITY.

- A. Definitions.** As used in this Section:

1. "Licensor" includes Licensors, its affiliates, its and their officers, directors, agents, and employees, and other railroad companies using Railroad Property at or near the location of Licensee's installation and their officers, directors, agents, and employees.
2. "Licensee" includes Licensee and its agents, contractors, subcontractors, sub-subcontractors, employees, officers, and directors, or any other person or entity acting on its behalf or under its control.
3. "Loss" includes claims, suits, taxes, loss, damages, (including punitive damages, statutory damages, and exemplary damages), costs, charges, assessments, judgments, settlements, liens, demands, actions, causes of action, fines, penalties, interest, and expenses of any nature, including court costs, reasonable attorneys' fees and expenses, investigation costs, and appeal expenses.

- B.** Licensee shall release, defend, indemnify, and hold harmless Licensors from and against any and all Loss, even if groundless, fraudulent, or false, that directly or indirectly arises out of or is related to Licensee's construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, removal, presence, use, or operation of Licensee's Facilities, including, but not limited to, any actual or alleged:

1. Bodily harm or personal injury (including any emotional injury or disease) to, or the death of, any person(s), including, but not limited to, Licensee, Licensors, any telecommunications company, or the agents, contractors, subcontractors, sub-subcontractors, or employees of the foregoing;

2. Damage to or the disturbance, loss, movement, or destruction of Railroad Property, including loss of use and diminution in value, including, but not limited to, any telecommunications systems or fiber optic cables on or near Railroad Property, any property of Licensee or Licensor, or any property in the care, custody, or control of Licensee or Licensor;
3. Removal of person(s) from Railroad Property;
4. Any delays or interference with track or Railroad's Use caused by Licensee's activity(ies) on Railroad Property, including, without limitation, the construction, maintenance, modification, reconstruction, repair, repair, renewal, revision, relocation, or removal of Licensee's Facilities or any part thereof, any activities, labor, materials, equipment, or machinery in conjunction therewith;
5. Right(s) or interest(s) granted pursuant to this Agreement;
6. Contents escaping from Licensee's Facilities, including without limitation any actual or alleged pollution, contamination, breach, or environmental Loss;
7. Licensee's breach of this Agreement or failure to comply with its provisions, including, but not limited to, any violation or breach by Licensee of any representations and warranties Licensee has made in this Agreement; and
8. Violation by Licensee of any law, statute, ordinance, governmental administrative order, rule, or regulation, including without limitation all applicable Federal Railroad Administration regulations.

C. THE FOREGOING OBLIGATIONS SHALL APPLY TO THE FULLEST EXTENT PERMITTED BY LAW FOR THE BENEFIT OF LICENSOR TO LOSSES CAUSED BY, ARISING FROM, RELATING TO, OR RESULTING FROM, IN WHOLE OR IN PART, THE NEGLIGENCE OF LICENSOR, AND SUCH NEGLIGENCE OF LICENSOR SHALL NOT LIMIT, DIMINISH, OR PRECLUDE LICENSEE'S OBLIGATIONS TO LICENSOR IN ANY RESPECT. NOTWITHSTANDING THE FOREGOING, SUCH OBLIGATION TO IDEMNIFY LICENSOR SHALL NOT APPLY TO THE EXTENT THE LOSS IS CAUSED BY THE SOLE, ACTIVE, AND DIRECT NEGLIGENCE, GROSS NEGLIGENCE, OR WILLFUL MISCONDUCT OF LICENSOR AS DETERMINED IN A FINAL JUDGMENT BY A COURT OF COMPETENT JURISDICTION.

Section 11. TERMINATION; REMOVAL OF LICENSEE'S FACILITIES.

- A. If Licensee does not use the right herein granted on Licensee's Facilities for one (1) year, or if Licensee continues in default in the performance of any provision of this Agreement for a period of thirty (30) days after written notice from Licensor to Licensee specifying such default, Licensor may, at its sole discretion, terminate this Agreement by written notice to Licensee at the address listed in the "NOTICES" Article of this Agreement. This Agreement will not terminate until Licensee complies with Paragraph's "C" and "D" of this Section found below.

- B.** In addition to the provisions of Paragraph “A” above, this Agreement may be terminated by written notice given by either party, without cause, upon thirty (30) days written notice to the non-terminating party at the address listed in the “NOTICES” Article of this Agreement. This Agreement will not terminate until Licensee complies with Paragraphs “C” and “D” of this Section found below.
- C.** Prior to the effective dates of any termination described in this Section, Licensee shall submit an application to Licensors for Licensee’s removal, or if applicable, abandonment in place of Licensee’s Facilities located on Railroad Property (“Removal/Abandonment Work”). Upon Licensors’ approval of Licensee’s application for the Removal/Abandonment Work, Licensors and Licensee shall execute a separate consent document that will govern Licensee’s performance of the Removal/Abandonment Work from those portions of Railroad Property not occupied by roadbed and/or trackage (“Consent Document”). Licensee shall then restore the impacted Railroad Property to the same or reasonably similar condition as it was prior to Licensee’s installation of Licensee’s Facilities. For purposes of this Section, Licensee’s (i) performance of the Removal/Abandonment Work, and (ii) restoration work will hereinafter be collectively referred to as the “Restoration Work”.
- D.** Following Licensee’s completion of the Restoration Work, Licensee shall provide a written certification letter to Licensors at the address listed in the “NOTICES” Article of this Agreement which certifies that the Restoration Work has been completed in accordance with the Consent Document. Licensee shall report to governmental authorities, as required by law, and notify Licensors immediately if any environmental contamination is discovered during Licensee’s performance of the Restoration Work. Upon discovery, the Licensee shall initiate any and all removal, remedial and restoration actions that are necessary to restore the property to its original, uncontaminated condition. Licensee shall provide written certification to Licensors at the address listed in the “NOTICES” Article of this Agreement that the environmental contamination has been remediated and the property has been restored in accordance with Licensors’ requirements. Upon Licensors’ receipt of Licensee’s restoration completion certifications, this Agreement will terminate.
- E.** In the event that Licensee fails to complete any of the Restoration Work, Licensors may, but is not obligated to, perform the Restoration Work. Any such work actually performed by Licensors will be at the sole cost and expense of Licensee. In the event Licensors performs any of the Restoration Work, Licensee shall release Licensors from any and all Loss (defined in the “INDEMNITY” Section of this **Exhibit B**) arising out of or related to Licensors’ performance of the Restoration Work.

Termination of this Agreement for any reason will not affect any rights or obligations of the parties which may have been accrued, or liabilities or Loss (defined in the “INDEMNITY” Section of this **Exhibit B**), accrued or otherwise, which may have arisen prior to such termination.

PIPELINE CROSSING AGREEMENT

MILE POST 351.78
HARTSHORNE, OK

THIS AGREEMENT ("Agreement") is made and entered into as of Feb 28, 2025 ("Effective Date"), by and between **ARKANSAS-OKLAHOMA RAILROAD COMPANY**, an Oklahoma Corporation, ("Licensor") and **CITY OF HARTSHORNE, OKLAHOMA** to be addressed at 1101 Penn Ave. Hartshorne, OK 74547 ("Licensee").

IT IS MUTUALLY AGREED TO BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:

ARTICLE 1. LICENSOR GRANTS RIGHT.

- A.** In consideration of the license fee paid by Licensee set forth below, and in further consideration of the covenants and agreements to be performed by Licensee, Licensor hereby grants to Licensee the right to construct, and thereafter, during the term hereof, maintain and operate pipeline crossing underground only, including any appurtenances required for the operation of said pipeline (collectively, "Licensee's Facilities") across Licensor's real property, trackage, or other facilities located in or near Hartshorne, Oklahoma ("Railroad Property"). The specific specifications and limited purpose for Licensee's Facilities on, along, across and under Railroad Property are described in, and shown on, the Print and Specification attached hereto as **EXHIBIT A**, and made a part hereof.
- B.** Licensee represents and warrants that Licensee's Facilities will (i) only be used for pipeline crossing underground, and (ii) not be used to convey any other substance, any fiber optic cable, or for any other use, whether such use is currently technologically possible, or whether such use may come into existence during the life of this Agreement.
- C.** Licensee acknowledges that if it or its contractor provides Licensor with digital imagery depicting Licensee's Facilities ("Digital Imagery"), Licensee authorizes Licensor to use the Digital Imagery in preparing **Exhibit A**. Licensee represents and warrants that through a license or otherwise, it has the right to use the Digital Imagery and to permit Licensor to use the Digital Imagery in said manner.

ARTICLE 2. LICENSE FEE.

Licensor elects not to charge a license fee to licensee in this case. Other applicable fees for flagging and right of entry will continue to apply.

ARTICLE 3. TERM.

This Agreement shall take effect as of the Effective Date first herein written and shall continue in full force and effect until terminated as provided in the "TERMINATION: REMOVAL OF LICENSEE'S FACILITIES" Section of **EXHIBIT B**.

ARTICLE 4. LICENSEE'S COMPLIANCE WITH GENERAL TERMS.

Licensee represents and warrants that all work on Licensee's Facilities performed by Licensee or its contractors will strictly comply with all terms and conditions set forth herein, including the General Terms and Conditions, attached hereto as Exhibit B and made a part hereof.

ARTICLE 5. INSURANCE.

- A. During the term of this Agreement, Licensee shall fully comply or cause its contractor(s) to fully comply with the insurance requirements described in **EXHIBIT C**, attached hereto and made a part hereof. Upon request only, Licensee shall send copies of all insurance documentation (e.g., certificates, endorsements, etc.) to Licensor at the address listed in the "NOTICES" Section of this Agreement.
- B. If Licensee is subject to statute(s) limiting its insurance liability and/or limiting its ability to obtain insurance in compliance with **Exhibit C** of this Agreement, those statutes shall apply.

ARTICLE 6. DEFINITION OF LICENSEE.

For purposes of this Agreement, all references in this Agreement to Licensee will include Licensee's contractors, subcontractors, officers, agents, and employees, and other acting under its or their authority (collectively, a "Contractor"). If a Contractor is hired by Licensee to perform any work on Licensee's Facilities (including initial construction and subsequent relocation, maintenance, and/or repair work), then Licensee shall provide a copy of this Agreement to its Contractor(s) and require its Contractor(s) to comply with all terms and conditions of this Agreement, including the indemnification requirements set forth in the "INDEMNITY" Section of **Exhibit B**. Licensee shall require any Contractor to release, defend, and indemnify Licensor to the same extent and under the same terms and conditions as Licensee is required to release, defend, and indemnify Licensor herein.

ARTICLE 7. ATTORNEY'S FEES, EXPENSES, AND COSTS

If litigation or other court action or similar adjudicatory proceeding is undertaken by Licensee or Licensor to enforce its rights under this Agreement, all fees, costs, and expenses, including, without limitation, reasonable attorney's fees and court costs, of the prevailing Party against whose interest the judgment or decision is rendered. The provisions of this Article shall survive the termination of this Agreement.

ARTICLE 8. WAIVER OF BREACH.

The waiver by Licensor of the breach of any condition, covenant, or agreement herein contained to be kept, observed and performed by Licensee shall in no way impair the right of Licensor to avail itself of any remedy for any subsequent breach thereof.

ARTICLE 9. ASSIGNMENT.

A. Licensee shall not assign this Agreement, in whole or in part, or any rights herein granted, without the written consent of Licensor, which must be requested in writing by Licensee. Any assignment or attempted transfer of this Agreement or any of the rights herein granted, whether voluntary, by operation of law, or otherwise, without Licensor's written consent, will be absolutely void and may result in Licensor's termination of this Agreement pursuant to the "TERMINATION; REMOVAL OF LICENSEE'S FACILITIES" Section of **Exhibit B**.

B. Upon Licensor's written consent to any assignment, this Agreement will be binding upon and insure to the benefit of the parties thereto, successors, heirs, and assigns, executors, and administrators.

ARTICLE 10. SEVERABILITY.

Any provision of this Agreement which is determined by a court of competent jurisdiction to be invalid or unenforceable shall be invalid or unenforceable only to the extent of such determination, which shall not invalidate or otherwise render ineffective any other provision of this Agreement.

ARTICLE 11. NOTICES.

Except Licensee's commencement of work notice(s) required under **Exhibit B**, all other notices required by this Agreement must be in writing, and (i) personally served upon the business address listed below ("Notice Address"), (ii) sent overnight via express delivery by a nationally recognized overnight delivery service such as Federal Express Corporation or United Parcel Service to the Notice Address, or (iii) by certified mail, return receipt requested to the Notice Address. Overnight express delivery notices will be deemed to be given upon receipt. Certified mail notices will be deemed to be given three (3) days after deposit with the United States Postal Service.

If to Licensor: Arkansas–Oklahoma Railroad Company
Att: Brandon Crouch, Real Estate Mgr.
116 West Main Street
Wilburton, OK 74578

If to Licensee: **City of Hartshorne**
1101 Penn Ave.
Hartshorne, OK 74547

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the date first herein written.

ARKANSAS-OKLAHOMA RAILROAD

BY:


Brandon Crouch
Dir. Projects
1/28/2025

[LICENSEE NAME]

BY:

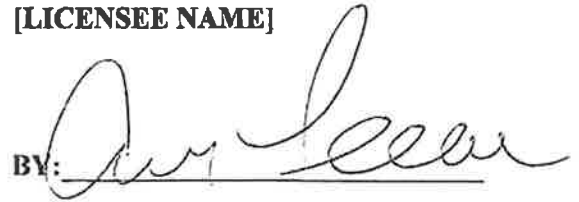


EXHIBIT A

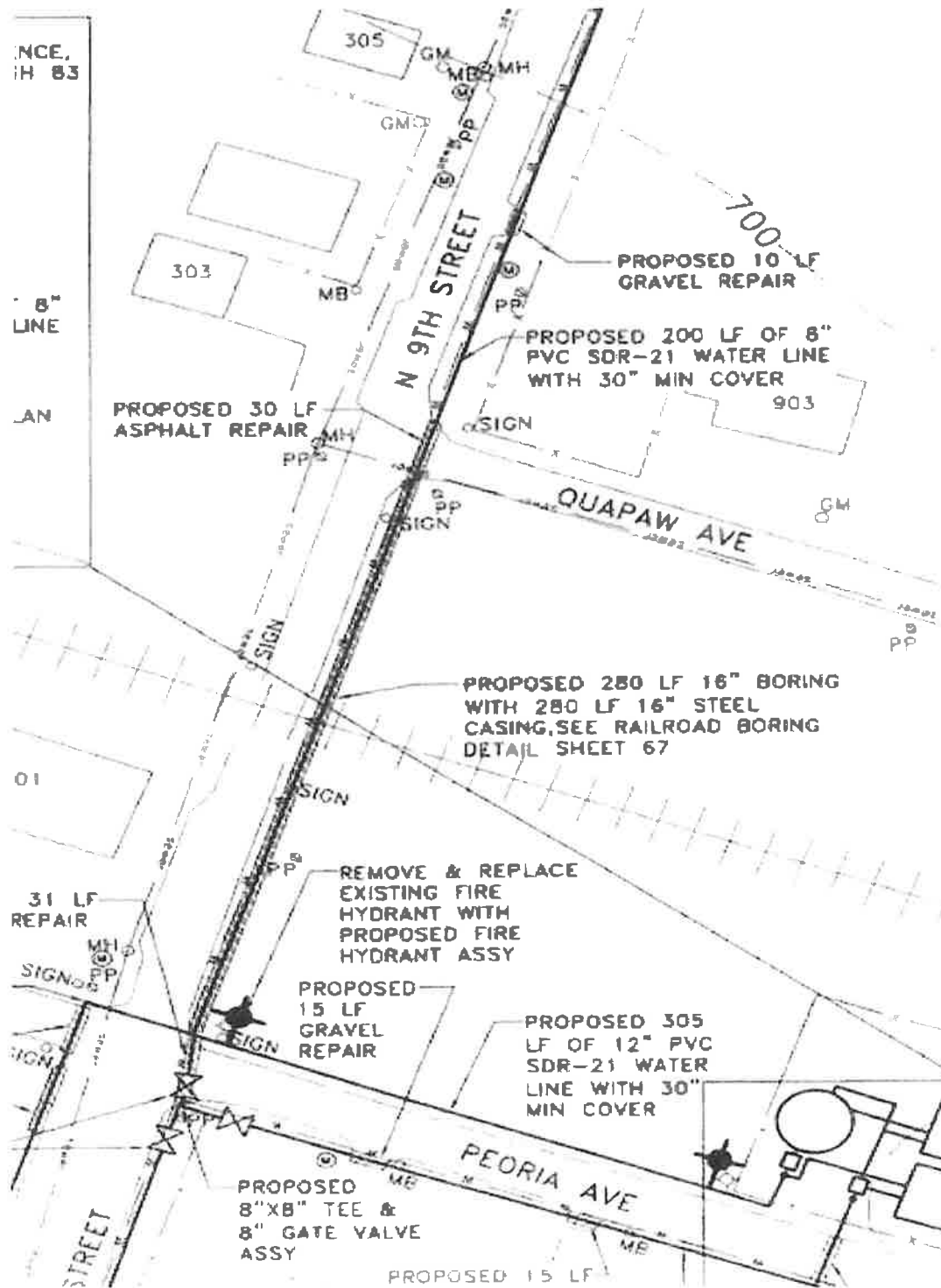


EXHIBIT B

GENERAL TERMS & CONDITIONS

Section 1. LIMITATION AND SUBORDINATION OF RIGHTS GRANTED.

- A.** The foregoing grant is subject and subordinate to the prior and continuing right and obligation of Licensor to use and maintain its entire property, including the right and power of Licensor to construct, maintain, repair, renew, use, operate, change, modify, or relocate railroad tracks, signal, communications, fiber optics, or other wirelines, pipelines, and other facilities upon, along, or across any or all parts of its property, all or any of which may be freely done at any time or times by Licensor without liability to Licensee, or to any other party for compensation or damages.
- B.** The foregoing grant is also subject to all outstanding superior rights (including those in favor of licensees and lessees of Railroad Property) and the right of Licensor to renew and extend the same, and is made without covenant of title, or for quiet enjoyment. It shall be Licensee's sole obligation to obtain such additional permission, license, and grants necessary on account of any such existing rights.

Section 2. ENGINEERING REQUIREMENTS; PERMITS

- A.** Licensee's Facilities will be designed, constructed, operated, maintained, repaired, renewed, modified, reconstructed, removed, or abandoned in place on Railroad Property by Licensee or its contractor(s) to Licensor's satisfaction and in strict conformity with: (i) Licensor's current engineering standards and specifications, including those for shoring and cribbing to protect Licensor's railroad operations and facilities (AOKRR Specifications), except for variances approved in written advance by Licensor's Chief Engineer or its authorized representative ("AOKRR Engineering Representative"); (ii) such other additional safety standards as Licensor, in its sole discretion, elects to require, including, without limitation, American Railway Engineering and Maintenance-of-Way Association ("AREMA") standards and guidelines (collectively, "AOKRR Additional Requirements"); and (iii) all applicable laws, rules, and regulations, including any applicable Federal Railroad Administration and Federal Energy Regulatory Commission regulations and enactments (collectively, "Laws"). If there is any conflict between AOKRR Specifications, AOKRR Additional Requirements, and Laws, the most restrictive will apply.
- B.** Licensee shall keep the soil over Licensee's Facilities thoroughly compacted, and maintain the grade over and around Licensee's Facilities even with the surface of the adjacent ground.

- C. If needed, Licensee shall secure, at Licensee's sole cost and expense, any and all necessary permits required to perform any work on Licensee's Facilities.

Section 3. NOTICE OF COMMENCEMENT OF WORK; EMERGENCIES

- A. Licensee and its contractors are strictly prohibited from commencing any work associated with Licensee's Facilities without Licensor's written approval that the work will be in strict compliance with the "ENGINEERING REQUIREMENTS; PERMITS" Section of this Exhibit B. Upon Licensor's approval, Licensee shall contact Licensor's field representatives at least ten (10) days before commencement of any work on Licensee's Facilities.
- B. Licensee shall not commence any work until: (1) Licensor has determined whether flagging or other special protective or safety measures ("Safety Measures") are required for performance of the work pursuant to the "FLAGGING" Section of this **Exhibit B** and provide Licensee written authorization to commence work; and (2) Licensee has complied with the "PROTECTION OF FIBER OPTIC CABLE SYSTEMS" Section of this **Exhibit B**.
- C. If, at any time, an emergency arises involving Licensee's Facilities, Licensee or its contractor shall immediately contact Licensor's Emergency Response Line at 1-855-838-3830.

Section 4. FLAGGING

- A. Following notice of Licensee's notice to Licensor's Field Representatives required under "NOTICE OF COMMENCEMENT OF WORK; EMERGENCIES" Section of this **Exhibit B**, Licensor shall inform Licensee if Safety Measures are required for performance of the work by Licensee or its contractor on Railroad Property. If Safety Measures are required, no work of any kind may be performed by Licensee or its contractor(s) until arrangements for the Safety Measures have been made and scheduled. If no Safety Measures are required, Licensor will give Licensee written authorization to commence work.
- B. If any Safety Measures are performed or provided by Licensor, including but not limited to flagging, Licensor shall bill Licensee for such expenses incurred by Licensor, unless Licensor and a federal, state, or local government entity have agreed that Licensor is to bill such expenses to the federal, state, or local entity. Additional information regarding the submission of such expenses by Licensor, and payment thereof by Licensee, can be found in the "LICENSEE'S PAYMENT OF EXPENSES" Section of this **Exhibit B**. If Licensor performs any Safety Measures, Licensee agrees that Licensee is not relieved of any responsibilities or liabilities set forth in this Agreement.
- C. For flagging, all rates of pay and other associated costs for flagging services will be in accordance with the Licensor's current Flagging Tariff found on page 12 of Licensor's Right of Entry packet. Flagging charges for any day flagging services are required will include all prep and driving time to and from Licensee's worksite, including, but not limited to placement of red boards and other precautionary measures required to control traffic and insure a safe worksite.

- D. Flagging performed on Saturdays and/or Sundays will be charged at a rate of one and one half times the normal rate.
- E. Flagging performed on holidays or observed holidays will be charged at a rate of two and one half times the normal rate.

Section 5. SAFETY.

- A. Safety of personnel, property, rail operations, and the public is of paramount importance in the prosecution of any work on Railroad's Property performed by Licensee or its contractor, and takes precedence over any work on Licensee's Facilities to be performed by Licensee or its contractors. Licensee shall be responsible for initiating, maintaining, and supervising all safety operations and programs in connection with any work on Licensee's Facilities. Licensee and its contractor shall, at a minimum, comply with Licensor's then-current safety standards, which can be found in the Licensor's Right of Entry packet.
- B. Licensee shall keep the job site on the Railroad Property free from safety and health hazards and ensure that their employees are competent and adequately trained in all safety and health aspects of the work.
- C. Licensee represents and warrants that all parts of Licensee's Facilities within and outside of the limits of Railroad Property will not interfere whatsoever with the constant, continuous, and uninterrupted use of the tracks, property, and facilities of Licensor, and nothing shall be done or suffered to be done by Licensee at any time that would in any manner impair the safety thereof.
- D. Licensor's operations and work performed by Licensor's personnel may cause delays in Licensee's or its contractor's work on Licensee's Facilities. Licensee accepts this risk and agrees that Licensor shall have no liability to Licensee or any other person or entity for any such delays. Licensee must coordinate any work on Railroad Property by Licensee or any third party with Licensor's Field Representatives in strict compliance with the "NOTICE OF COMMENCEMENT OF WORK; EMERGENCIES" Section of this **Exhibit B**.
- E. Licensor shall have the right, if it so elects, to provide any support it deems necessary for the safety of Licensor's operations and trackage during Licensee's or its contractor's construction, maintenance, repair, renewal, modification, relocation, reconstruction, or removal of Licensee's Facilities. In the event Licensor provides such support, Licensor shall invoice Licensee, and Licensee shall pay Licensor as set forth in the "LICENSEE'S PAYMENT OF EXPENSES" Section of this **Exhibit B**.
- F. Licensee may use unmanned aircraft systems ("UAS") to inspect Licensee's Facilities only upon the prior authorization from and under the direction of Licensor's Field Representatives. Licensee represents and warrants that its use of UAS on Railroad Property will comply with Licensor's then-current Unmanned Aerial Systems Policy and all applicable law, rules, and regulations, including any applicable Federal Aviation Administration regulations and enactments pertaining to UAS.

Section 6. PROTECTION OF FIBER OPTIC CABLE SYSTEMS.

- A. Fiber optic cable systems may be buried on Railroad Property. Protection of the fiber optic cable systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits.

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- A. Licensee shall bear the entire cost and expense of the design, construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities.
- B. Licensee shall fully pay for all materials joined, affixed to and labor performed on Railroad Property in connection with the construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities, and shall not permit or suffer any mechanic's or materialman's lien of any kind or nature to be enforced against the property for any work done or materials furnished thereon at the instance or request or on behalf of Licensee. Licensee shall promptly pay or discharge all taxes, charges, and assessments levied upon or in respect to, or on account of Licensee's Facilities, to prevent the same from becoming a charge or lien upon any property of Licensor, and so that the taxes, charges, and assessments levied upon or in respect to such property shall not be increased because of the location, construction, or maintenance of Licensee's Facilities or any improvement, appliance, or fixture connected therewith placed upon such property, or on account of Licensee's interest therein. Where such tax, charge, or assessment may not be separately made or assessed to Licensee but shall be included in the assessment of the property of Licensor, then Licensee shall pay to Licensor an equitable proportion of such taxes determined by the value of Licensee's property upon property of Licensor as compared with the entire value of such property.
- C. As set forth in the "FLAGGING" Section of this **Exhibit B**, Licensor shall have the right, if it so elects, to provide any Safety Measures Licensor deems necessary for the safety of Licensor's operations and trackage during Licensee's or its contractor's construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities, including, but not limited to supervision, inspection, and flagging services. In the event Licensor provides such Safety Measures, Licensor shall submit an itemized invoice to Licensee's notice recipient listed in the "NOTICES" Article of this Agreement. Licensee shall pay to Licensor the total amount listed on such invoice within thirty (30) days of Licensee's receipt of such invoice.

Section 8. MODIFICATIONS TO LICENSEE'S FACILITIES.

- A. This grant is subject to Licensor's safe and efficient operation of its railroad, and continued use and improvement of Railroad Property (collectively, "Railroad Use"). Accordingly, Licensee shall, at its sole cost and expense, modify, reconstruct, repair, renew, revise, relocate, or remove (individually, "Modification", or collectively, "Modifications") all or any portion of Licensee's Facilities as Licensor may designate or identify, in its sole discretion, in the furtherance of Railroad Use.

- B.** Upon any Modification of all or any portion of Licensee's Facilities to another location on Railroad Property, Licenser and Licensee shall execute a Supplemental Agreement to this Pipeline Agreement to document Modification(s) to Licensee's Facilities on Railroad Property. If the Modifications result in Licensee's Facilities moving off of Railroad Property, this Agreement will terminate upon Licensee's completion of such Modification(s) and all requirements contained within the "TERMINATION; REMOVAL OF LICENSEE'S FACILITIES" Section of this **Exhibit B**. Any such Modification(s) off of Railroad Property will not release Licensee from any liability or other obligation of Licensee arising prior to and upon completion of any such Modifications to the Licensee's Facilities.

Section 9. RESTORATION OF RAILROAD PROPERTY.

- A.** In the event Licensee, in any manner, moves or disturbs any property of Licenser in connection with the construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities, then Licensee shall, as soon as possible and at Licensee's sole cost and expense, restore Licenser's property to the same condition as the same were before such property was moved or disturbed.

Section 10. INDEMNITY.

- A.** Definitions. As used in this Section:

1. "Licenser" includes Licenser, its affiliates, its and their officers, directors, agents, and employees, and other railroad companies using Railroad Property at or near the location of Licensee's installation and their officers, directors, agents, and employees.
2. "Licensee" includes Licensee and its agents, contractors, subcontractors, sub-subcontractors, employees, officers, and directors, or any other person or entity acting on its behalf or under its control.
3. "Loss" includes claims, suits, taxes, loss, damages, (including punitive damages, statutory damages, and exemplary damages), costs, charges, assessments, judgments, settlements, liens, demands, actions, causes of action, fines, penalties, interest, and expenses of any nature, including court costs, reasonable attorneys' fees and expenses, investigation costs, and appeal expenses.

- B.** Licensee shall release, defend, indemnify, and hold harmless Licenser from and against any and all Loss, even if groundless, fraudulent, or false, that directly or indirectly arises out of or is related to Licensee's construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, removal, presence, use, or operation of Licensee's Facilities, including, but not limited to, any actual or alleged:

1. Bodily harm or personal injury (including any emotional injury or disease) to, or the death of, any person(s), including, but not limited to, Licensee, Licenser, any telecommunications company, or the agents, contractors, subcontractors, sub-subcontractors, or employees of the foregoing;

2. Damage to or the disturbance, loss, movement, or destruction of Railroad Property, including loss of use and diminution in value, including, but not limited to, any telecommunications systems or fiber optic cables on or near Railroad Property, any property of Licensee or Licensor, or any property in the care, custody, or control of Licensee or Licensor;
3. Removal of person(s) from Railroad Property;
4. Any delays or interference with track or Railroad's Use caused by Licensee's activity(ies) on Railroad Property, including, without limitation, the construction, maintenance, modification, reconstruction, repair, repair, renewal, revision, relocation, or removal of Licensee's Facilities or any part thereof, any activities, labor, materials, equipment, or machinery in conjunction therewith;
5. Right(s) or interest(s) granted pursuant to this Agreement;
6. Contents escaping from Licensee's Facilities, including without limitation any actual or alleged pollution, contamination, breach, or environmental Loss;
7. Licensee's breach of this Agreement or failure to comply with its provisions, including, but not limited to, any violation or breach by Licensee of any representations and warranties Licensee has made in this Agreement; and
8. Violation by Licensee of any law, statute, ordinance, governmental administrative order, rule, or regulation, including without limitation all applicable Federal Railroad Administration regulations.

C. THE FOREGOING OBLIGATIONS SHALL APPLY TO THE FULLEST EXTENT PERMITTED BY LAW FOR THE BENEFIT OF LICENSOR TO LOSSES CAUSED BY, ARISING FROM, RELATING TO, OR RESULTING FROM, IN WHOLE OR IN PART, THE NEGLIGENCE OF LICENSOR, AND SUCH NEGLIGENCE OF LICENSOR SHALL NOT LIMIT, DIMINISH, OR PRECLUDE LICENSEE'S OBLIGATIONS TO LICENSOR IN ANY RESPECT. NOTWITHSTANDING THE FOREGOING, SUCH OBLIGATION TO IDEMNIFY LICENSOR SHALL NOT APPLY TO THE EXTENT THE LOSS IS CAUSED BY THE SOLE, ACTIVE, AND DIRECT NEGLIGENCE, GROSS NEGLIGENCE, OR WILLFUL MISCONDUCT OF LICENSOR AS DETERMINED IN A FINAL JUDGMENT BY A COURT OF COMPETENT JURISDICTION.

Section 11. TERMINATION; REMOVAL OF LICENSEE'S FACILITIES.

- A. If Licensee does not use the right herein granted on Licensee's Facilities for one (1) year, or if Licensee continues in default in the performance of any provision of this Agreement for a period of thirty (30) days after written notice from Licensor to Licensee specifying such default, Licensor may, at its sole discretion, terminate this Agreement by written notice to Licensee at the address listed in the "NOTICES" Article of this Agreement. This Agreement

will not terminate until Licensee complies with Paragraph's "C" and "D" of this Section found below.

- B. In addition to the provisions of Paragraph "A" above, this Agreement may be terminated by written notice given by either party, without cause, upon thirty (30) days written notice to the non-terminating party at the address listed in the "NOTICES" Article of this Agreement. This Agreement will not terminate until Licensee complies with Paragraphs "C" and "D" of this Section found below.
- C. Prior to the effective dates of any termination described in this Section, Licensee shall submit an application to Licensor for Licensee's removal, or if applicable, abandonment in place of Licensee's Facilities located on Railroad Property ("Removal/Abandonment Work"). Upon Licensor's approval of Licensee's application for the Removal/Abandonment Work, Licensor and Licensee shall execute a separate consent document that will govern Licensee's performance of the Removal/Abandonment Work from those portions of Railroad Property not occupied by roadbed and/or trackage ("Consent Document"). Licensee shall then restore the impacted Railroad Property to the same or reasonably similar condition as it was prior to Licensee's installation of Licensee's Facilities. For purposes of this Section, Licensee's (i) performance of the Removal/Abandonment Work, and (ii) restoration work will hereinafter be collectively referred to as the "Restoration Work".
- D. Following Licensee's completion of the Restoration Work, Licensee shall provide a written certification letter to Licensor at the address listed in the "NOTICES" Article of this Agreement which certifies that the Restoration Work has been completed in accordance with the Consent Document. Licensee shall report to governmental authorities, as required by law, and notify Licensor immediately if any environmental contamination is discovered during Licensee's performance of the Restoration Work. Upon discovery, the Licensee shall initiate any and all removal, remedial and restoration actions that are necessary to restore the property to its original, uncontaminated condition. Licensee shall provide written certification to Licensor at the address listed in the "NOTICES" Article of this Agreement that the environmental contamination has been remediated and the property has been restored in accordance with Licensor's requirements. Upon Licensor's receipt of Licensee's restoration completion certifications, this Agreement will terminate.
- E. In the event that Licensee fails to complete any of the Restoration Work, Licensor may, but is not obligated to, perform the Restoration Work. Any such work actually performed by Licensor will be at the sole cost and expense of Licensee. In the event Licensor performs any of the Restoration Work, Licensee shall release Licensor from any and all Loss (defined in the "INDEMNITY" Section of this **Exhibit B**) arising out of or related to Licensor's performance of the Restoration Work.

Termination of this Agreement for any reason will not affect any rights or obligations of the parties which may have been accrued, or liabilities or Loss (defined in the "INDEMNITY" Section of this **Exhibit B**), accrued or otherwise, which may have arisen prior to such termination.

PIPELINE CROSSING AGREEMENT

MILE POST 351.28
HARTSHORNE, OK

THIS AGREEMENT ("Agreement") is made and entered into as of Jan. 28, 2025 ("Effective Date"), by and between **ARKANSAS-OKLAHOMA RAILROAD COMPANY**, an Oklahoma Corporation, ("Licensor") and **CITY OF HARTSHORNE, OKLAHOMA** to be addressed at 1101 Penn Ave. Hartshorne, OK 74547 ("Licensee").

IT IS MUTUALLY AGREED TO BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:

ARTICLE 1. LICENSOR GRANTS RIGHT.

- A.** In consideration of the license fee paid by Licensee set forth below, and in further consideration of the covenants and agreements to be performed by Licensee, Licensor hereby grants to Licensee the right to construct, and thereafter, during the term hereof, maintain and operate pipeline crossing underground only, including any appurtenances required for the operation of said pipeline (collectively, "Licensee's Facilities") across Licensor's real property, trackage, or other facilities located in or near Hartshorne, Oklahoma ("Railroad Property"). The specific specifications and limited purpose for Licensee's Facilities on, along, across and under Railroad Property are described in, and shown on, the Print and Specification attached hereto as **EXHIBIT A**, and made a part hereof.
- B.** Licensee represents and warrants that Licensee's Facilities will (i) only be used for pipeline crossing underground, and (ii) not be used to convey any other substance, any fiber optic cable, or for any other use, whether such use is currently technologically possible, or whether such use may come into existence during the life of this Agreement.
- C.** Licensee acknowledges that if it or its contractor provides Licensor with digital imagery depicting Licensee's Facilities ("Digital Imagery"), Licensee authorizes Licensor to use the Digital Imagery in preparing **Exhibit A**. Licensee represents and warrants that through a license or otherwise, it has the right to use the Digital Imagery and to permit Licensor to use the Digital Imagery in said manner.

ARTICLE 2. LICENSE FEE.

Licensor elects not to charge a license fee to licensee in this case. Other applicable fees for flagging and right of entry will continue to apply.

ARTICLE 3. TERM.

This Agreement shall take effect as of the Effective Date first herein written and shall continue in full force and effect until terminated as provided in the "TERMINATION: REMOVAL OF LICENSEE'S FACILITIES" Section of **EXHIBIT B**.

ARTICLE 4. LICENSEE'S COMPLIANCE WITH GENERAL TERMS.

Licensee represents and warrants that all work on Licensee's Facilities performed by Licensee or its contractors will strictly comply with all terms and conditions set forth herein, including the General Terms and Conditions, attached hereto as Exhibit B and made a part hereof.

ARTICLE 5. INSURANCE.

- A. During the term of this Agreement, Licensee shall fully comply or cause its contractor(s) to fully comply with the insurance requirements described in **EXHIBIT C**, attached hereto and made a part hereof. Upon request only, Licensee shall send copies of all insurance documentation (e.g., certificates, endorsements, etc.) to Licensor at the address listed in the "NOTICES" Section of this Agreement.
- B. If Licensee is subject to statute(s) limiting its insurance liability and/or limiting its ability to obtain insurance in compliance with **Exhibit C** of this Agreement, those statutes shall apply.

ARTICLE 6. DEFINITION OF LICENSEE.

For purposes of this Agreement, all references in this Agreement to Licensee will include Licensee's contractors, subcontractors, officers, agents, and employees, and other acting under its or their authority (collectively, a "Contractor"). If a Contractor is hired by Licensee to perform any work on Licensee's Facilities (including initial construction and subsequent relocation, maintenance, and/or repair work), then Licensee shall provide a copy of this Agreement to its Contractor(s) and require its Contractor(s) to comply with all terms and conditions of this Agreement, including the indemnification requirements set forth in the "INDEMNITY" Section of **Exhibit B**. Licensee shall require any Contractor to release, defend, and indemnify Licensor to the same extent and under the same terms and conditions as Licensee is required to release, defend, and indemnify Licensor herein.

ARTICLE 7. ATTORNEY'S FEES, EXPENSES, AND COSTS

If litigation or other court action or similar adjudicatory proceeding is undertaken by Licensee or Licensor to enforce its rights under this Agreement, all fees, costs, and expenses, including, without limitation, reasonable attorney's fees and court costs, of the prevailing Party against whose interest the

judgment or decision is rendered. The provisions of this Article shall survive the termination of this Agreement.

ARTICLE 8. WAIVER OF BREACH.

The waiver by Licensor of the breach of any condition, covenant, or agreement herein contained to be kept, observed and performed by Licensee shall in no way impair the right of Licensor to avail itself of any remedy for any subsequent breach thereof.

ARTICLE 9. ASSIGNMENT.

A. Licensee shall not assign this Agreement, in whole or in part, or any rights herein granted, without the written consent of Licensor, which must be requested in writing by Licensee. Any assignment or attempted transfer of this Agreement or any of the rights herein granted, whether voluntary, by operation of law, or otherwise, without Licensor's written consent, will be absolutely void and may result in Licensor's termination of this Agreement pursuant to the "TERMINATION; REMOVAL OF LICENSEE'S FACILITIES" Section of **Exhibit B**.

B. Upon Licensor's written consent to any assignment, this Agreement will be binding upon and inure to the benefit of the parties thereto, successors, heirs, and assigns, executors, and administrators.

ARTICLE 10. SEVERABILITY.

Any provision of this Agreement which is determined by a court of competent jurisdiction to be invalid or unenforceable shall be invalid or unenforceable only to the extent of such determination, which shall not invalidate or otherwise render ineffective any other provision of this Agreement.

ARTICLE 11. NOTICES.

Except Licensee's commencement of work notice(s) required under **Exhibit B**, all other notices required by this Agreement must be in writing, and (i) personally served upon the business address listed below ("Notice Address"), (ii) sent overnight via express delivery by a nationally recognized overnight delivery service such as Federal Express Corporation or United Parcel Service to the Notice Address, or (iii) by certified mail, return receipt requested to the Notice Address. Overnight express delivery notices will be deemed to be given upon receipt. Certified mail notices will be deemed to be given three (3) days after deposit with the United States Postal Service.

If to Licensor: Arkansas-Oklahoma Railroad Company
Att: Brandon Crouch, Real Estate Mgr.
116 West Main Street
Wilburton, OK 74578

If to Licensee: **City of Hartshorne**
1101 Penn Ave.
Hartshorne, OK 74547

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the date first herein written.

ARKANSAS-OKLAHOMA RAILROAD

BY:



Brandon Crouch
Dir. Projects
1/23/25

[LICENSEE NAME]

BY:

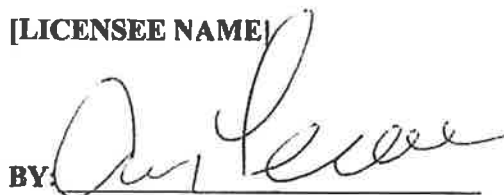


EXHIBIT A

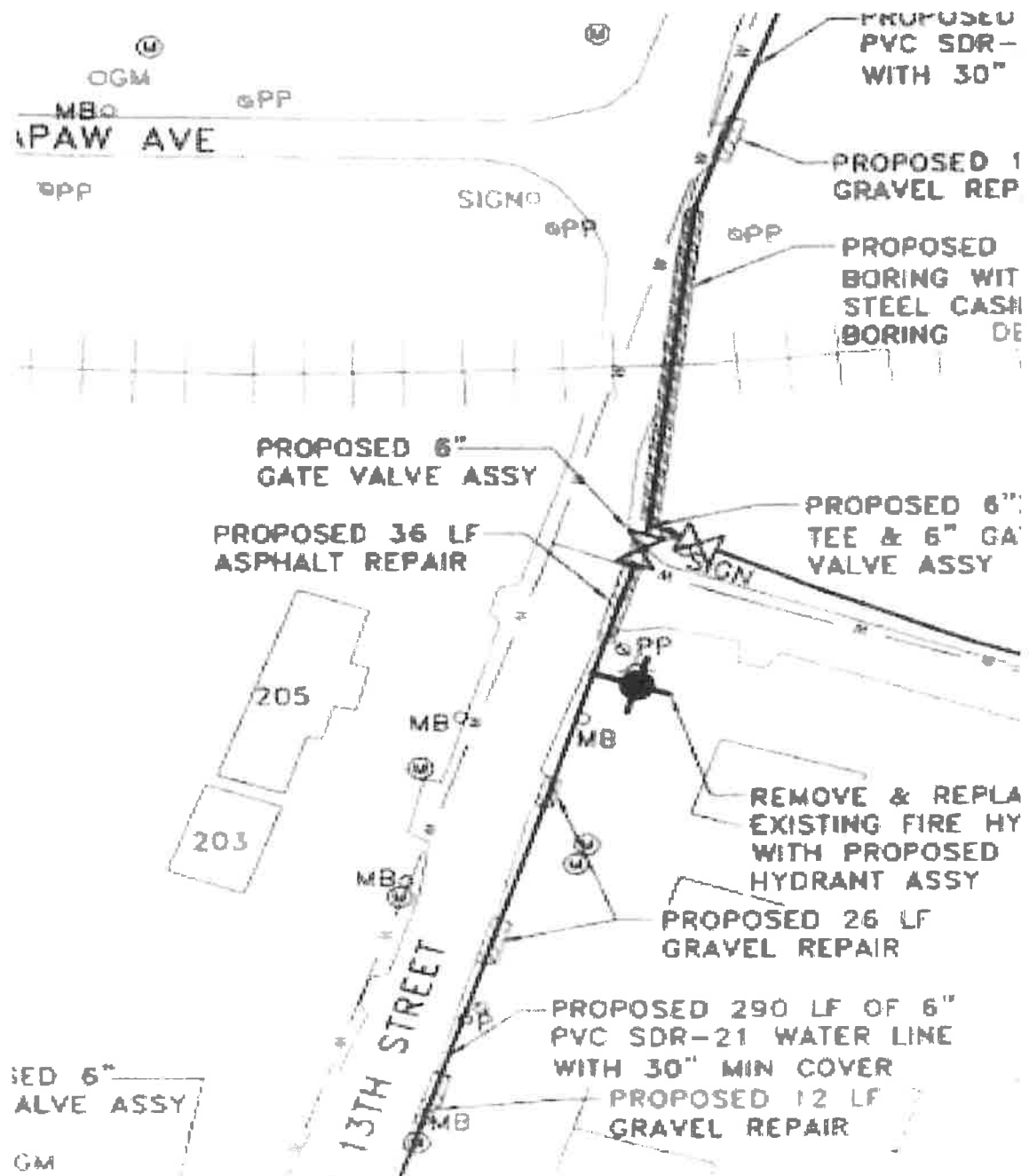


EXHIBIT B

GENERAL TERMS & CONDITIONS

Section 1. LIMITATION AND SUBORDINATION OF RIGHTS GRANTED.

- A.** The foregoing grant is subject and subordinate to the prior and continuing right and obligation of Licensor to use and maintain its entire property, including the right and power of Licensor to construct, maintain, repair, renew, use, operate, change, modify, or relocate railroad tracks, signal, communications, fiber optics, or other wirelines, pipelines, and other facilities upon, along, or across any or all parts of its property, all or any of which may be freely done at any time or times by Licensor without liability to Licensee, or to any other party for compensation or damages.
- B.** The foregoing grant is also subject to all outstanding superior rights (including those in favor of licensees and lessees of Railroad Property) and the right of Licensor to renew and extend the same, and is made without covenant of title, or for quiet enjoyment. It shall be Licensee's sole obligation to obtain such additional permission, license, and grants necessary on account of any such existing rights.

Section 2. ENGINEERING REQUIREMENTS; PERMITS

- A.** Licensee's Facilities will be designed, constructed, operated, maintained, repaired, renewed, modified, reconstructed, removed, or abandoned in place on Railroad Property by Licensee or its contractor(s) to Licensor's satisfaction and in strict conformity with: (i) Licensor's current engineering standards and specifications, including those for shoring and cribbing to protect Licensor's railroad operations and facilities (AOKRR Specifications), except for variances approved in written advance by Licensor's Chief Engineer or its authorized representative ("AOKRR Engineering Representative"); (ii) such other additional safety standards as Licensor, in its sole discretion, elects to require, including, without limitation, American Railway Engineering and Maintenance-of-Way Association ("AREMA") standards and guidelines (collectively, "AOKRR Additional Requirements"); and (iii) all applicable laws, rules, and regulations, including any applicable Federal Railroad Administration and Federal Energy Regulatory Commission regulations and enactments (collectively, "Laws"). If there is any conflict between AOKRR Specifications, AOKRR Additional Requirements, and Laws, the most restrictive will apply.
- B.** Licensee shall keep the soil over Licensee's Facilities thoroughly compacted, and maintain the grade over and around Licensee's Facilities even with the surface of the adjacent ground.

- C. If needed, Licensee shall secure, at Licensee's sole cost and expense, any and all necessary permits required to perform any work on Licensee's Facilities.

Section 3. NOTICE OF COMMENCEMENT OF WORK; EMERGENCIES

- A. Licensee and its contractors are strictly prohibited from commencing any work associated with Licensee's Facilities without Licensor's written approval that the work will be in strict compliance with the "ENGINEERING REQUIREMENTS; PERMITS" Section of this Exhibit B. Upon Licensor's approval, Licensee shall contact Licensor's field representatives at least ten (10) days before commencement of any work on Licensee's Facilities.
- B. Licensee shall not commence any work until: (1) Licensor has determined whether flagging or other special protective or safety measures ("Safety Measures") are required for performance of the work pursuant to the "FLAGGING" Section of this **Exhibit B** and provide Licensee written authorization to commence work; and (2) Licensee has complied with the "PROTECTION OF FIBER OPTIC CABLE SYSTEMS" Section of this **Exhibit B**.
- C. If, at any time, an emergency arises involving Licensee's Facilities, Licensee or its contractor shall immediately contact Licensor's Emergency Response Line at 1-855-838-3830.

Section 4. FLAGGING

- A. Following notice of Licensee's notice to Licensor's Field Representatives required under "NOTICE OF COMMENCEMENT OF WORK; EMERGENCIES" Section of this **Exhibit B**, Licensor shall inform Licensee if Safety Measures are required for performance of the work by Licensee or its contractor on Railroad Property. If Safety Measures are required, no work of any kind may be performed by Licensee or its contractor(s) until arrangements for the Safety Measures have been made and scheduled. If no Safety Measures are required, Licensor will give Licensee written authorization to commence work.
- B. If any Safety Measures are performed or provided by Licensor, including but not limited to flagging, Licensor shall bill Licensee for such expenses incurred by Licensor, unless Licensor and a federal, state, or local government entity have agreed that Licensor is to bill such expenses to the federal, state, or local entity. Additional information regarding the submission of such expenses by Licensor, and payment thereof by Licensee, can be found in the "LICENSEE'S PAYMENT OF EXPENSES" Section of this **Exhibit B**. If Licensor performs any Safety Measures, Licensee agrees that Licensee is not relieved of any responsibilities or liabilities set forth in this Agreement.
- C. For flagging, all rates of pay and other associated costs for flagging services will be in accordance with the Licensor's current Flagging Tariff found on page 12 of Licensor's Right of Entry packet. Flagging charges for any day flagging services are required will include all prep and driving time to and from Licensee's worksite, including, but not limited to placement of red boards and other precautionary measures required to control traffic and insure a safe worksite.

- D. Flagging performed on Saturdays and/or Sundays will be charged at a rate of one and one half times the normal rate.
- E. Flagging performed on holidays or observed-holidays will be charged at a rate of two and one half times the normal rate.

Section 5. SAFETY.

- A. Safety of personnel, property, rail operations, and the public is of paramount importance in the prosecution of any work on Railroad's Property performed by Licensee or its contractor, and takes precedence over any work on Licensee's Facilities to be performed by Licensee or its contractors. Licensee shall be responsible for initiating, maintaining, and supervising all safety operations and programs in connection with any work on Licensee's Facilities. Licensee and its contractor shall, at a minimum, comply with Licensor's then-current safety standards, which can be found in the Licensor's Right of Entry packet.
- B. Licensee shall keep the job site on the Railroad Property free from safety and health hazards and ensure that their employees are competent and adequately trained in all safety and health aspects of the work.
- C. Licensee represents and warrants that all parts of Licensee's Facilities within and outside of the limits of Railroad Property will not interfere whatsoever with the constant, continuous, and uninterrupted use of the tracks, property, and facilities of Licensor, and nothing shall be done or suffered to be done by Licensee at any time that would in any manner impair the safety thereof.
- D. Licensor's operations and work performed by Licensor's personnel may cause delays in Licensee's or its contractor's work on Licensee's Facilities. Licensee accepts this risk and agrees that Licensor shall have no liability to Licensee or any other person or entity for any such delays. Licensee must coordinate any work on Railroad Property by Licensee or any third party with Licensor's Field Representatives in strict compliance with the "NOTICE OF COMMENCEMENT OF WORK; EMERGENCIES" Section of this **Exhibit B**.
- E. Licensor shall have the right, if it so elects, to provide any support it deems necessary for the safety of Licensor's operations and trackage during Licensee's or its contractor's construction, maintenance, repair, renewal, modification, relocation, reconstruction, or removal of Licensee's Facilities. In the event Licensor provides such support, Licensor shall invoice Licensee, and Licensee shall pay Licensor as set forth in the "LICENSEE'S PAYMENT OF EXPENSES" Section of this **Exhibit B**.
- F. Licensee may use unmanned aircraft systems ("UAS") to inspect Licensee's Facilities only upon the prior authorization from and under the direction of Licensor's Field Representatives. Licensee represents and warrants that its use of UAS on Railroad Property will comply with Licensor's then-current Unmanned Aerial Systems Policy and all applicable law, rules, and regulations, including any applicable Federal Aviation Administration regulations and enactments pertaining to UAS.

Section 6. PROTECTION OF FIBER OPTIC CABLE SYSTEMS.

- A. Fiber optic cable systems may be buried on Railroad Property. Protection of the fiber optic cable systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits.

Section 7. LICENSEE'S PAYMENT OF EXPENSES.

- A. Licensee shall bear the entire cost and expense of the design, construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities.
- B. Licensee shall fully pay for all materials joined, affixed to and labor performed on Railroad Property in connection with the construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities, and shall not permit or suffer any mechanic's or materialman's lien of any kind or nature to be enforced against the property for any work done or materials furnished thereon at the instance or request or on behalf of Licensee. Licensee shall promptly pay or discharge all taxes, charges, and assessments levied upon or in respect to, or on account of Licensee's Facilities, to prevent the same from becoming a charge or lien upon any property of Licensor, and so that the taxes, charges, and assessments levied upon or in respect to such property shall not be increased because of the location, construction, or maintenance of Licensee's Facilities or any improvement, appliance, or fixture connected therewith placed upon such property, or on account of Licensee's interest therein. Where such tax, charge, or assessment may not be separately made or assessed to Licensee but shall be included in the assessment of the property of Licensor, then Licensee shall pay to Licensor an equitable proportion of such taxes determined by the value of Licensee's property upon property of Licensor as compared with the entire value of such property.
- C. As set forth in the "FLAGGING" Section of this **Exhibit B**, Licensor shall have the right, if it so elects, to provide any Safety Measures Licensor deems necessary for the safety of Licensor's operations and trackage during Licensee's or its contractor's construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities, including, but not limited to supervision, inspection, and flagging services. In the event Licensor provides such Safety Measures, Licensor shall submit an itemized invoice to Licensee's notice recipient listed in the "NOTICES" Article of this Agreement. Licensee shall pay to Licensor the total amount listed on such invoice within thirty (30) days of Licensee's receipt of such invoice.

Section 8. MODIFICATIONS TO LICENSEE'S FACILITIES.

- A. This grant is subject to Licensor's safe and efficient operation of its railroad, and continued use and improvement of Railroad Property (collectively, "Railroad Use"). Accordingly, Licensee shall, at its sole cost and expense, modify, reconstruct, repair, renew, revise, relocate, or remove (individually, "Modification", or collectively, "Modifications") all or any portion of Licensee's Facilities as Licensor may designate or identify, in its sole discretion, in the furtherance of Railroad Use.

- B.** Upon any Modification of all or any portion of Licensee's Facilities to another location on Railroad Property, Licensors and Licensee shall execute a Supplemental Agreement to this Pipeline Agreement to document Modification(s) to Licensee's Facilities on Railroad Property. If the Modifications result in Licensee's Facilities moving off of Railroad Property, this Agreement will terminate upon Licensee's completion of such Modification(s) and all requirements contained within the "TERMINATION; REMOVAL OF LICENSEE'S FACILITIES" Section of this **Exhibit B**. Any such Modification(s) off of Railroad Property will not release Licensee from any liability or other obligation of Licensee arising prior to and upon completion of any such Modifications to the Licensee's Facilities.

Section 9. RESTORATION OF RAILROAD PROPERTY.

- A.** In the event Licensee, in any manner, moves or disturbs any property of Licensors in connection with the construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities, then Licensee shall, as soon as possible and at Licensee's sole cost and expense, restore Licensors' property to the same condition as the same were before such property was moved or disturbed.

Section 10. INDEMNITY.

- A. Definitions.** As used in this Section:

1. "Licensor" includes Licensors, its affiliates, its and their officers, directors, agents, and employees, and other railroad companies using Railroad Property at or near the location of Licensee's installation and their officers, directors, agents, and employees.
2. "Licensee" includes Licensee and its agents, contractors, subcontractors, sub-subcontractors, employees, officers, and directors, or any other person or entity acting on its behalf or under its control.
3. "Loss" includes claims, suits, taxes, loss, damages, (including punitive damages, statutory damages, and exemplary damages), costs, charges, assessments, judgments, settlements, liens, demands, actions, causes of action, fines, penalties, interest, and expenses of any nature, including court costs, reasonable attorneys' fees and expenses, investigation costs, and appeal expenses.

- B.** Licensee shall release, defend, indemnify, and hold harmless Licensors from and against any and all Loss, even if groundless, fraudulent, or false, that directly or indirectly arises out of or is related to Licensee's construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, removal, presence, use, or operation of Licensee's Facilities, including, but not limited to, any actual or alleged:

1. Bodily harm or personal injury (including any emotional injury or disease) to, or the death of, any person(s), including, but not limited to, Licensee, Licensors, any telecommunications company, or the agents, contractors, subcontractors, sub-subcontractors, or employees of the foregoing;

2. Damage to or the disturbance, loss, movement, or destruction of Railroad Property, including loss of use and diminution in value, including, but not limited to, any telecommunications systems or fiber optic cables on or near Railroad Property, any property of Licensee or Licensor, or any property in the care, custody, or control of Licensee or Licensor;
3. Removal of person(s) from Railroad Property;
4. Any delays or interference with track or Railroad's Use caused by Licensee's activity(ies) on Railroad Property, including, without limitation, the construction, maintenance, modification, reconstruction, repair, repair, renewal, revision, relocation, or removal of Licensee's Facilities or any part thereof, any activities, labor, materials, equipment, or machinery in conjunction therewith;
5. Right(s) or interest(s) granted pursuant to this Agreement;
6. Contents escaping from Licensee's Facilities, including without limitation any actual or alleged pollution, contamination, breach, or environmental Loss;
7. Licensee's breach of this Agreement or failure to comply with its provisions, including, but not limited to, any violation or breach by Licensee of any representations and warranties Licensee has made in this Agreement; and
8. Violation by Licensee of any law, statute, ordinance, governmental administrative order, rule, or regulation, including without limitation all applicable Federal Railroad Administration regulations.

C. THE FOREGOING OBLIGATIONS SHALL APPLY TO THE FULLEST EXTENT PERMITTED BY LAW FOR THE BENEFIT OF LICENSOR TO LOSSES CAUSED BY, ARISING FROM, RELATING TO, OR RESULTING FROM, IN WHOLE OR IN PART, THE NEGLIGENCE OF LICENSOR, AND SUCH NEGLIGENCE OF LICENSOR SHALL NOT LIMIT, DIMINISH, OR PRECLUDE LICENSEE'S OBLIGATIONS TO LICENSOR IN ANY RESPECT. NOTWITHSTANDING THE FOREGOING, SUCH OBLIGATION TO IDEMNIFY LICENSOR SHALL NOT APPLY TO THE EXTENT THE LOSS IS CAUSED BY THE SOLE, ACTIVE, AND DIRECT NEGLIGENCE, GROSS NEGLIGENCE, OR WILLFUL MISCONDUCT OF LICENSOR AS DETERMINED IN A FINAL JUDGMENT BY A COURT OF COMPETENT JURISDICTION.

Section 11. TERMINATION; REMOVAL OF LICENSEE'S FACILITIES.

- A. If Licensee does not use the right herein granted on Licensee's Facilities for one (1) year, or if Licensee continues in default in the performance of any provision of this Agreement for a period of thirty (30) days after written notice from Licensor to Licensee specifying such default, Licensor may, at its sole discretion, terminate this Agreement by written notice to Licensee at the address listed in the "NOTICES" Article of this Agreement. This Agreement will not terminate until Licensee complies with Paragraph's "C" and "D" of this Section found below.

- B.** In addition to the provisions of Paragraph “A” above, this Agreement may be terminated by written notice given by either party, without cause, upon thirty (30) days written notice to the non-terminating party at the address listed in the “NOTICES” Article of this Agreement. This Agreement will not terminate until Licensee complies with Paragraphs “C” and “D” of this Section found below.
- C.** Prior to the effective dates of any termination described in this Section, Licensee shall submit an application to Licensor for Licensee’s removal, or if applicable, abandonment in place of Licensee’s Facilities located on Railroad Property (“Removal/Abandonment Work”). Upon Licensor’s approval of Licensee’s application for the Removal/Abandonment Work, Licensor and Licensee shall execute a separate consent document that will govern Licensee’s performance of the Removal/Abandonment Work from those portions of Railroad Property not occupied by roadbed and/or trackage (“Consent Document”). Licensee shall then restore the impacted Railroad Property to the same or reasonably similar condition as it was prior to Licensee’s installation of Licensee’s Facilities. For purposes of this Section, Licensee’s (i) performance of the Removal/Abandonment Work, and (ii) restoration work will hereinafter be collectively referred to as the “Restoration Work”.
- D.** Following Licensee’s completion of the Restoration Work, Licensee shall provide a written certification letter to Licensor at the address listed in the “NOTICES” Article of this Agreement which certifies that the Restoration Work has been completed in accordance with the Consent Document. Licensee shall report to governmental authorities, as required by law, and notify Licensor immediately if any environmental contamination is discovered during Licensee’s performance of the Restoration Work. Upon discovery, the Licensee shall initiate any and all removal, remedial and restoration actions that are necessary to restore the property to its original, uncontaminated condition. Licensee shall provide written certification to Licensor at the address listed in the “NOTICES” Article of this Agreement that the environmental contamination has been remediated and the property has been restored in accordance with Licensor’s requirements. Upon Licensor’s receipt of Licensee’s restoration completion certifications, this Agreement will terminate.
- E.** In the event that Licensee fails to complete any of the Restoration Work, Licensor may, but is not obligated to, perform the Restoration Work. Any such work actually performed by Licensor will be at the sole cost and expense of Licensee. In the event Licensor performs any of the Restoration Work, Licensee shall release Licensor from any and all Loss (defined in the “INDEMNITY” Section of this **Exhibit B**) arising out of or related to Licensor’s performance of the Restoration Work.

Termination of this Agreement for any reason will not affect any rights or obligations of the parties which may have been accrued, or liabilities or Loss (defined in the “INDEMNITY” Section of this **Exhibit B**), accrued or otherwise, which may have arisen prior to such termination.

SECTION 03100

CONCRETE FORMWORK

PART 1 - GENERAL

1. DESCRIPTION OF WORK

A. Work under this section consists of furnishing everything necessary for and incidental to the execution and completion of all concrete formwork, as indicated on the drawings and specified herein.

B. The extent of formwork is indicated by the concrete structures shown on the drawings.

C. The work includes providing formwork and shoring for cast-in-place concrete, specifically finished concrete, and installation into formwork of items furnished by others, such as anchor bolts, setting plates, bearing plates, anchorage's, inserts, frames, nosing and other items to be embedded in concrete (but not including reinforcing steel).

2. QUALITY ASSURANCE

A. Codes and Standards:

Unless otherwise shown or specified, design, construct, erect, maintain, and remove forms and related structures for cast-in-place concrete work in compliance with the following:

ACI 347: Recommended Practice for Concrete Formwork.
USPS PSI: Product Standard for Softwood Plywood Construction
and Industrial.

B. Allowable Tolerances:

- (1)** Construct formwork to provide completed cast-in-place concrete surfaces complying with the tolerances specified in ACI 374.
- (2)** Before concrete placement, check the lines and levels of erected formwork. Make corrections and adjustments to ensure proper size and location of concrete members and stability of forming systems.
- (3)** During concrete placement, check formwork and related supports to ensure that forms are not displaced and that completed work will be within specified tolerances.

3. SUBMITTALS

A. Manufacturer's Data - Concrete Formwork:

For information only, submit two (2) copies of manufacturer's data and installation instructions for proprietary materials including form coatings and manufactured form systems.

PART 2 - PRODUCTS

1. FORM MATERIALS

A. Forms for Exposed Concrete:

Unless otherwise shown or specified, construct form work for exposed concrete surfaces with high density overlay plyform Class I or II. Panels shall be APA grade-trade-marked and meet requirements of the latest edition of U.S. Product Standard PSI. Overlay shall not stain the surface of the architectural concrete. Provide continuous, straight, smooth as cast surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection (minimum $\frac{3}{4}$ inch).

B. Forms for Unexposed Concrete:

Form concrete surfaces, which will be unexposed in the finished structure with plywood, lumber, metal, or other acceptable material. Provide lumber that is dressed on at least 2 edges and 1 side for tight fit, tongue and grooved, free from loose knots and of such moisture content as to prevent free absorption of moisture.

C. Form Coatings:

Provide commercial formulation form coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatment of concrete surfaces requiring bond or adhesion, nor impede the wetting of surfaces to be cured with water or curing compounds. Release agent shall be used in strict accordance with manufacturer's recommendations.

D. Vinyl Foam Tape: $\frac{3}{4}$ " x _" adhesive backed closed cell tape.

E. Form Accessories:

Form ties, anchors, and hangers of sufficient strength to completely resist displacement of forms due to construction loads and the depositing of concrete. Provide tie-and-spreader type form ties designed so that no metal will be within one inch of any

surface when forms are removed. Where concrete surfaces are exposed to view, do not use form ties which, when removed, will leave a depression larger than one (1) inch in diameter. Use water seal ties in concrete exposed to hydrostatic pressure. Conform to ACI 301 and 347.

- (1) Provide metal inserts for anchorage's of materials or equipment to concrete construction, not supplied by other trades and as required for the work. Provide threaded inserts of malleable cast iron, furnished complete with full-depth bolts, $\frac{3}{4}$ " size, unless otherwise shown.
- (2) Provide adjustable wedge inserts of malleable cast iron, complete with bolts, nuts and washers, $\frac{3}{4}$ " bolt size, unless otherwise shown.

F. Screen Chairs:

Metal, wood is not permitted.

G. Corner Chamfer:

Shall be mill run white pine solid material or preformed PVC at all exposed corners of columns, walls and beams.

2. DESIGN OF FORMWORK

A. Design, erect, support, brace and maintain formwork so that it will safely support vertical and lateral loads that might be applied, until such loads can be supported by the concrete structure. Carry vertical and lateral loads to ground by formwork system and in-place construction that has attained adequate strength for that purpose. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation, and position.

B. Design forms and falsework to include assumed values of live load, dead load, weight of moving equipment operated on formwork, concrete mix, and height of concrete drop, vibrator frequency, ambient temperature, foundation pressures, stresses, lateral stability, and other factors pertinent to safety of structure during construction.

C. Provide shores and struts with positive means of adjustment capable of taking up formwork settlement during concrete placing operations, using wedges or jacks or a combination thereof. Provide trussed supports when adequate foundations for shores and struts cannot be secured.

D. Support form-facing materials by structural members spaced sufficiently close to prevent deflection. Fit forms placed in successive units for continuous surfaces to accurate alignment, free from irregularities and within allowable tolerances. Provide

chamber in formwork as required for anticipated deflections due to weight and pressures of fresh concrete and construction loads for long-span members without intermediate supports.

E. Provide temporary openings in wall forms, column forms and at other locations necessary to permit inspection and clean out.

F. Design formwork to be readily removable without impact, shocks or damage to cast-in-place concrete surfaces and adjacent materials.

G. Provide formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required preventing leakage and fins. Seal form joints with foam tape or other demonstrated effective means. Provide a means to seal the bottom of forms at construction joints such as foam tape or other gasket devices.

PART 3 - EXECUTION

1. GENERAL

A. Construct forms complying with ACI 347, to the exact sizes, shapes, lines and dimensions shown, and as required to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustication's, reglets, chamfers, blocking screeds, bulkheads, anchorage's and inserts, and other features required. Use selected materials to obtain required finishes.

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

C. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Brace temporary closures and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms in as inconspicuous location as possible, consistent with project requirements.

D. Form intersecting planes to provide true, clean-cut corners, with edge grain of plywood not exposed as form for concrete.

E. Provide openings in forms to accommodate other work, including mechanical and electrical work. Accurately place and securely support items required to be built into the form.

F. Falsework:

- (1) Erect falsework and support, brace, and maintain it to safely support vertical, lateral and asymmetrical loads applied until such loads can be supported by in-place concrete structures. Construct falsework so that adjustments can be made for take-up and settlement.
- (2) Provide wedges, jacks, or camber strips to facilitate vertical adjustments. Carefully inspect falsework and formwork during and after concrete placement operations to determine abnormal deflection or signs of failure; make necessary adjustments to produce work or required dimensions.

G. Forms for Exposed Concrete:

- (1) Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes. Do not splinter forms by driving ties through improperly prepared holes.
- (2) Do not use metal cover plates for patching holes or defects in forms.
- (3) Provide sharp, clean corners at intersecting planes, without visible edges or offsets. Back joints with extra studs or girts to maintain true, square intersections.
- (4) Use extra studs, walers, and bracing to prevent bowing of forms between studs and to avoid bowed appearance in concrete. Do not use narrow strips of form material, which will produce bow.
- (5) Assemble forms to be readily removed without damage to exposed concrete surfaces.
- (6) Form molding shapes, recesses and projections with smooth-finish materials, and install forms with sealed joints to prevent displacement.

H. Corner Treatment:

- (1) Form exposed corners to produce square, smooth, solid, unbroken lines, except as other wise shown.
- (2) Form chamfers with $\frac{3}{4}$ " x $\frac{3}{4}$ " strips, unless otherwise shown, accurately formed and surfaced to produce uniformly straight lines and tight edge joints. Extend terminal edges to required limit and miter chamfer strips at changes in direction.

(3) Unexposed corners may be formed either square or chamfered.

I. Control Joints:

See Section 03300 for treatment of control and construction joints, including wood screeds, metal keyways and sawcuts. Locate as indicate.

J. Provision for Other Trades:

Provide openings in concrete formwork to accommodate work of other trades, including those under separate prime contracts (if any). Size and location of openings, recesses and chases are the responsibility of the trade requiring such items. Accurately place and securely support items to be built into forms.

K. Cleaning and Tightening:

Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is to be placed. Retighten forms immediately after concrete placement as required to eliminate mortar leaks.

2. FORM - COATINGS

A. Coat forms contact surfaces with form-coating compound before reinforcement is placed. Do not allow excess form coating to accumulate in forms or to come into contact with surface which will be bonded to fresh concrete. Apply in compliance with manufacturer's instructions.

B. Coat steel forms with a non-staining rust-preventive form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3. INSTALLATION OF EMBEDDED ITEMS

A. General:

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

B. Edge Forms and Screen Strips for Slabs:

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

4. SHORES AND SUPPORTS

A. Comply with ACI 347 for shoring and reshoring, and as herein specified.

B. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support the work without excessive stress or deflection.

5. REMOVAL OF FORMS

A. General:

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

B. Formwork supporting weight of concrete, such as beam soffits, joists, and slabs and other structural elements may not be removed in less than fourteen (14) days and not until concrete has attained design minimum twenty-eight (28) day compressive strength. Determine potential compressive strength of in-place concrete location or members under the least favorable conditions prevailing for any portion of the concrete.

C. Form facing material may be removed four (4) days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

6. RE-USE OF FORMS

A. Clean and repair surfaces of forms to be re-used in the work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. Apply new form coating compound material to concrete contact surfaces as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close all joints. Align and secure joints to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to the Owner's Representative.

SECTION 03200 CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SCOPE

A. Work Included: Furnish all labor, materials and equipment necessary to install steel reinforcement for cast-in-place concrete including trough block and lintel reinforcement.

B. Related Work Specified Elsewhere:

1. Concrete Formwork: **Section 03100**
2. Cast-In-Place Concrete: **Section 03300**

1.2 QUALITY ASSURANCE

A. Codes and Standards

1. Fabrication shall conform to the requirements of the "Concrete Reinforcing Steel Institute".
2. Manufacturer's certified mill test shall be furnished to the Engineer when requested.

1.3 SUBMITTALS

A. Shop Drawings: Shop drawings shall be complete and shall include dimensions, bar schedules, bending details, stirrup spacing, and all other details. Shop drawings shall show location of all steel on placement plans as well as in section. **BAR LIST ALONE WILL NOT BE ACCEPTABLE.** All bars must be labeled on drawings. Bar delivered to the job site must carry same label as that shown on the drawings.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver reinforcement to project site in bundles marked with metal tags indicating bar size and length.
- B. Handle and store materials to prevent contamination.

PART 2 PRODUCTS

2.1 MATERIALS

A. BARS

1. ASTM-615, Grade 40-for stirrups and ties (minimum yield, 40,000 p.s.i.)
2. ASTM-615, Grade 60 for all other reinforcing (minimum yield 60,000 p.s.i.)
3. Wire:
 1. Cold Drawn Steel: ASTM A82
 2. Deformed Steel: ASTM A492
4. Wire Fabric:
 1. Welded Steel: ASTM A185
 2. Welded Deformed Steel: ASTM A497
5. High Chairs, Bar Supports and Spacers: Universal slab bar supports and spacers or equal, as approved by Architect. Provide plastic coated legs for all exterior exposed concrete.

PART 3 EXECUTION

3.1 CLEANING AND BENDING REINFORCEMENT

- A. Metal reinforcement at time concrete is placed, shall be free from rust, scale and other coatings that will destroy or reduce bond. Steel badly rusted or depreciated in cross section will not be acceptable.
- B. DO NOT bend or straighten in a manner that will injure the material. Bars with kinks or bends not shown on plans will be rejected. Bend all bars cold unless authorized otherwise by Engineer.
- C. Bars shall be free from injurious seams, slivers, flaws or mill defects.
- D. Metal tags shall be required in connection with the marking of all reinforcing rods. All mark numbers shall be the same as shown on the shop drawings.

3.2 PLACING REINFORCEMENT

- A. Accurately place as called for on the drawings and wire securely at intersections. Place all reinforcement needed in any one section in position and inspect before concreting starts, and take every means not to disturb it during pouring.
- B. There should be not less than 1" between bars, and do not wire parallel bars together. Unless specified otherwise, fabricate, tie anchor and support reinforcing in conformity with standards of the CONCRETE REINFORCING STEEL INSTITUTE with ample provision to prevent displacement during placing of concrete. Support reinforcing steel in footings and grade beams from above.

- C. Make reinforcing in continuous footings and stem walls fully continuous by lapping of steel and bending bars round corners. Corner bars will be accepted. Lap all bars a minimum of 32 bar diameters or 12" whichever is the greater distance.
- D. Welded wire fabric must have end and edge laps of one full mesh. Wire all laps securely together.
- E. Splices and offsets in reinforcing at points of maximum stress shall be avoided. Provide sufficient lap at splices to transfer the stress between bars by bond and shear.

3.3 CONCRETE PROTECTION FOR REINFORCEMENT

- A. Protect metal reinforcement by the thickness of concrete indicated on plans. Where not otherwise shown, thickness of concrete over reinforcement shall be as follows:
 - 1. Where concrete is deposited against ground without use of forms, not less than 2".
 - 2. Where concrete is exposed to weather, or exposed to ground, but is placed on forms, not less than 2" for bars larger than #5 and 1-1/2" for #5 bars or smaller.
 - 3. Where concrete is not exposed directly to ground or weather, not less than 3/4" for slabs, 1" for walls, and not less than 1-1/2" for beams and girders. In concrete floor joists where clear distance between joists is not more than 30", protection shall be at least 3/4".
 - 4. Column spirals or ties, not less than 1-1/2" nor less than 1-1/2 times the maximum size of the coarse aggregate.

END OF SECTION

SECTION 03210
STEEL REINFORCEMENT

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope

1. This section concerns the fabrication and installation of reinforcing steel for cast-in-place concrete.

1.2 QUALITY ASSURANCE

A. Allowable Tolerance

1. Fabrication Tolerances
 - a. Sheared length - plus or minus 1"
 - b. Depth of truss bars - plus or minus 1/2"
 - c. Stirrups, ties, and spirals - plus or minus 1/2".
 - d. Bends - plus or minus 1".
2. Placing Tolerances
 - a. Concrete cover to formed surface - plus or minus 1/4"
 - b. Minimum spacing between bars - two times the bar diameter
 - c. Bars spacing - plus or minus 1/4" in 12"
 - d. Conform to ACI-318.

B. Reference Standards

1. "Specifications for Deformed billet Steel bars for Concrete Reinforcement," ASTM A 615.
2. "Specifications for Cold - Drawn Steel Wire for Concrete Reinforcement," ASTM A 82.
3. "Specifications for Welded Steel Wire Fabric for Concrete Reinforcement," ASTM A185; or, "Specifications for Welded Deformed Steel Wire Fabric for Concrete Reinforcement," ASTM A497.
4. Manual of Standard Practice for Detailing Reinforced Concrete Structures, ACI 315, current edition.
5. Building Code Requirements for Reinforced Concrete Structures, ACI 318, current edition.
6. Recommended Practice for Placing Reinforcing Bars, CRSI 63
7. Recommended Practice for Placing Bar Supports, Specifications, and Nomenclatures, CRSI 65.
8. Standard specification for Epoxy-Coated Reinforcing Steel Bars,

ASTM A 775.

9. Guidelines for inspection and acceptance of Epoxy Coated Reinforcing Bars, CRSI.

1.3 SUBMITTALS

- A. Submit six (6) copies of shop and installation drawings of concrete reinforcement to the Engineer for review. Drawings shall indicate bar number, size, length, configuration, spacing and location of all reinforcing bars. Shop drawings shall be prepared in accordance with "manual of standard Practice for Detailing Reinforced Concrete Structures," ACI 315 (Current Edition)
- B. Review of shop drawings by the Engineer will not relieve the Contractor of the responsibility for deviations from original drawings nor from correcting deficiencies and errors on the shop drawings which have been returned to him.

1.4 STORAGE MATERIALS

- A. Stack reinforcing materials on blocks in a neat and orderly manner in such a location as to limit the possibility of damage by construction equipment, prevent ground contact, and as to permit easy access.
- B. Use care in loading, unloading handling, and storage of materials to prevent damage to bar marking labels.

PART 2 PRODUCTS

2.1 MATERIALS

A. General

1.	Bars	ASTM A615,
	Grade 60	
2.	Stirrups and Ties	ASTM A615,
	Grade 40	
3.	Column Spirals	ASTM A82,
	cold drawn wire	
4.	Welded Wire Fabric	ASTM A185
5.	Bar Supports	CRSI Class B
	or E, fabricated from galvanized wire or	
	stainless wire.	

B. Epoxy Coated Reinforcing

1. Provide electrostatically applied epoxy-coated reinforcing bars where indicated on plans. Epoxy coated bars to conform to ASTM A 775/A 775M-86.

2.2 FABRICATION

- A. All bars shall be bent cold, unless otherwise permitted by the Engineer.
- B. Bend all bars to the tolerances specified herein.
- C. Mark all bars with waterproof tags corresponding to the bar list; bundle all similar bars together.

2.3 ACCESSORIES

- A. Metal chairs, spacers and accessories necessary to provide the required clear distances and proper bar spacing shall be galvanized or have plastic protective coatings covering when in contact with forms.

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect subgrade and forms for proper location, grade and alignment before placing reinforcement.
- B. Inspect reinforcing for damage. Remove all mud, cement, oil, paint, excessive rust, or any other improper coating that would adversely affect or reduce the bond with the concrete.
- C. Inspect epoxy coated bars and touch-up or replace as required.

3.2 PLACEMENT

- A. Accurately position reinforcements on supports, spacers, hangers or other approved supports and secured in place with ties or clips. Supporting reinforcement directly on concrete, brick or rocks in lieu of approved wire chairs is prohibited. Wire sizing and spacing of the chairs shall be sufficient to properly support the steel and shall be in accordance with applicable CRSI standards. Steel reinforcement shall be placed in the exact position as shown on the Plans and held securely in place during the placing of the concrete. The minimum clear distance between bars shall be two times the bar diameter. Vertical stirrups shall always pass around the main tension members and be securely attached hereto. All reinforcing shall be wired

together at a sufficient number of intersections to produce a sound or sturymat or cage of reinforcement that will maintain the reinforcement in the intended positions when the concrete is poured.

- B. The main reinforcement of slabs in contact with the ground shall be supported in its proper position, as indicated on the plans, by means of precast cement mortar blocks, of approved dimensions, resting on the slabs's subbase. Such precast blocks shall be made of mortar composed of 1 part cement to 2 parts sand. Blocks shall be spaced at the intervals required to maintain the reinforcement in its required position in the slab during the placing of the concrete. The slab reinforcement shall not be used to support planing or runways used in placing concrete.
- C. Use templates to insure proper placement of column dowels.
- D. Splices not shown on the plans may be used provided such splices meet the requirements of ACI 318; except where indicated on the drawings, welding or track welding of reinforcement is prohibited. Bar splices shall be rigidly clamped or wired.
- E. Do not bend reinforcement embedded in hardened concrete, unless specifically approved by the Engineers.
- F. Splices in reinforcing bars shall conform to the general requirements of the ACI Code, except ring tension reinforcement splices, which should be a minimum of 40 bar diameters. Splices should be staggered where possible or increased by 30%.
- G. Lap welded wire fabric a distance equal to the wire spacing, plus two (2") inches. Place reinforcement to be held in position such that the concrete cover between the outside of any brand. The concrete form conforms to the following schedule.
 - 1. Slabs
 - a. 1-1/2 inches top and bottom in general;
 - b. 1-1/2 inches at surfaces trowled as floor finish, walkway, or driveway.
 - c. 2 inches for surfaces exposed to water, wet locations, or exposed to weather.
 - 2. Footings
 - a. 3 inches at top, bottom, sides, and ends of footings
 - 3. Walls
 - a. 2 inches on surfaces against earth;
 - b. 1 inch on interior surfaces, not exposed to weather
 - c. 2 inches on surfaces exposed to water
 - 4. Beams, Girders, and Columns

- a. 2 inches in general
 - b. 2-1/2 inches to main longitudinal steel and vertical reinforcement on surfaces in contact with water.
- 5. Concrete Structures in contact with raw sewage
 - a. 3 inches in general

END OF SECTION

SECTION 03251
CONSTRUCTION JOINTS AND WATERSTOPS

PART 1 GENERAL

1.1 SCOPE

A. General

1. This section covers construction joints, expansion joints, and placement of waterstops.

B. Placement

1. Waterstops shall be installed in all construction joints with a potential for differential water pressure through the wall or slab and at other locations required by the plans. All waterstops shall be continuous throughout their length.

1.2 SUBMITTALS

- A. Submit a catalogue brochure of the waterstop to be used showing dimension and configuration.

PART 2 PRODUCTS

2.1 WATERSTOPS

A. PVC Waterstop

1. All waterstops shall be of "Rib Type" with a center bulb, capable of resisting a maximum pressure load of 65 feet of water.
2. Approved Manufacturers
 - a. Serviced Products Division, W.R. Grace and Company
 - b. B.F. Goodrich
 - c. Vinyltex Corporation
 - d. Saf-T-Grip Specialties Corporation
 - e. Vinylstops by Sonneborn-Contech
 - f. Approved Equal
3. All waterstops shall be 3/16" nominal thick and 6 inches wide with 1 inch center bulb.

B. Adhesive Waterstops

1. Meet or exceed all requirements of Federal Specifications SS-S-

00210, "Sealing Compound, Preformed Plastic for Expansion Joints," Type I or Type II.

2. The plastic waterstop shall be produced from blends of refined hydrocarbon resins and plasticizing compounds reinforced with inert material filler, and shall contain no solvents, irritating fumes or obnoxious odors. The plastic waterstop shall not depend on oxidizing, evaporating or chemical action for its adhesive or cohesive strength. It shall be supplied in extruded form of suitable cross-section and of a size to seal the joint areas of concrete sections. The plastic waterstop shall be protected by a suitable removable two-piece wrapper. The two-piece wrapper shall be so designed that one-half may be removed longitudinally without disturbing the other half, to facilitate application of the sealing compound.

2.2 EXPANSION JOINTS

A. General

1. Expansion joints of the size and type shown on the Plans, or specified herein, shall be placed in concrete pavement or structure as shown on the Plans.

B. Preformed Asphalt Fiber Joint Material: Asphalt fiber sheet filler shall consist of preformed strips of inert material impregnated with asphalt. It shall be of the thickness shown on the Plans or indicated in these Specifications.

1. The sheet filler shall conform to the requirements of AASHTO Specification M-59 with the following additional provisions.
2. The sheet filler shall be of such character that it will not be deformed by ordinary handling during hot weather nor become hard and brittle in cold weather. It shall be of a tough, resilient, durable material not affected by weathering.

C. Hot Poured Rubberized Tar Joint Sealer

1. Hot poured rubberized mastic sealer shall consist of a mixture of durable, elastic rubber, coal tar pitch, and other materials which will form a resilient and adhesive compound capable of effectively sealing concrete joint surfaces against repeated expansion and contraction. The material shall be installed in accordance with the manufacturer's directions.

2.3 CONSTRUCTION JOINTS

A. General

1. Location of all construction joints shall be approved by the Engineer.
2. Maximum length of wall pours shall be 40 ft. and maximum height of wall pours shall be 18 ft. provided with construction joints or as shown on the plans.
3. Bottom slabs and wall footings for concrete structures that will hold water shall be poured monolithically without cold joints or other discontinuities or weakened areas.
4. Radial control joints consisting of 1/2" to 3/4" wide troweled grooves shall be required at 60 degree increments in circular slabs. Such joints shall be caulked with epoxy joint sealer after the concrete is cured and prior to placement of grout topping if used.
5. All cracks greater than 0.05" wide not located in control joints shall be sealed by cutting a bevel groove on the water side of the crack 1/2" to 3/4" wide and caulking with epoxy sealant. Crack widths shall be measured at the concrete surface.

PART 3 EXECUTION

3.1 INSTALLATION OF WATERSTOPS

- A. Install waterstops such that one-half of the width will be embedded on one side of the joint and one-half in the other. Secure the waterstop in position using a method insuring the waterstop will be held securely and in straight alignment; do not allow the waterstop to come in contact with reinforcing steel.
- B. Join all waterstops to form a continuous barrier to the passage of water, both in the same plane and at the intersection of different planes. Use splices designed for the specific purpose of joining PVC waterstops.
 1. Joints in PVC waterstops shall be made by heating the two surfaces to be joined until the material has softened to the point where it is just short of being fluid, bring the two softened surfaces together with a slight rubbing motion followed by firm pressing so that a solid and tight bond is made.
 2. The joints in strips of waterstop made in the above manner shall be such that the entire cross section of the joint is dense, homogeneous, and free of porosity. All finished joints shall have a tensile strength of not less than 75 percent of the base strip as extruded.
 3. Heating of the surfaces to be joined shall be done by means of an electric splicing iron designed for this purpose and controlled by means of a voltage regulator.
 4. Heat shall be regulated to prevent too rapid melting and charring of the waterstop material.
 5. The Contractor shall provide jigs needed to make the joints in proper

and workmanlike manner and in hold the strips so that alignment of joined strips is correct and angles are those required.

6. Inspect all joints prior to embedment, replace any defective joints.

C. Protect exposed waterstops from damage between concrete pours.

3.2 INSTALLATION OF ADHESIVE WATERSTOPS

A. As soon as the form lumber is removed from the joint, brush the joint clean to remove all dust and foreign particles. Immediately apply one brush coat of prime recommended by the waterstop manufacturer.

B. Remove one face of the protective paper and position in the center of the keyway, lapping strips one inch end to end to form a continuous homogeneous waterstop for the entire length of the section.

C. Immediately before pouring concrete at the joint, completely clean the joint using brushes and compressed air to remove all debris. Only just before the concrete pour is made, remove the protective paper covering from the waterstop.

END OF SECTION

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SCOPE

- A. Furnishing everything necessary for and incidental to the execution of all cast-in-place concrete work, as indicated on the drawings and specified herein.

1.2 RELATED REQUIREMENTS

- A. Quality Control - **Section 01400.**
- B. Concrete Formwork - **Section 03100.**
- C. Concrete Reinforcement - **Section 03200.**

1.3 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. Comply with the provisions of the following codes, specifications and standards except where more stringent requirements are shown or specified:
 - a. ACI 301 "Specifications for Structural Concrete for Buildings."
 - b. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete."
 - c. ACI 311 "Recommended Practice for Concrete Inspection."
 - d. ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures."
 - e. ACI 318 "Building Code Requirements for Reinforced Concrete."
 - f. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."
- B. Workmanship
 - 1. The Contractor is responsible for correction of concrete work which does not conform to the specified requirements, including strength, tolerances, and finishes. Correct deficient concrete as required by the specifications.

1.4 SUBMITTALS

- A. Manufacturer's Data - Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including admixtures, bonding agents, form release agents, patching compounds, waterstops, joint systems, chemical floor hardeners, dry-shake finish materials, curing procedure, and others as requested by the Owner's Representative.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Cement: Store cement in watertight buildings, bins, or silos.
- B. Aggregate: Stockpile aggregate in a manner to prevent contamination with other materials or with other sizes of aggregate. To ensure this condition, conduct tests for determining conformance to requirements at the point of batching. Allow sand to drain until it has reached a uniform moisture content before it is used.
- C. Admixtures: Store admixtures in a manner to prevent contamination. Protect admixtures from extreme temperatures which would adversely affect their characteristics.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150 as follows:
 - 1. Provide Type I cement, except as otherwise indicated. Type III cement may be used in lieu of Type I at the Contractor's option.
 - 2. Use only one brand and one type of cement throughout the project.
- B. Aggregates: ASTM C33, and as herein specified. Provide aggregates from a single source for all concrete.
 - 1. Local aggregates not complying with ASTM C33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to the Owner's Representative.
 - 2. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, or ochre which can cause stains on exposed concrete surfaces.
 - 3. Fine Aggregate: Clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances.

- a. Dune sand, bank-run sand, and manufactured sand are not acceptable.
- 4. Coarse Aggregate: Clean, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter, as follows:
 - a. Crushed stone, processed from natural rock or stone.
 - b. Washed gravel, either natural or crushed. Use of pit or bank run gravel is not permitted. Aggregate to have minimum of two fractured faces.
 - c. Maximum Aggregate Size: Not larger than one-fifth of the narrowest dimension between sides of forms, one-third of the depth of slabs, or wall, nor three-fourths of the minimum clear spacing between individual reinforcing bars or bundles of bars. These limitations may be waived if workability and methods of consolidation are such that concrete can be placed without honeycomb or voids.
- C. Water: Clean, fresh, potable.

2.2 CONCRETE ADMIXTURES

- A. Provide admixtures produced by established reputable manufacturers and use in compliance with the manufacturer's printed directions. Do not use admixtures which have not been incorporated and tested in the accepted mixes.
- B. Air-Entraining Admixture: ASTM C 260.
- C. Water-Reducing Admixture: ASTM C 494, Type A.
- D. Set-Control Admixtures: ASTM C 494, as follows:
 - 1. Type B, Retarding
 - 2. Type C, Accelerating
 - 3. Type D, Water-Reducing and Retarding
 - 4. Type E, Water-Reducing and Accelerating
- E. Calcium chloride will not be permitted in concrete. Do not use admixtures containing calcium chloride where concrete is placed against galvanized steel, in mixes using high-early strength cement, or post-tensioned structures.

2.3 RELATED MATERIALS

- A. Waterstops: Provide waterstops at construction joints and other joints of type and size shown on drawings.

1. Provide either rubber or PVC waterstops, at Contractors option, with rubber units complying with Corps of Engineers CRD-C513 and PVC units complying with CRD-C572. Configuration of waterstop shall be as shown on the drawings.

B. Bonding Agent:

1. Chemical Bonding Agent - Film forming, freeze thaw-resistant compound suitable for brush or spray application complying with mil-B-19235.
2. Epoxy-Resin Bonding Agent - 2-component, mineral filled, epoxy-polysulfide polymer complying with FS MMM-G650, Type I or Type II, Grade A.

2.4 CONCRETE CURING MATERIALS

- A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd. complying with AASHTO M 182, Class 3.
- B. Moisture-Retaining Cover: One of the following, complying with ASTM C171.
1. Waterproof paper.
 2. Polyethylene film - white opaque.
 3. White burlap-polyethylene sheet.
- C. Membrane-Forming Curing Compound: ASTM C 309, Type I with fugitive dye. Membrane-forming curing compound shall be compatible with floor toppings, hardeners, or covering.
- D. Resin Base Liquid Membrane-Forming Curing Compound: Federal Spec TT-C-800, Type I with fugitive dye. Membrane forming curing compound shall be compatible with floor toppings, hardeners, or covering.

2.5 CONCRETE MIX DESIGN AND TESTING

- A. Comply with the applicable requirements of **Section 01400** for mix design and testing of concrete as herein specified.
- B. All concrete, cured and tested in accordance with applicable ASTM standards shall develop an ultimate strength at 28 days as herein specified. Seventy percent (70%) of the 28-day ultimate strength shall be indicated by tests conducted at 7 days.

- C. In accordance with applicable provisions of ASTM C94, prepare design mixes for each type and strength of concrete as follows:
1. Standard weight concrete consisting of the specified Portland cement, aggregates, admixtures, and water to produce the following strengths:
 - a. Compressive strength: 4000 psi minimum at 28 days unless otherwise noted on the drawings.
- D. Proportion mixes by either laboratory trial batch or field experience method, using material to be employed on the project for each class of concrete required, complying with ACI 211.1 for normal weight concrete and ACI 211.2 for structural lightweight concrete, and report to the Owner's Representative the following data:
1. Complete identification of aggregate source of supply.
 2. Tests of aggregates for compliance with specified requirements.
 3. Scale weight of each aggregate.
 4. Absorbed water in each aggregate.
 5. Brand, type, and composition of cement.
 6. Brand, type, and amount of each admixture.
 7. Amounts of water used in trial mixes.
 8. Proportions of each material per cu. yd.
 9. Gross weight and yield per cu. yd. of trial mixtures.
 10. Measured slump.
 11. Measured air content.
 12. Compressive strength developed at 7 days and 28 days from not less than 3 test cylinders cast for each 7- and 28-day test, and for each design mix.
- E. Submit written reports to the Owner's Representative of each proposed mix for each type of concrete at least 15 days prior to start of work. Do not begin concrete production unit mixes have been reviewed and approved by Owner's Representative.
- F. Laboratory Trial Batches: When laboratory trial batches are used to select concrete proportions, prepare test specimens in accordance with ASTM C 192 and conduct strength tests in accordance with ASTM C 39.
1. For concrete other than lightweight concrete, establish a curve showing relationship between water-cement ratio (or cement content) and compressive strength, with at least 3 points representing batches which produce strengths above and below that required. Use not less than 3 specimens tested at 28-days or an earlier age when acceptable to the Owner's Representative, to establish each point on the curve. The maximum allowable water-

cement ratio for the concrete for the structure shall be as determined from these curves and shall correspond to an average compressive strength 15 percent greater than the specified strength.

- G. Field Experience Method: When field methods are used to select concrete proportions, establish proportions as specified in ACI 301.
 - 1. Strength data for establishing standard deviation will be considered suitable if the concrete production facility has certified records consisting of at least 30 consecutive tests in one group or the statistical average for 2 groups totaling 30 or more test, representing similar materials and project conditions.
 - a. Standard Deviation: If standard deviation exceeds 600 psi or if no suitable records available, select proportions to produce an average strength of at least 1200 psi greater than the required compressive strength of concrete.
 - b. After sufficient experience and test data become available from the job, using ACI 214 methods of evaluation, the standard deviation may be reduced when the probable frequency of tests more than 500 psi below required compressive strength will not exceed 1 in 100, and that the probable frequency of an average of 3 consecutive tests below required compressive strength will not exceed 1 in 100.
- H. Adjustment to Concrete Mixes: Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions weather, test results, or other circumstances warrant; at no additional cost to the Owner and as accepted by the Owner's Representative. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Owner's Representative before using in the work.
- I. Admixtures:
 - 1. Use air-entraining admixture in all concrete, unless otherwise indicated. Add air-entraining admixture at the manufacturer's prescribed rate to result in concrete at the point of placement having air content within the following limits:
 - a. 4% for maximum 2" aggregate
 - b. 6% for maximum 3/4" aggregate
 - c. 7% for maximum 1/2" aggregate
 - 2. Use admixtures for water-reducing and set-control in strict compliance with the manufacturer's directions.

3. Use amounts of admixtures as recommended by the manufacturer for climatic conditions prevailing at the time of placing. Adjust quantities and types of admixtures as required to maintain quality control.
4. Air content should be measured using the pressure method described in ASTM C231 for normal weight concrete.

J. Slump Limits:

1. Proportion and design mixes to result in concrete slump at the point of placement as follows:
 - a. Ramps and Sloping Surfaces: Not more than 3".
 - b. Reinforced Foundation Systems: Not less than 1" and not more than 3".
 - c. All other Normal Weight Concrete: Not less than 1" and not more than 4"

PART 3 EXECUTION

3.1 CONCRETE MIXING

- A. General: Concrete may be transit-mixed as specified with the requirements of ACI be mixed at batch plants or it may herein. Batch plants must comply 304, with sufficient capacity to produce concrete of the qualities specified in quantities required to meet the construction schedule. All plant facilities are subject to testing laboratory inspection and acceptance of the Owner's Representative. Maintain equipment in proper operating condition, with drums cleaned before charging each batch. Schedule rates of delivery in order to prevent delay of placing the concrete after mixing, or holding dry-mixed materials too long in the mixer before the addition of water and admixtures.
- B. Job-Site Mixing: Concrete mixed at site should conform to the following:
 1. General: Mix concrete in a batch mixer conforming to requirements of the mixer manufacturer's Bureau of the Associated General Contractors of America. Mixer shall bear the manufacturer's rating plate indicating rated capacity and recommended revolutions per minute. Operate mixer in accordance with these recommendations. Use only mixers that are equipped with a suitable charging hopper, water storage tank, water measuring device and are capable of thoroughly mixing the concrete into a uniform mass within the specified mixing time and of discharging the mix without segregation.
 2. Admixtures: When approved for use, dispense liquid admixtures by means of an automatic dispenser or similar metering device.

Weight or measure by volume powdered admixtures, as recommended by the manufacturer. Accurately measure all admixtures to within plus or minus 5 percent. Provide suitable agitating equipment to ensure uniform distribution of ingredients.

3. Mixing: Charge batch into the mixer so that some water will enter in advance of the cement and aggregates. Allow water to flow into the mixer until the end of the first 25 percent of the specified mixing time. Provide controls to ensure that the batch cannot be discharged until the specified mixing time has elapsed. Provide controls to insure that no additional water may be added during mixing. Discharge the entire batch before recharging.
4. Mixing Time: Mix each batch of 2 cubic yards or less for not less than 1-1/2 minutes, and not more than 5 minutes after all ingredients are in the mixer before any part of the batch is released. Increase mixing time by 15 seconds for each additional cubic yard or fraction thereof. Do not exceed 30 minutes total elapsed time between intermingling of damp aggregates and cement to the discharge of the complete mix into forms.
5. Maintenance: Keep mixer clean. Replace mixer pick-up and throw-over blades when they have lost 10 percent of their original depth.
6. Identification: Provide a batch ticket for each batch discharged and used in the work, indicating the project identification name and number, date, mix type, mix time, quantity and amount of water introduced.

C. Ready-Mix Concrete:

1. Comply with the requirements of ASTM C94, and as herein specified. Proposed changes in mixing procedures must be accepted by the Owner's Representative before implementation. Plant equipment and facilities should conform to National Ready-Mix Concrete Association "Checklist for Certification of Ready-Mixed Concrete Production Facilities".
2. When the air temperature is 90 degrees F or greater, the maximum mixing and delivery time shall be reduced to 60 minutes. Additional reductions in mixing and delivery time may be required when weather or other conditions exist that contribute to rapid setting of concrete. When a truck mixer is used for the complete mixing of the concrete, begin the mixing operation within 30 minutes after the cement has been intermingled with the aggregates.
3. Furnish duplicate delivery tickets. with each load of concrete delivered to the site, one for the Owner's Representative and one for the Contractor. In addition to the requirements of ASTM C94, provide the following information on delivery tickets:
 - a. Type & Brand of Cement
 - b. Cement Content per cu. yd. of concrete

- c. Maximum size of aggregate
 - d. Total water content expressed as water/cement ratio
Amount of water added at job site
- D. Retempering: Mix concrete only in quantities for immediate use. Discard concrete which has set. Adding water to mix at the jobsite will not be permitted unless prior approval is obtained from the Owner's Representative.

3.2 PREPARATION

A. Preplacement Inspection:

1. Before placing concrete, coordinate, inspect, and complete the formwork installation, reinforcing steel, preformed joint fillers, vapor barriers, water stops and items to be embedded or cast-in. Notify other crafts involved in ample time to permit the installation of their work cooperate with other trades. in setting such work as required. All embedded items shall be secure in position before concrete is placed.
2. Thoroughly wet wood forms immediately before placing concrete, as required where form coatings are not used. Where coating is used, apply with a brush or spray covering the form evenly without excess drip. Do not use form oil which causes softening or permanent staining of the concrete.
3. Soil at bottom of foundation systems are subject to testing for soil bearing value by the testing laboratory. Place concrete immediately after approval of foundation excavations. Excavate and backfill as necessary to complete the concrete work. Place concrete on sub-grades that are well compacted to level and true grade. Before concrete is poured in areas between slabs on grade previously poured, recheck compaction of subgrades and if necessary, recompact to avoid settlement of slabs at joints. Seals extremely pourous subgrades. Remove all ice, debris and excess water from subgrades. After completion of the concrete work, backfill all excavations in accordance with **Section 02200**.
4. The installation of anchors, inserts, and sleeves for electrical, mechanical plumbing, heating, ventilating, and airconditioning work is subject to the inspection and approval of the supervisors of the particular trades involved. Finish void in sleeves and inserts temporarily with readily removable material.
5. Notify Owner's Representative a minimum of 24 hours before placing concrete.

3.3 CONCRETE PLACEMENT

- A. General: Place concrete in compliance with the practices and recommendations of ACI 304, and as specified herein. Do not place any concrete until the results of the design mix 28 day test breaks are available showing compliance with specified requirements.
1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, provide construction joints as herein specified. Perform concrete placing at such a rate that concrete which is being integrated with fresh concrete is still plastic. Deposit concrete as nearly as practicable to its final location to avoid segregation due to rehandling or flowing. Do not subject concrete to any procedure which will cause segregation.
 2. Screed concrete which is to receive other construction to the proper level to avoid excessive shimming or grouting.
 3. Do not use concrete which becomes nonplastic and unworkable, or does not meet the required quality control limits, or which has been contaminated by foreign materials. Do not use retempered concrete. Remove rejected concrete from the project site and dispose of in an acceptable location.
- B. Concrete Conveying:
1. General: Handle concrete from the mixer to the place of final deposit as rapidly as practicable and in a manner which will assure that the specified quality of the concrete is obtained.
 2. Equipment: Provide conveying equipment of proper size and design to ensure a continuous flow of concrete at the delivery end. Conveying equipment will be subject to the Owner's Representative's approval. Conform to the following:
 - a. Truck mixers, agitators, and nonagitating units and their manner of operation shall conform to the applicable requirements of ASTM C94.
 - b. Belt Conveyors: Provide belt conveyors and discharge apparatus of a type which will not cause segregation. Discharge long runs into a hopper.
 - c. Chutes: Provide metal or metal lined chutes and install to a slope not flatter than 1 to 3 nor steeper than 1 to 2. Chutes more than 20 feet long and chutes not meeting the slope requirements may be used, provided they discharge into a hopper.
 - d. Runways: Provide runways or other means for wheeled equipment to convey concrete to placement points. Do not

support runways on reinforcement, nor wheel equipment over reinforcement.

- e. Pumps: Submit "pump" mix for approval by Owner's Representative prior to placing concrete by this method.

C. Placing Concrete Into Forms:

1. Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
2. Remove temporary spreaders in forms when concrete placing has reached the elevation of such spreaders.
3. Consolidate concrete, including floor slabs on grade, by internal concrete vibrators supplemented by hand-spading, rodding, or tamping so that the concrete is thoroughly worked around reinforcement and embedded items and into the corners of forms. Consolidate each layer of concrete with previously placed layers in a manner that will eliminate all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Internal vibrators shall produce a minimum frequency of 7000 impulses per minute when submerged in concrete. Do not use vibrators to transport concrete. Insert and withdraw vibrators at uniformly spaced points not farther apart than the visible effectiveness of the machine. Duration of vibration shall be limited to time necessary to produce satisfactory consolidation without causing objectionable segregation. The vibrating equipment shall at all times be adequate in number of units and power to properly consolidate all concrete. Spare units shall be on hand as necessary to ensure such adequacy.
4. Formed Elements: Use internal vibrators, not form vibrators, When a surface mortar is to be the basis of the finish, work coarse aggregate back from the forms with a suitable tool to bring a full surface of mortar against the form.
5. Supported Elements: Use internal vibrators in elevated beams, girders, and brackets and along construction joints. Consolidate elevated slabs with vibrating bridge screeds, or roller pipe screeds. Tamp slabs to force aggregates away from surface and screed level to comply with ACI 347. After screeding, do not manipulate concrete prior to commencing finishing operation.
6. Bring slab surfaces to the correct level with a straight-edge and strike off. Use bull floats or darbies to smooth the surface, leaving it free of humps or hollows. Do not sprinkle water on the plastic surface. Do not disturb the slab surfaces prior to beginning finishing operations.

7. Maintain reinforcing steel in the proper position continuously during concrete placement operation.
8. Do not drop concrete freely where reinforcing bars will cause segregation, nor drop freely more than six feet. Use tremies in length increments of six feet.

D. Special Placing Requirement for Slab on Grade:

1. The Contractor shall have a sufficient number of qualified personnel available at all times while concrete is being placed, to ensure proper placing, finishing, and curing. Do not place concrete for building floor slabs on grade until exterior walls and roof are in place except at pre-engineered metal building where the floor slabs may be placed prior to walls and roof being in place.

E. Bonding:

1. Roughen surfaces of set concrete at all joints, except where bonding is obtained by use of a concrete bonding agent, and clean surfaces of laitance, coatings, loose particles, and foreign matter. Roughen surfaces in a manner to expose bonded aggregate uniformly and to not leave laitance, loose particles of aggregate, or damaged concrete at the surface.
2. Prepare for bonding of fresh concrete to new concrete that has set but is not fully cured, as follows:
 - a. At joints between footings and walls and between walls and beams or slabs they support, and elsewhere unless otherwise specified herein, dampen, but do not saturate, the roughened and cleaned surface of set concrete immediately before placing fresh concrete.
 - b. At joints in exposed work; at vertical joints in walls; at joints in girders, beams, supported slabs, and other structural members; and at joints designed to contain liquids; dampen, but do not saturate, the roughened and cleaned surface of set concrete and apply either a liberal coating of neat cement grout or a commercial bonding agent.
 - c. Use neat cement grout consisting of equal parts Portland cement and fine aggregate by weight and not more than 6 gallons of water per sack of cement. Apply with a stiff broom or brush to a minimum thickness of 1/16". Deposit fresh concrete before cement grout has attained its initial set.

F. Cold Weather Placing:

1. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low

temperatures, in compliance with the requirements of ACI 306 and as herein specified.

2. When the air temperature has fallen to or is expected to fall below 40 degrees F., provide adequate means to maintain the temperature in the area where concrete is being placed at either 70 degrees F. for 3 days or 50 degrees F. for 5 days after placing. Provide temporary housings or coverings including tarpaulins or plastic film. Keep protections in place and intact at least 24 hours after artificial heat is discontinued. Avoid rapid dry-out of concrete due to overheating, and avoid thermal shock due to sudden cooling or heating.
3. When air temperature has fallen or is expected to fall below 40 degrees F., uniformly heat all water and aggregates before mixing as required to obtain a concrete mixture temperature of not less than 50 degrees F. and not more than 80 degrees F. at point of placement.
4. Do not use frozen materials containing ice or snow. Do not place concrete on frozen sub-grade or on subgrade containing frozen materials. Ascertain that forms, reinforcing steel, and adjacent concrete surfaces are entirely free of frost, snow, and ice before placing concrete.
5. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
6. Use set-control admixtures when required and accepted in mix designs.

G. Hot Weather Placing:

1. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
2. Temperature of concrete at time of placing shall not exceed 90 degrees F. Contractor shall maintain an accurate reading thermometer at the jobsite to check temperature of concrete. Concrete shall be rejected before placing if temperature of concrete exceeds 90 degrees F.
3. Special precautions to protect fresh concrete before and during finishing shall be mandatory when the rate of evaporation of surface moisture from concrete exceeds 0.2 pounds per square foot per hour. Rate of evaporation shall be determined in accordance with ACI 305. Special precautions shall include the following:
 - a. Good planning and close coordination between supplier and jobsite shall be maintained to ensure prompt placement of concrete upon arrival at jobsite.

- b. Cool ingredients before mixing to reduce concrete temperature at time of placement. Mixing water may be chilled, or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing water.
- c. Dampen subgrade and forms.
- d. Erect windbreaks to reduce wind velocity over the concrete.
- e. Erect sunshades to reduce concrete surface temperatures.
- f. Cover reinforcing steel with water-soaked burlap so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
- g. Utilize fogging to cool and moisten surrounding air. Fog nozzles, specially designed for concrete fogging, which produce a fog blanket shall be used. Common garden hose nozzles or other nozzles which produce an excessive washing spray shall not be allowed.
- h. Provide temporary covering such as set burlap, plastic membrane, curing paper, or other suitable means.
- i. Use set control admixtures when required and accepted in mix design.

3.4 JOINTS

A. Slabs of Grade:

- 1. No reinforcement, corner protection angles, or other fixed metal items shall be run continuous through joints containing expansion-joint filler.
- 2. Floor slab control joints (construction joints and sawed joints) shall be as shown on the drawings. Any deviation from joint layout as shown shall be approved in writing before placing concrete. Where sawed joints are shown, sawing shall be performed a maximum of one (1) day after concrete is placed. Joints in curbs shall coincide with floor joints.
- 3. Where indicated, joints between interior slabs on grade and vertical surfaces, unless otherwise shown, shall be of 1/2 inch premolded expansion material extending full slab depth. The perimeters of slabs at the joints shall be free of fins, rough edges, spalling, or other unsightly appearance.
- 4. At expansion joints in concrete slabs to be exposed, expansion joints where filler is completely covered by base and shoe mold, and at other joints indicated to receive joint sealant, premolded expansion-joint filler strips shall be installed at the proper level below the finished floor with a slightly tapered, dressed and oiled wood strip temporarily secured to the top of the expansion joint filler to form a groove not less than 3/4 inch deep. The wood strip

shall be removed after the concrete has set. The groove, when surface dry, shall be cleaned of foreign matter, loose particles, and concrete protrusions, then filled approximately flush with joint sealant so as to be slightly concave after drying. Edges of exposed concrete slabs along expansion joints shall be neatly finished with a slightly rounded edging tool.

5. Concrete shall be placed in an alternating pattern terminating at construction of contraction joints to provide panels of size indicated. Forms shall remain in place for at least 12 hours after concrete placement. Where indicated, isolation joints shall be provided in slabs on grade at columns on separate footing for full slab depth and shall be constructed so that corners of isolation joints will meet at contraction joints.
6. Concrete joints, where sawed or formed, shall be filled with joint sealant except where floor covering is required.

B. Construction joints Other Than Slabs on Grade: The unit of operation shall not exceed 50' maximum. Concrete shall be placed continuously so that the unit will be monolithic in construction. Fresh concrete may be placed against adjoining units provided the set concrete is sufficiently hard not to be injured thereby. Joints not indicated shall be made and located to least impair strength and appearance of the structure. Construction joints, if required, shall be located near the midpoint of spans for slabs, beams, or girders unless a beam intersects a girder at the center, in which case the joints in the girder shall be offset a distance equal to twice the width of the beam with provision for transfer of shear and other forces through the construction joint by use of reinforcement as approved. Joints in columns or piers shall be made at the underside of the deepest beam or girder framing thereto. Concrete for columns, walls, or piers shall be in place at least 2 hours before concreting beams, girders, or slabs thereon. Beams, girders, brackets, and haunches shall be considered as part of the floor system and shall be placed monolithically therewith. No horizontal joints shall be made in footings. Vertical construction joints in wall footings shall be reduced to a minimum. Placement of concrete shall be at such rate that surfaces of concrete not carried to joint levels will not have attained initial set before additional concrete is placed thereon. Girder, beams, and slabs shall be placed in one operation. In walls having door and window openings, individual lifts shall terminate at top and bottom of opening. Other lifts shall terminate at such levels as are indicated or as to conform to structural requirements or architectural details, or both, as directed.

C. Waterstops: Provide waterstops in construction joints of the configuration and at locations as shown on the drawings. Install waterstops to form a continuous diaphragm in each joint. Make provisions to support and protect waterstops during the progress of the work. Fabricate field joints

in waterstops in accordance with manufacturer's printed instructions. Protect waterstop material from damage where it protrudes from any point.

3.5 FINISH OF FORMED SURFACES

A. All Surfaces (including exposed):

1. On all-surfaces, the cavities produced by form ties, honeycomb spots, broken corners or edges and other defects, shall be thoroughly cleaned, moistened with water, and carefully pointed and trued with a mortar as follows: Moisten the hole with water, followed by a 1/16-inch brush coat of neat cement slurry mixed to the consistency of a heavy paste. Immediately plug the hole with a 1:1.5 mixture of cement and concrete sand mixed slightly damp to the touch (just short of "balling"). Hammer the grout into the hole until dense, and an excess of paste appears on the surface in the form of a spiderweb. Trowel smooth with heavy pressure. Avoid burnishing. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete.

B. Exposed surfaces, including inside tank walls to one (1) foot below normal liquid level:

1. Immediately following the removal of forms, all fins and irregular projections shall be removed.

C. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with a texture matching the adjacent formed surfaces.

3.6 MONOLITHIC SLAB FINISHES

A. Float Finish:

1. Apply float finish to monolithic slab surfaces that are to receive trowel finish and other finishes as hereinafter specified or shown on drawings or in schedules.
2. After placing concrete slabs, do not work the surface further until ready for floating. Begin floating when the surface water has disappeared or when the concrete has stiffened sufficiently to permit the operation of a power-driven float, or both. Consolidate the surface with power-driven floats or by handfloating if area is small or inaccessible to power units. Check and level the surface

plane to a tolerance not exceeding 1/8" in 10' when tested with a 10' straightedge placed on the surface at not less than two different angles. Cut down high spots and fill all low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat the surface to a uniform, smooth, granular texture.

B. Trowel Finish:

1. Trowel Finish: Apply trowel finish to monolithic slab surfaces that are to be exposed to view and slab surfaces that are to be covered with resilient flooring, thin-set tile, paint, or other thin-film finish coating systems. Tops of concrete curbs shall receive steel trowel finish.
2. After floating, begin the first trowel finish operation using a power-driven trowel. Begin final trowelling when the surface produces a ringing sound as the trowel is moved over the surface. Consolidate the concrete surface by the final hand trowelling operation, free of trowel marks, uniform in texture and appearance.

C. Non-Slip Broom Finish:

1. Apply non-slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as shown on the drawings or in schedules.
2. Immediately after trowel finishing, slightly roughen the concrete surface by brooming in the direction perpendicular to the main traffic route. Use fiber-bristle broom unless otherwise directed. Coordinate the required final finish with the Owner's Representative before application.

3.7 CONCRETE CURING AND PROTECTION

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperature for the period of time necessary for hydration of the cement and proper hardening of the concrete.
2. Start initial curing as soon as free moisture has disappeared from the concrete surface. after placing and finishing.
3. Begin final curing procedures immediately following initial curing and before the concrete has dried. Continue final curing for at least 7 days and in accordance with ACI procedures except high-early-strength concrete shall be cured for at least three days. Avoid rapid drying at the end of the final curing period.

B. Curing Methods:

1. Perform curing of concrete by moist curing, by moisture-retaining cover curing, by membrane curing, or by combinations thereof, as herein specified.
 - a. For curing, use only water that is free of impurities which could etch or discolor exposed, natural concrete surfaces.
 - b. Care shall be taken to ensure that no damage is done to fresh concrete during application of curing method. The contractor shall protect other construction areas from excess water.
2. Provide moist curing by any of the following methods:
 - a. Keeping the surface of the concrete continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Covering the concrete surface with the specified absorptive cover, thoroughly saturating the cover with water, and keeping the absorptive cover continuously wet. Place absorptive cover so as to provide coverage of the concrete surfaces and edges, with a 4" lap over adjacent absorptive covers.
3. Provide moisture-retaining cover curing as follows:
 - a. Cover the concrete surfaces with the specified moisture-retaining cover for curing concrete, placed in the widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during the curing period using cover material and waterproof tape.
4. Provide liquid membrane curing as follows:
 - a. Apply the specified membrane-forming curing compound to damp concrete surfaces as soon as the water film has disappeared. Apply uniformly in a 2-coat continuous operation by power spray-equipment in accordance with the manufacturer's directions. Recoat areas which are subjected to heavy rainfall within 3 hours after initial application. Maintain the continuity of the coating and repair damage to the coat during the entire curing period.
 - b. Do not use membrane curing compounds on surfaces which are to be covered with a coating material applied directly to the concrete or with a covering material bonded to the concrete, such as liquid floor hardener, waterproofing, dampproofing, membrane roofing, painting, and other coatings and finish materials. The Contractor shall obtain from the curing compound manufacturer a written guarantee that its compound will not be detrimental to bonding of flooring adhesives or surface materials. This guarantee shall be submitted to the Owner's Representative

at the time request is made for use of membrane curing compounds.

- c. Do not use curing compounds on surfaces to which additional concrete is to be applied. Such areas shall be cured by moist curing method.

C. Curing Formed Surfaces:

1. Cure formed concrete surfaces, including the undersides of girders, beams supported slabs, and other similar surfaces by moist curing with the forms in place for the full curing period or until forms are removed. If forms are removed prior to specified curing period, continue curing by one of the methods specified in "Curing Unformed Surfaces".
2. Moisture loss from surfaces placed against wooden forms or metal forms exposed to heating by the sun shall be minimized by keeping the forms wet until they can be safely removed.

D. Curing Unformed Surfaces:

1. Initially cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by moist curing, whenever Possible.
2. Final cure unformed surfaces, unless otherwise indicated, by any of the methods specified above, as applicable.

E. Temperature of Concrete During Curing:

1. When the atmospheric temperature is 40 degrees F. and below, maintain the concrete temperature between 50 and 70 degrees F. continuously throughout the curing period. When necessary; make arrangements before concrete placing for heating, covering, insulating, or housing as required to maintain the specified temperature and moisture conditions, continuously for the concrete curing period. Do not use combustion the first 24 hours or curing without taking precautions to prevent exposure of the concrete to exhaust gases. Provide cold weather protection complying with the requirements of ACI 306.
2. When the atmospheric temperature is 80 degrees F. and above or during other climatic conditions which will cause too rapid drying of the concrete, make arrangements before the start of concrete placing for the installation of windbreaks or shading, and for fog spraying, wet sprinkling, or moisture-retaining covering. Protect the concrete continuously for the concrete curing period. Provide hot weather protection complying with the requirements of ACI 305.

3. Maintain concrete temperature as uniformly as possible, and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete which exceed 5 degrees F. in any one hour and 50 degrees F. in any 24 hour period.

F. Protection from Mechanical Injury:

1. During the curing period, protect concrete from damaging mechanical disturbances including load stresses, heavy shock, excessive vibration, and from damage caused by rain or flowing water. Protect all finished concrete surfaces from damage by subsequent construction operations. Do not allow any traffic, except for curing purposes, on the concrete surfaces until the concrete has attained 60% of its 28-day strength.

3.8 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas:

1. Repair and patch defective areas with cement mortar immediately after removal of forms. Use epoxy-based mortar for structural repairs.
2. Before patching is performed, the Owner's Representative shall be notified and provided sufficient time to observe extent of repairs required.
3. Cut out honeycomb and rock pockets, down to solid concrete but, in no case, to a depth of less than 1". Where defective concrete extends to the depth of reinforcing steel or where reinforcing steel is exposed during concrete chipping, concrete shall be removed to a minimum depth of 3/4 inch clear beyond depth of reinforcing steel. Saw-cut perimeter or area to be patched to provide edges cut perpendicular to the concrete surface.
4. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, the patching mortar will match the color of the surrounding concrete. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with the patching. Compact mortar in place and strike off slightly higher than the surrounding surface.
5. Fill holes extending through concrete by means of a plunger-type gun or other suitable device from the least exposed face, using a flush stop held at the exposed face to ensure complete filling.

B. Repair of Formed Surfaces:

1. Repair exposed-to-view formed concrete surfaces, where possible, that contain defects which adversely affect the

appearance of the finish. Remove and replace the concrete having defective surfaces if the defects cannot be repaired to the satisfaction of the Owner's Representative. Surface defects, as such, include color and texture irregularities, crack, spalls, air bubbles, honeycomb, rock pockets, and holes left by the rods and bolts; fins and other projections on the surface; and stain and other discolorations that cannot be removed by cleaning.

2. Repair concealed formed' concrete surfaces, where possible, that contain defects that adversely affect the durability of the concrete. If defects cannot be repaired, remove and replace the concrete having defective surfaces. Surface defects, as such, include cracks in excess of 0.01" wide, cracks of any width through nonreinforced sections, honeycomb, rock pockets, holes left by tie rods and bolts, and spalls except minor breakage at corner.

C. Repair of Uniformed Surfaces:

1. Test unformed surfaces, such as monolithic slabs, for smoothness and to verify surface plane to the tolerances specified for each surface and finish. Correct low and high areas as herein specified.
2. Test unformed surfaces sloped to drain for trueness of slop, in addition to smoothness, using a template having the required slope. Correct high and low areas as herein specified.
3. Repair finished unformed surfaces that contain defects which adversely affect the durability of the concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.
4. Correct high areas in unformed surfaces by grinding, after the concrete has cured sufficiently so that repairs can be made without damage to adjacent areas.
5. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out the low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete.
6. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen all concrete surfaces in contact with patching concrete and brush with a neat cement grout coating, or use concrete bonding agent. Place patching concrete before grout takes its initial set. Mix patching concrete of the same materials to provide concrete of the same type or class as the original adjacent concrete. Place, compact, and finish as required

to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.

7. Repair isolated random cracks and single holes not over 1" in diameter by the dry-pack method. Groove the top of cracks, and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen all cleaned concrete surfaces and brush with a neat.cement grout coating. Place dry-pack before the cement grout takes its initial set. Mix dry-pack consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched areas continuously moist for not less than 72 hours.

3.9 MISCELLANEOUS CONCRETE ITEMS

- A. Filling-In: Fill in holes and openings, left in concrete structures for the passage of work by other trades, unless otherwise shown or directed, after the work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide all other miscellaneous concrete filling shown or required to complete the work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on the drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of the manufacturer furnishing the machines and equipment.

3.10 FIELD QUALITY CONTROL AND TESTING

- A. Comply with requirements of **Section 01400** for the field testing of concrete as herein specified.
- B. Concrete shall meet or exceed the properties for concrete as defined in the mix design criteria and as herein specified. Failure of the concrete to meet any of these requirements shall be considered grounds for rejection of the concrete or the portion of the work performed with it.
- C. Formed Concrete Dimensional Tolerances:
 1. Formed concrete having any dimension smaller than required, and outside the specified tolerance limits, will be considered efficient

in strength and will be rejected if the appearance or function of the structure is adversely affected.

2. Formed concrete having any dimension greater than required will be rejected if the appearance or function of the structure is adversely affected, or if the larger dimensions interfere with other construction. Repair or remove and replace rejected concrete as required to meet the construction conditions. When permitted, accomplish the removal of excessive material in a manner to maintain the strength of the section without affecting function and appearance.

D. Strength of Concrete Structures:

1. The strength of the concrete structure in-place will be considered potentially deficient if it fails to comply with any of the requirements which control the strength of structure, including the following conditions.
 - a. Failure to meet compressive strength test requirements.
 - b. Concrete which differs from the required dimensions or location in such a manner to reduce strength.
 - c. Concrete subjected to damaging mechanical disturbances particularly load stresses, heavy shock, and excessive vibration.
 - d. Poor workmanship and quality control likely to result in deficient strength.

3.11 SPECIFIC TESTS, INSPECTIONS AND METHODS REQUIRED FOR LABORATORY TESTING - CAST-IN-PLACE CONCRETE

A. Tests for Concrete Materials:

1. For normal weight concrete, test aggregates by method of sampling and testing of ASTM C33.
2. For Portland cement, submit certificate of materials properties and compliance with requirements of ASTM C150.
3. Submit written reports to the Owner's Representative for each material sampled and tested, prior to start of work. Provide the project identification name and number, date of report, name of Contractor, name of concrete testing service, source of concrete aggregates, material manufacturer and brand name for manufactured materials., values specified in the referenced specification for each material, and test results. Indicate whether or not material is acceptable for intended use.
4. Certificates of material properties and compliance with specified requirements may be submitted in lieu of testing, when acceptable

to the Owner's Representative. Certificates of compliance must be signed by the materials producer and the Contractor.

3.12 SPECIFIC TEST, INSPECTIONS AND METHODS REQUIRED FOR FIELD TESTING - CAST-IN-PLACE CONCRETE

- A. The testing laboratory shall make test to evaluate concrete. Failure to detect defective work or materials will not, in any way, prevent rejection later when such defects are discovered, nor will it be construed as obligating the owner to make final acceptance. Sampling and testing for field quality control during the placement of concrete shall be as follows:
1. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.
 2. Slump: ASTM C143; one test for each set of compressive strength test and whenever the indication of change requires.
 3. Air Content: For normal weight concrete ASTM C231, pressure method; one for every strength test and whenever the indication of change requires.
 4. Compression Test Specimens: ASTM C31; one set of 6 standard cylinders for each compressive strength test, unless otherwise directed.
 - a. Cast and store cylinders for laboratory cured test specimens and field-cured test specimens as specified in ASTM C31.
 - b. Four cylinders shall be delivered to the laboratory about 24 hours after being molded and shall be moist-cured under laboratory conditions.
 - c. The other two cylinders shall be kept on or near the work and shall receive the same protection from the elements and the same curing treatment as is given that portion of the work from which the sample was taken. Footing cylinders shall be treated as if taken from the superstructure.
 5. Concrete Temperature: Test hourly when air temperature is 40 degrees F. and below, and when 80 degrees F. and above and each time a set of compression test specimens made.
 6. Compressive Strength Tests: ASTM C49; one set for each 100 cu. yds. or fraction thereof, of each mix design placed in any one day or for each 5,000 sq. ft. or surface area placed or as directed; 2 specimens tested at 7 days, 3 specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 - a. When the total quantity of a given mix design of concrete is less than 50 cu. yds., the strength tests may be waived by the Owner's Representative if, in his judgment, adequate evidence of satisfactory strength is provided.

- b. When the strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
- 7. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of contractor, name of concrete supplier and truck number, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests, slump and air content

3.13 ADDITIONAL TESTS - CAST-IN-PLACE CONCRETE

- A. The testing service will make additional tests of in-place concrete when test results indicate the specified concrete strengths and other characteristics have not been attained in the structure. The testing service shall conduct tests to determine the strength and other characteristics of the in-place concrete by compression tests on cored cylinders complying with ASTM C42, or by load testing specified in ACI 318, or other acceptable non-destructive testing methods, as directed. The Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified to exist.

3.14 EVALUATION OF QUALITY CONTROL TESTS - CAST-IN-PLACE CONCRETE

- A. Do not use concrete delivered to the final point of placement which has slump or total air content outside the specified values.
- B. Compressive strength tests for laboratory-cured cylinders will be considered satisfactory, if the averages of all sets of three consecutive compressive strength tests results equal or exceed the 28-day design compressive strength of the type or class of concrete; and, no individual strength test falls below the required compressive strength by no more than 500 psi. In all cases where the average strength of the laboratory control cylinders shown by these tests for any portion of the structure falls below the minimum ultimate compressive strengths, the Owner's Representative shall have the right to reject the entire structure.
- C. Strength tests of specimens cured under field condition may be required to check the adequacy of curing and protecting of the concrete placed. Specimens shall be molded by the field quality control laboratory at the same time and from the same samples as the laboratory cured specimens.

1. Provide improved means and procedures for protecting concrete when the 28-day compressive strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders.
 2. When laboratory-cured cylinder strengths are appreciably higher than the minimum required compressive strength, field-cured cylinder strengths need not exceed the minimum required compressive strength by more than 500 psi even though the 85% criterion is not met.
- D. If individual tests of laboratory-cured specimens produce strengths more than 500 psi. below the required minimum compressive strength, or if tests of field-cured cylinders indicate deficiencies in protection and curing, provide additional measures to assure that the load-bearing capacity of the structure is not jeopardized. If the likelihood of low-strength concrete is confirmed and computations indicate the load-bearing capacity may have been significantly reduced, tests of cores drilled from the area in question may be required.
- E. If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such tests will be considered deficient in strength and subject to additional testing as herein specified.

END OF SECTION

SECTION 03602 NONMETALLIC GROUT

PART 1 GENERAL

1.1 SCOPE

- A. This section covers grouting of pump, motor, and equipment base plates; column base plates, and pipe supports; other miscellaneous base plates; and, other uses of grout as indicated on the Drawings. Except for grout to be applied as a topping on the floor of structures, and unless otherwise specified, all grouting shall be done with nonshrinking nonmetallic grout. Standard grout may be used as a topping for floors, setting beds, and clarifier tanks except where otherwise indicated.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Nonshrinking Nonmetallic Grout
 - 1. Master Builders "Special LL-713 Grout"
 - 2. Gifford-Hill "Supreme"
 - 3. U.S. Grout "Five Star Grout"
 - 4. Or approved equal
- B. Composition
 - 1. No metallic particles, aluminum powder, iron filings, or expansive cement.
- C. Nonshrinking grout shall be furnished prepackaged so that only water is added at jobsite. Mix grout in a mechanical mixer. Use no more water than is necessary to produce a workable grout. Follow manufacturer's instructions which shall be printed on the outside of each bag.
 - 1. No shrinkage (0.0%) and a maximum 4.0% expansion when tested in accordance with ASTM C-827. No shrinkage (0.0%) and a maximum of 0.2% expansion in the hardened state when tested in accordance with ASTM-C 621.
 - 2. Minimum 28-day compressive strength of 5,000 psi when tested in accordance with ASTM C-109.
 - 3. Minimum initial set time of 60 minutes when tested in accordance with ASTM C-191.

PART 3 EXECUTION

3.1 PREPARATION

- A. Wet the concrete foundation to receive nonshrinking grout with water prior to grouting.

3.2 APPLICATION

- A. Placement

- 1. Place grout in strict accordance with the directions of the manufacturer so that all spaces and cavities below the top of the baseplates are completely filled without voids. Use forms where structural components of base plates or bed plates will not confine the grout.

- B. Edge Finishing

- 1. In all locations where the edge of the grout will be exposed to view, finish smooth after initial set. Except where indicated to be finished on a slope, trim the edges of the grout flush at the base plate, bed plate, or piece of equipment.

END OF SECTION

SECTION 04100
MORTAR AND MASONRY GROUT

PART 1 GENERAL

1.1 SCOPE

- A. Mortar and grout for unit masonry.

1.2 RELATED SECTIONS

- A. **Section 01400** - Quality Requirements: Testing laboratory services.
- B. **Section 04300** - Unit Masonry System: Installation of mortar and grout.
- C. **Section 08100** – Metal Doors and Frames: Grouting steel door frames.

1.3 REFERENCES

- A. ACI 530 - Building Code Requirements for Masonry Structures.
- B. ACI 530.1 - Specifications for Masonry Structures.
- C. ASTM C5 - Quicklime for Structural Purposes.
- D. ASTM C91 - Masonry Cement.
- E. ASTM C94 - Ready Mix Concrete.
- F. ASTM C144 - Aggregate for Masonry Mortar.
- G. ASTM C150 - Portland Cement.
- H. ASTM C199 - Test Method for Pier Test for Refractory Mortar.
- I. ASTM C207 - Hydrated Lime for Masonry Purposes.
- J. ASTM C270 - Mortar for Unit Masonry.
- K. ASTM C387 - Packaged, Dry, Combined Materials, for Mortar and Concrete.
- L. ASTM C404 - Aggregates for Masonry Grout.
- M. ASTM C476 - Grout for Masonry.

- N. ASTM C595 - Blended Hydraulic Cement.
- O. ASTM C780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
- P. ASTM C1019 - Method of Sampling and Testing Grout.
- Q. ASTM C1072 - Method for Measurement of Masonry Flexural Bond Strength.
- R. ASTM C1142 - Ready-Mixed for Unit Masonry.
- S. ASTM E447 - Test Methods for Compressive Strength of Masonry Prisms.
- T. ASTM E518 - Test Method for Flexural Bond Strength of Masonry.
- U. IMIAC (International Masonry Industry All-Weather Council) - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
- V. IMIAC (International Masonry Industry All-Weather Council) - Recommended Practices and Guide Specifications for Hot Weather Masonry Construction.

1.4 SUBMITTALS

- A. Submit under provisions of **Section 01300**.
- B. Include design mix, indicate whether the Proportion or Property specification of ASTM C270 is to be used, required environmental conditions, and admixture limitations.
- C. Samples: Submit two samples of mortar, illustrating mortar color and color range.
- D. Reports: Submit reports on mortar indicating conformance of mortar to property requirements of ASTM C270 and test and evaluation reports to ASTM C780.
- E. Reports: Submit reports on grout indicating conformance of component grout materials to requirements of ASTM C476 and test and evaluation reports to ASTM C1019.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

- G. Submit premix mortar manufacturer's installation instructions under provisions of **Section 01300**.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 530 and ACI 530.1/ 04100-2
- B. Maintain one copy of each document on site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of **Section 01600**.
- B. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
- B. Maintain materials and surrounding air temperature to minimum 50 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Portland Cement: ASTM C150, Type I, gray color.
- B. Mortar Aggregate: ASTM C144, standard masonry type.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Grout Course Aggregate: ASTM C 404, or ASTM C 33.
- E. Grout Fine Aggregate: ASTM C 404, or ASTM C 144.
- F. Water: Clean and potable.

2.2 MORTAR MIXES

- A. Mortar for Non-load Bearing Walls and Partitions: ASTM C270, Type S.

- B. Mortar for Non-Load Bearing Walls and Partitions: ASTM C270, Type S.

2.3 MORTAR MIXING

- A. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.
- B. Maintain sand uniformly damp immediately before the mixing process.
- C. Do not use anti-frees compounds to lower the freezing point of mortar.
- D. If water is lost by evaporation, re-temper only within two hours of mixing.
- E. Use mortar within two hours after mixing at temperatures of 90 degrees F, or two-and-one-half hours at temperatures under 40 degrees F.

2.4 GROUT MIXES

- A. Bond Beams and Lintels: 3,000 psi strength at 28 days; 8-10 inches slump, mixed in accordance with ASTM C476 Course Grout.

2.5 GROUT MIXING

- A. Mix grout in accordance with ASTM C94.

2.6 MIX TESTS

- A. Test mortar and grout in accordance with **Section 01400**.
- B. Testing of Mortar Mix: In accordance with ASTM C270.
- C. Testing of Grout Mix: In accordance with ASTM C1019 for compressive strength, and slump.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Request inspection of spaces to be grouted.

3.2 INSTALLATION

- A. Install mortar in accordance with ASTM C270. Install grout in accordance with ASTM C 1019.

- B. Work grout into masonry cores and cavities to eliminate voids.
- C. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.
- D. Do not displace reinforcement while placing grout.
- E. Remove excess mortar from grout spaces.

3.3 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of **Section 01400**.
- B. Test and evaluate mortar in accordance with ASTM C780.
- C. Test and evaluate grout in accordance with ASTM C1019.
- D. Test mortar and masonry units to ASTM C1072; test in conjunction with masonry unit sections specified.

END OF SECTION

SECTION 04220 CONCRETE MASONRY

PART 1 GENERAL

1.1 SCOPE

A. GENERAL

1. Work under this section includes providing all labor, materials, equipment, scaffolding and incidentals necessary to complete the masonry work indicated on the drawings and specified herein.

1.2 QUALITY ASSURANCE

A. GENERAL

1. All masonry shall be performed by experienced masons, and shall be uniform in bond, thickness of joint, level and square, with uniform tooling and mortar color.

B. TESTING

1. Mortar samples may be taken at any time and tested in accordance with ASTM C-780.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver masonry units to job site undamaged. Deliver and handle units to prevent chipping, breaking, or other damage. Store masonry units off the ground and protected from rain, mud, dust, or other materials and contaminants likely to cause staining or defects. Use wood platforms or pallets, and cover stored masonry with tarpaulins or plastic.

1.4 JOB CONDITIONS

A. COLD WEATHER CONSTRUCTION

1. Masonry construction performed when ambient temperature falls below 40 degrees F. shall conform to the "Recommended Practice for Cold Weather Masonry Construction" published by the International Masonry Industry All Weather Council. Use of anti-freeze in mortar is not permitted

B. COVERINGS

1. During construction, partially completed walls which are not enclosed or sheltered shall be kept dry by covering at the end of each day and when work is not in progress. Use strong, weather-resistant material extended a minimum of 2 feet down each side, and held securely in place.

C. PROTECTION OF FINISHED WORK

1. Do not apply uniform floor or roof loads for at least 12 hours, or concentrated loads for at least 3 days, after building masonry walls or columns.

D. STAINING

1. Prevent grout or mortar from staining the face of masonry to be left exposed or to be painted. Remove immediately any grout or mortar in contact with face of such masonry.

PART 2 PRODUCTS

2.1 MATERIALS

A. PORTLAND CEMENT

1. ASTM C 150, Type I, natural, white, or colored as specified or indicated on the plans.
2. Architectural block shall be placed with colored mortar matching, or complimenting, block color. Submit color sample for approval.

B. HYDRATED LIME

1. ASTM C 207, Type S.

C. SAND

1. Washed masonry sand conforming to ASTM C 144. Use graded sand with 10% passing No. 100 sieve and 100% passing a No.8 sieve.

D. WATER

1. Mixing water must be clear potable water.

E. CONCRETE MASONRY UNITS

1. Provide standard light weight block complying with ASTM C 90, Grade N Type I, using aggregate complying with ASTM C 331 for a dry net weight of not more than 105 pounds per cubic foot, unless otherwise shown or specified. Provide manufacturer's standard units with nominal face dimensions of 16 inches long by 8 inches high, by 8 inches wide, unless otherwise shown. Provide, where shown or required, lintels, jambs, control joints, headers, bonding or other special conditions needed for a complete and uniform project.

F. HORIZONTAL JOINT REINFORCEMENT

1. Galvanized prefabricated welded ladder type wire units in not less than 10-foot lengths with matching corner and tee units. Fabricate from cold-drawn No.4 gauge steel wire complying with ASTM A 82; with deformed continuous longitudinal rods and plain continuous cross rods spaced not more than 16 inches. Width 1-1/2 inches to 2 inches less than wall thickness. Reinforcement to be "Dur-O-Wal", "Bet-R-Wal," or equal.

G. REINFORCEMENT BARS

1. Steel reinforcing shall conform to ASTM A 615; No.3 bars and smaller, Grade 40; all other, Grade 60.

H. ANCHORS AND TIES

1. All anchors and ties shall be galvanized or corrosion resistant metal.
2. Pre-fabricated, welded joint reinforcement, ladder or truss type design, minimum 9 gauge wire.
3. 3/16" diameter rectangular ties at intersecting members. Minimum tie spacing shall be as shown on the drawings or required by local building code.

- I. Steel lintels shall be standard shapes, hot-dip galvanized, minimum 1/4" thick A-36 steel.

J. CELLS FILLED WITH CONCRETE

1. Where specifically shown on the drawings, fill cells of concrete masonry units with minimum 2500 psi (28-day) test concrete mix using pea gravel aggregate, do not use mortar for this purpose.

K. ADMIXTURES

1. No air-entraining admixtures or materials containing air-entraining admixtures shall be used. Air content of mortar and grout shall be

limited to 12 percent.

PART 3 EXECUTION

3.1 INSTALLATION

A. PREPARATION

1. Inspect surfaces which are to support masonry work to assure completion to proper lines and grades. Clean masonry free of all dirt and other material.

B. GENERAL

1. No masonry shall be erected when the ambient temperature is below 32 deg. F. on a rising temperature or below 40 deg. F. on a falling temperature, or when there is probability of such a condition existing within 48 hours, unless special provisions are made for heating the materials and protecting the work. Such provisions shall be as directed or approved by the Engineer. No frozen water or mortar shall be built upon. No brick or other units having a film of water or frost on their surface shall be laid in the walls or frost on their surface plumb, true to line, with level and accurately spaced course and reveals, with corners plumb and true, and with each course breaking joint with the course below except where otherwise indicated on the Drawings. Bond shall be kept plumb throughout. Work required to be built in with the masonry, including anchors, wall plugs, flashing and accessories, shall be built in as the work progresses. Unless otherwise shown on the Drawings or specified, the space around built-in items shall be filled solid with masonry. Chases and pockets shall be built as shown on the Drawings or directed by the Engineer. Chases and pockets shall be kept free from mortar or other debris.

C. CONCRETE BLOCK

1. Concrete masonry units shall be PLACED where shown on the Drawings. Each course shall be solidly bedded in mortar, with vertical joints stacked where shown on the plans. Vertical joints shall be buttered their entire length. Each course shall be bonded at corners and intersections, and shall be either bonded into or anchored over 3 ft. on centers in both directions. Where units terminate against beams on soffits, units shall be wedged tight with slate or clay tile wedges and the joint shall be packed with mortar. Jamb units shall be of shapes and sizes required to bond with wall units and shall be built where shown on the drawings or as required.

3.2 FIELD QUALITY CONTROL

A. MORTAR AND GROUT

1. Mix mortar and grout in accordance with the proportion requirements of ASTM C 270, and ASTM C 476 as applicable. Mortar shall be Type M. Control batching procedure to ensure proper proportions by measuring materials by volume. Amount of mixing water and mortar consistency shall be controlled by mason. Retempering will be permitted only with the first 2-1/2 hours of initial mix. Any mortar or grout which has partially set shall be discarded.

B. ANCHORS AND TIES

1. Remove all dirt, loose rust, and scale prior to installation.

C. Protection of Work

1. Protect sills, ledges and offsets from mortar droppings or other damage during construction. Remove misplaced mortar or grout immediately. Protect face materials against staining. Protect door jambs and corners from damage during construction.

3.3 INSTALLING MASONRY

A. INSTALLATION

1. Do not install cracked, broken or chipped masonry units exceeding ASTM allowances. Use masonry saws to cut and fit exposed units. Lay units plumb, true to line, and with level courses accurately spaced within allowable tolerances. Unless otherwise shown on the drawings, install masonry work using 1/2 running bond. Stop horizontal runs by racking back 1/2 unit length in each course. Adjust units to final position while mortar is soft and plastic. If units are displaced after mortar has stiffened, remove, clean joints and units of mortar, and reinstall with fresh mortar. Adjust shelf angles to keep work level and at proper elevation. When joining fresh masonry to set or partially set masonry, remove loose units and mortar, and clean and lightly wet exposed surface of set masonry prior to laying fresh masonry. The mason shall place all accessories and reinforcement in the masonry as the job progresses.

B. REINFORCING

1. Horizontal reinforcing shall be installed in every other course (16" on center vertically) unless otherwise indicated on the plans. Vertical

reinforcing shall be as shown on the plans. Bond beams shall be reinforced as shown on the plans and filled with 2500 psi concrete (28 day compressive strength). Do not use masonry mortar for this purpose.

C. BUILT-IN ITEMS

1. Install bolts, anchors, nailing blocks, inserts, frames, vents flashings, conduit, and other built-in items as masonry work progresses. Avoid cutting and patching. Solidly grout spaces around built-in items. Provide joints around exterior framed openings 1/4" to 3/8" wide, raked and tooled smooth to a uniform depth of 3/4", ready for caulking by others.

D. JOINTS

1. Provide nominal joint thickness of 3/8". Provide face shell bedding for concrete unit masonry except at grouted cells where full mortar bedding is required. Construct uniform joints. Provide full head and bed joints, shoved tight to prevent penetration of moisture. Provide weatherproof, concave, tooled joints in exposed surfaces when mortar is thumb-print hard, using round jointing tool. Strike joints flush in surfaces to be plastered, stuccoed, or covered with other material or surface-applied finish other than paint. Remove mortar protruding into cells or cavities to be grouted. Do not permit mortar droppings to fall into cavities or to block weep holes.

E. FLASHING

1. Provide thru-wall flashing at base of all cavity walls; at shelf angles; at lintels, heads, and sills of openings in exterior walls; at all locations shown on the drawings; and at any other locations as required to complete the integrity of waterproofed or dampproofed surfaces. Clean surfaces of masonry smooth and free from projections which might puncture or otherwise damage flashing membrane. Carefully fit flashing around projections and where dampproof membrane touches columns, walls, etc. Neatly fold and bed in mastic or mortar so as to direct moisture to the outside. Hold outer edge of membrane to surface with mastic or mortar. Lap joints 4" and seal with mastic. Form membrane to correct profile without wrinkles or buckles, and protect from punctures and tears during installation.

F. LINTELS

1. Provide reinforced concrete masonry lintels over all openings not shown to have steel lintels. Use special lintel blocks, steel reinforced

and sized as shown on the drawings. Filled with 2500 psi concrete using pea gravel aggregate. Minimum bearing of lintel to be 8 inches at each end.

G. EXPANSION AND CONTRACTION

1. Provide vertical control joints where called for on the drawings or at intervals not to exceed 20'-0". Provide continuous bond break at steel columns and members. Provide pressure-relieving neoprene pods below shelf angles.

3.4 REPAIR, POINTING AND CLEANING

A. REPLACEMENT

1. Remove and replace masonry units which are loose, uneven, dipped, broken, stained, or otherwise damaged; or if units do not match joining units as intended. Provide new units to match and install in fresh mortar, pointed to eliminate evidence of replacement.

B. POINTING

1. At final completion of masonry work, cut out any defective joints or holes in exposed masonry and repoint with mortar; tool to match adjacent joints.

C. CLEANING

1. Dry brush masonry surface after mortar has set at end of each work day and after final pointing. Clean exposed masonry with stiff brush and clean water. Protect adjacent materials from damage due to cleaning operations. Leave work area and surrounding surfaces clean and free of mortar spots, dropped mortar, chips and broken masonry.

D. COMPLETION

1. Scrub walls with tri-sodium phosphate solution and rinse using clear water.

END OF SECTION

SECTION 04300
UNIT MASONRY SYSTEM

PART 1 GENERAL

1.1 SCOPE

- A. Concrete masonry units.
- B. Reinforcement, anchorage, and accessories.

1.2 RELATED SECTIONS

- A. **Section 01400** - Quality Control: Testing laboratory services.
- B. **Section 04100** - Mortar and Masonry Grout: Mortar and grout.

1.3 REFERENCES

- A. ACI 530 - Building Code Requirements for Masonry Structures.
- B. ACI 530.1 - Specifications For Masonry Structures.
- C. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.
- D. ASTM A641 - Zinc-Coated (Galvanized) Carbon Steel Wire.
- E. ASTM C55 - Concrete Building Brick.
- F. ASTM C62 - Building Brick (Solid Masonry Units Made From Clay or Shale).
- G. ASTM C90 - Load-Bearing Concrete Masonry Units.
- H. ASTM C129 - Non-Load Bearing Concrete Masonry Units.
- I. ASTM C652-- Hollow Brick (Hollow Masonry Units made from clay or shale).
- J. ASTM C744 - Pre-faced Concrete and Calcium Silicate Masonry Units.
- K. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.
- L. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Hot Weather Masonry Construction.

1.4 SUBMITTALS

- A. Submit under provisions of **Section 01300**.
- B. Product Data: Provide data for pre-faced masonry units.
- C. Samples: Submit four samples of face brick and pre-faced units to illustrate color, texture, and extremes of color range.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 530 and ACI 530.1. B. Maintain one copy of each document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of **Section 01600**.
- B. Cover stored masonry units to keep masonry units dry.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
- B. Hot Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Hot Weather Masonry Construction.

1.9 COORDINATION

- A. Coordinate the masonry work with installation of windows and doors, structural and miscellaneous steel, and mechanical and electrical work.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Hollow Load Bearing Block Units (CMU): ASTM C90, Grade N, Type I - Moisture Controlled; light weight.

- B. Hollow Non-Load Bearing Block Units (CMU): ASTM C129, Type I - Moisture Controlled; light weight.
- C. Size and Shape: Nominal modular sizes of 8 x 8 x 16 inches, 6 x 8 x 16 inches and 4 x 8 x 16 inches. Provide special units for 90 degree corners, bond beams, lintels, and pilasters.

2.2 REINFORCEMENT AND ANCHORAGE

- A. Single Wythe Joint Reinforcement: Ladder type; steel wire, hot dip galvanized to ASTM A641 Class 3 after fabrication, No. 9 side rods with No. 9 cross ties.
- B. Reinforcing Steel: Type specified in **Section 03200**; sizes as shown on Drawings.

2.3 MORTAR AND GROUT

- A. Mortar and Grout: As specified in **Section 04100**.

2.4 ACCESSORIES

- A. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Verify items provided by other sections of work are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied to other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.

3.4 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
- D. Remove excess mortar as work progresses.
- E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- G. Cut mortar joints flush where wall tile is scheduled, vinyl wall covering is scheduled, or resilient base is scheduled,
- H. Isolate masonry partitions from vertical structural framing members with a control joint.
- I. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.5 CHASE WALL

- A. Do not permit mortar to drop or accumulate into cavity air space.

3.6 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

- A. Install horizontal joint reinforcement 16 inches oc.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place joint reinforcement continuous in first joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Reinforce stack bonded unit joint corners and intersections with wire mesh anchors 16 inches oc.

3.7 LINTELS

- A. Install loose steel lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel lintels are not scheduled.
- C. Openings Up To 48 inches Wide: 8 inch tall CMU trough block; place two No. 4 reinforcing bars 1 inch from bottom web; fill with 3,000 psi concrete.
- D. Do not splice reinforcing bars.
- E. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- F. Place and consolidate grout fill without displacing reinforcing.
- G. Allow masonry lintels to attain specified strength before removing temporary supports.
- H. Maintain minimum 24 inch bearing on each side of opening.

3.8 GROUTED COMPONENTS

- A. Reinforce bond beam with .2 No. 4 bars, 1 inch from bottom web.
- B. Reinforce exterior walls with No. 5 bars, placed vertically at minimum 48 inches oc in concrete filled cells.

- C. Reinforce interior full-height walls with No. 5 bars, placed vertically at minimum 48 inches oc in concrete filled cells.
- D. Lap splices minimum 24 bar diameters.
- E. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- F. Place and consolidate grout fill without displacing reinforcing.
- G. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening and as shown on structural drawings.

3.9 BUILT-IN WORK

- A. As work progresses, install built-in metal door and glazed frames, fabricated metal frames, window frames, anchor bolts, plates, and other items to be built-in the work and furnished by other sections.
- B. Install built-in items plumb and level.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build in organic materials subject to deterioration.

3.10 TOLERANCES

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- C. Maximum variation from Plumb: 3/8 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- E. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
- F. Maximum variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.11 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.12 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of **Section 01400**.
- B. Inspect all masonry work.

3.13 CLEANING

- A. Clean work under provisions of **Section 01700**.
- B. Remove excess mortar and mortar smears as work progresses.
- C. Replace defective mortar. Match adjacent work.
- D. Clean soiled surfaces with cleaning solution.
- E. Use non-metallic tools in cleaning operations.

3.14 PROTECTION OF FINISHED WORK

- A. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.
- B. At day's end, cover unfinished walls to prevent moisture infiltration.

END OF SECTION

SECTION 05050 ANCHORAGE AND FASTENERS

PART 1 GENERAL

1.1 SCOPE

- A. This section covers the anchorage, fasteners, and erection bolts used in the construction of the wastewater plant and installation of equipment.

1.2 GENERAL REQUIREMENTS

- A. Anchorage and erection bolting shall be designed and selected by the process equipment manufacturers but shall not be less than the sizes indicated in this section, or shown on the plans.

PART 2 PRODUCTS

2.1 ANCHORAGE

- A. All cast-in-place anchorage shall be minimum 5/8" diameter and shall be of A.I.S.I. Type 304 stainless steel. Submerged anchorage for stainless steel fabrication shall be Type 316 stainless steel.
- B. The minimum size drop in style anchor bolt used shall be 1/2" in diameter. Anchors shall be stainless steel.

2.2 ERECTION BOLTS

- A. All assembly bolts for fabricated equipment and metals shall be minimum 3/8 inch in diameter. No field welding will be allowed for assembly of any of the equipment without approval of the Engineer.
- B. Materials
 - 1. All submerged erection bolts shall be of Type 304 stainless steel for galvanized or painted fabrication, Type 316 stainless steel for stainless steel fabrication.
 - 2. All exposed erection bolts and fasteners attaching to stainless steel items shall be Type 316 Stainless steel. All other exposed erection bolts shall be Type 304 stainless steel.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Cast-in-place anchor bolts shall be cleaned, retapped and oiled as necessary prior to use.
- B. Stainless steel anchor bolts and erection bolts shall be coated with an anti-seize compound prior to use.

END OF SECTION

SECTION 05100 STRUCTURAL STEEL

PART 1 GENERAL

1.1 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.2 FEDERAL SPECIFICATIONS (Fed. Spec.):

- A. TT-C-490B - Cleaning Method and Pretreatment of Ferrous Surfaces for Organic Coatings
 - 1. TT-P-645A - Primer, Paint, Zinc Chromate, Alkyd Type
- B. Military Specifications (Mil. Spec.):
 - 1. DOD-P-15328D - Primer (Wash), Pretreatment & Am 1 (Formula No. 117 for Metal) Metric
 - 2. DOD-P-21035A - Paint, High Zinc Dust Content, Galvanizing Repairs (Metric)
- C. U.S. Army Corps of Engineers (COE) Waterways Experiment Station Publication:
 - 1. CRD-C-621-83 - Handbook for Concrete and Cement, Specifications for Nonshrink Grout, Volume II (1949 Ed.)
- D. American Association of State Highway and Transportation Officials (AASHTO) Publication:
 - 1. 1983 -Standard Specifications for Highway Bridges (Thirteenth Edition)
- E. American National Standards Institute (ANSI) Publications:
 - 1. B18.22.1-65 - Plain Washers (R81)
 - 2. B46.1-78 - Surface Texture, Surface Roughness, Waviness and Lay
- F. American Institute of Steel Construction (AISC) Publications:
 - 1. 1989 - Manual of Steel Construction (Ninth Edition) (Includes

"Specification for the Design, Fabrication and Erection of Structural Steel for Buildings," "Code of Standard Practice for Steel Buildings and Bridges," and "Structural Joints Using ASTM A325 or A490 Bolts")

2. 1983 - Detailing for Steel Construction
3. 1984 - Engineering for Steel Construction

G. American Society for Testing and Materials (ASTM) Publications:

1. A36-84a - Structural Steel
2. A123-78 - Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates Bars and Strip
3. A153-82 - Zinc Coating (Hot Dipped) on Iron and Steel Hardware
4. A307-84 - Carbon Steel Externally Threaded Standard Fasteners
5. A325-84 - High-Strength Bolts for Structural Steel Joints
6. A500-84 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
7. A563-84 - Carbon and Alloy Steel Nuts
8. C827-84 - Early Volume Change of Cementitious Mixtures

H. American Welded Society, Inc. (AWS) Publication:

1. D1.1-88 - Structural Welding Code - Steel

I. Steel Structures Painting Council (SSPC) Publications:

1. PS8.01-82 - One-Coat Rust Preventive Painting System with Thick-Film Compounds
2. SP-3-82 - Power Tool Cleaning SP-6-82 Commercial Blast Cleaning

1.2 DESCRIPTION OF WORK

- A. The work includes the fabrication, erection, and shop painting of structural steel. Provide in accordance with AISC "Manual of Steel Construction" except as specified herein. In the AISC "Manual of Steel Construction" referred to herein, the "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings," the "Code of Standard Practice for Steel Buildings and Bridges," and Structural Joints Using ASTM A325 or A490 Bolts" shall be considered a part thereto.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval by the Architect/Engineer prior to fabrication. Prepare in accordance with the AISC "Detailing for Steel Construction" and AISC "Engineering for Steel Construction." Shop

drawings shall not be reproductions of contract drawings. Include complete information for the fabrication and erection of the structure's components, including the location, type, and size of bolts, welds, member sizes and lengths, connection details, blocks, copes, and cuts. Use AWS standard welding symbols.

B. Manufacturer's Certificates of Compliance

1. 1.3.2.1 Steel-Mill Test Reports
2. 1.3.2.2 Bolts, nuts and washers
3. 1.3.2.3 Shop painting materials
4. 1.3.2.4 Welding electrodes and rods
5. 1.3.2.5 Nonshrink grout
6. 1.3.2.6 Galvanizing

C. Welder, Welding Operation and Tacker

1. Qualification: Prior to welding, submit certification for each stating the type of welding and positions qualified for, the code and procedure qualified under, date qualified, and the firm and individual certifying the qualification tests.

D. Certified Field Test Reports:

1. 1.3.4.1 Field Bolting
2. 1.3.4.2 Field Welding and Full Penetration Welds

1.4 DELIVERY AND STORAGE

- A. Handle, store, and protect materials in accordance with the manufacturer's recommendations. Replace damaged items with new items, or repair as approved by the Contracting Officer.

1.5 QUALIFICATIONS

- A. Fabricator and/or erector shall be a company specializing in the fabrication and/or erection of structural steel with a minimum of 10 years of documented experience.

PART 2 PRODUCTS

2.1 STEEL

- A. Structural Steel: ASTM A36

1. Structural Steel Tubing: ASTM A500, Grade B.

2. See 1.1.7.

2.2 BOLTS NUTS AND WASHERS

A. Provide the following unless indicated otherwise.

1. Structural Steel:

- a. Bolts: ASTM A307, Grade A; ASTM A325, Type 1 or 2.
- b. Nuts: ASTM A563, Grade A, heavy hex style, except nuts under 1-1/2 inch may be provided in hex style.
- c. Washers: ANSI B18.22.1, Type B.

2.3 Shop Painting:

A. Pretreatment: Mil. Spec. DOD-P-15328 or Fed. Spec. TT-C-490, Type I, II, or IV.

C. Rust Preventive: SSPC PS-8.01, suitable for temporary protection.

2.4 GALVANIZING

A. ASTM A123 or A153, as applicable, unless specified otherwise.

1. Galvanizing Repair Paint: Cold Galvanizing Compound.

2.5 Structural Steel Accessories:

A. Welding Electrodes and Rods: AWS D1.1.

B. Nonshrink Grout: COE CRD-C-621, with no ASTM C827 shrinkage. Grout shall be nonmetallic.

PART 3 EXECUTION

3.1 FABRICATION

A. Marking: Prior to erection, members shall be provided with a painted erection mark. In addition, connecting parts assembled in the shop for reaming holes in field connections shall be match marked with scratch and notch marks. Do not locate erection markings on areas to be welded. Do not locate match markings in areas that will decrease member strength or cause stress concentrations.

B. Shop Painting: Shop paint structural steel, except as modified herein. Do not paint steel surfaces embedded in concrete, galvanized surfaces, bearing surfaces, or surfaces within 1/2 inch of the toe of the welds prior to

welding (except surfaces on which metal decking or shear studs are to be welded). Prior to assembly, paint surfaces which will be concealed or inaccessible after assembly. Do not apply paint in foggy or rainy weather; when the ambient temperature is below 45 degrees F or over 95 degrees F; or when paint may be exposed to temperatures below 40 degrees F within 48 hours after application, unless approved otherwise.

1. Cleaning: SSPC SP 6, except as modified herein. SSPC SP 3 or SP 6 for steel surfaces exposed in spaces above ceilings, attic spaces, crawl spaces, furred spaces, and chases. In addition, maintain steel surfaces free from rust, dirt, oil, grease, and other contaminants through final assembly.
 2. Pretreatment: Immediately after cleaning, provide the metal surfaces with one coat of Mil. Spec. DOD-P-15328 pretreatment to a dry film thickness of 0.3 to 0.5 mil. Fed. Spec. TT-C-490.
 3. Priming: Immediately after the pretreatment coating has dried, apply primer to a minimum dry film thickness of 2.0 mil. Repair damaged primed surfaces with an additional coat of primer.
- C. Galvanizing: Provide as indicated or specified. Galvanize after fabrication where possible.
1. Galvanizing Repair: ASTM A780, using galvanizing repair paint for galvanizing damaged by handling, transporting, cutting, welding, or bolting. Do not heat surfaces to which repair paint has been applied.
- D. Bearing Surfaces and Friction Type Joints: In the shop, coat with a temporary rust preventative. Remove coating, as recommended by the coating manufacturer, immediately prior to field erection.

3.2 ERECTION

- A. Calibration wrenches shall be calibrated every two working days on a minimum of three typical bolts of each diameter. Provide for drainage in structural steel.
- B. Base Plates and Bearing Plates: After final positioning of steel members, provide full bearing under plates using nonshrink grout. Place nonshrink grout in accordance with the manufacturer's instructions.

3.3 CONNECTIONS

- A. Connections not detailed shall be selected and detailed in accordance with AISC "Manual of Steel Construction." Build connections into existing work. Do not tighten anchor bolts set in concrete with impact torque wrenches. Punch, subpunch and ream, or drill bolt holes.

304 WELDING

- A. AWS D1.1 Grind exposed welds smooth. Provide AWS D1.1 qualified welders, welding operators, and tackers.

3.5 TESTS AND INSPECTIONS

- A. Perform field tests, and provide labor, equipment, and incidentals required for testing, except that electric power for field tests will be furnished as set forth in Division 1.
- B. Welds:
 - 1. Visual and Nondestructive Inspection: AWS D1.1. Provide AWS certified welding inspectors for fabrication/erection inspection and testing and verification inspections. Welding inspectors shall visually inspect and mark welds, including fillet weld end returns. Welding inspectors shall perform radiographic or ultrasonic inspections on all welds required to be full penetration welds.

END OF SECTION

SECTION 05500 METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop fabricated ferrous metal items, prime painted.

1.4 REFERENCES

- A. ASTM A36 - Structural Steel.
- B. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
- C. ASTM A325 - High Strength Bolts for Structural Steel Joints.
- D. AWS D1.1 - Structural Welding Code.
- E. AISC - Specification for the Design, Fabrication and Erection of Structural Steel For Buildings.
- F. FS TT-P-31 - Paint, Oil: Iron Oxide, Ready Mix, Red and Brown.

1.5 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
- B. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Sections: ASTM A36.
- B. Plates: ASTM A283.
- C. Bolts, Nuts, and Washers: ASTM A325.
- D. Welding Materials: AWS D1.1; type required for materials being welded.

- E. Shop and Touch-Up Primer: FS TT-P-31, red; for shop application and field touch-up.

2.2 FABRICATION

- A. Verify dimensions on site prior to shop fabrication.
- B. Fabricate items with joints tightly fitted-and secured.
- C. Fit and shop assemble in largest practical sections, for delivery to site.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FINISHES

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime paint items with one coat.

PART 3 EXECUTION

3.1 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate sections.

3.2 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.

- B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Perform field welding in accordance with AWS D1.1.
- D. Obtain Architect/Engineer approval prior to site cutting or making adjustments not scheduled.
- E. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.3 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset from True Alignment: 1/4 inch.

3.4 SCHEDULE

- A. The Schedule is a list of principal items only. Refer to Drawings details for items not specifically scheduled.
- B. Steel Wall Ladders: Steel, of 3/8 x 2 inch side rails spaced at 24 inches; rungs of 3/4 inch diameter solid rod spaced 12 inches on center; space rungs 7 inches from wall surface; with steel mounting brackets and attachments; prime paint finish.
- C. Bumper Posts and Guard Rails: prime paint finish.
- D. Ledge and Shelf Angles, Channels and Plates Not Attached to Structural Framing: For support of metal decking, joists and masonry; prime paint finish.
- E. Lintels: Prime paint finish.
- F. Aluminum Safety Nosings; Imbedded in interior and exterior concrete stairs, color as selected by Engineer.

END OF SECTION

SECTION 05710 MISCELLANEOUS METALS

PART 1 GENERAL

1.1 SCOPE

- A. Furnish and install all miscellaneous and ornamental specialty metal work shown on the drawings or specified herein. Provide anchors, hangers, rods, bars, brackets or fasteners required to complete this work and to connect to work by others. Provide inserts for concrete where necessary.
- B. Submit six (6) copies of shop fabrication drawings for all miscellaneous metals of this Section in accordance with **Section 01300 SUBMITTAL REQUIREMENTS**, for Engineers approval prior to fabrication and installation

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Rolled Shapes and Plates
 - 1. ASTM A 36, having a minimum yield strength not less than 36,000 psi.
- B. Cast Iron
 - 1. Soft, gray iron, ASTM A-48, Class 30,000 psi tensile strength. Accessories and connections shall be steel unless noted otherwise.
- C. Aluminum
 - 1. Aluminum shall be of an alloy suitable for the function intended and will generally be ALUMINUM ALLOY ASSOCIATION Type 6063T. Finish shall be as noted on the drawings, otherwise shall be of recognized industry standard for the type of component.
- D. Stainless Steel
 - 1. When stainless steel is specified without designation, the material furnished shall be AISI type 304, 304L, 316, or 316L.

2.2 PREFABRICATION PRODUCTS

A. Miscellaneous Structural Fabrication

1. Fabricate all miscellaneous steel components, stands, supports, or other items to the design noted on the drawings and utilizing structural shapes, bent plates, sheet steel or other material as required to construct the item. Generally, assembly shall be welding. Provide brackets, fillets, plates and anchor bolts as required.

B. Miscellaneous Frames

1. Fabricate frames as shown on the plans by welding or bolting using best modern practice. Frames shall be true to dimension and square, and shall be set plumb and securely braced to prevent displacement until built into construction.

C. Aluminum Handrails

1. Aluminum handrails assembled from 1.9" O.D. (1-1/2" nominal size) aluminum pipe shall be provided for both sides of the access bridges and as shown on the plans. The railing shall be a two rail system with intermediate rail located at 24" above the deck. The pipe sections shall be assembled in the field with cast aluminum fittings. Vertical posts shall be Schedule 40 pipe and horizontal runs shall be minimum Schedule 10 pipe. Vertical supports shall be located at no greater than 8'-0" centers. Cast aluminum fittings shall have stainless steel set screws. Aluminum bases shall be mounted with Type 304 stainless steel anchors or attaching bolts, minimum 3/8 inch diameter.

D. Safety Treads

1. Provide safety treads at nosings of all concrete steps. Safety treads shall be 1/4" x 3" with integral concrete anchor.

E. Grating (Steel)

1. Unless otherwise noted on plans, the grating furnished shall be welded steel grating hot-dip galvanized after fabrication. Steel grating shall be selected for the opening span, conform to all applicable requirements of the Occupational Safety and Health Act of 1970 (O.S.H.A.), and as a minimum shall consist of main bearing bars 1-1/2" x 3/16", spaced 1-3/16" center to center with cross bar resistance welded at right angles to the bearing bars spaced maximum 4" on center.
2. Grating is to safely sustain a uniformly distributed load of 150 pounds per square foot on a 36 inch span and deflect less than 0.25" inches.

3. Openings in grating sections for valve stems or other devices shall be banded.
4. Grate sections shall be adequately supported by galvanized cross members anchored to concrete structures, galvanized steel framing, or galvanized steel support angles cast-in-place as shown on the plans.

F. Fiberglass Grating

1. Where indicated on the plans, provide compression molded fiberglass grating and Type 304 stainless steel mounting hardware.
2. Where indicated grating is cut to fit around valve stems, or other obstructions, the exposed, ends shall be recoated with an epoxy resin. Recommended by the fiberglass grating manufacturer.
3. Fiberglass grating shall be KORDEC 2000, BORDON, or Engineer's approved equal.
4. Fiberglass grating to have rectangular mesh, deep 1 1/4" bars with a 1" by 4" mesh. Top surface to have a slip resistant finish.
5. Resin selected shall be for corrosion environments, outdoor service, and ultraviolet (sunlight) exposure. Color to be green or light grey
6. Spacing of fiberglass grating shall conform to OSHA specification 1910.23.
7. Steps and stairs associated with walkways banning fiberglass decking shall use equal quality fiberglass stainless treads with non-skid nosing and molded tread support.

G. Staircases

1. Staircases shall be furnished as shown on the plans. The stairs shall be constructed of galvanized steel stringers of minimum 10 inch deep section steel channel shapes. The upper ends of the stringers shall be mitered as needed to form a landing for the first step flush with the upper floor or deck. The stringers shall be securely anchored at the upper end with minimum 3/4" erection bolts or concrete anchors. The lower end shall be securely anchored to a concrete footing with minimum 3/4" anchor bolts. Bolt on diagonal sway bracing of minimum 2 x 2 x 3/16 steel angle shapes shall bolt to the bottom flange of the channel stringers.
2. Stair treads shall be mounted to the stringers with minimum 3/16" galvanized erection bolts, two each end, and shall bridge between the stringers. Stair treads to be galvanized steel with 1-3/16" bearing bars, 3'-0" wide with 9-1/8" treads. Stair treads shall have a 1-1/4" checkered plate nosing.
3. Stair stringers shall have 2-rail bolt on aluminum handrail as specified elsewhere. Railing shall neatly meet connecting rails at the top of the structure.

4. Staircases shall be positioned at approximately 45 Degree angle to horizontal and shall have the proper vertical rise as established by O.S.H.A. regulations. All treads shall have equal rise dimensions with any odd dimension positioned on the first step at the bottom of the staircase.
5. Stairs shall be detailed to conform to all applicable requirements of the Occupational Safety and Health Act of 1970 (O.S.H.A.).

END OF SECTION

SECTION 07920 SEALANTS AND CAULKING

PART 1 GENERAL

1.1 SCOPE

- A. The work covered by this section includes the furnishing of all labor, materials, and equipment for all caulking of windows, doors, louvers, machinery and instrument installation, and for all joint sealants where required. All materials shall be delivered in original containers labeled with the quality, type, manufacturer, and application instructions.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Interior caulking compounds shall be "Sonolac" as manufactured by Sonneborn Building Products, Inc., Des Plaines, IL, or equal products by Dow-Corning, or Engineers approved equal caulking materials to be compatible with finish paints system and of an appropriate color.
- B. Exterior caulking and all vertical joint sealers shall be a polysulfide polymer base sealant. Sealant shall be "Sonolastic Two Part" as manufactured by Sonneborn Building Products, Inc., or Dow-Corning building Sealant 780, or equal. Color to be selected by the Engineer to match exterior surfaces.
- C. All horizontal joint sealants in traffic areas shall be a self-leveling polyurethane sealant. Color to be limestone.
- D. Back up material for caulking and sealant shall be compressible in nature and compatible with the sealant such as: glass yarn, expanded polyethylene foam, PVC urethane foam. Where butyl, neoprene, or similar rubber backing is used, these shall be compatible with the sealant used.
- E. Primer, where required, shall be as recommended by manufacturer of sealant.

PART 3 EXECUTION

3.1 INSTALLATION

- A. The Contractor shall install all caulking in conformance to manufacturer's written directions.

- B. Do not caulk during damp or inclement weather. Temperature of air and materials shall be above 40 deg. F.
- C. All joints shall be carefully cleaned of dust, oil, grease, water frost, or other materials which would impair or prevent sealing.
- D. Apply primer on all materials as directed or required by the sealant manufacturer.
- E. Joints and spaces deeper than 3/4" shall be filled with a backfilling material to within 3/4" of surface before caulking.
- F. Backing material shall be compressed to 50% of its original volume at time of installation to provide a positive contact between all surfaces. Thickness of backing shall be adjusted with size of joint.
- G. Apply caulking compound with pressure gun having the correct size nozzle to fit into joint. Fill solidly and smooth without voids and thin edges, and in a manner to prevent air entrapment. Finish joint shall show a neat clean bead.
- H. All caulking shall be done a minimum of 3 weeks in advance of painting.

3.2 COMPLETION

- A. Upon completion of the work, all caulking and sealing compounds shall be removed from surrounding areas and all joints checked for watertightness and touched up as required. It shall be the Contractor's responsibility to provide a weathertight building.

END OF SECTION

SECTION 09876
WATER TANK PAINT SYSTEM (NEW TANK)

PART 1 GENERAL

1.1 SCOPE

- A. The work of this section includes the coating of all interior surfaces, and the painting of all exterior surfaces.

1.2 RELATED WORK SPECIFIED ELSEWHERE (If Applicable)

- A. Coating and painting of all other surfaces is specified in Section 9.

1.3 REFERENCE SPECIFICATIONS AND STANDARDS

- A. Without limiting the general aspects of other requirements of these specifications, all surface preparation, coating and painting of interior and exterior surfaces and inspection shall conform to the applicable requirements of the Steel Structures Painting Council, NACE International, ASTM (American Society for Testing and Materials), AWWA and the manufacturer's printed instructions.
- B. The Engineer's decision shall be final as the interpretation and/or conflict between any of the referenced specifications and standards contained herein.
- C. Paint systems must be listed by NSF or UL as meeting the ANSI / NSF standards for contact with potable water.

1.4 CONTRACTOR

- A. The Contractor shall have five years practical experience and successful history in the application of specified product to surfaces of steel water tanks. Upon request, he shall substantiate this requirement by furnishing a list of references and job completions.
- B. The Contractor shall submit when requested a written statement by the coatings manufacturer stating that the Contractor is familiar with the materials specified and has workers capable of performing the work specified herein.
- C. The personnel performing the work shall be knowledgeable and have the required experience and skill to adequately perform the work for this project, in accordance with SSPC-PA1, "Shop, Field and Maintenance Painting".

1.5 QUALITY ASSURANCE

- A. General: Quality assurance procedures and practices shall be utilized to monitor all phases of surface preparation, application and inspection throughout the duration of the project. Procedures or practices not specifically defined herein may be utilized provided they meet recognized and accepted professional standards and are approved by the Engineer.
- B. Surface Preparation: Surface preparation will be based upon comparison with: "Pictorial Surface Preparation Standards for Painting Steel Surfaces: SSPC-VIS 1-89", ASTM Designation D2200-95, "Standard Methods of Evaluating Degree of Rusting on Painted Surfaces", ASTM D 4417-91, Method A and/or Method C or NACE Standard RP0287-87, and ASTM Designation D610 "Visual Standard for Surfaces of New Steel Airblast Cleaned with Sand Abrasive". In all cases the written standard shall take precedence over the visual standard. In addition, NACE Standard RP0178-91, along with the Visual Comparator, shall be used to verify the surface preparation of welds.
- C. Application: No coating or paint shall be applied when:
- 1) the surrounding air temperature or the temperature of the surface to be coated or painted is below the minimum surface temperature for the products specified herein,
 - 2) rain, snow, fog or mist is present,
 - 3) the temperature is less than 5F above the dew point,
 - 4) the air temperature is expected to drop below the minimum temperature for the products specified within six hours after application of coating. Dewpoint shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with U.S. Department of Commerce Weather Bureau Psychrometric Tables. If any of the above conditions are prevalent, coating or painting shall be delayed or postponed until conditions are favorable. The day's coating or painting shall be completed in time to permit the film sufficient drying time prior to damage by atmospheric conditions.
- D. Thickness and Holiday Checking: Thickness of coatings and paint shall be checked with a non-destructive, magnetic-type thickness gauge, as per SSPC-PA 2 "Measurement of Dry Film Thickness with Magnetic Gages". References in PA 2 which allow 80% of the minimum thickness specified are not acceptable. Use an instrument such as a Tooke Gauge if a destructive test is deemed necessary by the Engineer.

The integrity of interior coated surfaces shall be checked with a low voltage holiday detector in accordance with NACE Standard RP0188. Non-destructive holiday detector shall not exceed 67.5 volts, nor shall destructive holiday detector exceed the voltage recommended by the manufacturer of

the coating system. A solution of 1 ounce non-sudsing type wetting agent and 1 gallon of tap water shall be used to perform the holiday testing. All pinholes and/or holidays shall be marked and repaired in accordance with the manufacturer's printed recommendations and retested. No pinholes or other irregularities will be permitted in the final coating.

- E. Inspection Devices: The contractor shall furnish, until final acceptance of coating and painting is accepted, safety and inspection devices in good working condition for detection of holidays and measurement of dry film thickness of coating and paint. The Contractor shall also furnish U.S. Department of Commerce, National Bureau of Standards certified thickness calibration plates and/or plastic shims, depending upon the thickness gauge used, to test the accuracy of dry film thickness gauges, equipment, and certified instrumentation to test the accuracy of holiday detectors safety. Dry film gauges, equipment, and holiday detectors shall be made available for the Engineer's use at all times until final acceptance of application. Holiday detection devices shall be operated in the presence of the Engineer or his / her representative.
- F. Inspection: Inspection for this project shall consist of 'hold point' inspections. The Engineer or his representative shall inspect the surface prior to abrasive blasting, after abrasive blasting but prior to application of coating materials, and between subsequent coats of material. Final inspection shall take place after all coatings are applied, but prior to placing the tank in service. Contractor will insure that sufficient rigging is in place so that the Engineer or his representative shall be able to conduct the required inspections.
- G. Warranty Inspection: Warranty inspection shall be conducted during the eleventh month following acceptance of all coating and painting work. All defective work shall be repaired in accordance with this specification and to the satisfaction of the Engineer and Owner.

1.6 SAFETY AND HEALTH REQUIREMENTS

- A. General: In accordance with requirements set forth by regulatory agencies applicable to the construction industry and manufacturer's printed instructions and appropriate technical bulletins and manuals, the Contractor shall provide and require use of personal protective lifesaving equipment for persons working on or about the project site.
- B. Head and Face Protection and Respiratory Devices: Equipment shall include protective helmets which shall be worn by all persons while in the vicinity of the work. In addition, workers engaged in or near the work during sandblasting shall wear eye and face protection devices and air purifying

halfmask or mouthpiece respirators with appropriate filters. Barrier creams shall be used on any exposed areas of skin.

- C. Ventilation: Where ventilation is used to control hazardous exposure, all equipment shall be explosion-proof. Ventilation shall reduce the concentration of air contaminants to a degree a hazard does not exist. Air circulation and exhausting of solvent vapors shall be continued until coatings have fully cured for immersion service.
- D. Sound Levels: Whenever the occupational noise exposure exceeds maximum allowable sound levels, the Contractor shall provide and require the use of approved ear protection devices.
- F. Illumination: Adequate illumination shall be provided while work is in progress, including explosion-proof lights and electrical equipment. Whenever required by the Engineer, the Contractor shall provide additional illumination and necessary supports to cover all areas to be inspected. The level of illumination for inspection purposes shall be determined by the inspector.
- G. Temporary Ladders and Scaffolding: All temporary ladders and scaffolding shall conform to applicable safety requirements. They shall be erected where requested by the Engineer to facilitate inspection and be moved by the Contractor to locations requested by the Engineer or his / her representative.

1.7 PRODUCT DELIVERY, STORAGE & HANDLING

- A. All materials shall be brought to the jobsite in original sealed containers. They shall not be used until the Engineer or his / her representative has inspected the contents and obtained data from information on containers or label. Materials exceeding storage life recommended by the manufacturer shall be rejected.
- B. All coatings and paints shall be stored in enclosed structures to protect them from weather and excessive heat or cold. Flammable coatings and paints must be stored to conform with City, County, State and Federal safety codes for flammable coating or paint materials. At all times coatings and paints shall be protected from freezing.

PART 2 MATERIALS

2.1 SUBSTITUTIONS

- A. Requests for substitution shall include manufacturer's literature for each product giving name, product number, generic type, descriptive information,

solids by volume, recommended dry film thickness and certified lab test reports showing results to equal the performance criteria of the products specified herein

- B. All requests for product substitution shall be made at least 10 days prior to the bid date. Proposed substitute products and systems must have a minimum of 5 years satisfactory service in the field. Included with above information, provide a list of 5 projects satisfactorily completed by the contractor of similar size and scope utilizing proposed substitute systems and products.
- C. Any material savings gained as a result of using substitute products shall be passed to the owner in the form of a contract dollar reduction.
- D. Manufacturer's color charts shall be submitted to the Engineer at least 30 days prior to coating and/or paint application. General Contractor and Painting Contractor shall coordinate work so as to allow sufficient time (normally seven to ten days) for paint to be delivered to the job site.

2.2 GENERAL REQUIREMENTS

- A. All materials shall be lead-free as defined by the Consumer Product Safety Act, Part 1303.
- B. All zinc dust pigment contained in any zinc-rich material shall meet the requirements of ASTM D 520 Type III as regards zinc content and purity.
- C. All materials for the interior wetted portion of the tank shall meet the requirements of ANSI/NSF Standard 61 for potable water contact.
- D. All clear coat products shall incorporate the use of a fugitive dye to aid in the proper application and coverage of such coats.

2.3 MATERIAL PREPARATION

- A. Mix and thin materials according to manufacturer's latest printed instructions.
- B. Do not use materials beyond manufacturer's recommended shelf life.
- C. Do not use mixed materials beyond manufacturer's recommended pot life.

2.4 TANK INTERIOR COATING SYSTEMS

- A. Premier System:

1. Surface Preparation Prior to Abrasive Blast Cleaning: Weld flux and spatter shall be removed by power tool cleaning. Sharp projections shall be ground to a smooth contour. All welds shall be ground to a smooth contour as per NACE Standard RP0178 and herein.
2. Surface Preparation: SSPC-SP10 Near-White Metal Blast Cleaning. Anchor profile shall be 1.5 to 2.5 mils as per ASTM D 4417, Method C or NACE Standard RP0287.
3. Coating System:

1st Coat: Organic Zinc-Rich Urethane. Apply at 2.5 to 3.5 dry mils. Thin only with approved thinner.

Stripe Coat: Modified Polyamidoamine Epoxy. Applied by brush and scrubbed into all weld seams. In addition to all weld seams, all edges, corners, bolts, rivets shall receive a stripe coat.

2nd Coat: Modified Polyamine Epoxy. Apply at 12.0 to 18.0 dry mils. Thin only with approved thinner.

Total dry film thickness shall be a minimum of 14.5 mils per SSPC-PA 2 dry film inspection standards, with exception as noted in this specification.

For cold weather applications, substitute shall be submitted to Engineer for approval.

Thin only with approved thinner from manufacturer data sheets.

2.5 TANK EXTERIOR COATING SYSTEMS

The Exterior Coating Standard Three Coat System shall be bid unless otherwise specified in the contract documents.

A. Standard Three Coat System:

1. Surface Preparation Prior to Abrasive Blast Cleaning: Weld flux and spatter shall be removed by power tool cleaning. Sharp projections shall be ground to a smooth contour. All welds shall be ground to a smooth contour as per NACE Standard RP0178 and herein.
2. Surface Preparation: SSPC-SP6 Commercial Blast Cleaning. Anchor profile shall be 1.5 to 2.0 mils as per ASTM D 4417, Method C or NACE Standard RP0287.

3. Coating System:

1st Coat: Organic Zinc-Rich Urethane. Apply at 2.5 to 3.5 dry mils. Thin only with approved thinner.

Stripe Coat: Modified Polyamidoamine Epoxy. Applied by brush and scrubbed into all weld seams. In addition to all weld seams, all edges, corners, bolts, rivets shall receive a stripe coat.

2nd Coat: Modified Polyamidoamine Epoxy. Apply at 4.0 to 6.0 dry mils. Thin only with approved thinner.

3rd Coat: Aliphatic Acrylic Polyurethane: Apply at 2.0 to 3.0 dry mils. Thin only with approved thinner.

Total dry film thickness shall be a minimum of 9.0 mils per SSPC-PA 2 dry film inspection standards, with exception as noted in this specification.

Thin only with approved thinner from manufacturer data sheets.

The Contractor shall paint lines, lettering and logos as detailed on the plans. Coating shall be as specified above in "3rd Coat."

The Color of the tank and lettering shall be selected by the Owner from the manufacturer's color chart.

B. Ultimate Three Coat System with Fluoropolymer Polyurethane

1. Surface Preparation Prior to Abrasive Blast Cleaning: Weld flux and spatter shall be removed by power tool cleaning. Sharp projections shall be ground to a smooth contour. All welds shall be ground to a smooth contour as per NACE Standard RP0178 and herein.

2. Surface Preparation: SSPC-SP6 Commercial Blast Cleaning. Anchor profile shall be 1.5 to 2.0 mils as per ASTM D 4417, Method C or NACE Standard RP0287.

3. Coating System:

1st Coat: Organic Zinc-Rich Urethane. Apply at 2.5 to 3.5 dry mils. Thin only with approved thinner.

Stripe Coat: Modified Polyamidoamine Epoxy. Applied by brush and scrubbed into all weld seams. In addition to all weld seams, all edges, corners, bolts, rivets shall receive a stripe coat.

2nd Coat: Acrylic Aliphatic Polyurethane. Apply at 2.0 to 3.0 dry mils. Thin only with approved thinner.

3rd Coat: Advanced Thermoset Fluoropolymer. Apply at 2.0 to 3.0 dry mils. Thin only with approved thinner.

Total dry film thickness shall be a minimum of 6.5 mils per SSPC-PA 2 dry film inspection standards, with exception as noted in this specification.

Thin only with approved thinner from manufacturer data sheets.

The Contractor shall paint lines, lettering and logos as detailed on the plans. Coating shall be as specified above in "3rd Coat."

The Color of the tank and lettering shall be selected by the Owner from the manufacturer's color chart.

2.6 MINIMUM PERFORMANCE CRITERIA

A. Aromatic Urethane, Organic Zinc-Rich

1. ADHESION - ASTM D 4541
 - a. Type II - No less than 1,516 psi adhesion, average of three tests.
 - b. Type V - No less than 2,083 psi adhesion, average of three tests.
2. CATHODIC DISBONDMENT - ASTM G8
 - a. No blistering, cracking, rusting or delamination and no undercutting at holiday after 30 days exposure.
3. GALVANIC PROTECTION
 - a. Significance: A range of -1100 millivolts to -750 millivolts would indicate galvanic action is occurring. The optimum potential is -850 millivolts. A Potential of -500 millivolts or less would indicate that the coating is only acting as a barrier coating. Results: The average measured potential of 91-H2O is -878 millivolts.
4. HUMIDITY - ASTM D 4585
 - a. No blistering, cracking, rusting or delamination of film after

- 4,000 hours exposure.
5. IMMERSION - ASTM D 870.
 - a. No blistering, cracking, rusting or delamination of film after seven years immersion.
 6. PROHESION - ASTM G 85 Prohesion Cabinet Testing
 - a. No blistering, cracking, rusting or delamination of film. No more than 1/64" creepage at scribe after 15,000 hours.
 7. SALT SPRAY (FOG) - ASTM B 117
 - a. No blistering, cracking or delamination of film. No more than 1/32"rust Creepage at scribe after 10,000 hours exposure.
 8. ZINC DUST PURITY – ASTM D
 - a. The zinc dust shall meet the requirements of ASTM D 520 Type III as regards zinc content and purity.

B. Polyamidoamine Epoxy

1. Abrasion - ASTM D 4060, (CS-17 Wheel, 1,000 grams load).
 - a. No more than 140 mg loss after 1,000 cycles.
2. Adhesion- ASTM D 4541
 - a. Type II Fixed Alignment - No less than 1,583 psi pull, average of three tests.
 - b. Type V Self-Aligning - No less than 1,943 psi pull, average of three tests.
3. Exterior Exposure -ASTM D 1014.
 - a. No blistering, cracking, checking, rusting or delamination of film. No rust creepage at scribe after 5 years exposure.
4. Humidity - ASTM D 4585.
 - a. No blistering, cracking or delamination of film after 10,000 hours exposure.
5. Immersion- ASTM D 870.
 - a. No blistering, cracking, checking, rusting or delamination of film after two years continuous water immersion.
6. Prohesion - ASTM G 85
 - a. No blistering, cracking, checking, rusting or delamination of film. No more than 1/8" rust creepage at scribe after 5,000 hours exposure.
7. Salt Spray (FOG) - ASTM B 117
 - a. No blistering, cracking or delamination of film. No more than 1% rusting on plane. No more than 1/16" rust creepage at scribe after 6,700 hours exposure.

C. Aliphatic Acrylic Polyurethane

1. ABRASION - ASTM D 4060, (CS-17 Wheel, 1,000 gram load).
 - a. No more than 96 mg loss after 1,000 cycles.
2. ADHESION

- a. ASTM D 3359 Method B, Crosshatch
No less than a rating of 5.
 - b. ASTM D 4541
Type II
No less than 1,466 psi pull, average of three tests.
 - c. ASTM D 4541
Type V
No less than 2,040 psi pull, average of three tests.
3. EXTERIOR EXPOSURE - ASTM D 4141 (EMMAQUA)
 - a. No blistering, cracking or chalking. No less than 86% gloss retention (8 units gloss change) and 0.23 DED Hunter Lab Scale color change after 500 MJ/m² exposure.
4. FLEXIBILITY - ASTM D 522
 - a. Conical Mandrel
 - b. No less than 19.05% elongation, average of three tests. (TR5120)
 - c. ASTM D 522
 - d. Cylindrical Mandrel
 - e. No cracking or delamination of film. No less than 39.0% elongation, average of three tests.
5. GRAFFITI RESISTANCE - The following graffiti materials applied to coating and allowed to dry for seven days.

a. Reagent Series	680	MEK
b. Acrylic Spray Paint	Removal	Removal
c. Alkyd Spray Paint	Removal	Faint Shadow
d. Epoxy Spray Paint	Removal	Removal
e. Crayon	Removal	Removal
f. Lipstick	Removal	Removal

Note: Some slight gloss loss and/or softening may occur depending on the amount of effort required for removal of the graffiti and length of exposure of the underlying coating to the cleaning solvents.
6. HUMIDITY - ASTM D 4585
 - a. No blistering, cracking, rusting or delamination of film after 2,000 hours exposure.
7. IMPACT - ASTM D 2794.
 - a. No cracking or delamination of film after 29 inch-pounds (3.3 J) direct impact, average of three tests.
8. PROHESION - ASTM G 85
 - a. No blistering, cracking, checking, rusting or delamination of film. No more than 3/16 inch (5.0 mm) rust creepage at scribe after 15,000 hours exposure.
9. QUV EXPOSURE - ASTM D 4587
 - a. No blistering, cracking, chalking or delamination. No more than 2.6 DED FMCII (MacAdam units) color change after 2,000 hours exposure.

10. SALT SPRAY (FOG) - ASTM B 117
 - a. No blistering, cracking, rusting or delamination of film. No rust creepage at scribe after 2,000 hours exposure.
11. SURFACE BURNING CHARACTERISTICS -
 - a. Independent laboratory tests conducted in accordance with ASTM E 84 have been conducted on various coating systems that included one or more coats of Series 73 Endura-Shield. All systems meet the NFPA (National Fire Protection Association) No. 101, Class A requirements pertaining to Flame Spread and Smoke Density.

D. Advanced Thermoset Fluoropolymer Polyurethane

1. ABRASION – ASTM D 4060
 - a. No more than 103 mg loss after 1,000 cycles, average of three tests.
2. ADHESION – ASTM D 4541
 - a. Type II
No less than 1,333 psi pull, average of three tests.
ASTM D 4541
 - b. Type V
No less than 1,930 psi pull, average of three tests.
3. EXTERIOR EXPOSURE – Exposed at 45 degrees facing south.
 - a. No blistering, cracking, rusting or delamination of film. No less than 87% gloss retention (8.9 units gloss change) and 2.99 DED FMCII (MacAdam units) color change after 24 months exposure.
 - b. ASTM D 4141, (EMMAQUA).
No blistering, cracking or chalking. No less than 96% gloss retention (3.2 units gloss change) and 0.18 DED Hunter Lab Scale color change after 1,260 MJ/m² EMMAQUA exposure, average of five tests in five colors.)
4. FLEXIBILITY – ASTM D 522
 - a. Conical Mandrel
No less than 34% elongation average of three tests.
5. GRAFFITI RESISTANCE- The following graffiti materials applied to coating and allowed to dry for seven days.

a. Reagent	Series 680	MEK
b. Acrylic Spray Paint	Removal	Removal
c. Epoxy Spray Paint	Removal	Removal
d. Markette Marker	Removal	Removal
e. Ball Point Ink	Removal	Removal
f. Crayon	Removal	Removal
g. Lipstick	Removal	Removal

Note: Some slight gloss loss and/or softening may occur depending on the amount of effort required for removal of the graffiti and length

- of exposure of the underlying coating to the cleaning solvents
6. HARDNESS – ASTM D 3363
 - a. No gouging with an 8H or less pencil.
 7. HUMIDITY – ASTM D 4585
 - a. No blistering, cracking, rusting or delamination of film after 2,500 hours exposure.
 8. IMPACT – ASTM D 2794
 - a. No visible cracking or delamination of film after 34 inch-pounds (3.9J) or less direct impact.
 9. QUV EXPOSURE – ASTM D 4587
 - a. No blistering, cracking or chalking. No less than 93% gloss retention (5.7 units gloss change) and 2.21 DED FMCII (MacAdam units) color change after 10,000 hours exposure, average of five tests in five colors.
 10. SALT SPRAY (FOG) ASTM B 117
 - a. No blistering, cracking, rusting or delamination of film. No more than 1/32 inch rust creepage at scribe after 10,000 hours exposure.
 11. WEATHEROMETER EXPOSURE ASTM D 5031
 - a. No blistering, cracking or chalking. No less than 92% gloss retention (6 units gloss change) and 0.73 DED Hunter Lab Scale color change after 5,500 hours exposure.

E. Modified Polyamidoamine Epoxy

1. ABRASION - ASTM D 4060
 - a. No more than 122 mg average loss after 1,000 cycles.
2. ADHESION
 - a. ASTM D 3359, Crosshatch
No less than a rating of 5.
 - b. ASTM D 4541
No less than 850 psi pull, average of three tests.
3. FLEXIBILITY
 - a. ASTM D 522, Conical Mandrel
No less than 16 percent elongation.
 - b. ASTM D 522, Cylindrical Mandrel
No less than 36 percent elongation.
4. HUMIDITY
 - a. ASTM D 4585
No blistering, cracking, rusting or delamination of film after 2,000 hours exposure.
5. IMPACT
 - a. ASTM D 2794
No less than 28 inch-lbs (3.16 J) average, direct impact.
6. PROHESION
 - a. ASTM G 85

- No rusting, cracking or blistering of film. No more than 1/16" (1.6 mm) rust creepage at scribe after 10,000 hours exposure.
7. SALT SPRAY (FOG)
- a. ASTM B 117
- No blistering, cracking, rusting or delamination of film. No more than 1/64" (.4 mm) rust creepage at scribe after 1,500 hours exposure.

PART 3 EXECUTION

3.1 GENERAL

- A. All surface preparation, coating and painting shall conform to applicable standards of the Steel Structures Painting Council, NACE International and the manufacturer's printed instructions. Materials applied to the surface prior to the approval of the Engineer shall be removed and re-applied to the satisfaction of the Engineer at the expense of the contractor.
- B. All work shall be performed by skilled craftsmen qualified to perform the required work in a manner comparable with the best standards of practice. Continuity of personnel shall be coordinated with the Engineer.
- C. The Contractor shall provide a supervisor at the work site during cleaning and application operations. The supervisor shall have the authority to sign and change orders, coordinate work and make decisions pertaining to the fulfillment of the contract.
- D. Dust, dirt, oil, grease or any foreign matter that will affect the adhesion or durability of the coating or paint must be removed by washing with clean rags dipped in an approved cleaning solvent and wiped dry with clean rags.
- E. Coating and painting systems include surface preparation, prime coating and finish coatings. Unless otherwise approved in writing by the Engineer, prime coating shall be field applied. Where prime coatings are shop applied, the Contractor shall instruct suppliers to provide the prime coat compatible with the specified finish coat. Any off-site work which does not conform to this specification, is subjected to damage during transportation, construction or installation shall be thoroughly cleaned and touched-up in the field as directed by the Engineer. The Contractor shall use repair procedures which insure the complete protection of all adjacent primer. The specified repair method and equipment may include wirebrushing, hand or power tool cleaning, or dry air blast cleaning. In order to prevent injury to surrounding painted surfaces, blast cleaning may require use of lower air pressure, smaller nozzle and/or abrasive blast particles, or shorter blast nozzle distances from surface shielding and masking. If damage is too

extensive or uneconomical to touch-up, the entire item shall be blasted and then coated or painted as directed by the Engineer.

- F. The Contractor's coating and painting equipment shall be designed for application of materials specified and shall be maintained in first class working condition. Compressors shall have suitable traps and filters to remove water and oils from the air. Contractor's equipment shall be subject to approval of the Engineer.
- G. Application of the first coat shall follow immediately after surface preparation and cleaning and stripe coat, if applicable, before rust bloom occurs or the same day, whichever is less. Any cleaned areas not receiving first coat within this period shall be recleaned prior to application of first coat. Use of dehumidification equipment shall be first reviewed by the Engineer and coatings manufacturer prior to deviating from this provision.
- H. Prior to assembly, all surfaces made inaccessible after assembly shall be prepared as specified herein and shall receive the coating or paint system specified.

3.2 SURFACE PREPARATION

- A. The latest revision of the following surface preparation specifications of the Steel Structures Painting Council (SSPC) shall form a part of this specification. The summaries listed below are for informational purposes; consult the actual SSPC specification for full detail.
 - 1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, soil and other contaminants by use of solvents, emulsions, cleaning compounds, steam cleaning or similar materials and methods which involve a solvent or cleaning action.
 - 2. Hand Tool Cleaning (SSPC-SP2): Removal of loose rust, loose mil scale and other detrimental foreign matter to a degree specified by hand chipping, scraping, sanding and wirebrushing
 - 3. Power Tool Cleaning (SSPC-SP3): Removal of loose rust, loose mil scale and other detrimental foreign matter by power wirebrushing, power impact tools or power sanders.
 - 4. White Metal Blast Cleaning (SSPC-SP5/NACE No. 1): Air blast cleaning to a gray-white uniform metallic color until each element of surface area is free of all visible residues.

5. Commercial Blast Cleaning (SSPC-SP6 NACE No. 3): Air blast cleaning until at least two-thirds of each element of surface area is free of all visible residues.
 6. Brush-Off Blast Cleaning (SSPC-SP7 NACE No. 4): Air blast cleaning to remove loose rust, loose mil scale and other detrimental foreign matter to a degree specified.
 7. Near-White Metal Blast Cleaning (SSPC-SP10 NACE No. 2): Air blast cleaning until at least 95% of each element of surface area is free of all visible residues.
 8. Power Tool Cleaning to Bare Metal (SSPC-SP11): Differs from SSPC-SP3 in that it requires more thorough cleaning and a surface profile not less than 1 mil.
- B. Slag, weld metal accumulation and spatters not removed by the Fabricator, Erector or Installer shall be removed by chipping and/or grinding. All sharp edges shall be peened, ground or otherwise blunted as required by the Engineer. All grinding and finishing of welds, edges, etc. shall be performed prior to solvent cleaning and abrasive blasting. Welds shall be prepared as per NACE Standard RP0178 for all interior and exterior surfaces:
1. Butt Welds: Shall be ground smooth and free of all defects, designation "D".
 2. Lap Welds: Shall be ground smooth and blended., designation "D ",excepting that visual imperfections and ripples are allowable.
 3. Fillet Welded Tee Joint: Shall be ground smooth and blended, designation "D"
- C. Field blast cleaning for all surfaces shall be by dry method unless otherwise directed. Blast nozzles shall be venturi-type nozzles with a minimum pressure at the nozzle of 90 psi.
- D. Particle size of abrasives used in blast cleaning shall be that which will produce a 1.5 - 2.5 mil (37.5 microns - 65.0 microns) surface profile or in accordance with recommendations of the manufacturer of the specified coating or paint system to be applied.
- E. Abrasive used in blast cleaning operations shall be new, washed, graded and free of contaminants that would interfere with adhesion of coating or paint and shall not be reused unless specifically approved in writing by the Engineer.

- F. During blast cleaning operations, caution shall be exercised to insure that existing coatings or paint are not exposed to abrasion from blast cleaning.
- G. The Contractor shall keep the area of his work and the surrounding environment in a clean condition. He shall not permit blasting materials to accumulate as to constitute a nuisance or hazard to the accomplishment of the work, the operation of the existing facilities or to the surrounding environment.
- H. Blast cleaned surfaces shall be cleaned prior to application of specified coatings or paint. All surfaces shall be free of dust, dirt, and other residue resulting from the abrasive blasting operation. No coatings or paint shall be applied over damp or moist surfaces.
- I. All welds shall be neutralized with a suitable chemical compatible with the specified coating or paint.
- J. Specific Surface Preparation: Surface preparation for the specific system shall be as noted in Section 2.04 and Section 2.05.

3.3 APPLICATION, GENERAL

- A. Coating and paint application shall conform to the requirements of the Steel Structure Painting Council Paint Application Specification SSPC-PA1, latest revision, for "Shop, Field and Maintenance Painting".
- B. Thinning shall be permitted only as recommended by the manufacturer and approved by the Engineer, and utilizing the thinners stated in Sections 2.04 and 2.05.
- C. Each application of coating or paint shall be applied evenly, free of brush marks, sags, runs, with no evidence of poor workmanship. Care shall be exercised to avoid lapping on glass or hardware. Coatings and paints shall be sharply cut to lines. Finished surfaces shall be free from defects or blemishes.
- D. Protective coverings or drop cloths shall be used to protect floors, fixtures and equipment. Care shall be exercised to prevent coatings or paints from being spattered onto surfaces which are not to be coated or painted. Report to the Engineer surfaces from which materials cannot be satisfactorily removed.
- E. When two coats of coating or paint are specified, where possible, the first coat shall contain sufficient approved color additive to act as an indicator of coverage or the two coats must be of contrasting color.

F. Film thickness per coat as specified in Sections 2.04 and 2.05 are the minimum required. If roller application is deemed necessary, the Contractor shall apply additional coats as to achieve the specified thickness.

G. All material shall be as specified.

3.4 COATING SYSTEMS APPLICATION

A. After completion of surface preparation as specified for the specific system, materials shall be applied as noted in Section 2.04 and Section 2.05.

3.5 DISINFECTION

A. Disinfection of interior surfaces shall be performed in the presence of the Engineer in accordance with all the requirements of applicable AWWA Standards and regulatory agencies.

B. Disinfection shall be performed after protective coatings have been applied to the interior surfaces and allowed to thoroughly cure.

C. Prior to disinfecting, the complete interior shall be washed down with clean water and thoroughly flushed out.

D. All interior surfaces shall be thoroughly washed with a solution having a minimum chlorine content of 50 PPM. Chlorine solution accumulated on the bottom shall be drained to waste. Rinsing with clean water is not required.

3.6 SOLVENT VAPOR REMOVAL

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

B. All solvent vapors will be exhausted both during and after coating application at a minimum rate of one air change every four hours to allow the proper curing of the coating material. High rates of production may require an increase in ventilation.

C. Forced ventilation as noted above shall be continued for 7 days or until such time as the coating has reached "full cure to immersion" as specified by the coating manufacturer.

3.7 CLEAN UP

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

END OF SPECIFICATION

SECTION 09900 PAINTING

PART 1 GENERAL

1.1 SCOPE

- A. The work covered by this item of the specifications includes furnishing all paint, labor, and materials and performing all operations in accordance with this section of the Specifications and the applicable portion of the plans.
- B. The Contractor shall furnish all labor, material, equipment and services for cleaning and painting of surfaces as follows:
- C. All metal work, equipment, pump valves, fittings, hangers, supports and machinery; except stainless steel, galvanized steel, and aluminum.
- D. All exposed piping and hazardous concealed piping, where required, to be color coded.
- E. All structural steel not hot-dip galvanized, and miscellaneous steel work.
- F. All interior and exterior concrete block surfaces, drywall, wood, etc.
- G. All exposed conduit and electrical work (including galvanized steel).
- H. All doors and frames as required, except, aluminum or fiberglass frames.

1.2 SUBMITTALS

- A. Six (6) sets of submittals are required. Submittals shall include a list of each specific type of paint proposed along with the manufacturer's product data sheet for that product and color charts for color selection. Colors to be selected by Engineer or blended to match existing paint.

1.3 DELIVERY AND STORAGE

- A. Deliver all materials to the site in original containers, with labels intact and seals unbroken. With the exception of ready-mixed materials, do all mixing at site.
- B. The Contractor shall use one convenient location at the site for keeping all materials and doing all mixing, etc. Floor of this space shall be properly protected with drop cloths. Oily rags and waste shall be frequently removed and under no circumstances shall they be allowed to accumulate. At the

completion of the work, the Contractor shall clean off all paint spots, oil and stain from all surfaces and leave the entire project in a satisfactory condition.

PART 2 PRODUCTS

2.1 SCOPE

- A. Systems by other manufacturers may be acceptable if proper documentation is submitted with the shop drawings. Primers, solvents, and thinners are not specified by name but shall be those recommended by the paint system manufacturer as compatible with the surface and paint system used. All paint systems shall be supplied by a single manufacturer unless otherwise approved in writing by the Engineer.

2.2 PAINT SYSTEM FOR METAL SURFACES

A. Submerged Metal Surfaces

- 1. Submerged metal surfaces include all surfaces of pipe, machinery, equipment, structural steel, etc. submerged totally or partially during normal paint operation and surfaces immediately above or adjacent to open water containing structures.
- 2. Submerged metal surfaces shall be prepared with a SSPC-SP10 near-white metal sand blast and coated with a hi-build polyamidoamine epoxy painting system. The paint system shall be one coat hi-build with a total dry film thickness of 4.0-6.0 mils. Paint system for submerged metal surfaces shall be two coats.

B. Exposed Metal Surfaces

- 1. Exposed metal surfaces include all surfaces of pipe, valves, machinery, equipment, structural steel, etc. which are not submerged, buried, or embedded in concrete. Previously uncoated exposed metal surfaces shall be prepared with a SSPC-SP6 Commercial Blast Cleaning with a three coat semi-gloss aliphatic polyester polyurethane finish paint system with a dry film thickness of at least 8.0 mils. Metal surfaces having an approved manufacturers shop coating shall receive at least one field coat of finish paint and a tie coat if necessary.

2.3 PAINT SYSTEM FOR CONCRETE BLOCK

- A. Exterior concrete block structures shall receive a two coat (minimum) polyamidoamine epoxy system with a dry film thickness of 12 mils or

greater. Additional coats may be required to completely seal the block.

- B. Interior concrete block structure with masonry shall receive a two coat system of Acrylic Latex over Masonry Filler/ Waterborne Acrylic Epoxy.

2.4 PAINT SYSTEMS FOR METAL DOORS AND CABINETS

- A. Aklyd gloss, color selected by Owner.

2.5 PAINT SYSTEM FOR WOOD

- A. Interior and exterior wood trim soffits, and facia. Acrylic latex color selected by Engineer.
- B. Interior staining grade doors and cabinets, lacquer stain, sanding sealer, and lacquer finish, color selected by Engineer.

2.6 PAINT SYSTEMS FOR OTHER SURFACES

- A. Exposed surfaces not mentioned above shall receive at least two coats of an appropriate type of paint as recommended by the approved paint manufacturer.

2.7 COLOR CODING OF PROCESS PIPING

- A. All piping, both exposed and to be buried, or located out of view, containing gas, chlorine, or other hazardous material shall be color coded.
- B. All other exposed process piping visible to the plant operating personnel shall be color coded, including non-potable water lines. Color coding shall be as follows:
 - 1. Non-potable water lines, painted white with stenciled warnings alternatively in English and Spanish, "Unsafe Water".

WATER LINES

Raw Water
Settled or Clarified
Finished or Potable

Generic Color

olive green
aqua
dark blue

CHEMICAL LINES

Alum.	orange
Ammonia	white
Carbon Slurry	black
Caustic	yellow with green band
Chlorine (Gas and Solution)	yellow
Fluoride light	blue with red band
Lime Slurry	light green
Ozone	yellow with orange band
Phosphate Compounds	light green with red band
Polymers or Coagulant	orange with green band
Potassium Permanganate	violet
Soda Ash	light green with orange band/
Sulfur Dioxide	light green with yellow band
Sulfuric Acid	yellow with red band

Generic Color**WASTE LINES**

Sewage Plant Effluent	clay
Backwash Waste	light brown
Residuals	dark brown
Sewer (sanitary or other)	dark gray

Generic Color**Other**

Compressed Air	dark green
Natural or LPG Gas	red
Other Lines	light gray

Generic Color

2.8 OTHER COLOR CODING

- A. OSHA Orange - Moving parts of equipment, protected by guards-shafts, couplings, pulleys, and sprockets (the guards themselves to be same color as equipment color).
- B. OSHA Yellow - Caution signs and physical hazards, outside levers, weight on check valves, lower pulley bis sprockets and chains on valve oper., inside of openings adjacent to steps on ladder, platforms subject to being stuck.
- C. Dark Green - "Safety" and location of first aid equipment such as gas masks, first-aid kits, and safety delux showers.
- D. Black and White - Areas to remain clear.

PART 3 EXECUTION

3.1 GENERAL

- A. All finish coats are to be field applied. Shop applied primer is acceptable, providing that shop primers are compatible with finish coats and that surface preparation and paint techniques equal or exceed in quality those specified herein. Shop prime coats which are damaged before finish coats are applied shall be repaired by field preparation and priming of the damaged surfaces. Fabricated steel with shop primers shall receive finish paint within 30 days from delivery to the job site. It is recognized that some equipment is furnished with a manufacturers finish coating system. The Contractor shall be responsible for recoating these items with paint systems as specified herein as required by the Engineer.

3.2 SURFACE PREPARATION

A. General

1. Surfaces to be painted shall be clean before applying paint or surface treatments. Oil, grease, dirt, rust, loose mill scale, old weathered paint, and other foreign substances shall be removed except as hereinafter specified.
2. The removal of soil and grease shall, in general, be accomplished by blast cleaning; minor amounts of grease and oil contaminants will be tolerated on the surface prior to blast cleaning, provided that abrasive is not reclaimed and reused.
3. Clean cloths and clean fluids shall be used in solvent cleaning to avoid leaving a thin film of greasy residue. Cleaning and painting shall be so programmed that dust or spray from the cleaning process will not fall on wet, newly painted surfaces. Hardware, electrical fixtures and similar accessories shall be removed or suitably masked during preparation and painting operations, or shall be disconnected and moved to permit cleaning and painting of equipment, and following painting shall be replaced and reconnected. Hangers, brackets and other metallic surfaces which are inaccessible after installation shall be painted, except for final coat, prior to installation. Specific surface preparation requirements are included in paint system.

B. Metal Surfaces

1. Submerged metal surfaces shall be blasted to white metal in accordance with SSPC-SP5 prior to coating. Exposed metal surfaces, except non ferrous surfaces, are to be blasted to a near-white metal in accordance with SSPC-SP10 or are to be power tool cleaned in accordance with SSPC-SP3 before priming. All metal surfaces are to be primed immediately following cleaning.

C. Concrete Block and Concrete Surfaces

1. Concrete and block masonry is to be thoroughly cured, washed with clear water, and dry before application of any coating. Remove all loose mortar and projections, fill cracks and blemishes too large to be covered by coating with patching mortar.

D. Wood surfaces to be painted shall be cleaned of dirt, oil or other foreign substances with mineral spirits, scrapers, sandpaper, or wire brush. Finished surfaces exposed to view shall, if necessary, be made smooth by planing or sandpapering. Millwork shall be sandpapered where necessary, and given a coat of the specified exterior primer on all concealed sides before installation. Small, dry seasoned knots shall be surface scraped, sandpapered, and thoroughly cleaned, and shall be given a thin coat of an acceptable knot sealer before application of the priming coat. All beads or streaks of pitch shall be scraped off, or if the pitch is still soft, it shall be removed with mineral spirits or turpentine and the resinous area shall be thinly coated with knot sealer. After priming, all holes and imperfections shall be filled with putty or plastic wood colored to match the finish coat, allowed to dry and sandpapered smooth. Painting of exterior wood surfaces shall proceed insofar as practicable only after masonry work has dried.

3.3 APPLICATION

- A. Painting shall be accomplished by skilled painters in a workmanlike manner. The painting Contractor shall be wholly responsible for the quality of his work and shall not begin any work until the surfaces have been properly prepared. Do not paint any surface which has been damaged, or is in questionable condition, that normal finishing procedures will not conceal. Painter to inspect all surfaces and report any defects to be corrected to the Contractor prior to painting.
- B. Work shall be accomplished under conditions which are suitable for the production of good results. Interior painting shall not begin until all masonry and plaster surfaces are thoroughly cured and dry. Temperatures of spaces in building to be painted shall be maintained above 50 degrees F, and such spaces shall be kept dry. Exterior painting shall not be done in rainy, damp cold or dusty weather, or until surface is thoroughly dry.
- C. Industrial paint systems shall be applied in strict observation of manufacturer's recommendations for temperature, humidity, curing time, mixing proportions, and surface preparations. All coats shall be applied using procedures and techniques that will assure adhesion to the bare surface and top intermediate coatings. Final finish coat shall be of a color selected by the Engineer or Owner.

3.4 RESPONSIBILITY

- A. The general intent of this specification is to provide direction for placement of protective painting on surfaces which may be corroded or damaged by the weather and to provide a finished project pleasing to the eye.
- B. It shall be the Contractor's responsibility to repair any painting systems which fail either due to the failure of the field applied painting done by the Contractor or his subcontractors, or due to the failure of any shop perform sandblasting and shop applied prime coats.

3.5 TOUCH UP PAINT, PROTECTION AND CLEANUP

- A. Provide 1 gallon of each color and type of primer and finish paint used for touch-up purposes. Place for storage in area designated by the Engineer. Provide touch up paint at conclusion of project and provide with a minimum of 6 months shelf life.
- B. Protect work against damage by painting and finishing work as required. Leave all work undamaged. Clean, repair or replace, and repaint any damaged areas as directed by Engineer.
- C. Remove any surplus materials, scaffolding and debris and leave area clean.

END OF SECTION

SECTION 11004 PRE-BID SUBMITTAL REQUIREMENTS

PART 1 GENERAL

1.1 SCOPE

- A. The contractor is required to utilize equipment on this project as specified herein by manufacturers or identified by brand name, or which has been prior approved by the engineer as the owner's representative, utilizing the pre-bid submittal process specified herein.
- B. Only equipment which is of domestic manufacture or otherwise qualifies for the "Buy America" Act will be considered in the pre-bid submittal process as required.

1.2 SPECIFIED EQUIPMENT

- A. The equipment specified in these contract documents is deemed to be the most appropriate for this project. Equipment was selected because of optimum efficiency, durability, longevity and manufacturer/supplier field support.
- B. The equipment selected for the basis of project design has been specified by manufacturer's name or brand name. Other prior approved substitute equipment may be acceptable for use on this project, providing the pre-bid submittal requirements as specified herein, have been strictly adhered to. Substitute equipment must be approved prior to bid. Consideration of substitute after the bid will not be given.

1.3 PRE-BID SUBMITTAL REQUIREMENTS

- A. Any manufacturer, supplier, contractor, or other party wishing to provide substitute equipment on this project must comply with the pre-bid submittal requirements as specified herein.
- B. Pre-bid submittals for substitute equipment must be provided to the engineer for review at least 15 days prior to original bid. Pre-bid submittals must be provided in triplicate and may remain the property of the review engineer. A reviewed copy of the pre-bid submittal may be returned to the submitting party, at the option of the engineer, and only if the proposed substitute equipment is deemed acceptable, in the professional opinion of the engineer. The utilization of approved substitute equipment on this project is conditional upon strict compliance with the engineer's review comments and acceptance by the Owner.

- C. If, in the professional opinion of the engineer and acceptance by the Owner, a substitute item is deemed acceptable, that substitute item will be named in an addendum as approved for use in the project. Approval of a pre-bid submittal in no way waives a manufacturer or supplier of the responsibility of providing full equipment submittals post bid, nor are any requirements of these specifications mitigated in any way.
- D. Pre-bid submittals must be bound into a concise all-inclusive document. The document must contain a cover identifying the Project, Engineer, Owner, submitting party, submittal date, date of bid, and proposed substitute equipment. The pre-bid submittal will contain an index or table of contents. Attachments must be bound to or attached to the document.
- E. Pre-bid submittals must include, but not be limited to the following:
1. Valves – cut sheets, weights, dimensions, actuator diagrams, materials of construction and protective coatings.
 2. Pumps – pump curves denoting performance, efficiency, NPSHR, horsepower requirements, priming capability, performance envelopes, and system head curves; weights; dimensions; materials of construction of all components; motor data including efficiency speed, voltage, phase, hertz, power factor, service factor, NEMA rating, insulation class, enclosure type, and weight; protective coatings. Wire to water efficiencies must be stated.
 3. Bar screens – motor data, gear reducer information, materials of construction, dimensions, weight, and a list of out-sourced components with procurement information.
 4. Screenings conveyors/compactors – motor data, gear reducer information, materials of construction, dimensions, weight and a list of out-sourced components with procurement information.
 5. Grit Collection Equipment – motor data, gear reducer information, air requirements, materials of construction, dimensions, weight and a list of out-sourced components with procurement information.
 6. Controls – wiring schematics, component cut sheets, panel ratings, panel dimensions, UL508A listing, NEMA compliance, and materials of construction.
 7. Clarifiers – materials of construction, dimensions, protective coatings, assembly drawings, assembly breakdown, component cut sheets, motor data and drive data.
 8. Flowmeters – Accuracy statement, dimensions, range, size, electronics box ratings, voltage and signal requirements and materials of construction.
 9. Blowers – Performance curves speed, motor data, coupling information, materials of construction, and cut sheets on accessories components.

10. Hoists & Cranes – materials of construction, dimensions, weights and capacities.
11. Disinfection Equipment – Cut sheets on components, performance data, power consumption, utility requirements, environmental considerations, safety requirements, and chemical consumption.
12. Diffused Aeration Equipment – Transfer efficiency, SOR, AOR, energy requirements, design calculations, materials of construction, and dimensional drawings.
13. Mechanical Aerators/Mixers – motor data, gear reducer data, oxygen transfer efficiency, weight, dimensions, and component cut sheets.
14. Analytical Measurement Equipment – Consumable items, sensor description, electronics description, performance, accuracy, calibration methods, weight, dimensions, materials of construction, and power and signal requirements.
15. SCADA & Telemetry Equipment – Description, bill of materials, component cut sheets, software description, accessory equipment, I/O diagram, company resume, 25 project references, and path studies.

END OF SECTION

SECTION 11005 EQUIPMENT SUBMITTALS

PART 1 GENERAL

1.1 SCOPE

- A. This section covers the submittal requirements for equipment used and supplements **Section 01300** of the Specifications and is applicable to all submittals of equipment and products specified in Division 11 and Division 13.

1.2 SUBMITTAL REQUIREMENTS

- A. Contractor shall submit shop drawings and product data for all equipment and products regardless of whether or not the Specifications for the particular item of equipment or product require a submittal.
- B. The following requirements shall supplement and be additional to the requirements of **Section 01300** and **01330**.
 - 1. Each submittal shall be specific for individual items of equipment. Large size drawings shall be collated, bound, indexed and labeled. Booklets, charts, brochures, and other data shall be bound in folders with the following information enclosed:
 - a. Title page with job name, job location, Engineers' name, General Contractor's name, sub-Contractor's name and address.
 - b. Index page indicating equipment title and section numbers in submittal along with the equipment numbers.
 - c. Each section of the submittal shall include a section title page indicating item name, manufacturer's name, model numbers, size, capacity, performance data and printed descriptive literature, shop drawings, illustration, diagrams, and catalog portions that apply.
 - d. Complete wiring diagrams for equipment furnished, showing equipment and control device terminals and the relationship to other disciplines.
 - e. Equipment layouts showing bases, anchor bolts, machinery and equipment, major piping and clearances.
 - f. Ductwork and piping showing relationship to building structure, finishes, lighting fixtures, major wireways and piping.
 - g. Complete pump curves showing pump efficiency and motor efficiency, NPSH, horsepower requirements and marked with

the design point or points shall be submitted for all pumping equipment.

- h. The manufacturer's written instructions for storing and maintaining equipment during construction shall be submitted with the shop drawings.
- i. The test procedures and certifications required to show how the equipment will be installed and will operate in compliance with the Specifications shall be submitted with the shop drawings.
- j. Descriptions of equipment shown in the submittal shall apply only to the equipment being supplied. All other information shall be marked out.

END OF SECTION

SECTION 13000 CONTROLS AND TELEMETRY

PART 1 GENERAL

1.1 SCOPE

- A. This section covers the furnishing and installing of all required equipment components to provide a complete instrumentation and telemetry control system. Functions to be controlled and/or monitored shall include three (3) booster pumps and one (1) tower level. Monitoring and control shall be located at the pump station and water tower sites. Equipment furnished under this Contact shall be of the same manufacturer.

1.2 DELIVERY, STORAGE, HANDLING

- A. Equipment shall be delivered to the jobsite completely factory assembled. Individual equipment components shall be crated in structurally adequate packing containers to prevent damage during shipping, facilitate easy of handling and to provide suitable protection from weather from extended storage at the jobsite prior to installation. Packing containers shall be permanently labeled with appropriate equipment identification, shipping address and return address. Packing list shall be provided with equipment at time of delivery.
- B. Electrical equipment shall be kept thoroughly dry at all times and shall be stored indoors. Equipment storage shall be protected and maintained in accordance with the manufacturer's recommendations. Equipment shall not be stored directly on the ground.
- C. Contractor shall utilize equipment and tools of adequate size suitable for unloading, transporting, storing and supporting the equipment during installation. Caution shall be employed to prevent equipment damage resulting from abrupt contact with other materials or equipment.

1.3 QUALITY ASSURANCE

- A. Manufacturer's regularly engaged in the manufacture of the type of equipment specified and can demonstrate equipment of their manufacture in actual service will be considered as an acceptable manufacturer. Manufacturers not named in the specifications meeting the minimum experience time requirement must submit to the Engineer 10 working days prior to the bid date detailed information describing the equipment proposed to furnish. The detailed information shall include but not be limited to dimensional data, materials of construction and an installation list with address, telephone number, and an individuals name directly employed by the owner of the equipment. Plans holders will be notified of approved

manufacturers by addendum 7 working days prior to bid date.

- B. The instrumentation manufacturer shall submit to the contractor for Engineer's review, certified copies of factory test results for each instrumentation panel. Test results shall be submitted prior to shipment upon Engineer's request and shall show compliance with specified performance requirements.
- C. The telemetry equipment provided under this Contract shall be fully compatible with the existing telemetry equipment and SCADA system. Other than some programming changes to existing system, no modifications or hardware additions shall be required at the Central control unit.

1.4 WARRANTY

- A. The Contractor shall warrant the equipment to be of quality construction, free from defects in materials and workmanship for one (1) year. The warranty shall become effective upon acceptance by the Owner.
- B. Upon request from the Engineer and/or the owner, the manufacturer shall demonstrate proof of financial responsibility with respect to performance and delivery date. In addition, the manufacturer shall provide proof of evidence of facilities, equipment and skills required to produce the equipment specified herein and provide technical service and replacement parts.
- C. Components failing to perform as specified by the Engineer, or as represented by the Manufacturer, or proven defective in service during the warranty period, shall be replaced, repaired, or satisfactorily modified by the contractor without cost of parts or labor to the Owner.

1.5 WARRANTY FUNCTIONAL CONTROL DESCRIPTION

A. BOOSTER PUMP STATION

- 1. The three (3) booster pumps shall be manually or automatically controlled and monitored. The manual mode of control shall start the pumps and allow the pumps to operate continuously until manually stopped by changing out of the manual mode of control. The automatic mode of control shall start and stop the pumps based on the elevated tank level. A triplex automatic alternator shall be furnished as part of the control panel. The alternator circuit shall be designed to automatically start the next pump in sequence if the previous pump fails to start. The start and stop set-points shall be field adjustable at the control panel. Selector switches, relays, pressure switches, transducers, telemetry system and all required components to achieve the above specified control shall be furnished.
- 2. Booster pump "fail", "call for" and "run" status conditions shall be

indicated for each individual pump locally and at the tower site. A "call for" condition shall exist when the pump mode selector switch is in the manual position or in the automatic position and the start set-point of the particular pump determined by the alternator to be the next in sequence to start is activated. A pump "fail" condition shall be determined if a pump fails to start after a field adjustable time delay once the pump is "called" to run. A pump "run" condition shall be determined utilizing a motor starter auxiliary contact. NEON or LED pilot lights shall be furnished to indicate the above specified status conditions.

3. Tank level shall be monitored on the front of the radio telemetry panel at the pump station and control panel at the tower site.
4. Control functions and status conditions shall be transmitted via radio telemetry. A telemetry system, NEON or LED pilot light and all components required to achieve the above specified control and monitoring functions shall be furnished.
5. The elevated tank RTU shall also serve as a Central telemetry unit for remote control and indication of the pump station. Operator interface and all required items for this requirement shall be provided.

PART 2 PRODUCTS

2.1 ENCLOSURE

- A. The telemetry panel enclosures shall be NEMA 12 wall mounted, constructed of 14 gauge or thicker steel sheet braced as necessary to provide flatness and rigidity. Enclosures mounted outside shall be housed inside another NEMA 3R enclosure. All seams shall be continuously welded and ground smooth. Doors shall be supplied with a minimum of 3 point latching. Louver plates shall be installed as required to provide adequate ventilation for internal components. All surfaces shall be phosphatized, primed and finished as follows: inside shall be white enamel and outside shall be TNEMEC #2019 Buff, Series 66 epoxy-polyamide coating of a minimum 8 mils dry thickness. The enclosure shall be Hoffman Bulletin A-30, Wiegmann, or equal.
- B. Nameplates shall be provided for instruments, control devices, switches, etc., on the face of the panel. The plates shall be 3/16 inch black laminated plastic with a white core, and engraved with suitable identification.
- C. Electrical wiring shall conform to the National Electric Code and to applicable state and local requirements. Any additional costs resulting from any deviation from codes or local requirements shall be borne by Contractor. All panel wiring shall be type MTW, sized in accordance with the loads, but shall be #16 minimum. Wiring shall be color coded as follows: 120VAC ungrounded-black, 120VAC neutral-white, 120VAC ladder rungs-yellow, DC+ - red, DC- - blue, 120VAC isolated contacts - orange.
- D. All panel wiring shall be labeled at each wire termination with an adhesive label which is part white and part clear, with the wire number typed upon the white part, and install label so that the clear part overlaps the white part.

The number shall be typed twice in order to be visible without twisting the wire. Labels shall be Brady Datatab, Thomas & Betts, or equal.

- E. All panel wiring shall terminate in tubular clamp type, nylon, 300V rated terminal blocks suitable for #22 through #10 AWG wire. Each terminal shall have a white painted surface and shall be numbered with a permanent ink pen. Terminal blocks shall have a 60Hz AC breakdown voltage of 5300V contact to contact and 8400V contact to ground minimum. Terminals shall be Buchanan #0625, Weidmuller, or equal.

2.2 CONTROL DEVICES

- A. Control devices such as pushbuttons and selector switches shall be 22.5MM units. Control devices shall have a service temperature range of -30 degrees centigrade to +60 degrees at 35% inductive power factor. Control units shall be rated watertight without the use of a boot. Control devices shall be Square D class 9001 type KX, Cutler Hammer, or equal.

2.3 PILOT LIGHTS

- A. Pilot lights shall be of the high efficiency LED type operating in the 24 VDC range. The lens shall be of the cylindrical style with a minimum 9/32" diameter. Pilot lights shall be Dialight 249 Series, Leecraft, IDEC or equal.

2.4 POWER SUPPLIES

- A. Twenty-four VDC power supplies shall be furnished as required to operate the solid state control components. The power supplies shall be suitable for operation on 120 VAC, single phase, 60 cycle control voltage and be mounted within each control panel. All necessary fuses or switches recommended by the Engineer shall be provided. The power supply shall provide +0.1% line and load regulation with +10% input variations and a temperature coefficient of +0.02% per degree C. The input/output isolation shall be 100 Mohms DC (900 Volts AC) with output transient response of 50 microseconds maximum. The power supply shall be equipped with output transient response of 50 microseconds maximum. The power supply shall be equipped with short circuit and over-voltage protection.
- B. Power supplies shall be by Elpak, Cutler Hammer or Westinghouse.

2.5 HYDRAULIC PIPING

- A. Hydraulic piping shall be copper tubing not less than 3/8-inch O.D., in size. The piping installation and transmitter mounting heights shall be arranged and the piping graded up the taps on the flow tubes such that the lines shall be self-venting.

2.6 RADIO TELEMETRY EQUIPMENT

- A. System Description
 - 1. The central control panel shall provide the primary control of the system. Each remote site in the system shall be assigned a unique digital address. The "central" shall address the remote site in

sequence to send command data and receive status, alarm, flow, pressure, and level data as required by that site. The "Central" panel shall indicate, display, alarm, and record as required all information received and compare the data to thumbwheel setpoints and selector switches for control commands and outputs. Should the "Central" unit fail, the storage reservoir remote shall interrogate its respective control station remotes with level data and each control station remote shall generate its own pump/stop/start or valve open/close commands to maintain its water tower's level. Should a control station fail to be interrogated or experience an internal failure, it shall turn off its "System Normal" output relay causing the station controls to automatically shift to any existing back-up controls. All sites in the system shall have a "System Normal" lamp to indicate that the site is functioning normally and in communication with the "Central" or its respective storage reservoir. Each control station shall also have a "Central Normal" lamp to indicate the station is being controlled by the "Central" unit.

2. The control system shall operate in a half-duplex mode over a single VHF radio frequency. The control system shall test the radio squelch gate for clear channel to allow co-channel operation with other radio systems. To facilitate system layout and future expansion all remote sites shall, under the direction of the central unit, be able to relay to and from another remote site as required to establish the path. Should the assigned relay site for a distant remote be inoperative, the "Central" shall choose another remote site to access the distant remote. All data transmitted shall be in digital word form using FSK (frequency shift keying) transmission and the standard ASCII format at a rate of 110 baud. All transmissions shall include the address of the sender and the receiver and be subject to double scan, parity, and framing error checks to insure a minimum data reliability of 1 error in 1,000,000,000 bits. Any transmissions that fail the data checking will be retried until correct. No data correction methods will be allowed. The control system shall be designed specifically for radio communication and capable of operation on the narrow band splinter frequencies of the Private Land Mobile Radio Services within the FCC's (Federal Communications Commission) rules and regulations regarding these telemetry channels and guarantee operation under co-channel conditions with other radio systems. FSK tones, data baud rates, transmitter output power and deviation, and antenna gain and height shall be chosen to comply with the FCC requirements Part 90 - Subpart B (90.17) for Local Government or Part 90 - Subpart D (90.63) for Power Radio Service. The radio system shall specifically meet the requirement the sum of the highest FSK frequency and the amount of deviation shall not exceed 1.7 kHz for 3F2 emission (or 2.8 kHz for 6F2 emission) as required by the FCC for the specific frequency assigned. The overall system design and operation shall provide a 20db pad over the minimum required for operation on all primary data paths (secondary relay sites not included). The 20 db pad and FCC rule compliance shall be demonstrated to the Engineer or his representative at his request and at no additional cost to the owner. The testing shall be accomplished using an IFR AM/FM 1000S communications analyzer or equal equipment.

B. System Operation

1. There shall be two (2) levels of control operation in the system. The "System Normal" lamp at control stations will indicate which mode the stations is operating in.
2. The primary level of control (utilized under this Contract) will employ direct data transmission between the "storage reservoir" remotes and their respective control stations. At this level of control the control stations will act as individual "Central" units and generate their own pump commands to maintain their respective water tower levels. In the event of failure in the primary level of control the system shall revert to the secondary level of control on a station by station basis. That is, if the system is operating in the secondary control and a "storage reservoir" fails to transmit its level, only the respective control station will revert to the secondary level of control while the remainder of the system continues to function at the primary level. In the primary level of control station remotes will have only the "System Normal" lamp turned on.
3. The second level of control will utilize a local pressure control system at the control station. In the secondary level of control no lamps will be turned on.
4. At all times the system will attempt to operate in the highest level of control (lowest number available). Whenever a failure is correct or power restored the system shall automatically transfer to the next highest available level of control, always trying to reach primary control. Control station high discharge and low suction cut-off controls will be operative in all levels.

C. Equipment Description

1. The control system shall use micro-processors at all locations. A standard plug-in RS232C data port shall be provided at all locations in the system to allow the use of any standard data terminal to view data exchanges between remotes and the central and provide a means of extensive debugging. The software programs used at all locations shall be stored in non-volatile "burned-in" type ROM memories. The system shall be "self-initializing" and not required operator intervention after power interruptions, transients from lightning storms, or component changes. The remote software used shall be identical for all sites and interchangeable without regard to station type (ie: Water Towers, Control Stations, etc.) All items in the control system (electronic cards, power supplies, radios, time delays, relays, etc.) shall be of plug-in construction or make use of a plug-in wiring harness and interchangeable without re-calibration. Equipment that must be unwired-wired for replacement will not be accepted to insure field repair-ability by non-technical personnel. The discrete input/output cards shall have 110 VAC optically isolated couplers with 7500 volts of isolation. The analog inputs and outputs shall be 0-5 volt DC with +0.3% accuracy. Conversion to and from other analog signals shall be by means of a signal conditioning card or module constructed so that zero and span adjustments are a part

of the card rack or remote site enclosure allowing the card to be interchangeable without recalibration. Each site in the system shall be equipped with a three terminal gas discharge tube power line lightning arrestor. The gas tube shall have 500-900 VDC breakdown voltage and meet military specifications MIL-P-55624/3-010.

2. The remote units shall contain three major components: a VHF radio transceiver, a onecard RTU (Remote Terminal Unit), and a single (common) 12 VDC power supply. Each one card RTU shall be capable of controlling a four digit LCD display, reading BCD outputs from thumbwheel and totalizer assemblies, inputting and outputting analog data (with zero and span adjustments to be part of the remote enclosure), and have 110 VAC inputs and outputs with 7500 volts of optical isolation. The onecard RTU modules shall be completely housed in a 4"Wx2"Hx8"L plastic case to provide complete protection of all components and internal adjustments during handling. All connections to the onecard RTU module shall be via a gold flashed end mounted plug-in connector. The remote station addressing shall be accomplished via this end mounted connector and not be affected by changing of onecard RTU modules.
3. The system manufacturer shall supply a 25 watt VHF radio transceiver (adjustable to 4 watts output power as may be required for FCC requirement of 20 Watts ERP- (Effective Radiated Power) to insure a high level of quality and reliability. Radio transceivers without 25 watt maximum output power will not be accepted. All connections to the radio shall be plug-in. The VHF radio transceiver shall have the following specifications:

a. Transmitters:

RF output power	25 watts (adjustable to 4)
Spurious & Harmonic emission	-65db
Frequency Stability	$\pm 0.0005\%$ (-30 to +60° C)
Emission	6F2 (2.5 kHz DEV max) or 3F2 (1.2 kHz DEV max)
FM Hum and Noise	-60 db

b. Receivers:

Sensitivity	.35 Microvolt(.5uV @ 20 db quieting)
Selectivity	-80 db
Spurious Image Rejection	-90 db
Intermodulation	-75 db
Frequency Stability	$\pm 0.0005\%$ (-30 to +60° C)
Receive bandwidth	*6kHz (or 3kHz) as required to match the transmitter

4. The radio equipment shall be FCC type approved and the system capable of operation on the narrow band splinter frequencies (154-173 mHz) in the Power Radio or Local Government Service per the

FCC requirements listed above. The receiver bandwidth shall be reduced to match the transmit bandwidth of the transmitter and provide a minimum adjacent channel rejection of -60db with FCC specified transmitter deviation. The control system manufacturer shall do all the paperwork necessary to obtain a license for the Owner.

5. The radio antennas at all locations shall be a five element Yagi constructed with 3/8" diameter aluminum rod elements and 1-1/16" diameter aluminum pipe element support. The antenna shall be 8.0 db forward gain with a 20.0 db front to back ratio. The antenna shall be wind rated for 100 MPH wind speed. Antennas shall be connected to the transmitter enclosure connection by a RG/8U low loss coaxial cable with (foam) cellular polyethylene dielectric. The coaxial cable shall have braided copper coverage of 78% and along life weather resistant polyvinylchloride jacket. The antenna coaxial cable connection shall be a constant impedance weatherproof Type N connector filled with a silicone grease, taped with a weather resistant polyvinylchloride jacket. The antenna coaxial cable connection shall be a constant impedance weatherproof Type N connector filled with a silicone grease, taped with a weather resistant electrical tape, and coated with Scotchcote to insure a lifetime water tight assembly. Coaxial connection to the transmitter enclosure shall be by means of a coaxial type bulk-head lightning arrestor rated at 1 kilowatt with a minimum 500V and maximum 2000V breakdown voltage. The central shall use directional antennas as specified above with automatic coaxial switching. The coaxial relays shall have the contact structure enclosed in a heavy duty precision machined brass cavity with removable plug for convenient inspection of contact. The SPDT contacts for switching RF shall be silver alloy, gold flashed, conservatively rated for 500 watts of RF power, and impedance matched to 50 ohm cable with standard UHF connectors. The relay assembly shall be a VSWR of 1.25:1 maximum up to 500 mHz. The use of Omni-Directional antennas will not be allowed.
6. Remote units as indicated shall be supplied with battery back-up operation. The rechargeable batteries shall be the sealed solid gelled electrolyte type for float or standby service. Batteries shall be sized to maintain 24 hour service at water tower remotes and 8 hour service at control stations. The remote units shall include a plug-in charging module to recharge the battery when power is resumed, maintain the charge between outages, and have a low voltage cut-off to protect the battery from excessive discharge during prolonged outages. Pressure, level, flow rate and flow totalization inputs shall continue to function on battery back-up. Discrete inputs and outputs will be required only as specified on specific remotes.

D. Warranty

The control system contractor shall supply a one (1) year parts and labor warranty for the control system. The warranty shall begin from the time of Owner acceptance.

E. System Testing

The entire control system shall be "Burned In" at the factory for a period of at least 20 days. The equipment shall be computer tested and temperature cycled at zero degrees and at fifty degrees centigrade.

2.7 PRESSURE SWITCHES

- A. Pressure switches shall be provided with external adjustment dials and be provided with internal or external indicating pressure gauge to facilitate adjustment. Maximum differential between contact actuation shall be two (2) percent of full scale.
- B. Pressure switches shall be as manufactured by Asco or SOR, Incorporated.

2.8 LIMIT ALARM MODULES

- A. The limit alarm modules shall be plug-in 110VAC operated devices with top mounted dial setpoint adjustment. The unit shall have an internal relay contact output with 75mS delay. The unit shall have stability of +0.05% of span degree C and a deadband of not more than 0.25% of span.
- B. Limit alarm modules shall be as manufactured by Action Pak, Wilkerson or approved equal.

2.9 SIGNAL CONDITIONING MODULE

- A. Signal conditioning modules for thermocouple, RTD, thermistor, bridge (strain gauge), LVDT and VRT, DC voltage and current, AC voltage and current, and potentiometer inputs shall be plug-in modules with accuracy and linearity of +0.1% of span and stability of +0.05% of span per degree C.
- B. Signal conditioning modules shall be as manufactured by Action Pak, Wilkerson or approved equal.

2.10 SIGNAL ISOLATION

- A. It is expected that the instruments furnished under this section be selected such that a minimum of signal isolators is required. In the event that isolators are required to circumvent the idiosyncrasies of the particular devices involved, then these isolators shall be identical to isolators required by the system design. These isolators not required by system design shall be furnished under the instrument section without extra cost to the owner.
- B. Isolation modules shall be as manufactured by Action Pak, Wilkerson or approved equal.

2.11 PRESSURE TRANSDUCER

- A. Pressure transducer shall be an all solid-state two-wire transmitter with a 4-20 MA output. The transducers shall be loop powered from the common 12 VDC power supply. The transducers shall have a combined error (linearity and hysteresis) of +.25 percent full scale and be temperature compensated to one percent per 100oF. The transducers shall be mounted at the sensing

point and wired to the enclosure. Transducers shall be suitable for submergence in water up to 50 feet where required.

- B. Transducers shall be as manufactured by Ametek, Sensor Technics or equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. The instrumentation manufacturer and contractor shall assume full responsibility for coordination of the entire project. Including verification that all instrumentation and process equipment components are compatible. The general contractor shall initially operate each equipment system, and shall make all necessary adjustments so that each system is placed in proper operation condition.
- B. Equipment and materials utilized for this project must be approved by the Engineer prior to installation. Approval for installation or incorporation in this project will be made only after submittal of manufacturer's shop and installation drawings.
- C. Installation of equipment shall be in full conformance with the manufacturer shop drawings and requirements as approved by the Engineer. Wherever a conflict arises between manufacturer's instruction and the contract documents, the contractor shall follow the Engineer's decision at no additional cost to the owner.

3.2 WORKMANSHIP

- A. The contractor shall install equipment and materials in a workmanlike manner utilizing craftsmen skilled in the particular trade. The finished installation shall portrait a neat and plumb appearance.

3.3 MANUFACTURER SERVICES

- A. The contractor shall require the manufacturer to furnish the services of a qualified field engineer to perform the following functions in the designated periods of time. These services are to be preformed at the jobsite. A minimum of one (1) visit to the job site shall be required.
 - 1. Instruct contractor in the installation of the process control equipment, and supervise and assist installation as required.
 - 2. Check-out of installation, start-up of equipment and initial operator instruction. This service shall take place after all mechanical equipment associated with the process control system is installed and mechanically operable.
 - 3. Final system check-out and training of owner personnel in the operation and maintenance of the control system.
- B. Instruction of owner's personnel

1. After equipment is fully operational, and before owner will assume responsibility for the operation of the equipment, the equipment manufacturer's operation specialists shall instruct the owner's operating personnel in the care, maintenance and proper operation of the equipment.
- C. All costs for the above manufacturer functions including travel, lodging, meals, and incidentals shall be considered to have been included in the contractor's price.

END OF SECTION

SECTION 13207
PEDESPHERE ELEVATED WATER STORAGE TANK

PART 1 GENERAL REQUIREMENTS

1.1. Scope

- A. The Contractor shall be responsible for all labor, materials and equipment necessary for the design, fabrication, construction, painting, disinfection and testing of an elevated, welded carbon steel water storage tank supported by a steel support pedestal, commonly referred to as a "Pedesphere". Design and construction of the Elevated Tank shall conform to all requirements of AWWA D100 Standard for Welded Carbon Steel Tanks for Water Storage, except as modified by the requirements of these contract documents.

1.2. Qualification of Manufacturer

- A. The design and construction of the "Pedesphere" style water storage tank shall only be undertaken by a Contractor with a minimum of five years experience with elevated tank construction. The Contractor must be able to demonstrate experience through the design and construction of at least five "Pedesphere" style water tanks. The Contractor shall not subcontract the design or erection of the steel tank, pedestal and base cone support structure.

1.3. Submittals

- A. A list of five "Pedesphere" style elevated tanks constructed within the last five years, including the name of the Owner, tank capacity and the Consulting Engineer.
- B. A preliminary drawing of the tank showing major dimensions and plate thickness upon which the bid is based, the high and low water levels and the dimensions of the supporting pedestal and base cone.
- C. A foundation design drawing showing preliminary dimensions and approximate quantities of concrete and reinforcing steel.

1.4. Standard Specifications

All work on the water storage tank shall fully conform to the requirements of the latest published editions of the following Standard Specifications:

- A. AWWA (American Water Works Association) D100 Standard for Welded Carbon Steel Tanks for Water Storage.

- B. AWWA D102 - Standard for Painting Steel Water Storage Tanks
- C. AWWA C652 - Standard for Disinfection of Water Storage Facilities.
- D. AWS (American Welding Society) D1.1
- E. NSF (National Sanitation Foundation) 61 - Materials in contact with Potable Water.
- F. Steel Structures Painting Council Manual - Volume 1 - Good Painting Practice.
- G. Steel Structures Painting Council Manual - Volume 2 - Systems and Specifications.
- H. ACI 318 - Building Code Requirements for Reinforced Concrete
- I. ACI 301 – Standard Specification for Structural Concrete

1.5. Tank Details

The elevated tank shall be all-welded construction of the most economical design. All members of structural steel or of reinforced concrete shall be designed to safely withstand the maximum stresses to which they may be subjected during erection and operation.

1.6. Working Drawings

After contract award and prior to construction, the Contractor shall provide engineering drawings and design calculations for the elevated steel tank and the foundation. Drawings shall show the size and location of all structural components and the foundations along with reinforcement details, the required strength and grade of all materials and the size and arrangement of principle piping and equipment. The drawings and calculations shall bear the certification of a professional Engineer licensed in the State of Oklahoma. The design coefficients and resultant loads for snow, wind and seismic forces, and the methods of analysis shall be documented.

PART 2 DESIGN

2.1. General

The structural design of the elevated storage tank shall conform to the following design standards except as modified or clarified as follows:

- A. Foundations – AWWA D100 and ACI 318 – Building Code Requirements for Reinforced Concrete.
- B. Steel Tank - AWWA D100

C. Steel Tank Painting – AWWA D102.

2.2. Loads

A. Seismic Loads

Seismic Design shall be performed in accordance with Section 13 of AWWA D100-05.

Structures located in regions where the mapped spectral response acceleration at 1-second period S_1 is less than or equal to 0.04g and the mapped short-period spectral response acceleration S_s is less than or equal to 0.15g do not require design for seismic loads. All other structures that will require seismic design shall have the following parameters defined. Note that these parameters have a significant bearing on design and, hence, the final cost:

- Seismic Use Group A classification assigned based on the tank's intended use and expected performance.

Per AWWA D100, Seismic Use Group III shall be used for tanks that provide direct services to facilities that are deemed essential for post-earthquake recovery and essential to life, health and safety of the public, including post-earthquake fire suppression.

For tanks that provide direct service to facilities that are deemed important to the welfare of the public, Seismic Use Group II shall be used.

For tanks not assigned to Seismic Use Group III or II, Seismic Use Group I shall be used.

(Seismic Use Group is used to assign the Seismic Importance Factor. AWWA D100 recommends Use Group III as a default value, corresponding to the Seismic Importance Factor I_E value of 1.5, the most severe case.)

- Site Class The contractor's engineer shall determine the Site Class based on local soil conditions in the upper 100 feet of site soil profile (AWWA D100 Table 25). Sites with a soil profile F require site specific response spectra as defined in Section 13.2.8.1 of AWWA D100-05.
- Latitude & Longitude Exact location of the tank site in Latitude and Longitude, or at least the USPS Zip Code values. These parameters are needed for determining the mapped acceleration parameters.

- Mapped Accelerations Along with the site class, defined above, the Contractor's Engineer shall provide:
 - S_s Mapped maximum considered response acceleration, 5 percent damped, at 0.2 second period, and
 - S₁ Mapped maximum considered response acceleration, 5 percent damped at 1 second period.
- B. Wind Loads
Wind pressure shall be determined in accordance with AWWA D100-05, Section 3.1.4. For tanks located in coastal regions, Owner's Engineer shall consider use of increased wind load as appropriate.
- C. Snow Loads
Snow load shall be determined in accordance with AWWA D100-05, Section 3.1.3.1 for 25 psf minimum loading. Owner's Engineer shall specify a higher snow load, as appropriate, if required in a high snow region.

2.3. Foundation

- A. A Geotechnical investigation has been carried out at the site and a copy of the report is included with the Contract Documents. The contractor shall be responsible for the concrete foundation designed by a Professional Engineering licensed in Oklahoma based upon the information in the geotechnical report. The report must provide the allowable soil bearing pressure with appropriate factors of safety, the active and passive earth pressure coefficients, the angle of soils internal friction, its cohesion, unit weight and recommendations for bearing depth and backfill requirements.

2.4. Steel Tank

- A. General
 - 1. The tank and supporting structure shall be of all-welded steel design and construction. All materials, design, fabrication, erection, welding, testing and inspection of the steel tank shall be in accordance with the applicable sections of AWWA D100 except as modified in this document. The tank shall have a spherical shape for capacities of 150,000 gallons and less, and a spheroidal shape for capacities 200,000 gallon and greater.
 - 2. The supporting structure shall be a butt-welded single pedestal having a minimum shaft diameter adequate for the capacity and height of tower. Transition sections at the top and bottom of the pedestal shall be in accordance with the manufacturer's standard.

The transition from the base to the pedestal shall be a truncated cone with a compression ring. The transition from pedestal to tank shall be a compression ring with truncated cone for tank capacities less than 150,000 gallons. The transition from pedestal to tank shall be a double-curved smooth knuckle for tank capacities of 150,000 gallons and above.

B. Minimum Plate Thickness

The minimum thickness for any part of the structure shall be 3/16 inch for parts not in contact with water and 1/4 inch for parts in contact with water. At junctions in plates where meridional forces are discontinuous such as cone to cylinder junctions or cone to base plate junctions, a tension or compression ring may be required to resist radial forces generated by the discontinuous membrane forces. In these regions, allowable stresses shall not exceed the following stress:

1. Tension ring stress shall not exceed the lesser of 15,000 PSI or one half of the minimum specified yield of the plate material.
2. Compression ring stresses shall not exceed 15,000 PSI.
3. The overturning moment used in designing the pedestal and foundation shall include the moment due to eccentricity of the gravity loads caused by deflection of the structure under wind or seismic conditions (i.e. P-delta effect).

PART 3 CONSTRUCTION

3.1. Concrete Foundation

The foundation shall be designed and constructed to safely and permanently support the structure. The basis of the foundation construction shall be consistent with the soils investigation data included herein. The concrete foundation shall be constructed in accordance with ACI 301.

3.2. Steel Tank Construction

A. General

The erection of the steel tank shall comply with the requirements of Section 10 of AWWA D100 except as modified by these documents.

B. Welding

All shop and field welding shall conform to AWS and AWWA D100, Section 10. The contractors shall ensure that the welders or welding operators are qualified in accordance with ASME Section IX or ANSI/AWS B2.1.

C. Fabrication

All fabrication and shop assembly shall conform to the requirements of AWWA D100, Section 9, Shop Fabrication.

- D. Erection
Plates subjected to stress by the weight or pressure of the contained liquid shall be assembled and welded in such a manner that the proper curvature of the plates in both directions is maintained. Plates shall be assembled and welded together by a procedure that will result in a minimum of distortion from weld shrinkage.
- E. Inspection and Testing
Inspection of shop and field welds shall be in accordance with AWWA D100, Section 11, Inspection and Testing. All inspection shall be performed prior to interior and exterior field painting. Radiographic inspection shall be performed by an independent testing agency with all costs included in the Contractor's bid and paid by the Contractor.
- F. Roof Lap Joints
All interior lap joints shall be sealed by means of caulking or continuous seal welding. This shall include penetrations of roof accessories.
- G. Painting and Disinfection
Surface preparation and coating of all steel surfaces shall be in accordance with **Section 09875** "Water Tank Paint System".

PART 4 ACCESSORIES

- 4.1. General
The following accessories shall be provided in accordance with these specifications. All items shall be in full conformity with the current applicable OSHA safety regulations and the operating requirements of the structure.
- 4.2. Ladders
Access ladders shall be provided at the following locations:
 - A. Grade to upper platform.
 - B. Upper platform to tank floor manhole.
 - C. Upper platform to steel tank roof mounted on access tube interior.
 - D. Exterior of access tube to provide access from the roof manhole to the tank floor.

Ladder side rails shall be a minimum 3/8 inch by 2 inches with a 16 inch clear spacing. Rungs shall not be less than 3/4 inch, round or square, spaced at 12 inch centers. The surface of the rungs shall be knurled, dimpled or otherwise treated to minimize slipping. At platforms or landings, the ladder shall extend a minimum 4 feet above the platform. Ladders shall be secured to adjacent structures by

brackets located at intervals not exceeding 10 feet. Brackets shall be of sufficient length to provide a minimum distance of 7 inches from the center of the rung to the nearest permanent object behind the ladder.

4.3. Fall Protection

Ladders shall be equipped with a fall arrest system meeting OSHA regulations. The system shall be supplied complete with safety harnesses, locking mechanisms, lanyards and accessories for two persons.

4.4. Upper Platform

An upper platform shall be located at the top of the support pedestal to provide access from the pedestal ladder to the roof access ladder located on the interior of the access tube. Platform shall include a 24" x 36" access hatch with opening to allow ladder and safety device to continue 48" minimum above the platform floor.

4.5. Roof Handrail

A roof handrail shall be provided surrounding the roof manholes, vents and other roof equipment. Handrail shall comply with OSHA requirements.

4.6. Condensate Ceiling

Steel condensate ceiling located at the junction of the pedestal shaft and base cone complete with drain and 24" x 36" access hatch with opening to allow ladder and safety device to continue 48" minimum above the platform floor.

4.7. Openings

A. Roof Hatches

1. Provide two access hatches on the roof of the tank. One hatch shall be 24 inch square and allow access from the roof to the interior of the tank. The hatch will be hinged and equipped with a hasp for locking. The hatch cover shall have a 2 inch downward edge. The second hatch will be 24 inch diameter and flanged with a removable cover so constructed that an exhaust fan may be connected for ventilation during painting operations. The openings shall have a minimum 4 inch curb.
2. Provide one 24 inch square hinged access hatch on the access tube roof. The hatch cover shall have a 2 inch downward edge.

B. Tank Vent

The tank vent should be centrally located on the tank roof above the maximum weir crest elevation. The tank vent shall have an intake and relief capacity sufficiently large that excessive pressure or vacuum will not be developed during maximum flow rate. Maximum flow rate should be based on a break in the inlet/outlet pipe when the tank is full. The vent shall be designed, constructed and screened so as to prevent the ingress of wind driven debris, insects, birds and animals. The vent should be designed to operate when frosted over or otherwise clogged. The screens or relief material shall not be damaged by the occurrence and shall return automatically to operating position after the blockage is cleared.

C. Tank Floor Manhole

A minimum 18 x 24 inch elliptical access manhole shall be provided in the tank bottom accessible from the upper platform or from a ladder that extends from the platform to the opening. The hatch shall open inward.

4.8. Access Tube

A minimum 36" diameter access tube shall be provided for tanks with capacities of 150,000 gallons and less, or 42" diameter access tube on tanks with capacities 200,000 gallons and greater. The access tube will be provided from the top of the pedestal to the tank roof.

4.9. Rigging

Interior and exterior rigging devices shall be provided for painting, inspecting and maintaining the structure and accessories. A continuous bar or tee rail near the top of the exterior support structure shall be provided. The rail may be attached to the support column or steel tank. A painter's rail attached to the roof, pipe couplings with plugs in the roof or other attachments that provide complete access for painting of tank interior shall be furnished.

4.10. Piping

A. General

Exterior of pipes exposed to stored water shall be coated with tank interior wet system. Exterior of pipes in the pedestal and base cone shall be coated with tank interior dry system.

B. Inlet Piping

Provide a standard weight steel inlet pipe that extends vertically from the base of the pedestal to the bottom of the tank. Refer to Plans for size. An expansion joint shall be provided in the vertical section of pipe. The expansion joint should be constructed to accommodate any differential movement caused by settlement or thermal expansion and contraction. Inlet pipe shall not extend above the LWL.

C. Outlet Piping

Provide a standard weight steel outlet pipe that extends vertically from the base of the pedestal to the bottom of the tank. Refer to the Plans for the size. An expansion joint shall be provided in the vertical section of pipe. The expansion joint should be constructed to accommodate any differential movement caused by settlement or thermal expansion and contraction. Outlet pipe shall not extend above the LWL.

D. Overflow

The overflow pipe shall be designed to carry the maximum design flow rate of 800 GPM. The steel overflow pipe will be 12 inch in diameter and shall have a minimum wall thickness of $\frac{1}{4}$ ". A suitable weir shall be provided with the crest at High Water Level. The overflow pipe shall extend down from the weir box through the tank, pedestal, and base cone. The overflow pipe shall penetrate the base cone wall approximately 1 to 2 feet above grade and discharge onto a concrete splash pad. The point of discharge shall have a 45 degree elbow and be equipped with a stainless steel screened end.

4.11. Interior Floor

A concrete slab-on-grade shall be provided inside the base cone. The floor shall be a minimum of 6 inches thick, and reinforced with 6x6/W2.9 x W2.9 WWF. Isolation joints shall be provided at junctions with walls, columns, equipment or piping foundations.

4.12. Personnel Door

A 36" by 80" access door with a flush threshold shall be located in the base of the pedestal cone. A step over threshold is not acceptable. The door shall be fabricated from steel plate with adequate stiffening and specifically designed for use with the tank. The access door will be equipped with handle, drip cover and dead bolt lock. Commercial hollow metal doors and frames are not acceptable.

4.13. Identification Plate

A tank identification plate shall be mounted near the personnel door. The identification plate shall be corrosion resistant and contain the following information.

- A. Tank Contractor
- B. Contractor's project or file number
- C. Tank capacity
- D. Height to High Water Level
- E. Date erected

PART 5 Guarantee

- 5.1. The tank Contractor shall guarantee its work for a period of one year from the completion date defined in the contract documents to the extent that it will repair any defects caused by faulty design, workmanship or material furnished under the specifications.

END OF SECTION

SECTION 15010 BASIC MECHANICAL REQUIREMENTS

PART 1 GENERAL

1.1 The General Conditions, Supplementary conditions and Special Conditions of this specification are included in and made a part of this specification and Contract. All of the conditions mentioned therein shall apply except as otherwise amplified or altered in the following specifications. Particular reference is made to the paragraph pertaining to material substitution.

1.2 REGULATIONS

- A. State Public Health Requirements.
- B. The Contractor shall comply with all local, state and national codes, including applicable ASME and NFPA requirements and local utility company requirements. In absence of applicable local or state regulations, work shall conform to the applicable portions of BOCA Mechanical /Plumbing Code latest edition, which shall constitute minimum requirements.
- C. All Mechanical/Plumbing installations shall be in accord with regulations of services and other authorities having jurisdiction. In case of conflict, highest standard applies.

1.3 CODE JURISDICTION

- A. Should drawings or specifications be at variance with governing code in such a way as to cause a violation, the code shall govern. The Contractor shall satisfy code requirements as a minimum without any extra cost to the Owner.

1.4 CODES

- A. The intent of this Division of the specifications is that the Contractor's bid on the work covered herein shall be based upon the drawings and specifications, but that the work shall comply with all applicable codes and regulations (as may be amended by any waivers).

1.5 PERMITS, METERS AND UTILITIES

- A. The Contractor shall procure all necessary permits or licenses to carry out his work; the lawful fees therefore shall be paid by the Contractor. He

shall also obtain the necessary certificates of approval, the cost of which shall be borne by the Contractor.

1.6 SCOPE

- A. The work covered by this division of the specifications consists of furnishing all labor, material and equipment in performing all operations necessary for the installation of the mechanical systems delineated on the drawings and/or described herein. Any incidental work not shown or specified, but which can be presumed as belonging to or necessary for the satisfactory completion of the various systems, shall be included. The work covered under this specification division shall be coordinated with the requirements of the other divisions and with all of the drawings for the entire project. The work shall be accomplished on such a schedule and in such a manner as not to delay or interfere with other construction.

1.7 VISITING THE SITE

- A. The Contractor shall visit the site to familiarize himself with the conditions to be met, as no extras will be allowed to cover work which the Contractor did not include in his bid due to his failure to inform himself of the condition at the site.

1.8 DRAWINGS

- A. The drawings and specifications cover the extent and general arrangement of the various systems subject to the individual characteristics of the mechanical equipment with regard to size, internal arrangement, etc. The exact location and installation of the meters for utilities shall conform to the applicable requirements of the local utilities. The mechanical drawings are diagrammatical only and are not intended to include all of the details or dimensions shown on the architectural or structural drawings and conversely the same; however, each drawing is intended to supplement the others and the interpretation of the drawings shall be such that the architectural, structural, mechanical or electrical details are included on all of the various drawings. Where no figures or dimensions are noted, the drawings shall be accurately followed. Exceptions to or conflicts between the drawings and/or specifications shall be brought to the Engineer's attention 10 days prior to bid opening. If conflicts are not disclosed prior to this time, the Contractor shall resolve these conflicts, to the Engineer's satisfaction at no increase in contract cost.

1.9 PRODUCTS

- A. Items, unless specified otherwise, shall be a product of a manufacturer that has been engaged in the manufacture of this product or similar products for a minimum period of five (5) years.
- B. Items that have safety limits established shall be tested and listed or approved by Underwriters Laboratories, Inc. or the American Gas Association and shall bear their label.
- C. Where Association standards have been established for capacity ratings, items shall be tested to these standards and results listed with the Association.

1.10 SUBSTITUTIONS

- A. The equipment specified herein is intended to establish standards of design and quality as well as capacities.
- B. Where the words "approved substitute" are used, it shall be understood that any substitutions proposed for the specified items shall be equal in such features as noise level, power requirements, metal gages, vibration attenuation, finish, appearance, certification of recognized testing agencies and standards bureaus, allowable working pressures, physical size and arrangement so far as affects installation in the available space, factory-applied insulation, electrical devices, capacity reduction capability, access to internal parts, pressure losses, operating speeds, coil face areas, fan diameter, operating efficiencies, physical size, aesthetic appearance and all other features and capacities. The Engineer shall be the sole judge of the ability of any proposed substitution to meet the requirements of this specification and burden of proof shall be the responsibility of the Contractor. No consideration will be given to any proposed substitution which does not comply with the requirements of this specification. Where several manufacturers are listed and the words "approved substitute" do not appear, no other manufacturer's equipment will be considered except as noted in paragraph E. The Contractor shall be responsible for making any and all alteration required for installation of substitute equipment. This includes additional foundations, electrical service, etc.
- C. Equipment to be submitted shall have both manufacturers sheets (specified and substitute) included, pointing out the differences in physical size, configuration, capacities, etc. and highlighting these differences in a distinctive manner.
- D. Where substitute equipment has been approved for installation, it shall be the Contractor's responsibility to adjust the capacity of all associated

equipment to compensate for additional requirements of the substitute equipment to the Engineer's satisfaction. It remains the contractor's responsibility that all space requirements including size, shape, all connections, accessibility, etc. are maintained so that final installation shall accomplish true intent and meaning of contract documents. If these conditions are not met, this contractor assumes the responsibility for replacement with items named in the specifications and/or shown on the drawings at no additional cost to the owner.

- E. All equipment substitutions shall be approved by the Engineer in writing 10 days prior to the bid opening date.

1.11 SHOP DRAWINGS AND SUBMITTALS

- A. The Contractor shall submit complete information on all proposed items in this division of the specifications to the Engineer for approval. Such submittals shall indicate where the proposed equipment or material will be installed and shall include sufficient manufacturer's information to determine that the material is in accordance with these specifications.
- B. Submittal information shall be clearly indexed and marked to indicate the proposed items of equipment as well as to indicate under which paragraph of the specifications each item of the equipment is described. Submittals shall be bound in hard back loose leaf binders. Furnish 6 copies minimum. Four will be returned to the Contractor.
- C. Submittals which list only the specified capacities of equipment instead of the actual proposed capacities will not be acceptable, except when by coincidence, the proposed values are identical with those specified. The Contractor shall indicate the actual operating characteristics of the proposed equipment at the specified design conditions in the submittal.
- D. Submittals shall be complete when delivered to the Engineer for consideration. No consideration shall be given to partial information from time to time. Any item(s) not included in the original submittals shall be assumed to be "as specified" and shall be supplied as called for.
- E. The approval of submittals shall be general in nature and approval shall not be considered: (1) as permitting any departure for the contract requirements, nor (2) as relieving the Contractor of the responsibility for any errors, including details, quantities, dimensions, materials, etc.
- F. If requested, the Contractor shall provide samples of material or equipment that he proposes to furnish. Such samples shall remain the property of the Contractor and will be returned to him sometime before the final payment has been made.

- G. Shop drawings shall be required as called for under the individual Sections. The shop drawings shall be submitted and approved before any fabrication is started.

1.12 COMPATIBILITY OF EQUIPMENT

- A. The Contractor shall have full responsibility of all component parts of the mechanical systems to assure that the integrated system will perform and operate in accordance with the requirements of the specifications without excessive or unusual operation, service and/or maintenance requirements. Should a bidder consider any part of the specifications or drawings as rendering his acceptance of such responsibility impossible, prohibitive or restrictive, he shall notify the Engineer before submitting his bid and the bid shall be accompanied by a written statement of any objection or exception to the specifications and drawings that the bidder may have.

1.13 DIVISION OF WORK

- A. The division of the specifications into sections is for convenience and orderly development only and is not intended to apportion the various phases of the work among the various contractors on the project. Items required by the work generally covered under a section of the specifications may be mentioned under such section but specified in detail elsewhere. Neither the mention nor the detailed specification is intended to divide the work between contractors.

1.14 COORDINATION

- A. The work of Division 15 shall be coordinated with the requirements of the other divisions of these specifications and with all of the work for the entire project. All work shall be accomplished on such a schedule and in such a manner as not to delay or interfere with other construction work.
- B. Coordinate use of space in front of and above electrical equipment as not to violate the provisions of Section 110-16 and Article 384-4 of the National Electric Code as interpreted by the local code enforcement authority.
- C. This Contractor shall familiarize himself with any Laboratory Drawings to provide such items that may be required but not detailed on the plumbing sheets.

1.15 WARRANTY

- A. The Contractor shall warrant the installation from defect and provide a manufacturer's warranty to cover all equipment and labor for a period of one year after the acceptance of the building (unless noted otherwise for a specific item of equipment or indicated otherwise in the general or supplemental conditions).

1.16 CONNECTION TO EQUIPMENT FURNISHED BY OTHERS

- A. The Contractor shall provide necessary material and labor to connect to the mechanical system all fixtures and equipment having mechanical connections and which are specified in other sections of these specifications. Supply connections shall be provided with shut-off valves. Supply and waste connections shall be sized as indicated in the Plumbing Rough-in Schedule. Ventilation connections shall be connected by flexible duct connections.

1.17 LOCATION OF PIPES, DUCTS, ETC.

- A. The location of all pipe, ducts, outlets, equipment, etc., shown on the drawings is approximate only and understood to be subject to such revision as may be found necessary or desirable at the time the work is installed. All such offsets or rerouting of pipes and ductwork shall be made where required to clear obstructions, provided that such work is properly coordinated with all other work and that there be no impairment of system operation as a result, at no increase in Contract cost. (See 1.14 B). Generally, all outlets shall be properly located for the purpose for which they are intended or centered in rooms, panels, or finished work and shall not interfere with outlets or equipment of other trades and shall meet the dimensions or scale drawing of the Engineer. Refer to reflected ceiling plans and details for exact locations.

1.18 MAINTENANCE AND OPERATING MANUALS

- A. Furnish two copies of maintenance and operating manual in hard back binders. Manuals shall include complete instructions on all items of mechanical equipment. Manuals shall include routine maintenance and lubrication instructions as recommended by the equipment manufacturer and any other material that may be required in other sections of the specifications.

1.19 AS BUILT DRAWINGS

- A. Contractor shall mark in red pencil or ink any field changes made in the Contract Drawings. One set of clean prints shall be used for this purpose. This set of prints shall not be used for construction purposes and shall be kept as clean as practical.

1.20 EQUIPMENT SUPPORTS

- A. All pieces of equipment including but not limited to pumps, air units, boilers, condensing units, chillers etc. shall be mounted on equipment supports.
- B. Supports on floor slabs shall consist of a concrete pad with 4-inch minimum height poured on floor slab. Supports shall be as hereinafter specified.
- C. Supports on grade shall consist of a concrete pad with 6-inch minimum thickness. Supports shall be as hereinafter specified.
- D. Concrete supports shall be furnished by the General Contractor.
- E. Supports on roofs shall be as hereinafter specified or as shown on the drawings. If no support is indicated, this contractor shall provide redwood screeds in pitch pans.

1.21 CUTTING AND PATCHING

- A. Cutting and patching shall be held to the practicable minimum consistent with good construction practice by properly locating and leaving openings where required as construction progresses. All necessary cutting and patching of walls, floors, partitions, ceilings, etc., as required for the proper installation of the work under this contract shall be done at the Contractor's expense in a neat, careful and workmanlike manner subject to the written approval of the Engineer. Any penetration of a fire wall shall be done in such a manner as not to violate the integrity of the fire rating. All cutting of pavements shall be accomplished by saw cutting a minimum of 1-1/2 inches deep prior to jack hammering. Patch all pavements to match existing. Contractor shall pay all street cutting and patching fees. Labor and materials required to replace and rebuild parts cut or injured shall be furnished at the Contractor's expense.

1.22 PRELIMINARY TESTING AND BALANCING

- A. The Mechanical Contractor shall be responsible for the initial setting of pumps, water flow, fans, air flow, etc. in preparation for the final calibration by the NEBB contracting firm.
- B. The Mechanical Contractor shall deliver to the Engineer a completed check list that confirms all equipment has been checked and is in proper operating condition. This check list shall be delivered prior to the start of their final testing and balancing.

1.23 MOTORS AND RESISTANCE HEATERS

- A. Motors shall be supplied with all equipment requiring electrical drive. Motors shall be of adequate size to drive its respective equipment without utilization of the motor service factor. Synchronous speed of motors shall not exceed 1800 rpm unless specifically called for on the plans. Motors shall be suitable of the electrical characteristics shown on the electrical drawings. Contractor shall verify exact electrical characteristics required by electrical drawings and shall be solely responsible for furnishing same. Open drip proof motors shall be loaded to nameplate amperage maximum and shall have service factor not less than 115%. Totally enclosed motors shall be loaded to 90% nameplate amperage maximum with service factor of 100%.
- B. Resistance heaters shall have nameplate electrical characteristics equal to nominal distribution voltage. Contractor shall verify exact electrical characteristics required by electrical drawings and shall be solely responsible for furnishing same.

1.24 STARTERS

- A. Furnish starters for all mechanical equipment with electric motor drive (except 120 V., 1 phase motors). All starters shall be furnished with control station (momentary push button-start-stop or hand-off-automatic (H-O-A) type). All starters, unless otherwise specified, shall be magnetic full voltage starters. All starters shall have a minimum of one auxiliary contact except air unit starters shall have two auxiliary contacts.
- B. Enclosure shall be given rust inhibitor treatment and painted with enamel and shall be General Purpose NEMA Type 3 as required. Enclosure door shall have complete nameplate data clearly marked thereon and shall also have an engraved micarta black/white motor operated description with 1/4-inch letters.
- C. Starters shall have three overloads for three phase motors and two overloads for single phase melting alloy overload relay type with reset button with cover. Relays shall be of the manually resettable type. Where required starters shall be equipped with step-down control circuit transformers. Control voltage shall be 120 volts.
- D. Units shall be completely pre-wired to terminals to eliminate any interior field wiring, except for connection of power supply conductors to line side terminals and motor leads to the starter load side terminals and control conductors that are to be connected to holding coil terminals.

- E. All starters shall be furnished as starter/disconnect.
- F. Units shall be Square D, Allen Bradley, Cutler-Hammer, Siemens ITE or approved equal.
- G. All starters shall be the product of a single manufacturer.

1.25 DELIVERY, STORAGE & HANDLING

- A. Transport and handle Products in accordance with manufacturer's instructions.
- B. Store and protect Products in accordance with manufacturer's instructions, with seals and labels intact and legible.
- C. Protect Products with suitable coverings so that no degrading of the product can occur.
- D. Provide bonded off-site storage or protection when site does not permit on-site storage or protection.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION