

SPECIFICATION MANUAL

City of Dyersburg (TDEC ARPA Funded)

ARPA Grant ID: 2022-8696

Downtown Water Treatment Plant

Roger Hawkins Water Treatment Plant

SCADA UPGRADES

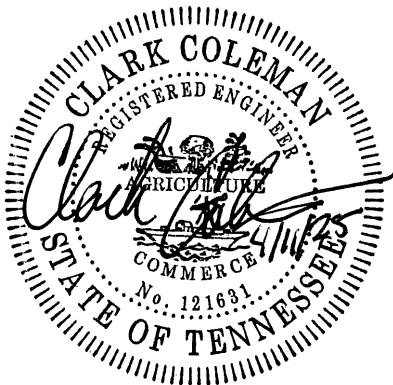
TDEC ARPA PROJECT ID: DW-PDC-1

Owner:

City of Dyersburg

325 Clark Street

Dyersburg, TN 38024



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Bid Number: TDEC ARPA ID: 2022-8696 (Project ID: DW-PDC-1)
Bid Title: City of Dyersburg- Water System SCADA Upgrades Project
Category: Public Works
Status: Open

Advertisement for Bids

City of Dyersburg- Water System SCADA Upgrades Project

The City of Dyersburg will be soliciting bids to upgrade the Dyersburg Water System's Supervisory Control and Data Acquisition (SCADA) system located at various sites throughout the City. The project will consist of the installation of new PLCs in the Roger Hawkins and Dyersburg Water Treatment Plants and Remote Telemetry Units (RTUs) at Water Well #8 and the Hurricane Hill Booster Station.

This project is being supported with the American Rescue Plan Act (ARPA), Coronavirus State and Local Recovery Fund grant funding. Therefore, certain restrictions and other federal requirements are attached to this opportunity.

A non-mandatory pre-bid meeting will be held at the Dyersburg Public Works building on 4/24/25 at 10:30am. Separate sealed bids for the City of Dyersburg Water System SCADA Upgrades Project will be received by Tiffany Heard at the City of Dyersburg Public Works building located at 435 Hwy. 51 Bypass South, Dyersburg, TN 38024 until 10:30AM on Thursday, May 8, 2025, and then at said office publicly opened and read aloud. Any person with a disability requiring special accommodations must contact the City of Dyersburg no later than 7 days prior to the bid opening.

All bid documents may be examined after 12:00pm Monday, April 14, 2025, at the City of Dyersburg Public Works Building located at 435 US Hwy. 51 Bypass South, Dyersburg, TN 38024 or at SSR, Inc. located at 6055 Primacy Parkway, Suite 401, Memphis, TN 38119. Printed Copies may be obtained upon payment of \$50.00 (non-refundable). Electronic Copies of the Bidding Documents may be obtained at no charge. Please email Tiffany Heard at theard@dyersburgtn.gov or Clark Coleman at ccoleman@ssr-inc.com. Any prospective bidder must be on the plan holders list with the City of Dyersburg.

The City of Dyersburg hereby notifies all bidders that it will affirmatively ensure that any contract entered pursuant to this advertisement will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex, or national origin in consideration for an award. The City of Dyersburg is an Equal Opportunity Employer. Any contract that uses federal funds to pay for construction work is a "federally assisted construction contract" and must include the equal opportunity clause found in 2 C.F.R. Part 200, unless otherwise stated in 41 C.F.R. Part 60. We encourage all small and minority owned firms and women's business enterprises to participate. No bidder may withdraw his bid within (60) days after the actual date of the opening thereof.

PLEASE NOTE: Official plan holders list will only be the list maintained by The City of Dyersburg. It is the sole responsibility of all plan holders, whether they have received digital downloads or paper copies of the plans and specifications, to periodically check for Addenda prior to submitting a separate sealed bid.

The Copeland "Anti-Kickback" Act is also applicable, which prohibits workers on construction contracts from giving up wages that they are owed. Contractors must not appear on the Sam.gov disbarment list.

A detailed listing of all subcontractors shall be provided by the Bidder. In accordance with the Contract Documents, documentation that the prospective General Contractor and its subcontractors meet minimum qualifications shall be provided and submitted. Subcontractors must also not appear on Sam.gov disbarment list. Mark-ups on subcontractor work or CostPlus Overhead will be disallowed for reimbursement.

A bid bond or certified check for five percent (5%) of the total bid amount must accompany each bid. The successful bidder will be required to furnish a performance bond in the amount of his bid and shall, before entering on the work of said contract, be licensed as a contractor of The City of Dyersburg.

The owner reserves the right to waive any informalities or to reject any or all bids.

April 9, 2025

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INSTRUCTIONS FOR BIDDERS

1. DEFINED TERMS

Terms used in these Instructions for Bidders are defined in the EJCDE C-700 Standard General Conditions of the Construction Contract. The term "Successful Bidder" means the lowest, qualified, responsible Bidder to whom the Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award.

2. COPIES OF BIDDING DOCUMENTS

- 2.1. Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation may be obtained from Engineer (unless another issuing office is designated in the Advertisement or Invitation to Bid).
- 2.2. Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of the incomplete sets of Bidding Documents.
- 2.3. Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

3. QUALIFICATIONS OF BIDDERS

To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit within five days of Owner's request written evidence, such as financial data, previous experience, and evidence of authority to conduct business in the jurisdiction where the Project is located. Each Bid must contain evidence of Bidder's qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the contract.

4. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

- 4.1. Before submitting a Bid, each Bidder must: (a) examine the Contract Documents thoroughly; (b) visit the site to familiarize himself with local conditions that may in any manner affect cost, progress, or performance of the Work; (c) familiarize himself with federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress, or performance of the Work; and (d) study and carefully correlate Bidder's observations with the Contract Documents.
- 4.2. On request, Owner will provide each Bidder access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of his Bid.
- 4.3. The lands upon which the Work is to be performed, rights-of-way for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Supplementary Conditions, General Requirements, or Drawings.

5 INTERPRETATIONS

All questions about the meaning or intent of the Contract Documents shall be submitted to Engineer in writing. Replies will be issued by Addendum mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids will not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

6 BID SECURITY

- 6.1. Bid Security shall be made payable to Owner, in an amount of five (5) percent of the Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond (on form attached, if a form is prescribed) issued by a Surety meeting the requirements of the General Conditions.
- 6.2. The Bid Security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required Contract Security, whereupon it will be returned; if the successful Bidder fails to execute and deliver the Agreement and furnish the required Contract Security within 15 days of the Notice of Award, Owner may annul the Notice of Award and the Bid Security of that Bidder will be forfeited. The Bid Security of any Bidder whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seventh day after the "effective date of the Agreement" (which term is defined in the General Conditions) by Owner to Contractor and the required Contract Security is furnished or the sixty-first day after the Bid opening. Bid Security of other Bidders will be returned within seven days of the Bid opening.

7. CONTRACT TIME

The number of days within which, or the date by which, the Work is to be completed (the Contract Time) is set forth in the Bid Form and will be included in the Agreement.

8 LIQUIDATED DAMAGES

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

9 SUBSTITUTE MATERIAL AND EQUIPMENT

The Contract, if awarded, will be on the basis of material and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or-equal" items. When it is indicated in the Drawings or specified in the Specifications that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the "effective date of the Agreement." The procedure for submittal of any such application by Contractor and consideration by Engineer is set forth in the General Conditions which may be supplemented in the Supplementary Conditions.

10. SUBCONTRACTORS, ETC.

- 10.1. If the Supplementary Conditions require the identity of certain Subcontractors and other persons or organizations to be submitted to Owner in advance of the Notice of Award, the apparent Successful Bidder, and any other Bidder so requested, will within seven days after the day of the Bid opening submit to Owner a list of all Subcontractors and other persons or organizations (including those who are to furnish the principal items of material and equipment) proposed for those portions of the Work as to which such identification is so required. Such list shall be accompanied by an experience statement with pertinent information as to similar projects and other evidence of qualification for each such Subcontractor, person, and organization if requested by the Owner. If Owner or Engineer after due investigation has reasonable objection to any proposed Subcontractor, other person or organization, either may before giving the Notice of Award request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price. If the apparent Successful Bidder declines to make any such substitution, the contract shall not be awarded to such Bidder, but his declining to make any such substitution will not constitute grounds for sacrificing his Bid Security. Any Subcontractor, other person or organization so listed and to whom Owner or Engineer does not make written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer.
- 10.2. No contractor shall be required to employ any Subcontractor, other person or organization against whom he has reasonable objection.

11. BID FORM

- 11.1. The Bid Form is attached hereto; additional copies may be obtained from Engineer.
- 11.2. Bid Forms must be completed in ink or by typewriter.
- 11.3. Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.
- 11.4. Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.
- 11.5. All names must be typed or printed below the signature.
- 11.6. The Bid shall contain an acknowledgement of receipt of all Addenda (the numbers of which shall be filled in on the Bid Form).
- 11.7. The address to which communications regarding the Bid are to be directed must be shown.

12 SUBMISSION OF BIDS

- 12.1 Bids shall be submitted at the time and place indicated in the Invitation to Bid and shall be included in an opaque sealed envelope, marked:

Project title.
Bidder's name and address.
Bidder's Tennessee Contractors License Number.
Bidder's License Expiration Date.
Bidder's License Classification.
Contract for which Bid is submitted.

- 12.2 Bids must be accompanied by the Bid Security and other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face thereof.

13 MODIFICATION AND WITHDRAWAL OF BIDS

- 13.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.
- 13.2 If, within twenty-four hours after Bids are opened, any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to a reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of his Bid, that Bidder may withdraw his Bid and the Bid Security will be returned. Thereafter, that Bidder will be disqualified from further bidding on the Work.

14 OPENING OF BIDS

Bids will be opened publicly and will be read aloud. An abstract of the amounts of the base Bids and major alternates (if any) will be made available after the opening of Bids.

15 BIDS TO REMAIN OPEN

All Bids shall remain open for sixty days after the day of the Bid opening, but Owner may, in his sole discretion, release any Bid and return the Bid Security prior to that date.

16 AWARD OF CONTRACT

- 16.1 Owner reserves the right to reject any and all Bids, to waive any and all irregularities and to negotiate contract terms with the Successful Bidder, and the right to disregard all nonconforming, non-responsive, or conditional bids. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.
- 16.2 In evaluating Bids, Owner shall consider the qualification of the Bidders, whether or not the Bids comply with the prescribed requirements, and alternates and unit prices if requested in the Bid forms. It is the Owner's intent to accept alternates (if any are

accepted) in the order in which they are listed in the Bid form, but Owner may accept them in any order or combination.

- 16.3. Owner may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the Work as to which the identity of Subcontractors and other persons and organizations must be submitted as provided in the Supplementary Conditions. Operating costs, maintenance considerations, performance data, and guarantees of materials and equipment may also be considered by Owner.
- 16.4. Owner may conduct such investigations as he deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of the Bidders, proposed Subcontractors, and other persons and organizations to do the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.
- 16.5. Owner reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to Owner's satisfaction.
- 16.6. If the contract is to be awarded, it will be awarded to the lowest bidder whose evaluation by Owner indicates to Owner that the award will be in the best interests of the Project.
- 16.7. If the contract is to be awarded, Owner will give the Successful Bidder a Notice of Award within sixty days after the day of the Bid opening.

17. PERFORMANCE AND OTHER BONDS

Provide all bonds as detailed in the Advertisement for Bids.

18. SIGNING OF AGREEMENT

When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by at least three unsigned counterparts of the Agreement and all other Contract Documents. Within fifteen days thereafter, Contractor shall sign and deliver at least three counterparts of the Agreement to Owner with all other Contract Documents attached. Within ten days thereafter, Owner will deliver all fully signed counterparts to Engineer. Engineer will identify those portions of the Contract Documents not fully signed by Owner and Contractor and such identification shall be binding on all parties.

BID BOND

KNOWN ALL MEN BY THESE PRESENTS, that we, the undersigned, as CONTRACTOR, and _____ as Surety, are hereby held and firmly bound unto _____ City of Dyersburg _____ as OWNER in the penal sum of payment of which, well and truly made, we hereby jointly and severally bind ourselves, successors, and assigns.

Signed, this _____ day of _____, 20____.

The Condition of the above obligation is such that whereas the principal has submitted to _____ City of Dyersburg _____ a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for the NOW, THEREFORE,

- (a) If said Bid shall be rejected, or
- (b) If said Bid shall be accepted and the CONTRACTOR shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the CONTRACTOR and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

CONTRACTOR

By _____

Witness _____

Title _____

Surety

By _____

Witness _____

Title _____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located for federally funded projects.
Note: Bond may be declared invalid if not accompanied by Power of Attorney.

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

State of _____

County of _____

_____, being

first duly sworn, deposes and says that:

(1) He is _____ of

_____,

the Bidder that has submitted the attached BID;

(2) He is fully informed respecting the preparation and contents of the attached BID and of all pertinent circumstances respecting such BID;

(3) Such BID is genuine and is not a collusive or Sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed directly or indirectly with any other Bidder, firm or person to submit a collusive or sham BID in connection with the Contract for which the attached BID has been submitted, or to refrain from bidding in connection with such Contract; for which the attached Bid has been submitted, or to refrain from bidding in connection with such Contract; or has in any manner, directly or indirectly, sought by agreement, collusion, communication or conference with any other Bidder, firm or person to fix the price or prices in the attached BID or of any other Bidder, or to fix any overhead, profit or cost element of the BID price, or the BID price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement, any advantage against the City or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached UNIT PRICE BID SCHEDULE are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or parties in interest, including the affiant.

Subscribed and sworn to _____ (signed) _____

before me this _____

day of _____ 20, _____

Title: _____

Title

My commission expires _____

BID FORM

Bid of:

(Name of Bidder)

(Address of Bidder)

organized and existing under the laws of the State of _____ and doing business as (indicate: "a corporation", "a partnership", "an individual", a "limited liability company" or otherwise, as applicable).

To: City of Dyersburg -
Owner Public Works
Building
435 Highway 51 Bypass South
Dyersburg, TN 38025-1358

In compliance with your ADVERTISEMENT FOR BIDS, BIDDER hereby proposes to furnish all necessary labor, machinery, tools, apparatus, materials, equipment, services, and other necessary supplies in strict accordance with the terms and conditions of the plans, specifications and CONTRACT DOCUMENTS within the number of consecutive calendar days and at the prices set forth below for the construction of:

Project: CITY OF DYERSBURG Water System SCADA Upgrades Project

By submitting this BID, BIDDER certifies that this BID has been arrived at independently without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any other competitor.

BIDDER agrees, upon receipt of the NOTICE OF AWARD accompanied by the CONSTRUCTION CONTRACT and all required attachments, to cause same to be properly executed and returned to the CITY OF DYERSBURG within fifteen (15) days thereafter. BIDDER further agrees, upon receipt of the NOTICE TO PROCEED, (i) to commence work on the PROJECT not later than the last date stated in the Notice to Proceed as to which the BIDDER may commence to proceed, (ii) to achieve Substantial Completion of the PROJECT within ONE HUNDRED EIGHTY (180) calendar days after such date, otherwise, to pay the CITY OF DYERSBURG as liquidated damages a sum as set forth in the Tennessee Department of Transportation Supplemental Specification Section 108.07 (based on Contract price) for each consecutive calendar day thereafter as provided in the GENERAL PROVISIONS; and (iii) to complete all Punch List items within thirty (30) consecutive calendar days after the date of Substantial Completion, as such date is determined by the CITY.

BIDDER agrees to perform all work described in the CONTRACT DOCUMENTS for the following unit price(s):

BID FORM

TOTAL BID PRICE (Sum Total of Items 1 thru 19), (show amount in both words and figures):

_____ and _____/100ths Dollars

\$ _____

Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents

Submitted by:

Authorized signature: _____ Date: _____

Name and title: _____
(Type or print)

On behalf of: _____
(Name of Bidder)

Bidder's address: _____

(Please give Street and Mailing address if different)

Bidder's Telephone Number: _____

Bidder's Fax Number: _____

Bidder's contact's email address: _____

BIDDER agrees to perform all work described in the CONTRACT DOCUMENTS for the following unit price(s):

Item No.	Description	Quantity	Unit	Unit Cost	Total Cost
1	Mobilization and bonding, maximum five percent (5%) of bid.	1	LS	\$ _____	\$ _____
2	PLC Replacement at RHWTP	1	LS	\$ _____	\$ _____
3	PLC Replacement at DWTP	1	LS	\$ _____	\$ _____
4	Water System SCADA Software and workstation upgrades	1	LS	\$ _____	\$ _____
5	RTU at Water Well #8	1	LS	\$ _____	\$ _____
6	RTU at Hurricane Hill Booster Station	1	LS	\$ _____	\$ _____
	TOTAL BID:				\$ _____

ADDENDA ACKNOWLEDGEMENT FORM

BIDDER acknowledges receipt of the following addenda (as applicable):

Addendum No. 1 _____	Dated _____
Addendum No. 2 _____	Dated _____
Addendum No. 3 _____	Dated _____

(Name of Bidder)

By: _____

Title: _____

CONSTRUCTION CONTRACT

Construction Contract made as of the _____ day of _____, _____
Between THE CITY OF DYERSBURG (hereinafter referred to as "THE CITY") and
_____(hereinafter referred to as "CONTRACTOR").

In consideration of their acceptance of the terms and conditions stated below, the parties agree as follows:

ARTICLE 1 - THE CONTRACT DOCUMENTS

The Contract Documents consist of this Construction Contract and the terms and conditions stated herein below; the Advertisement for Bids dated April 9, 2025, attached as Exhibit A to this Contract; the Instructions for Bidders attached as Exhibit B to this Contract; the Bid Form of CONTRACTOR dated _____, attached as Exhibit C to this Contract; the Standard General Conditions and Supplemental Conditions attached collectively as Exhibit D to this Contract; the Technical Specifications, attached as Exhibit E to this Contract; the Certificate of Liability Insurance of Accord Corporation, insuring _____, attached as Exhibit F to this Contract; Performance Bond # _____ with _____ as surety in the amount of _____, attached as Exhibit G to this Contract; Payment Bond # _____ with _____ as surety in the amount of _____, attached as Exhibit H to this contract, the Notice of Award dated _____, attached as Exhibit I to this Contract; and the Notice to Proceed dated _____, attached as Exhibit J to this Contract.

ARTICLE 2 - THE WORK

The work agreed to be performed by CONTRACTOR under this Contract, known as **City of Dyersburg Water System SCADA Upgrades Project** (hereinafter "the Work") shall consist of, but is not limited to the installation of new PLCs in the Roger Hawkins and Dyersburg Water Treatment Plants and Remote Telemetry Units (RTUs) at Water Well #8 and the Hurricane Hill Booster Station.

The Work shall also include the furnishing of all labor and equipment necessary and required for the safe, proper and expeditious performance of the Work.

ARTICLE 3 - ENGINEER

The Dyersburg City Engineer will act as the ENGINEER in connection with the completion of the project in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIME

As soon as practicable after the parties' execution of this Construction Contract, CONTRACTOR shall commence performance of the Work. Thereafter, CONTRACTOR shall diligently perform in order to complete the Work within ONE HUNDRED EIGHTY (180) calendar days of the commencement of the Work. The parties acknowledge and agree that time is of the essence of this Contract.

ARTICLE 5 - CONTRACT PRICE AND PAYMENT PROCEDURES

The Contract Price is _____ THE CITY shall make monthly progress payments to the CONTRACTOR based upon the CONTRACTOR'S Application for Payment, as approved by the ENGINEER.

ARTICLE 6 – LIQUIDATED DAMAGES

If the CONTRACTOR fails to complete the Work within the time stipulated in this Agreement, including any extensions of time for excusable delay as approved by the ENGINEER, the CONTRACTOR shall pay THE CITY liquidated damages in the amount of \$100 per day for each and every calendar day of delay, until the work is substantially Complete, as certified by the ENGINEER.

ARTICLE 7 - CHANGES IN THE WORK

THE CITY may, from time to time during the performance of the Work, order changes within the general scope of the Work. In such event, the parties may agree to an amendment of the Contract Price and/or time to compensate CONTRACTOR for additional work performed or materials furnished as a result of the change ordered in the Work.

ARTICLE 8-TERMINATION

If CONTRACTOR shall be adjudged bankrupt or make general assignment for the benefit of creditors; or if a receiver should be appointed for CONTRACTOR or any of its property; or should CONTRACTOR persistently disregard instructions or fail to observe or perform any condition as required by the Contract, or fail to observe or perform any provision of the Contract or otherwise be guilty of a substantial violation of any provision of the Contract, then, THE CITY may, by at least five days' prior written notice to CONTRACTOR, without prejudice to any other rights or remedies available to THE CITY, terminate this Contract and CONTRACTOR's right to proceed with the Work. The above provisions are in addition to, and not in limitation of, the rights of THE CITY under the law or other provisions of this Contract.

ARTICLE 9 - ASSIGNMENT OF CONTRACT

CONTRACTOR shall not assign the whole or any part of this Contract or any monies due or to become due hereunder without THE CITY's written consent. In case CONTRACTOR assigns all or any part of any money due or to become due under this Contract the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to CONTRACTOR, shall be subject to prior liens to all persons, firms, and corporations for services rendered or materials supplied for the performance of the Work.

ARTICLE 10 - TAXES

CONTRACTOR shall pay and be responsible for any and all applicable federal, state and local taxes assessed in connection with the furnishing of the services required by this Contract and shall indemnify and also hold THE CITY harmless therefore.

ARTICLE 11 - SAFETY AND HEALTH REGULATIONS

CONTRACTOR shall comply with all applicable labor safety and health regulations promulgated by the U.S. Department of Labor and the State of Tennessee, including without limitation the Occupational Safety and Health Act of 1970 (PL 91-596) and the Contract Work Hours and Safety Standards Act (PL 91-54). CONTRACTOR shall also grant to authorized representatives of THE CITY and the Department of Labor free access to all work areas for inspection.

ARTICLE 12 - INSURANCE

Prior to commencing the Work, CONTRACTOR shall purchase and maintain such comprehensive general liability and other insurance as is appropriate for the Work being performed and furnished and will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed or furnished by CONTRACTOR, by any Subcontractor, by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable:

A. Claims under workers' or workmen's compensation, disability benefits and other similar employee benefit acts; where applicable;

B. Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees;

C. Claim for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;

D. Claims for damages insured by personal injury liability coverage which are sustained:

(a) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR; or (b) by any other person for any other reason;

E. Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom;

F. Claims arising out of operation of Laws or Regulations for damages because of bodily injury or death of any person or for damage to property; and

G. Claims for damages because of bodily injury or death of any person or

property damage arising out of the ownership, maintenance or use of any motor vehicle.

CONTRACTOR's general liability insurance shall also include coverage for the indemnification obligation to THE CITY assumed under Article 13 hereof.

The insurance required hereby shall include the specific coverage and be written for not less than the following stated limits of liability and coverage or limits of liability and coverage required by law, whichever is greater:

Comprehensive General Liability

1. Bodily Injury (including completed operations and products liability) and Property Damage: Combined single limit of \$1,000,000.00 each occurrence and \$1,000,000.00 aggregate.
2. Property damage liability insurance will provide explosion, collapse and underground coverage where applicable.
3. Personal injury, with employment exclusion deleted: combined single limit of \$1,000,000.00 each occurrence and aggregate.

Comprehensive Automobile Liability

Combined single limit of \$500,000.00 each occurrence.

Workers' Compensation and Employers Liability

All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the

coverage afforded will not be cancelled, materially changed or renewal refused until at least thirty (30) days' prior written notice has been given to THE CITY by certified mail. All such insurance shall remain in effect until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing defective work. In addition, CONTRACTOR shall maintain such completed operations insurance for at least two years after final payment and furnish THE CITY with evidence of continuation of such insurance at final payment and one year thereafter.

ARTICLE 13 - INDEMNIFICATION

CONTRACTOR shall indemnify and hold harmless THE CITY, its agents and employees, from and against all claims, damages, losses and expenses, including attorneys' fees, arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense: (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, and (b) is proximately caused by the negligent act or omission of CONTRACTOR, its subcontractors, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

ARTICLE 14 – NOTICES

All notices, demands, requests, instructions, approvals and claims issued or presented by either party to the other hereunder shall be in writing. All such written notices and communications shall be sufficiently given if sent by registered or certified mail, postage prepaid, addressed to the respective parties as follows:

If to THE CITY, then to:

Ms. Tiffany Heard,
PE City Engineer
City of Dyersburg
P.O. Box 1358
Dyersburg, Tennessee 38025-1358
(731) 288-2587

If to CONTRACTOR, then to:

ARTICLE 15 - MISCELLANEOUS PROVISIONS

A CONTRACTOR warrants that it is duly and lawfully qualified to conduct business in the State of Tennessee.

B This Contract sets forth the entire agreement and understanding of the parties in respect of the transactions contemplated hereby and supersedes all prior agreements, communications and understandings relating to the subject matter hereof.

C THE CITY and the CONTRACTOR each binds himself, his partners, successors, assigns, and legal representatives to the other party hereto in respect of all covenants, agreements and obligations contained in the Contract Documents.

D This Contract shall not be amended or modified except by written instrument duly executed by both parties.

E If there is any conflict between this Agreement and the General Conditions, or any other document incorporated herein by reference, the terms of this Agreement shall control.

IN WITNESS WHEREOF, the parties have executed this Construction Contract on the day and date first above said.

THE CITY OF DYERSBURG

By: _____
John Holden, Mayor

Date:

CONTRACTOR

By: _____

Printed Name, Title: _____

Date: _____

STATE OF TENNESSEE

COUNTY OF DYER

PERSONALLY, APPEARED BEFORE ME, the undersigned Notary Public for County and State aforesaid, being duly commissioned and qualified, JOHN HOLDEN, with whom I am personally acquainted and who acknowledged himself to be the Mayor of the CITY OF DYERSBURG, a municipal corporation, and that he as such Mayor, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself as such Mayor.

WITNESS MY HAND AND NOTARIAL SEAL of office in Dyersburg, Dyer County, Tennessee, this __ day of _____, ____.

My Commission Expires:

STATE OF TENNESSEE COUNTY OF DYER

STATE OF TENNESSEE

COUNTY OF DYER

PERSONALLY, APPEARED BEFORE ME, the undersigned Notary Public for County and State aforesaid, being duly commissioned and qualified, _____, with whom I am personally acquainted and who acknowledged himself to be _____ of _____, the contractor for the _____ project, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself.

WITNESS MY HAND AND NOTARIAL SEAL of office in Dyersburg, Dyer County, Tennessee, this _____ day of _____, _____.

My Commission Expires:

STATE OF TENNESSEE COUNTY OF DYER

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called CONTRACTOR,
(Corporation, Partnership, Individual, or Joint Venture)

and

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto the City of Dyersburg, hereinafter called OWNER, in the penal sum of _____ Dollars \$(_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the CONTRACTOR has entered into a certain contract with the OWNER, dated the _____ day of _____, _____, a copy of which is hereto attached and made a part of here of for the construction of: **City of Dyersburg Water System SCADA Upgrades Project.**

NOW, THEREFORE, if the Contractor shall well, truly, and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full-force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or to the Work to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the contract or to the Work or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____
(number)

counterparts, each one of which shall be deemed an original, this the _____
day of _____, _____.

ATTEST:

(Contractor) Secretary
(SEAL)

Witness to Contractor

Address

Witness to Surety

Address

Contractor

By _____

Title _____

Address _____

Surety By

Attorney-in-fact

Address _____

Note: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership all partners should execute BOND.

BOND is not valid unless accompanied by Power of Attorney.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is to be located.

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that

(Name of Contractor)

(Address of Contractor)

A _____, hereinafter called CONTRACTOR,
(Corporation, Partnership, Individual, or Joint Venture)

and _____
(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto the City of Dyersburg, 435 Highway 51 Bypass South 38025-1358 hereinafter called OWNER, in the penal sum of Dollars, \$(_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the CONTRACTOR has entered into a certain contract with the OWNER, dated the _____ day of _____, _____, a copy of which is hereto attached and made a part of here for the construction of: City of Dyersburg Water System SCADA Upgrades Project.

NOW, THEREFORE, if the CONTRACTOR shall promptly make payment to all persons, firms, Subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the Work provided for in such contract, and any authorized extension or modification thereof, including all amounts due to material, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment, and tools, consumed or used in connection with the construction of such Work, and all insurance premiums on said Work, and for all labor, performed in such Work whether by Subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or to the Work to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the contract or to the Work or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in counterparts, each one of which shall be deemed an original, this the _____ day of _____, _____.

ATTEST:

(Contractor) Secretary

Contractor

(SEAL)

By _____

Title _____

Address _____

Witness to Contractor

Address

Surety

By _____

Attorney-in-fact

Address _____

Witness to Surety

Address

Note: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership all partners should execute BOND.

BOND is not valid unless accompanied by Power of Attorney.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is to be located.

NOTICE OF AWARD

TO: _____

PROJECT: **City of Dyersburg Water System SCADA Upgrades Project**

THE OWNER has considered the BID submitted by you for the above-described WORK in response to its Advertisement for Bids dated April 9, 2025 and information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of:

You are required by the Information for Bidders to execute the Contract and furnish the required Contractor's Performance Bond and Payment Bond within ten calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said bonds within ten days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your Bid Bond. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this ___ day of _____, ____.

ACCEPTANCE OF NOTICE
Receipt of the above
NOTICE OF AWARD is
hereby acknowledged

CITY OF DYERSBURG, TENNESSEE
Owner

By _____
John Holden
Title Mayor of the City of Dyersburg

By _____

this the _____ day of
_____, 20_____.

Signature: _____

Title: _____

NOTICE TO PROCEED

TO: _____

PROJECT: City of Dyersburg Water System SCADA Upgrades Project

You are hereby notified to commence work in accordance with the CONSTRUCTION CONTRACT dated _____, on or before _____, you are to complete the WORK within One Hundred Eighty (180) consecutive calendar days thereafter. The date of completion of all WORK is therefore _____.

ACCEPTANCE OF NOTICE

City of Dyersburg, Tennessee
Owner

Receipt of the above
NOTICE TO PROCEED is
Hereby acknowledged by

this is the _____ day of
_____, _____

By _____
John Holden
Title: Mayor of the City of Dyersburg

By _____

Title

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared By



Endorsed By



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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

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

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

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

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

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals.
36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
38. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
40. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers’ instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
42. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion of such Work.

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

1.02 Terminology

- A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:* The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:* The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:* The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
1. does not conform to the Contract Documents;
 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 3. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).
- E. *Furnish, Install, Perform, Provide*
1. The word “furnish,” when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 2. The word “install,” when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.
 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

- F. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

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

2.02 *Copies of Documents*

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

2.03 *Before Starting Construction*

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work

into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 - 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 - 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.
 - 4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

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

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

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

3.02 *Reference Standards*

- A. *Standards Specifications, Codes, Laws and Regulations*
 - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 - 2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

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

3.04 *Requirements of the Contract Documents*

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

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

3.05 *Reuse of Documents*

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

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

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

4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the

established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

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

4.05 *Delays in Contractor's Progress*

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

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

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

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.
 - C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment

and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

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

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
3. Technical Data contained in such reports and drawings.

- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

- C. *Reliance by Contractor on Technical Data:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

- D. *Limitations of Other Data and Documents:* Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:
1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;
 2. is of such a nature as to require a change in the Drawings or Specifications;
 3. differs materially from that shown or indicated in the Contract Documents; or
 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- E. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in

Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
 - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
 - c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
- a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;
 - b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice required by Paragraph 5.04.A.
3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.
- F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

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

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
 4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
 2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
 3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
 4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.

During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
 - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
 - c. Contractor gave the notice required in Paragraph 5.05.B.
2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
 4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

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

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

B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures

- of construction to be employed by Contractor, and safety precautions and programs incident thereto;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special

conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

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

Regulations, and must be issued and signed by a surety named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual’s authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner’s termination rights under Article 16.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

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

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

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

6.03 *Contractor's Insurance*

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

4. not seek contribution from insurance maintained by the additional insured; and
5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

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

6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against

Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

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

6.06 *Receipt and Application of Property Insurance Proceeds*

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

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

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

7.02 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.

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

7.04 *Services, Materials, and Equipment*

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

7.05 *"Or Equals"*

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

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

7.06 *Substitutes*

- A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.
1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.
 2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

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

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

7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

- H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If an invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *Taxes*

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

7.11 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

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

7.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.
- H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

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

7.14 *Hazard Communication Programs*

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

7.15 *Emergencies*

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

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

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

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. *Shop Drawings*
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.
 2. *Samples*
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.
 3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Engineer's Review of Shop Drawings and Samples*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.
 3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will

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

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

D. Resubmittal Procedures for Shop Drawings and Samples

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.
2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

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

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

- d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
 2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 Contractor's General Warranty and Guarantee

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
1. Observations by Engineer;
 2. Recommendation by Engineer or payment by Owner of any progress or final payment;
 3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. Use or occupancy of the Work or any part thereof by Owner;
 5. Any review and approval of a Shop Drawing or Sample submittal;
 6. The issuance of a notice of acceptability by Engineer;
 7. The end of the correction period established in Paragraph 15.08;
 8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.
- E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 *Delegation of Professional Design Services*

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

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

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

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

8.03 *Legal Relationships*

- A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.
 - 1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.
 - 2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

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

9.03 *Furnish Data*

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

9.04 *Pay When Due*

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

- 9.05 *Lands and Easements; Reports, Tests, and Drawings*
- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
 - B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
 - C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.
- 9.06 *Insurance*
- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.
- 9.07 *Change Orders*
- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.
- 9.08 *Inspections, Tests, and Approvals*
- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.
- 9.09 *Limitations on Owner's Responsibilities*
- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- 9.10 *Undisclosed Hazardous Environmental Condition*
- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.
- 9.11 *Evidence of Financial Arrangements*
- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).
- 9.12 *Safety Programs*
- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
 - B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Resident Project Representative*

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

10.04 *Engineer's Authority*

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.

E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *Determinations for Unit Price Work*

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

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

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

10.07 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, will create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation, and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Contractor under Paragraph 15.06.A, will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

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

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

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

11.02 *Change Orders*

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

11.03 *Work Change Directives*

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

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

11.04 *Field Orders*

- A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:

1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
 2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
 3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit will be determined as follows:
1. A mutually acceptable fixed fee; or
 2. If a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. For costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
 - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;
 - c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
 - d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
 - e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
 - f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *Change of Contract Times*

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

11.09 *Change Proposals*

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

B. *Change Proposal Procedures*

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

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

3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

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

ARTICLE 12—CLAIMS

12.01 *Claims*

- A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:
 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;
 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and
 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge

and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

- C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation*
 - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.
 - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.
 - 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

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

13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 - 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included:* Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.
 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.
 3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
 4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.
 5. Other costs consisting of the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are

consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

- 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

- 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.
- 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
- 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

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

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
- 2. The cost of purchasing, renting, or furnishing small tools and hand tools.
- 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 6. Expenses incurred in preparing and advancing Claims.
- 7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*

- 1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
 - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
 - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
 - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
 - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
- 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

- E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 Allowances

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

13.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision

thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

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

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

14.01 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply with such procedures and programs as applicable.

14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 3. by manufacturers of equipment furnished under the Contract Documents;
 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

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

14.05 *Uncovering Work*

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work,

or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 Owner May Correct Defective Work

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

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

15.01 Progress Payments

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments*
 - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.
 - 2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work;
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
 - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

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

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

- b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. The Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. The Contract Price has been reduced by Change Orders;
 - i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
 - j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or
 - l. Other items entitle Owner to a set-off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 Contractor's Warranty of Title

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

15.03 Substantial Completion

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time

submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without

significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.
2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

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

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.
2. The final Application for Payment must be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

- d. a list of all duly pending Change Proposals and Claims; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. *Engineer's Review of Final Application and Recommendation of Payment:* If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.
- C. *Notice of Acceptability:* In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due:* Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such adjacent areas;
 - 2. correct such defective Work;
 - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.
- C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
 - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);
 - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:
 - 1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
 - 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

- A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The

provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this article:
1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and
 2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this article, Owner or Contractor may:
1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;
 2. agree with the other party to submit the dispute to another dispute resolution process; or
 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

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

18.02 *Computation of Times*

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

18.03 *Cumulative Remedies*

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

18.04 *Limitation of Damages*

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

18.05 *No Waiver*

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

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Assignment of Contract*

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

18.09 *Successors and Assigns*

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

18.10 *Headings*

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

FUNDING AGENCY BID FORMS

Owner anticipates receiving financial assistance through Treasury American Rescue Plan Act (ARPA) State to aid in financing the Project. Bidders, Contractor, and Subcontractors shall comply with the following requirements herein.

The funding agency forms included within this section shall be included with Bid Documents. These forms are as follows:

1. BYRD Anti-Lobbying Amendment Certification
2. Iran Divestment Act Certification
3. Debarment Certification
4. Non-Boycott of Israel Certification
5. MWBE Certification
6. Acknowledgement of SAM Registration
7. Certification by Proposed Prime or Subcontractor Regarding Equal Employment Opportunity
8. Drug-Free Workplace Affidavit
9. Statement Of Compliance Certificate Regarding Illegal Immigrants

Successful Bidder shall be subject to additional funding agency requirements, as listed in Contract Documents.



STATE OF TENNESSEE

BYRD ANTI-LOBBYING AMENDMENT CERTIFICATION

Contractors who apply or bid for an award of \$100,000 or more shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352.

Each tier shall 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 recipient who in turn will forward the certification(s) to the awarding agency.

APPENDIX A, 44 C.F.R. PART 18 – CERTIFICATION REGARDING LOBBYING – REQUIRED FOR CONTRACTS OVER \$100,000 *Certification for Contracts, Grants, Loans, and Cooperative Agreements*

The undersigned certifies, to the best of his or her knowledge and belief, that:

- 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 an 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, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- 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, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) 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.

The Contractor certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap. 38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

Signature of Authorized Representative	Date
Printed Name and Title	Phone Number / Email Address



STATE OF TENNESSEE
IRAN DIVESTMENT ACT CERTIFICATION

SUBJECT CONTRACT NUMBER(S):	
CONTRACTOR LEGAL ENTITY NAME:	
EDISON SUPPLIER IDENTIFICATION NUMBER:	

The Iran Divestment Act, Tenn. Code Ann. § 12-12-101 et. seq. requires a person that attempts to contract with the state, including a contract renewal or assumption, to certify at the time the bid is submitted or the contract is entered into, renewed, or assigned, that the person or the assignee is not identified on a list created pursuant to § 12-12-106.

Currently, the list is available online at the following website: <https://www.tn.gov/generalservices/procurement/central-procurement-office--cpo-/library-/public-information-library.html>

The Contractor, identified above, certifies by signature below that it is not included on the list of persons created pursuant to Tenn. Code Ann. § 12-12-106 of the Iran Divestment Act.

CONTRACTOR SIGNATURE

NOTICE: This certification MUST be signed by an individual with legal capacity to contractually bind the Contractor.

PRINTED NAME AND TITLE OF SIGNATORY

DATE



STATE OF TENNESSEE
CERTIFICATION REGARDING DEBARMENT, SUSPENSION
AND OTHER RESPONSIBILITY MATTERS

The prospective participant certifies to the best of its knowledge and belief that it and its principals:

- Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- Have not within a three-year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (b) of this certification; and
- Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

I understand that a false statement on this certification may be grounds for rejection of this proposal or termination of the award. In addition, under 18 USC Sec. 1001, a false statement may result in a fine of up to \$10,000 or imprisonment for up to 5 years, or both.

Signature of Authorized Representative	Date
Printed Name	Phone Number / Email Address

- I am unable to certify to the above statements. Explanation is attached.



**STATE OF TENNESSEE
NON-BOYCOTT OF ISRAEL CERTIFICATION**

The Bidder certifies that it is not currently engaged in, and will not for the duration of the contract engage in, a boycott of Israel as defined by Tenn. Code Ann. § 12-4-119. This provision shall not apply to contracts with a total value of less than two hundred fifty thousand dollars (\$250,000) or to contractors with less than ten (10) employees.

According to the law, a boycott of Israel means engaging in refusals to deal, terminating business activities, or other commercial actions that are intended to limit commercial relations with Israel, or companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel to do business, or persons or entities doing business in Israel, when such actions are taken:

- 1) In compliance with, or adherence to, calls for a boycott of Israel, or
- 2) In a manner that discriminates on the basis of nationality, national origin, religion, or other unreasonable basis, and is not based on a valid business reason. Tenn. Code Ann. §12-4-119.

Signature of Authorized Representative	Date
Printed Name	Phone Number / Email Address



STATE OF TENNESSEE
CERTIFICATION OF BIDDER REGARDING
USE OF WOMEN/MINORITY SUBCONTRACTORS
****Construction Projects Only****

This certification is required for the contractor to demonstrate that when subcontractors are to be used on this project, an attempt will be made to utilize women/minority owned firms.

Documentation must be on file to show who has been contacted.

- I certify that every attempt was made to utilize female/minority contractors on this project.
- I am unable to certify to the above statements. Explanation is attached.

Signature of Authorized Representative	Date
Printed Name	Phone Number
Email Address	Address

CERTIFICATION OF BIDDER REGARDING EQUAL EMPLOYMENT OPPORTUNITY

This certification is required pursuant to Executive Order 11246 (30 F. R. 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven calendar days after bid opening. No contract shall be awarded unless such report is submitted.

Certification by Bidder

Bidder/Firm: _____

Address: _____

City: _____ State _____ Zip _____

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause. Yes No
2. Compliance reports were required to be filed in connection with such contract or subcontract. Yes No
3. Bidder has filed all compliance reports due under applicable instructions, including SF-100. Yes No None Req.
4. Have you ever been or are you being considered for sanction due to violation of Executive Order 11246, as amended? Yes No

Bidder Name: _____

Title: _____

Signature: _____

Date: _____

DRUG-FREE WORKPLACE AFFIDAVIT

STATE OF _____

COUNTY OF _____

The undersigned, principal officer of _____, an employer of five (5) or more employees contracting with _____ government to provide construction services, hereby states under oath as follows:

1. The undersigned is a principal officer of _____ (hereinafter referred to as the "Company"), and is duly authorized to execute this Affidavit on behalf of the Company.
2. The Company submits this Affidavit pursuant to T.C.A. § 50-9-113, which requires each employer with no less than five (5) employees receiving pay who contracts with the state or any local government to provide construction services to submit an affidavit stating that such employer has a drug-free workplace program that complies with Title 50, Chapter 9, of the Tennessee Code Annotated.
3. The Company is in compliance with T.C.A. § 50-9-113.

Further affiant saith not.

Principal Officer

STATE OF _____

COUNTY OF _____

Before me personally appeared _____, with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who acknowledged that such person executed the foregoing affidavit for the purposes therein contained.

Witness my hand and seal at office this _____ day of _____, 20____.

Notary Public

My commission expires: _____

STATEMENT OF COMPLIANCE CERTIFICATE ILLEGAL IMMIGRANT

EACH CONTRACTOR BIDDING SHALL FILL IN AND SIGN THE FOLLOWING

Bidder Name: _____

Address: _____

City: _____ State: _____ Zip: _____

This is to certify that _____ have fully complied with all the requirements of T.C.A. § 12-3-309, stating:

- (1) No state governmental entity shall contract to acquire goods or services from any person who knowingly utilizes the services of illegal immigrants in the performance of a contract for goods or services entered into with a state governmental entity;
- (2) No person may contract to supply goods or services to a state governmental entity if that person knowingly utilizes the services of illegal immigrants in the performance of a contract to supply goods or services entered into with the state or a state entity.

All Bidders for construction services on this project shall be required to submit an affidavit (by executing this compliance document) as part of their bid, that attests that such Bidder shall comply with requirements of T.C.A. § 12-3-309.

Name: _____ Title: _____

Signature: _____ Date: _____

FUNDING AGENCY SUPPLEMENTARY CONDITIONS

Owner anticipates receiving financial assistance through Treasury American Rescue Plan Act (ARPA) State and Local Fiscal Recovery Funds (SLFRF) to aid in financing the Project. The Owner anticipates receiving this funding through the State Water Infrastructure Grants (SWIG) program, run by Tennessee Department of Environment and Conservation (TDEC). As such, Contractor and all Subcontractors shall comply with all funding agency supplementary conditions listed herein.

ARTICLE 1 - EQUAL EMPLOYMENT OPPORTUNITY

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

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

(4) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or

suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(8) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: Provided, that if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

ARTICLE 2 - CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

(1) **Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate

not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) **Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph (1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the t \$27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this section.

(3) **Withholding for unpaid wages and liquidated damages.** The Contractor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this section.

(4) **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this section.

ARTICLE 3 - CLEAN AIR ACT

(1) The contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq.

(2) The contractor agrees to report each violation to the Owner and understands and agrees that the Owner will, in turn, report each violation as required to assure notification to Treasury, and the appropriate Environmental Protection Agency Regional Office.

(3) The contractor agrees to include these requirements in each subcontract exceeding \$150,000.

ARTICLE 4 - DEBARMENT AND SUSPENSION

(1) This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such, the contractor is required to verify that none of the contractor's principals (defined at 2 C.F.R. § 180.995) or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).

(2) The contractor must comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.

(3) This certification is a material representation of fact relied upon by Owner. If it is later determined that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

(4) The bidder or proposer agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

ARTICLE 5 - BYRD ANTI-LOBBYING AMENDMENT

(1) Contractors who apply or bid for an award of \$100,000 or more shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall 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 recipient who in turn will forward the certification(s) to the awarding agency.

ARTICLE 6 - FEDERAL WATER POLLUTION CONTROL ACT

(1) The contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.

(2) The contractor agrees to report each violation to the Owner and understands and agrees that the Owner will, in turn, report each violation as required to assure notification to Treasury, and the appropriate Environmental Protection Agency Regional Office.

(3) The contractor agrees to include these requirements in each subcontract exceeding \$150,000.

ARTICLE 7 - PROCUREMENT OF RECOVERED MATERIALS

(1) In the performance of this contract, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired competitively within a timeframe providing for compliance with the contract performance schedule; meeting contract performance requirements; or at a reasonable price.

(2) The Contractor also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act.

ARTICLE 8 - DOMESTIC PREFERENCE

- (1) As appropriate, and to the extent consistent with law, the contractor should, to the greatest extent practicable, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States. This includes, but is not limited to iron, aluminum, steel, cement, and other manufactured products.
- (2) Produced in the United States means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States. Manufactured products mean items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.
- (3) Please note that this requirement is solely a domestic preference, and it only applies to the extent appropriate and practical. This project is **not** subject to Build America Buy America (BABA) requirements **nor** American Iron and Steel (AIS) requirements.

ARTICLE 9 - ACCESS TO RECORDS

- (1) The Contractor agrees to provide (insert name of state agency or local or Indian tribal government), (insert name of recipient), Treasury, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.
- (2) The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.
- (3) The Contractor agrees to provide the Treasury or authorized representatives access to construction or other work sites pertaining to the work being completed under the contract.

ARTICLE 10 - FEDERAL LAW, REGULATIONS, AND EXECUTIVE ORDERS

- (1) This is an acknowledgement that Treasury ARP SLFRF financial assistance will be used to fund all or a portion of the contract. The contractor will comply with all applicable Federal law, regulations, executive orders, Treasury policies, procedures, and directives.

ARTICLE 11 - FALSE CLAIMS ACT

- (1) The Contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the Contractor's actions pertaining to this contract.

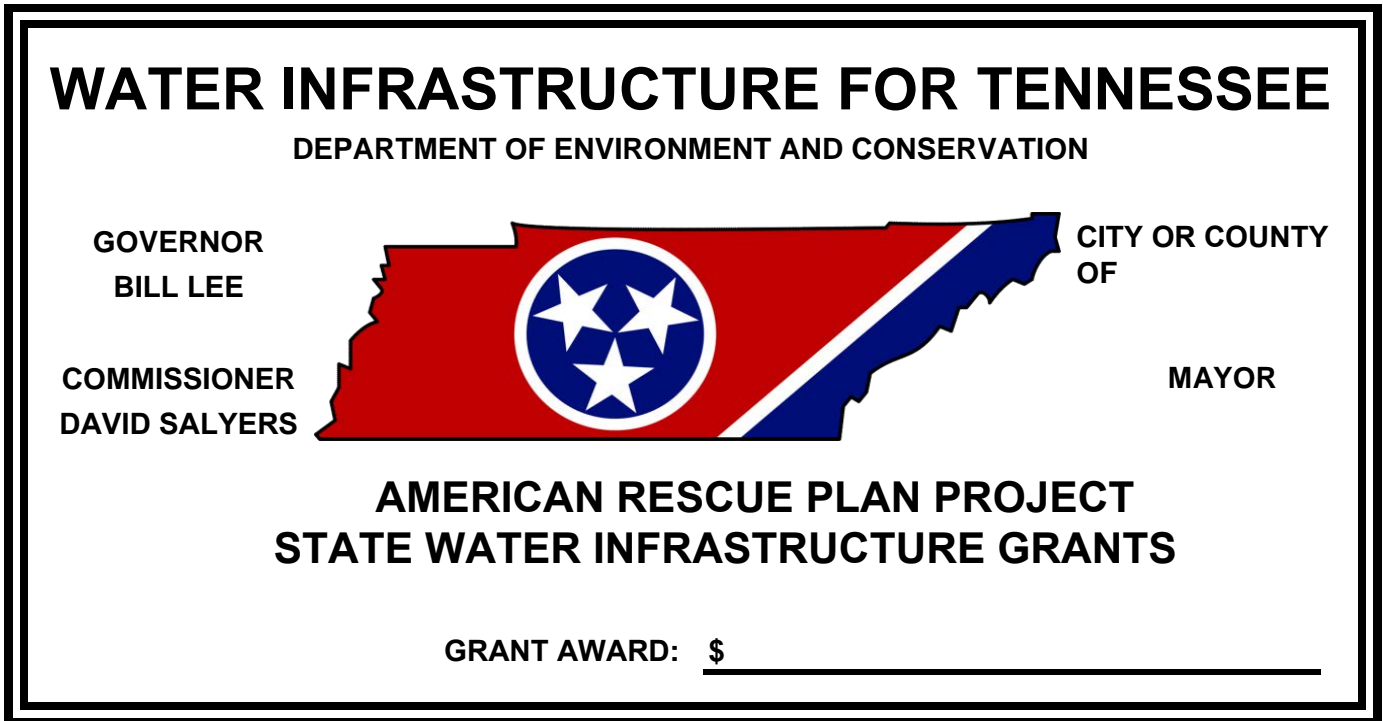
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STATE WATER INFRASTRUCTURE GRANTS

IDENTIFICATION SIGN

All plans and specifications for each project approved shall contain provisions for requiring the general contractor to provide identification signs. The signs shall conform to the following basic features:

1. The following diagram shall be used as a design:



2. The sign shall be a 4'0" X 8'0" sheet of exterior grade plywood and shall be built so as to remain erected during the entire construction phase of the project.
3. The background of both sides shall be white. The lettering shall be black and shall be large enough to take advantage of the full size of the plywood. The stars shall be white set on a blue field and surrounded by a white ring placed inside a state map in red with a stripe of white and blue on the right side. The sign shall be bordered by a one-inch blue stripe.

City of Dyersburg SCADA Upgrades

Downtown Water Treatment Plant

Roger Hawkins Water Treatment Plant



CITY OF DYERSBURG

CITY HALL

425 WEST COURT ST

DYERSBURG, TN 38024

CONFORMED CONTRACT DOCUMENTS AND SPECIFICATIONS

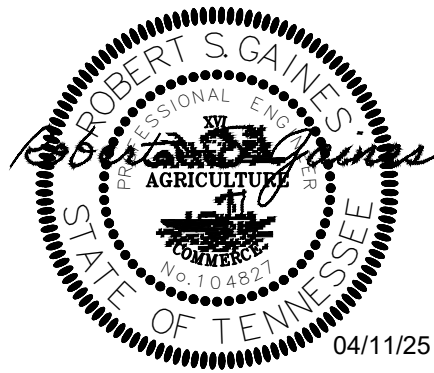
SCADA Upgrades

CITY OF DYERSBURG

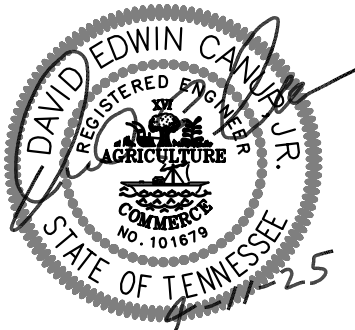
ENGINEER SEALS PAGE

CIVIL ENGINEER

INSTRUMENTATION AND CONTROLS ENGINEER



ELECTRICAL ENGINEER



TECHNICAL SPECIFICATIONS

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01 00 05	Basic Requirements
01 00 10	Temporary Facilities and Controls
01 76 00	Protection of Existing Facilities
01 77 13	Closeout
01 99 00	Reference Forms

DIVISION 02 – EXISTING CONDITIONS

Not used.

DIVISION 03 – CONCRETE

Not used.

DIVISION 04 – MASONRY

Not used.

DIVISION 05 – METALS

Not used.

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

Not used.

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

Not used.

DIVISION 08 – OPENINGS

Not used.

DIVISION 09 – FINISHES

Not used.

DIVISION 10 – SPECIALTIES

Not used.

Section Number	Section Title
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DIVISION 11 – EQUIPMENT

Not used.

DIVISION 12 – FURNISHINGS

Not used.

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Not used.

DIVISION 14 – CONVEYING EQUIPMENT

Not used.

DIVISION 21 – FIRE SUPPRESSION

Not used.

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Not used.

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Not used.

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Not used.

DIVISION 26 – ELECTRICAL

26 00 00	Basic Electrical Requirements
26 05 19	Low Voltage Electrical Power Conductors and Cables
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DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

Not used.

Section Number	Section Title
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DIVISION 31 – EARTHWORK

Not used.

DIVISION 32 – EXTERIOR IMPROVEMENTS

Not used.

DIVISION 33 – UTILITIES

Not used.

DIVISION 34 – TRANSPORTATION

Not used.

DIVISION 35 – WATERWAY AND MARINE CONSTRUCTION

Not used.

DIVISION 40 – PROCESS INTEGRATION

40 90 00 Controls and Instrumentation

DIVISION 41 – MATERIAL PROCESSING AND HANDLING EQUIPMENT

Not used.

DIVISION 42 – PROCESS HEATING, COOLING, AND DRYING EQUIPMENT

Not used.

DIVISION 43 – PROCESS GAS AND LIQUID HANDLING, PURIFICATION, AND STORAGE EQUIPMENT

Not used.

DIVISION 44 – POLLUTION AND WASTE CONTROL EQUIPMENT

Not used.

DIVISION 45 – INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT

Not used.

DIVISION 46 – WATER AND WASTEWATER EQUIPMENT

Not used.

Section Number	Section Title
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DIVISION 48 – ELECTRICAL POWER GENERATION

Not used.

END OF SECTION

SECTION 01 00 05
BASIC REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Summary of Work.
2. Coordination.
3. Hangers, Supports, and Restraints
4. Openings, Chases, Sleeves, Inserts, Etc.
5. Field Engineering.
6. Schedule of Values.
7. Payment Procedures.
8. Preconstruction Conference.
9. Progress Meetings.
10. Change Order Procedures.
11. Allowances, Alternates, and Guaranteed Prices.
12. Submittals.
13. Construction Photographs.
14. Quality Control.
15. Laboratory Testing Services.
16. Materials and Equipment.
17. Product Options and Substitutions.
18. Protection of Existing Facilities.
19. Starting of Systems.

B. Related documents:

1. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions (if included), and Division 01 Specifications Sections, apply to this Section.

1.02 SUMMARY OF WORK

A. Work Covered by Contract Documents.

1. Intent of these Contract Documents is for Work described herein to be complete in every detail for purposes designated and Contractor to provide everything necessary for such Work, notwithstanding any omission in Contract Documents. Work not specifically identified on Drawings or in Specifications but necessary to accomplish Work, and to provide equipment complete in all details and every respect and ready for operation and functionality described in these Contract Documents, shall be performed as specified and as required. All parts of Contract Documents, including all drawings and all specification sections, apply to Contractor and all subcontractors on Project.
2. Work to be performed under this Contract shall consist of following major Work items:

Furnish and install new PLC Equipment at Dyersburg Water Treatment Plant and Roger Hawkins Water Treatment Plant. Furnish and install remote telemetry equipment at Hurricane Hill booster station and Water Well 8. Furnish and Install new SCADA works stations as shown in drawings.
3. All Work shall conform to requirements of these Contract Documents, any applicable codes, and regulations, and norms of industry, whichever is more stringent.

B. Work Hours.

1. Contractor shall, in general, confine Work to between 7:00 AM and 6:00 PM Monday through Friday. Any work outside these stipulated times, including work on Saturdays, Sundays and Federal, state, or Owner-observed Holidays must be approved by Owner at least five (5) days in advance of such work.

C. Contractor Use of Premises and Responsibilities.

1. Contractor shall confine his operations to such portions of property of Owner, and to rights-of-way or easements acquired for work as shown. Private property adjacent to work shall not be entered upon or used by Contractor for any purpose whatsoever without written consent of owner thereof. Contractor shall provide at his expense for all additional lands required for temporary construction facilities, storage of materials and equipment or access to work not otherwise provided by Owner.
2. Contractor shall assume full responsibility for protection and safekeeping of products, materials, supplies, and equipment under this Contract; and all injury or damage to same from whatever cause, shall be made good at Contractor's expense before final payment is made.
3. Contractor shall maintain premises in a safe condition, free from human hazard, and provide proper facilities to allow access by his workers and those of his subcontractors, Owner, Engineer, and their agents and other employees, and all in compliance with applicable regulations, including OSHA.
4. Contractor shall be solely responsible for means, manpower, methods, techniques, sequences and procedures of construction, including those related to safety.
5. No extra payment shall be made for any labor, materials, tools, equipment or temporary facilities required during construction of facilities. All costs therefore shall be considered to have been included in price bid of Proposal.
6. Contractor shall keep themselves fully informed of all laws, municipal ordinances, and regulations in any manner affecting those engaged or employed in work, or materials used in work, or in any way affecting conduct of work, and of all orders, decrees and instructions of bodies or tribunals having any jurisdiction or authority over same.

- a. If any discrepancy or inconsistency should be discovered in Contract Documents in relation to any such permits, laws, ordinances, regulations, orders, decrees, or instructions, he shall forthwith report same in writing to Owner and Engineer
7. Contractor shall not load nor permit any part of any new or existing structure associated with Work to be loaded in any manner that shall endanger structure, nor shall Contractor subject any part of Work or adjacent property to stresses or pressures that shall endanger it.
8. All color choices shall be submitted to Engineer for selection.
9. Contractor shall at all times maintain a drug-free and alcohol-free workplace.
10. Contractor shall conduct necessary background checks on any person employed by Contractor to ensure that they are legally allowed to work in this Country and that their background does not present or constitute a reasonable threat to security of Owner's facilities prior to allowing them access to Site. Contractor shall require all subcontractors and all other personnel not under direct control of Contractor to conduct similar background checks of their employees prior to allowing them access to Site. Contractor shall provide evidence of such background checks at request of Owner.
11. Contractor shall comply with all security measures currently in place by Owner or instituted by Owner during course of Work with no basis for change in Contract Price or Contract Time. Contractor shall familiarize himself with all of Owner's security procedures to ensure they are followed at all times while Work is conducted.
12. Coordination.
 - a. Contract Drawings are intended to show relative positions and arrangement of equipment and do not show all details required for a complete system. Contract Drawings should, however, be followed as closely as possible in general arrangement and location of equipment. Drawings shall not be scaled for exact dimensions. All dimensions shall be checked and all structural and finish conditions investigated and Contractor shall coordinate Work with these conditions and provide such offsets, brackets, rises, drops, transitions, alternate routings, and other necessary accessories as may be required to provide a complete operating system. Immediately upon discovery of any discrepancy in Drawings or Specifications, or points of conflict therein, Contractor shall notify Engineer. Engineer shall clarify such discrepancy in writing prior to progress of Work beyond point of concern.
 - b. Contract Drawings do not necessarily contain all details and incidentals necessary to perform or complete Work. Those details and other requirements described herein shall be provided by Contractor in form of coordination drawings. In addition to shop drawings and other submittals, Contractor, and any applicable subcontractors, shall prepare and submit to Engineer for review, coordination and layout drawings in sufficient detail to fully describe Work to be performed. Such drawings shall include, but not be limited to, pipe laying schedules, pipe fabrication, support and restraint details, pipe, duct and conduit routings, equipment layout and mounting details, concrete placing schedules, reinforcing steel details, structural steel fabrication and erection details, etc. Intent of these Contract Documents is for Contractor to provide complete and operable equipment whether or not any specific component is shown or specified.
 - c. Contractor and all his subcontractors shall be responsible for reviewing all of Contract Documents, including those drawings and specification sections, related to work to be provided by his subcontractors for his responsibilities and that of his subcontractors. Failure by Contractor or his subcontractors to fully review Contract

Documents in their entirety shall not be basis for change in Contract Price or Contract Time by Contractor or his subcontractors.

- 1) Individual specification sections may contain requirements for Contractor to provide equipment, accessories, components, or appurtenances in lieu of specified manufacturer(s). Contractor shall be responsible for providing those items with no change to Contract Price or Contract Time.
 - 2) Individual drawings may specify equipment, accessories, components, or appurtenances to be provided by Contractor without being specified elsewhere in individual specification sections. Contractor shall be responsible for providing those items with no change to Contract Price or Contract Time.
- d. Contractor is responsible for proper coordination of Work including his subcontractor's work, to prevent interference with operation of facility and to assure that Owner is made aware in advance of proposed construction activities.
 - e. Contractor shall prepare composite working coordination drawings and sections at a suitable scale, not less than 1/4 inch equals 1 foot, clearly showing how work is to be installed in relation to work of others. If Contractor permits any work to be installed before coordinating with various subcontractors; or so as to cause interference with work of other subcontractors, he shall make necessary changes in work to correct condition with no change to Contract Price or Contract Time.
 - 1) Coordination drawings shall include, but not be limited to, pipe laying schedules, pipe fabrication, support and restraint details, pipe, duct and conduit routings, equipment layout and mounting details, concrete placing schedules, reinforcing steel details, structural steel fabrication and erection details, etc. Intent of these Contract Documents is for Contractor to provide complete and operable equipment whether or not any specific component is shown or specified.
 - f. Contractor shall arrange that each subcontractor determines location, size and arrangement of all chases and openings and shall establish clearances in concealed spaces required for proper installation of its work and shall see that such are provided.
 - g. Contractor shall be responsible for completion of all documentation, forms, and other paperwork as required by any permits associated with this Project.
 - h. All products supplied under this Project by Contractor shall meet lead-free requirements established by authorities having jurisdiction.
13. Contractor shall be responsible for protection of all existing facilities from damage during execution of Work.
- a. Contractor shall be responsible for safety of existing structures whether above or below ground level, and shall use all precaution to avoid damage to such structures. Wherever water, sewer lines, or other underground utilities or above-grade utilities are broken, damaged or disconnected, they shall be replaced promptly with a minimum interruption of service and incident shall be recorded and reported to Engineer. Locations of existing utilities shown on plans are approximate and for Contractor's assistance only. Contractor shall be responsible for determining exact locations of all existing utilities.
 - b. Interference with any property owned and operated by Owner and utilities furnishing water, electricity, natural gas, transportation and communication service, shall have approval of existing company or department as to methods and manner of

construction used by Contractor, and Contractor shall pay all costs incidental to maintenance of service and for replacement of poles, anchors, or other existing works disturbed by construction of this Work.

- c. Contractor shall, at his own cost and expense, sustain in their places and permanently protect from direct or indirect injury any and all utilities, structures, property, and all existing Site features in vicinity of his Work whether on Site or on adjacent properties, whether over or underground, or which appear within trench or excavations, and Contractor shall assume all costs and expenses for direct or indirect damage which may be occasioned by injury to any of them.
- d. Contractor shall locate all existing utilities prior to commencement of Work.
- e. Whenever damage occurs, Contractor shall immediately notify property Owner(s) affected, emergency services as necessary, Owner, Engineer, and any authorities having jurisdiction.
- f. If location or position of an existing utility, structure, or other element be such as, in opinion of Engineer, to require its removal, realignment or change, such alteration shall be an additional mutually-agreed-upon cost to Owner for Work of removal, realignment or change unless previously identified in Contract Documents, in which case removal, realignment, or change shall be done with no change to Contract Price or Contract Time.

D. Limits of Work Area.

1. Conduct operations so as not to interfere with operation of Owner's facilities. Any interference, such as excavations, that could impact ability to operate Owner's facilities or receive materials at facilities shall be coordinated with Owner and Engineer at least seven (7) days in advance of any work commencing. Contractor shall not operate any of Owner's facilities.

E. Construction Permits and Inspection Fees and Other Fees.

1. Contractor shall obtain and pay for necessary construction permits from those authorities or agencies having jurisdiction over land areas, utilities or structures which are located within Contract Limits and which shall be occupied, encountered, used, or temporarily interrupted by Contractor's operations. All fees, including any fees related to obtaining any of permits, shall be paid for by Contractor, including but not limited to, building permits, electrical permits, sign permits, office trailer and construction trailer permits, plumbing and mechanical permits, blasting permits, excavation and grading permits, and permits for any road cutting.
2. When construction permits are accompanied by regulations or requirements issued by a particular authority or agency, it shall be Contractor's responsibility to familiarize himself and comply with such regulations or requirements as they apply to his operations on this Project. Any costs associated with additional field supervision by authorities or agencies shall be Contractor's responsibility.
3. Contractor shall pay all necessary inspection fees related to Work to those agencies having jurisdiction over Work.
4. In all cases, for all permits, whether applied for by Owner or Contractor, Contractor shall be responsible for payment of all required fees, charges, maintenance, bonds, insurance, and penalties or fines for non-compliance, associated with all required permits.
5. Additional fees, such as those required to establish utility accounts, or any other fee required to be paid as part of this Project shall be borne by Contractor with no change to

Contract Price or Contract Time. Contractor shall be fully responsible for identifying all fees that may be incurred from agencies, companies, or authorities having jurisdiction over Work.

F. Work Sequence.

1. Work Plan.

- a. Contractor shall develop and submit for review in accordance with this Section no more than 10 days after Effective Date of Contract a written work plan for sequencing of Work that:
 - 1) Identifies tasks of construction in an orderly and logical sequence along with schedule/duration of each task that completes Work within allowable Contract Time.
 - a) Tasks shall outline specific means and methods to be used by Contractor that are unique, abnormal for intended Work, or in any way deviate from stipulated requirements of Contract Documents.
 - 2) Demonstrates ability to keep Owner's existing facilities operational and ability to protect existing facilities from contamination of any sort.
 - 3) Identifies tasks (and order in which they shall be performed) that shall require temporary interruption of service or shutdown of any portion of Owner's facilities. Description shall include how an orderly removal of relevant facilities from service shall occur and how those services shall be brought back on-line with no interruption to Owner's operations.
 - 4) Identifies time frame for such interruptions of services.
 - 5) Establishes contingency plan for return of system to service in a timely fashion should problems be encountered completing that task.
- b. Contractor shall be solely responsible for means, manpower, methods, techniques, sequences and procedures of construction and for coordinating construction and installation of all materials and equipment shown or described in Contract Drawings and Specifications in accordance with Contract Documents, and subject to approval of Engineer and Owner. However, following sequence is offered to identify that certain proposed facilities must be constructed in an order which permits commissioning of certain unit processes before others may be decommissioned, renovated, or demolished. This sequence is only a guideline and is not to be considered complete and a formal sequence shall be prepared by Contractor. Contractor may proceed concurrently with work on multiple systems. Contractor is responsible for coordinating parallel work items with Engineer so as to expedite progress while minimizing interference with operations of Owner's facilities.

G. Bypass Pumping.

1. Contractor shall be responsible for maintaining continuous operation of existing facilities and shall be responsible for damages caused by failure to do so when caused by his negligence.
2. Owner and Engineer shall consider alternative methods suggested by Contractor which are believed to accomplish intended goals of bypass pumping. In event Owner and Engineer do not accept Contractor's proposed alternative methods, construction sequence outlined herein must be followed by Contractor, with no change to Contract Price or Contract Time.

3. Design, installation and operation of temporary bypass pumping system shall be Contractor's responsibility. Bypass system shall meet requirements of all codes and regulatory agencies having jurisdiction, including local noise and light ordinances.
 - a. Design shall include primary and backup pumps.
 - b. Contractor shall submit to Owner and Engineer, detailed equipment, controls and facility configuration data for approval prior to shut-down scheduling.
 4. Contractor shall provide temporary pumping units, if necessary, with all necessary piping and supports, hoses, valves, temporary plugs, controls and power. Contractor shall coordinate with Owner actual flow capacities required. Type and style of temporary pumping units shall be of Contractor's choosing with approval by Owner. Pumping equipment shall be suitable for intended service. Method of pump drive source shall be of Contractor's choosing with approval by Owner, but Contractor must maintain continuous operation of facilities. Contractor shall provide and maintain all necessary appurtenances such as temporary power or fuel with no change to Contract Price or Contract Time.
 5. Pumps shall be provided with automatic controls to start and stop pumps and maintain existing maximum pumping rates. As a minimum, pump controls shall include level control floats providing alarm and control features, automatic alternation and auxiliary power. Complete redundancy shall be provided for Temporary Pumping System.
- H. Weather Delays.
1. Weather and neglect of utility owner or other contractors shall not be deemed a consideration for change in Contract Price or Contract Time.

1.03 EQUIPMENT AND HOUSEKEEPING PADS

- A. All process, mechanical, heating and ventilating and air conditioning, fire suppression, plumbing, electrical, and instrumentation and control equipment shall be provided with a housekeeping pad whether shown on Contract Drawings or not, unless Contract Drawings explicitly state that pads are not to be provided or equipment is to be wall-mounted. Unless otherwise shown on Contract Drawings, equipment pads and housekeeping pads shall be constructed of reinforced concrete and shall be 12 inches larger than footprint of equipment. Unless otherwise shown on Contract Documents or required by equipment manufacturer, pads shall be no less than 4 inches high. Contractor shall coordinate all pad dimensions, locations, and equipment anchor requirements described in Contract Documents with equipment suppliers and manufacturers and subcontractors and confirm all aspects of pad construction prior to pad fabrication and placement. Cost to repair or correct pads of incorrect size shall be borne solely by Contractor with no change to Contract Price or Contract Time. Lack of pads being shown on Contract Drawings shall not be grounds by Contractor for a request to change Contract Price or Contract Time.

1.04 HANGERS, SUPPORTS, AND RESTRAINTS

- A. Contractor shall be responsible for designing, engineering, and providing suitable hangers, supports and restraints for all piping and equipment provided under Contract, whether shown on Contract Drawings or not. All hangers, supports and restraints shall be furnished and installed in accordance with all applicable codes and standards and in accordance with these Contract Documents. All hardware shall be specifically designed for application intended and shall be of a materials or finish which shall prevent corrosion in in-service atmosphere in which it is located. Shop Drawing information on proposed hangers, supports and restraints, whether manufactured, or fabricated, shall be provided. Refer to Section 40 27 00 for additional details.

1.05 OPENINGS, CHASES, SLEEVES, INSERTS, ETC.

- A. Contractor shall provide all openings, chases, etc., in his work to fit his own work and that of other subcontractors. All such openings or chases shown on Contract Drawings, or reasonably implied thereby, or as confirmed or modified by shop drawings approved by Engineer, or shown on manufacturer's erection drawings, shall be provided by Contractor. Anywhere where pipes or conduits pass through new or existing slabs, walls, floors, and ceilings, Contractor shall provide wall sleeves, unless wall pipes are specifically called for on Contract Drawings or required to be provided under terms of Section 33 11 00.

1.06 FIELD ENGINEERING

- A. Adhere to requirements of General Conditions and Supplementary Conditions.
- B. Contractor shall be responsible for verifying accuracy of any control reference points, benchmarks, and monuments shown on Contract Drawings prior to commencement of Work and advise Engineer of any observed discrepancies, especially any Contractor believes may impact Work.
- C. Control datum for survey work is that provided by Engineer. Datum shall be provided prior to start of construction.
- D. Contractor shall provide three control points at each Site.
- E. Contractor shall provide field engineering services as follows:
 - 1. Provide construction surveys as necessary to construct Work in accordance with lines, grades, and elevations shown on Contract Drawings.
 - 2. Protect all control and reference points. Accurately replace any such point which is damaged or moved with no change to Contract Price or Contract Time.
 - a. All benchmarks used by Contractor, whether provided by Contractor or by Owner or Engineer shall be identified on final record documents.
 - 3. Provide correct lines, grades, locations and elevations for construction of all Project components.
 - 4. Provide correct information for preparation of Project record documents.
 - 5. At completion of Project, Contractor shall submit certification that locations and elevations of Work are in conformance with Contract Documents and indicate any substantive deviations.
 - 6. At completion of Project, Contractor shall submit site drawings with certification that locations and elevations of Work are in conformance with Contract Documents and indicate any substantive deviations.

1.07 SCHEDULE OF VALUES

- A. Type Schedule on AIA G702 (cover page) and G703 (continuation sheets).
- B. Identify each line item of Schedule by number and title of Specifications Sections.
- C. Cost of shop drawing preparation and submittal shall be included in price of each piece of equipment or material. Shop drawings shall not be paid as a separate payment item, unless otherwise indicated in individual specification section.

- D. Submit one (1) pdf of Schedule of Values. Assemble so that form and content is acceptable to Engineer.
- E. Schedule of Values shall be approved by Engineer prior to submission of first payment application.
- F. When Engineer requires substantiating information, submit data justifying line item amounts in question.

1.08 PAYMENT PROCEDURES

- A. Payment application cover and continuation sheets shall be similar to AIA Form G702 (cover) and G703 (continuation sheets) and approved by Engineer.
- B. Application shall include invoices or receipts for stored material for which payment is requested and other information that may be requested by Engineer.
- C. Approved Schedule of Values shall be used to list items on Applications for Payment.
- D. Retainage shall be withheld from stored materials, unit price items, allowances, as well as completed work at rate indicated in Agreement, or if not included in Agreement at a rate of 5 percent.
- E. Submit one (1) pdf of Application for Payment to Engineer, each with original signatures.
- F. Payment Period: Monthly.
- G. No payment application shall be reviewed by Engineer unless Record Drawings are up to date, Progress Schedule has been approved and is up-to-date at time of payment submittal, required photographs submitted, List of Submittals is up-to-date and copy submitted with payment application, and List of Operations and Maintenance Manuals is up-to-date in and copy submitted with payment application.

1.09 PRECONSTRUCTION CONFERENCE

- A. Engineer shall schedule a pre-construction conference before Notice to Proceed and before Work commences.
- B. Attendance – Owner, Engineer, Contractor and his superintendent (and major subcontractors that Contractor deems appropriate), local authorities and utility owners, and others required by Owner and Engineer.
- C. Agenda:
 - 1. Designation of responsible personnel of Owner, Contractor, and Engineer.
 - 2. Executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents (and State approved documents as applicable).
 - 4. Notice to proceed and construction schedule.
 - 5. Permits.
 - 6. Existing and subsurface conditions.
 - 7. Submittal of:

- a. List of subcontractors.
 - b. List of products.
 - c. Schedule of values.
 - d. Schedule of shop drawing, product data, and sample submittals.
 - e. Schedule of operations and maintenance manual submittals.
 - f. Progress schedule.
 - g. Erosion and sediment control plan.
 - h. Spill prevention plan.
 - i. Storm water pollution prevention plan (SWPPP).
 - j. Work Plan/Sequence of Construction.
 - k. Project Sign Rendering.
 - l. List of unspecified equipment, components, accessories, or connections.
 - m. List of required dates for selection and purchase of allowance related items.
 - n. Draft training schedule.
 - o. Samples for color selections.
 - p. Photographs.
8. Procedures and processing of:
- a. Lines of communication.
 - b. Emergency communications.
 - c. Discrepancies.
 - d. Progress meetings.
 - e. Field decisions.
 - f. Submittals including Shop Drawings.
 - g. Substitutions and proposal requests.
 - h. Applications for payment.
 - i. Change orders.
 - j. Operation and maintenance manuals.
 - k. Record documents and drawings.
 - l. Contract closeout procedures.

- m. Claims.
 - 9. Testing Laboratory – scheduling activities and procedures for testing.
 - 10. Requirements of regulatory agencies.
 - 11. Use of premises by Owner and Contractor, including chemical deliveries, and Owner's occupancy.
 - 12. Temporary facilities, utilities, and controls to be provided by Owner and by Contractor.
 - 13. Maintenance of vehicular traffic detours, flagmen, etc.
 - 14. Periodic cleanup of Site, housekeeping procedures, and security.
 - 15. Notification of utilities' owners.
 - 16. Requirements for startup of equipment and plant startup.
 - 17. Review and acceptance of equipment put into service during construction period.
 - 18. Survey and building layout.
 - 19. Site mobilization.
 - 20. Other issues.
- D. Engineer shall record minutes and distribute copies after meeting to participants. Contractor shall distribute copies to his subcontractors and other parties not in attendance who are affected by decisions made.

1.10 PROGRESS MEETINGS

- A. Engineer shall schedule and administer progress meetings throughout progress of Work at maximum monthly intervals.
- B. Location of meetings: Owner's office or other convenient location as determined by Engineer.
- C. Engineer shall prepare meeting agenda with copies for participants, preside at meetings, record minutes, and distribute copies of minutes to meeting attendees.
- D. Distribution of minutes by Engineer shall include mailing, faxing, or e-mailing minutes.
- E. Contractor shall distribute copies of minutes to those who did not attend meeting and who are affected by decisions made at meeting, including any subcontractors.
- F. Attendance Required: Owner, Engineer and other professional consultants he deems appropriate, Contractor and his job superintendent, major Subcontractors and suppliers as appropriate to agenda topics for each meeting, and others as appropriate to agenda topics. Contractor shall be responsible for ensuring that representatives of contractors, subcontractors and suppliers attending meetings are qualified and authorized to act on behalf of entity each represents.
- G. Agenda:
 - 1. Attendee Sign-in Sheet.
 - 2. Review and approval of minutes of previous meeting.

3. Schedule of next meeting.
4. Review and maintenance of progress schedule.
5. Status of modifications and change orders and effects on schedule and coordination.
6. New business relating to Work.
7. Coordination of process interruptions.
8. Review of action items from previous meeting.
9. Review of submittals schedule and status of submittals.
10. Review of Work progress since last meeting.
11. Planned Work progress before next meeting.
12. Field observations, issues and decisions.
13. Identification of issues which may impede planned progress and measures to regain Project schedule.
14. Review of requests for information and status of requests.
15. Review of field drawings.
16. Construction photographs.
17. Review of fabrication and delivery schedules.
18. Other business.

H. Contractor shall provide Engineer following in PDF format prior to each meeting:

1. Written summary of work performed since last progress meeting.
2. Updated Project schedule reflecting completed work, revised dates for future work, and any changes to substantial and final completion dates.
3. Documentation indicating number of days ahead of or behind schedule. If behind schedule, include proposed methods of regaining schedule.
4. Brief summary of major work to be performed between present meeting and next progress meeting, including any anticipated interruptions to Owner's facilities.
5. Photographs taken over past month.
6. Current payment application.

I. Schedule shutdown coordination, pre-installation, system startup, and other meetings as Work and Contractor means and methods deem appropriate.

1.11 CHANGE ORDER PROCEDURES

A. Conform to General Conditions and Supplementary Conditions.

- B. Requests for changes to Contract Time shall only be acceptable for those items shown to be on critical path of Project completion as shown on most recent Project schedule provided by Contractor prior to Contractor advising Engineer of change or Engineer determining such a change is necessary, whichever comes first. Those items not on critical path, although adjustments to Contract Price may be acceptable, shall not be permitted to adjust Contract Time.
 - 1. For any request for change in Contract Time, as part of submission of documents supporting change to be provided to Engineer, Contractor shall provide schedule, or portion thereof, clearly showing that respective change is on critical path and that such schedule existed prior to determination that such change to Work is necessary. Failure to provide such documentation shall result in change being deemed to result in no change to Contract Time.
- C. Change Order Forms: AIA Document G701 or similar Engineer approved form. Provide supporting documentation as may be requested by Engineer.
 - 1. Requests for change in Contract Price and/or Contract Time shall include origin and date of claim, dates and times Work was performed, and by whom, time records and wage rates paid, and receipts and invoices for products, equipment and subcontracts, similarly documented.
- D. Lump Sum Change Order – Content of Change Orders shall be based on either Engineer Proposal Request or Notice of Change and Contractor's lump sum quotation or Contractor's request for a Change Order as approved by Engineer.
- E. C. Unit Price Change Order – For contract unit prices and quantities, and for adjustment prices, Change Order shall be executed on a fixed unit price basis. For unit costs or quantities of units of Work that are not predetermined, execute Work under a Work Change Directive as directed by Owner. Changes in Contract Price or Contract Time shall be computed as specified for Cost of Work Change Order

1.12 ALLOWANCES, ALTERNATES, AND GUARANTEED PRICES

- A. Cash and Contingency Allowances.
 - 1. All allowances shall be included in Total Base Bid Price submitted by Contractor.
 - 2. Costs Included in Allowances:
 - a. Cash Allowances – See General Conditions.
 - b. Contingency Allowances – Allowances include costs of materials and equipment (less applicable trade discounts); applicable taxes; product delivery to Site and handling at Site, including unloading, uncrating, and storage; protection of Products from elements and from damage; labor for installation and finishing; and overhead and profit.
 - 3. Engineer Responsibilities – consult with Contractor for consideration and selection of Products, suppliers and installers; select Products in consultation with Owner and transmit decision to Contractor; and prepare change order.
 - 4. Contractor Responsibilities:
 - a. Within 30 calendar days of Notice to Proceed commencement work date, notify Engineer of date when final selection and purchase of each product or system described by an allowance must be completed in order to avoid delay in performance of Work.

- b. Assist Engineer in selection of products, suppliers and installers.
 - c. Obtain proposals from suppliers and installers and offer recommendations.
 - d. On notification of selection by Engineer, execute purchase agreement with designated supplier and installer.
 - e. Arrange for and process shop drawings, product data, and samples. Arrange for and coordinate delivery of each product or system. Contractor is responsible for delivery schedule even if there is an equipment manufacturer proposal in bid documents that includes a delivery schedule. Changes to bid proposal schedule due not constitute grounds for a change in Contract Time.
 - f. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
 - g. Provide copies of all paid purchase orders to Engineer, including invoices, receipts, or other satisfactory evidence of actual amounts paid for installation of utility services by utility companies.
5. Differences between allowance amounts and actual costs shall be adjusted by Change Order prior to final payment.
6. Allowances Schedule: None
- a. Contingency Allowances: None
 - 1) Cash Allowance for Construction Contingencies:

B. Alternates.

- 1. Alternates quoted on Bid Forms shall be reviewed and accepted or rejected at Owner's option. Accepted Alternates shall be identified in Schedule of Bid Items as referenced by Agreement Notice of Award.
- 2. Coordinate related Work and modify surrounding Work as required. Dimensions and locations shown on Drawings for equipment and accessories are based on base bid equipment. Any change in dimensions or location of equipment or accessories or type of accessories required to accommodate alternate manufacturers and models shall be at Contractor's expense.
- 3. All costs associated with modifying design and construction of building, structural, piping, electrical, mechanical, plumbing and instrumentation systems and all other aspects of Project required to accommodate alternate manufacturers and models shall be responsibility of Contractor.

1.13 SUBMITTALS

A. General.

- 1. Purpose of submittals is to demonstrate that Contractor understands and shall conform to intent of Contract Documents.
- 2. Engineer's review of submittals shall not be for purpose of determining accuracy or completeness of details such as quantities, dimensions, materials, catalog numbers, or similar data for compliance with Contract Documents, or for substantiating instructions

for installation or performance of materials, equipment, or systems, all of which remain sole responsibility of Contractor.

- a. Engineer's review does not constitute approval of any safety precautions taken or not taken by Contractor nor means and methods or field construction criteria employed or not employed by Contractor.
 3. Engineer's review is only to check general conformity with Contract Documents.
 4. Contractor's submission of submittals to Owner/Engineer or Engineer's/Owner's review of said submittals shall not in any way relieve Contractor of responsibility for full compliance with Contract Documents and Contractor's responsibility for any deviations or variations from requirements of Contract Documents or other errors contained or implied in submittals or any omissions from submittals.
- B. Email all submittals to Engineer.
- C. Consecutively number all submittals using specification number as a prefix. Every submittal and re-submittal shall be accompanied with a letter of transmittal with Contractor's signature or initials that itemizes all data transmitted as well as identifies Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and Specification Section number, as appropriate.
- D. Contractor and all his subcontractors shall review and coordinate all submittals, as well as field verify all measurements, quantities, field construction criteria, performance criteria, manufacturer's catalog numbers, and compliance of submittal with requirements of Contract Documents, prior to transmittal to Engineer. Any comments from Contractor or subcontractor as well as any deviations between submittal and Contract Documents shall be provided to Engineer in writing at time of submittal.
- E. Revise and resubmit submittals as required. Resubmittal shall clearly and conspicuously identify all changes made since previous submittal.
- F. Distribute copies of all reviewed (even if not accepted) and accepted submittals, including shop drawings, product data, samples, and Operations and Maintenance Manuals, which bear Engineer's stamp, to job site files, Record Documents file, subcontractors, suppliers, other affected contractors, concerned parties, and other entities requiring information. Instruct anyone receiving said submittals to promptly report any inability to comply with provisions.
- G. Do not fabricate products or begin Work which requires submittals until return of submittal with Engineer's acceptance.
- H. Owner shall not be obligated to accept or pay for any materials or equipment furnished in absence of a required shop drawing submittal or in absence of addressing any comments concerning said shop drawings.
- I. After acceptance of submittals, items shall be provided exactly as described in submittal, inclusive of any comments.
1. In event that a manufacturer changes design of an item subsequent to its acceptance via a submittal, Contractor providing said item shall bear all additional costs incurred by Owner or other contractors.
- J. Engineer shall review original submittal and one re-submittal of any equipment at cost to Owner. Any subsequent re-submittals shall be reviewed at expense of Contractor, cost of which shall be deducted by Owner from Contract amount.

K. Construction Progress Schedules.

1. Submit preliminary progress schedule in duplicate within 10 calendar days after Effective Date of Contract for Engineer review.
2. Submit finalized progress schedule at least 10 calendar days before submission of first Application for Payment.
3. Submit revised schedules at each progress meeting, identifying changes since previous version.
4. Prepare computer-generated network analysis diagram using critical path method, generally as outlined in Associated General Contractors of America (AGC) publication "Use of CPM in Construction A Manual for General Contractors and Construction Industry."
5. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration. Diagram shall be divided into calendar months.
6. Indicate estimated percentage of completion for each item of Work at each progress meeting and update accordingly. Submission of updated progress schedules of each monthly progress meeting shall be necessary for processing monthly payments.
7. Indicate submittal dates for all required shop drawings, product data, samples, and anticipated product delivery dates, including those furnished by Owner and under Allowances.
8. As a minimum, progress schedules shall include at least one task for each Specification Section and each major section of Division 01 of Specifications.

L. Initial Submittals.

1. In addition to Progress Schedule, Contractor shall also submit following by stipulated deadlines:
 - a. Within 10 days after Effective Date of Contract:
 - 1) Detailed Work Plan including intended Sequence of Construction in accordance with this Section.
 - 2) Schedule of Values.
 - b. Within 15 days after Effective Date of Contract:
 - 1) All requests for substitutions including comparative literature.
 - c. Within 10 days of Notice to Proceed commencement work date, Contractor shall submit following:
 - 1) Rendering of Project sign in conformance with Section 00 83 13.
 - 2) Before beginning any on-site construction (including mobilization), submit insurance certificates.
 - 3) Before beginning any on-site construction (including mobilization), submit erosion and sediment control plan, spill prevention plan, and storm water

pollution prevention plan in conformance with Section 01 00 10 and regulation of state where Project is located.

- 4) List from each equipment manufacturer required to provide a performance affidavit of any equipment, components, accessories, or connections which are required for a complete operating system but are not shown or described in Contract Documents.
- d. Within 30 days of Notice to Proceed commencement work date, Contractor shall submit following:
- 1) List of dates when final selection and purchase of each product or system described by an allowance must be completed in order to avoid delay in performance of Work.
 - 2) Draft training schedule.
 - 3) Name of proposed reputable independent testing laboratory to perform services to be provided by Contractor.
 - 4) List of all shop drawings, product data, and samples to be submitted with respective specification or drawing number and proposed dates of submittal to Engineer. List shall be updated prior to each monthly progress payment with actual submittal dates and revised proposed dates and submitted with payment application.
- e. Within 60 days of Notice to Proceed commencement work date, Contractor shall submit following:
- 1) Samples for selection of colors.
 - 2) List of all operations and maintenance manuals to be submitted with respective specification or drawing number and proposed dates of submittal to Engineer. List shall be updated prior to each monthly progress payment with actual submittal dates and revised proposed dates and submitted with payment application.

M. Shop Drawings.

1. Shop drawing submittals shall include all descriptive data, performance characteristics, material specifications, spare parts list, drawings, piping diagrams, wiring schematics, and shall be complete and accurate to indicate item-by-item compliance with Contract Documents. Shop drawing submittals shall be coordinated, assembled, and submitted in groupings to facilitate checking related items. Contractor shall provide additional information as may be required by Engineer.
 - a. All materials of construction shall be compatible with process fluid regardless of material specified in Contract Documents. During shop drawing review and prior to purchase of any component or associated accessory or appurtenance, materials of construction shall be coordinated with Engineer. Contractor shall obtain written confirmation from Engineer during submittal review that selected materials of construction are correct, and those correct materials which may differ from those specified. Failure of Contractor or Integrator to obtain such written confirmation from Engineer or purchase of materials prior to obtaining such written confirmation shall be at sole risk and expense of Contractor and all costs to provide compatible materials of construction with no change to Contract Price or Contract Time.

2. General Submission Requirements.
 - a. A copy of this specification section and other sections as may be required by individual specification sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. A check mark (✓) shall denote full compliance with a paragraph as a whole. A check mark shall denote full compliance with related sections in their entirety. If deviations from specifications are indicated, and therefore requested by Contractor, each deviation shall be underlined and denoted by a number in margin to right of identified paragraph, referenced to a detailed written explanation of reasons for requesting deviation. Engineer shall be final authority for determining acceptability of requested deviations. Remaining portions of paragraph not underlined shall signify compliance on part of Contractor with specifications. Failure to include a copy of marked up specification section(s), along with justification(s) for any requested deviations to specification requirements, with submittal shall be sufficient cause for rejection of entire submittal with no further consideration.
 - b. A copy of Contract control diagrams, process and instrumentation diagrams, mechanical layout drawings, and other relevant documents relating to submitted equipment, with addendum updates that apply to equipment in this section, marked to show specific changes necessary for equipment proposed in submittal. If no changes are required, drawing or drawings shall be marked "no changes required". Failure to include copies of relevant drawings with submittal shall be cause for rejection of entire submittal with no further review.
 - c. Drawings showing plan, elevation, appropriate cross sections of equipment being provided and anchor bolt locations when applicable.
 - d. Complete engineering data including, but not limited to, all pertinent engineering calculations, descriptive data, material specifications, equipment weights, loads imparted on supporting structures, piping diagrams, instrumentation diagrams, and wiring diagrams, as appropriate, to support design of equipment being provided.
 - e. Paint system data where applicable.
 - f. Pump performance curves in accordance with Section 43 21 05 where applicable.
 - g. Motor test data and all other information necessary to show compliance with Section 11 05 13 where applicable.
3. Identify field dimensions. Show relation to adjacent or critical features, Work or products.
4. Submit quantity of hard and digital copies as specified herein. Additional copies shall not be processed.
5. Submit pdf to Engineer.
6. Submittals shall bear Contractor's stamp, signed or initialed to each submittal certifying that review, verification of Products required, field dimensions, adjacent construction Work, installation requirements, and coordination of information, is in accordance with requirements of Work and complies with Contract Documents. Submittals without Contractor's stamp shall not be reviewed and shall be returned to Contractor for proper resubmission.

N. Product Data.

1. Submit in conformance with this Section and requirements for Shop Drawings, above.
 2. Submit pdf to Engineer.
 3. Mark each copy to identify pertinent products, models, options, and other data, referenced to specification number and article number. Supplement or modify manufacturers' standard data, drawings, and diagrams, to provide information unique and specifically applicable to this Project. Delete or otherwise cross out information not pertinent or applicable to submittal. Provide additional information as may be required by Engineer.
 4. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
 5. Provide manufacturer's preparation, assembly and installation instructions as specified in this Section and individual sections of these Contract Documents.
- O. Samples and Field Samples.
1. Submit samples to illustrate functional and aesthetic characteristics of Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing Work.
 2. Submit samples of finishes from full range of manufacturers' standard colors selected textures and patterns for Engineer's selection, except when more restrictive requirements are specified, in which case custom colors, textures, patterns, or finishes shall be provided for review.
- P. Manufacturer's Installation Instructions – Submit in conformance with this Section and requirements for Shop Drawings, above.

1.14 CONSTRUCTION PHOTOGRAPHS

- A. Photography.
1. Provide digital photographs of Site and construction throughout progress of Work.
 2. Deliver digital files monthly with each Application for Payment on flash drive. Catalog and index in chronological sequence; provide table of contents.
 - a. Provide two (2) flash drives, one for Owner and one for Engineer.
 3. Digital image shall include date and time stamp.
 4. Photograph filename shall identify subject and orientation of view (for example, "Sedimentation Tank Foundation, looking north").
 5. Contractor shall pay costs for specified photography. Parties requiring additional photography or prints shall pay Contractor directly for additional work.
 6. Contractor shall have entity performing photography and videos provide a release to Owner at end of Project that all photos and videos shall become property of Owner and that Owner is entitled to unrestricted use of said videos and photographs for any purpose and in any manner Owner chooses.
 7. Contractor shall also have entity performing photography and videos provide a release to Owner at end of Project that none of photos and videos taken shall be used in any manner whatsoever by entity nor shall any copies/originals of said photographs or videos be

provided by entity to anyone else but Owner without express written permission of Owner in advance of such use or before providing said copies/originals.

- B. Digital Photographs (non-aerial).
 - 1. Full color.
 - 2. Film – digital. Digital imagery shall be 10 mega-pixel or better quality.

1.15 QUALITY CONTROL

- A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Verify that field measurements are as indicated on shop drawings or as instructed by manufacturer.
- D. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- E. Comply with specified standards as a minimum quality for Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- G. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- H. References and Standards.
 - 1. Conform to reference standard by date of issue current on date for receiving bids, except where a specific date is established by code. Where referred to in these Contract Documents, published regulations, specifications, codes, or standards shall be followed or complied with as if they were incorporated herein in their entirety, as applicable to Work of these Contract Documents and to extent that they do not conflict with specific requirements contained in these Contract Documents.
 - 2. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
 - 3. No provision of any standard, specification, manual, code, or instruction shall be effective to change duties and responsibilities of Owner, Contractor, Engineer, or any of their subcontractors, nor shall these be effective to assign to Owner, Contractor, Engineer, or any of their subcontractors, or any of their consultants, agents, employees any duty or authority to supervise or direct providing or performance of Work or any duty or authority to undertake responsibility inconsistent with any provisions of Contract Documents.
- I. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- J. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

K. Adjust products to appropriate dimensions; position before securing products in place.

1.16 LABORATORY TESTING SERVICES

A. Section and Payment

1. Contractor shall employ and pay for services of an independent testing laboratory to perform following special inspections, inspections, and testing:
 - a. Compaction testing. for foundations and other structural elements.
 - b. Concrete consistency, air content, compressive test cylinder casting and compression testing specified in section 03 31 00 of these specifications.
 - c. Sieve analysis and proctor tests of proposed backfill material (except that Contractor shall conduct initial testing to determine suitability as described on Drawings.
 - d. Steel inspections including visual inspection of welds, weld testing, visual inspection of bolts, and determination of metal type and gauge thickness.
 - e. Paving tests, including those described in Sections 32 11 00, 32 12 00, and 32 13 13.
 - f. Other tests as ordered by Engineer not due to deficiencies of Contractor or his subcontractors.
2. Contractor shall furnish required labor, facilities, tools, equipment, compressed air, water and electric power, and as necessary a reputable independent testing laboratory, to conduct following tests:
 - a. Hydrostatic and/or pressure tests on installed utilities, process piping, valves, air piping, tanks, and structures in accordance with individual Sections of Specifications.
 - b. Disinfection of water lines, process piping, and related facilities and collect necessary samples to be provided to Owner for analysis to verify proper disinfection in accordance with individual Specification Sections.
 - c. All startup, field, performance, and other tests required to verify compliance with Contract Documents of equipment and materials of a manufacturer, fabricator, supplier, or distributor incorporated into Work or proposed to be incorporated into Work or required for pre-approval prior to purchase as described in individual specifications, this Section, and Section 01 77 13.
 - d. Testing and analysis of materials for pre-installation approval such as concrete mix designs (including, but not limited to, soundness tests, sieve analysis, shrinkage tests and alkali aggregate reactivity tests), sieve and proctor tests of proposed granular fill materials, and paving materials.
 - 1) Results of Contractor's testing shall be furnished to Engineer and Owner at time of request for pre-installation approval.
 - 2) Even after testing by Contractor, Owner reserves right to test concrete mix designs (including, but not limited to, soundness tests, sieve analysis, shrinkage tests and alkali aggregate reactivity tests).
 - e. Any specialized testing of manufactured materials or equipment, such as pipe certifications, steel certifications, pump certifications, etc. shall be provided by Contractor or manufacturer of material or equipment.

- f. Contractor shall pay all costs associated with hydrostatic/pressure tests, disinfection sampling, and equipment startup, field, performance, and other testing and equipment testing described in Divisions 26, 33, and 40.
 - g. Contractor shall employ and pay for services of an independent testing laboratory to perform all other testing not specifically defined in this Section to be provided by Owner but required to be performed by Contract Documents.
 - h. Other materials and workmanship requirements specified in these Contract Documents, unless otherwise noted, including other tests as ordered by Engineer due to deficiencies of Contractor or his subcontractors.
 - i. Contractor shall submit results of all testing to Engineer and Owner within 7 days of receiving results. Submittals shall conform to this Section.
 - j. In event testing performed by Contractor's laboratory, or another entity, indicates Work performed by Contractor does not fully comply with requirements of Contract Documents, any costs associated with re-testing regardless of entity performing re-testing shall be full responsibility of Contractor.
 - k. Material for testing shall be supplied by Contractor, and Contractor shall assist laboratory or other testing entities in obtaining samples. Contractor shall dispose of and clean up all excess material.
3. Should Contractor employ any laboratory to conduct testing required to be performed by Contractor, laboratory shall be acceptable to Owner and Engineer. Submit name of laboratory to Engineer at least no later than 30 days after Notice to Proceed.
 - a. Employment of a testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.
 4. Owner shall provide name of laboratory employed by Owner to Contractor at least 14 days prior to any services being required. Contractor shall inform Owner and Engineer at least 30 days prior to first time when Owner's laboratory needs to provide services.
 5. Contractor shall be responsible for coordinating required testing with laboratory employed by Owner.
 6. Testing, transporting, and storage of material to be tested shall conform to applicable standards of care for industry.
 7. Contractor shall not employ same laboratory as one chosen by Owner for this project for any testing conducted by Contractor.

B. Laboratory Reports.

1. After each inspection and test, Testing Laboratory shall promptly submit laboratory report to Engineer, resident project representative (RPR), Owner, and Contractor. If test results indicate failure to conform to specified requirements, Testing Laboratory shall immediately transmit results to Engineer, RPR, and Contractor via facsimile or electronic mail. Submit reports within 7 days of performing tests. Report shall include:
 - a. Date issued.
 - b. Project title and number.

- c. Name of field tester or inspector.
 - d. Date and time of sampling or inspection.
 - e. Name of individual performing test.
 - f. Identification of product and Specifications Section.
 - g. Location in Project.
 - h. Type of inspection or test.
 - i. Record of temperature and weather conditions when sample was taken, tested, and inspected.
 - j. Date of test.
 - k. Results of tests and any observations made during sampling or testing.
 - l. Degree of compliance with Contract Documents.
 - m. Recommendations on retesting and re-inspecting.
2. Reports shall also indicate that materials were tested in accordance with applicable edition of applicable Building Code and Specifications, and shall state whether materials passed or failed to meet those requirements. Engineer may select items and determine how they shall be selected. In no case shall vendor select items to be tested.

C. Contractor Responsibilities.

1. Deliver to laboratory at designated location, adequate samples of materials proposed for use which require testing, together with proposed mix designs.
2. Cooperate with laboratory personnel, and provide access to Work.
3. Provide equipment, tools, storage, and assistance necessary for proper sampling and testing and as may be requested by laboratory, Engineer, or Owner.
4. Provide incidental labor and facilities to provide access to Work to be tested, to obtain and handle samples at Site, or at source of products to be tested, to facilitate tests and inspections, and for storage and curing of test samples.
5. Notify Engineer and/or resident project representative, Owner, and laboratory 72 hours prior to expected time for operations requiring testing and inspection services, including concrete.
6. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's own use.
7. Retesting required because of non-conformance to specified requirements shall be performed by same independent firm(s) which performed initial tests and inspections, whether employed by Owner or Contractor.
8. Payment for any required retesting shall be by Contractor with no consideration of changing Contract Price or Contract Time regardless of whether initial testing was paid for by Owner or Contractor.

9. Contractor shall be responsible for, and shall pay for:
 - a. Additional testing expenses resulting from Contractor's failure to advise Engineer and independent firm 72 hours in advance of operations.
 - b. Additional testing expenses resulting from changes in Contractor's schedule after independent firm has been notified that testing is required, canceled or modified.
 - c. Expenses and delays resulting in Work from Contractor's failure to provide adequate notice to Owner or Engineer of upcoming Work requiring field testing and resulting inability to arrange for testing to accommodate Contractor's schedule and subsequent deferment or rescheduling necessary until required testing services are available. Contractor shall make no claim for damages or delay as a result of any such deferral or rescheduling.

1.17 MATERIAL AND EQUIPMENT

- A. Related Sections – specification sections listed under “related sections”, “related documents”, or other similar headings, of individual specification sections shall be an integral part of those specification sections and Contractor shall be responsible for providing those related sections to equipment manufacturers and for complying with all requirements described therein.
- B. Room and Area Classifications.
 1. Room and area classifications are shown on Contract Documents. Definitions of those designations are as follows and Contractor shall adhere to requirements as described herein:
 - a. Corrosive Area: Containment area or area exposed to delivery, storage, transfer, or use of chemicals and/or areas exposed to hydrogen sulfide gas. Interior areas shall indicate, if appropriate, area group classification under applicable International Building Code (e.g., H-1, H-2, H-3, H-4, or H-5).
 - b. Exterior Area: Location not protected from weather by a building or other enclosed structure.
 - c. Interior Dry Area: Location inside building or structure not subject to wet conditions.
 - d. Interior Wet Area: Location inside building or structure where floor is sloped to floor drains or gutters and is subject to liquid spills or washdown, or where wall, floor, or roof slab is common to a water-holding or earth-retaining structure.
 - e. Submerged: Location at or below top of wall of open water-holding structure, such as a basin or channel, or wall, ceiling or floor surface inside a covered water-holding structure, or exterior below grade wall or roof surface of water-holding structure, open or covered.
 - f. Hazardous: Location rated by presence of flammable gases or vapors in air, such as natural gas or gasoline vapor. When these materials are found in atmosphere, a potential for explosion exists, which could be ignited if an electrical or other source of ignition is present. Locations further defined as NEC Class I, Division 1 or 2, Group C & D areas.
 - 1) Any controls panels or other electrical cabinets located in a hazardous area shall be rated NEMA 7 (indoor) or NEMA 8 (outdoor) regardless of what might be specified elsewhere in these Contract Documents. Contractor shall make necessary adjustments with no change to Contract Price or Contract Time.

- g. Unclassified: None of above.
- h. Any area or space not listed in table above and defined as potentially hazardous by latest edition of NFPA 820 and not otherwise classified elsewhere in Contract Documents shall be classified as a Class I, Division 1 (Groups C and D) area. Contractor shall provide materials and equipment for those areas in full compliance with applicable codes and these Contract Documents for a Class I, Division 1 (Groups C and D) environment.
 - 1) Any area or space not listed in table above and not classified as hazardous and not otherwise classified elsewhere in Contract Documents shall be classified based on area classification definitions shown above. Contractor shall provide materials and equipment for those areas in full compliance with applicable codes and these Contract Documents.

C. Performance Affidavits.

1. Contractor shall submit manufacturer's Performance Affidavits for equipment to be furnished as indicated in individual equipment specification section and in accordance with this Section.
2. By these affidavits, each manufacturer must certify to Contractor and Owner, jointly, that he has examined Contract Documents and that equipment, apparatus or process he offers to furnish shall meet in every way performance requirements set forth or implied in Contract Documents. Equipment design, manufacturing, and assembly specifications are an integral part of performance affidavit. Contractor must transmit to Engineer copy of affidavit given him by manufacturer or supplier along with initial Shop Drawing submittals. Performance Affidavit must be signed by an officer of basic corporation, partnership or company manufacturing equipment and witnessed by a notary public. Shop Drawings, if required, shall not be reviewed prior to receipt of an acceptable Performance Affidavit, which shall have following format:

Addressed to: (Contractor) and Location of Project

Reference: (Project Name)

Text: “ _____ (Manufacturer's Name) _____ has examined Contract Documents and hereby certifies that _____ (Product) _____ described in Section(s) _____ of Contract Documents:

- a. Product meets in every way performance requirements and design specifications set for in Contract Documents.
- b. Contract Documents show and/or describe all equipment, components, accessories, and connections necessary for a complete operating system.
- c. Manufacturer shall provide within 10 days of Notice of Proceed commencement work date a list of any equipment, components, accessories, or connections which are required for a complete operating system but are not shown or described in Contract Documents.
- d. Manufacturer has unitary responsibility over product including components not of his manufacture that are within manufacturer's scope of supply.”

Signature: Corporate officers shall be Vice President, or higher (unless statement authorizing signature is attached).

Notary: Signature(s) must be notarized.

D. Manufacturer's Certificates.

1. When specified in individual Specification Sections or as required by this Section, submit manufacturer's certificate to Engineer for review, in quantities specified for Product Data. Manufacturer's certificates are not required when a Performance Affidavit is required.
2. Certify that all materials used in Work comply with all specified provisions or exceed said provisions. Submit supporting reference data, affidavits, and certifications as appropriate. Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer. Certification shall not be construed as relieving Contractor from responsibility to furnish satisfactory materials if, after tests are performed on selected samples, material is found not to meet specified requirements.
3. Show on each certification name and location of Work, name and address of Contractor, quantity and date or dates of shipment or delivery to which certificate applies, and name of manufacturing or fabricating company. Certification shall be in form of a letter or company-standard forms containing all required data. Certificates shall be signed by an officer of manufacturing or fabricating company.
4. In addition to above information, all laboratory test reports submitted with certificate of compliance shall show date or dates of testing, specified requirements for which testing was performed, and results of test or tests.
5. In addition to manufacturer's certificates, when specified in this Section or individual Specification Sections, submit manufacturer's performance affidavit for equipment to be furnished for this Project. Affidavits shall be of format and content prescribed in this Section, and shall be included with shop drawing or product data submittal for item of equipment to be furnished.

E. Transportation and Handling.

1. Deliver products in accordance with accepted current Progress Schedule and coordinate to avoid conflict with Work and conditions at Site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete. Allow time for inspection prior to installation.
2. Coordinate deliveries to avoid conflict with Work, conditions at Site, work of subcontractors, work of Owner, and availability of personnel and handling equipment.
3. Transport and handle materials and equipment in accordance with manufacturer's instructions and by methods to avoid Product damage; deliver in undamaged condition in manufacturer's original unopened containers or packaging, dry, with identifying labels intact and legible. Labels shall clearly identify contents and net weight of container.
 - a. Where delivery in original manufacturer packaging is not practical, provide cover and shielding for all items with protective materials to keep them from being damaged.
4. Stiffeners shall be used where necessary to maintain shapes and to give rigidity. Ship equipment, material, and spare parts complete, except where partial disassembly is required by transportation regulations, or for protection of components.
5. All equipment shall be suitably boxed, crated, or otherwise protected during transportation.
6. Promptly inspect shipments at time of delivery to ensure that materials and equipment comply with Project specifications, requirements and shop drawings, quantities are

correct, and products are undamaged. Equipment and materials damaged or not meeting Project requirements shall be immediately returned for replacement or repair by manufacturer. Contractor shall not be permitted to make repairs. Notify Engineer or any products received in damaged conditions or not meeting Project requirements. No damaged products or products not meeting Project requirements shall be installed. Owner and Engineer, in conjunction with equipment manufacturer, shall decide if equipment shall be repaired or replaced.

7. Provide equipment and personnel to handle materials and equipment by methods to prevent soiling, disfigurement, or damage. Protect sensitive equipment and finishes against impact, abrasion, and other damage.
8. Lifting and handling drawings and instructions furnished by manufacturer or supplier shall be strictly followed. Slings and chains shall be padded as required to prevent damage to protective coatings and finishes.
9. Items such as nonmetallic pipe, nonmetallic conduit, etc. shall be handled using nonmetallic slings or straps.
10. Pack all spare parts in separate containers bearing labels clearly designating contents and equipment for which they are intended.
11. Deliver spare parts at same time and primary equipment. Contractor shall deliver all spare parts to Owner prior to Substantial Completion.
12. Prior to delivery to Site of any material listed as toxic or hazardous, Contractor shall submit to Owner Material Safety Data Sheet (MSDS) for material. In addition, one (1) copy of MSDS for each item of material shall be prominently posted on outside of storage area in a manner which protects sheets from weather.

F. Storage and Protection.

1. Store and protect materials and equipment from loss or damage in accordance with manufacturer's instructions.
2. Store with seals and labels intact and legible.
3. Provide equipment and personnel to store materials and equipment by methods to prevent soiling, disfigurement, or damage.
4. During interval between delivery of equipment to Site and installation, all equipment whether no or pre-existing Owner equipment being relocated, unless otherwise specified, shall be stored in an enclosed space affording protection from weather, dust and mechanical damage and providing favorable temperature, humidity and ventilation conditions to ensure against equipment deterioration. Manufacturer's recommendations shall be adhered to in addition to these requirements.
5. Finished iron or steel surfaces not required to be painted, such as flange faces, shall be properly protected to prevent rust, corrosion and damage.
6. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 60 degrees F. Protect electrical, instrumentation, and control products, and insulate against moisture, water, and dust damage. Connect and operate continuously space heaters furnished in electrical equipment.
7. Unless specified otherwise in individual equipment or material specification, equipment and materials to be located outdoors may be stored outdoors if protected against moisture

condensation. Equipment shall be stored at least 6 inches above ground. Temporary power shall be provided to energize space heaters or other heat sources for control of moisture condensation. Space heaters or other heat sources shall be energized without disturbing sealed enclosure.

8. Cover materials and equipment subject to deterioration with impervious sheet covering. Tarps and other coverings shall be supported above stored equipment or materials on wooden strips to provide ventilation under cover and minimize condensation. Outdoor supports shall be sloped to prevent ponding of water.
9. Contractor shall be responsible for providing satisfactory storage facilities which are acceptable to Engineer. In event that satisfactory facilities cannot be provided on Site, satisfactory warehouse, acceptable to Engineer, shall be provided by Contractor for such time until equipment, materials, and products can be accommodated at Site.
10. Store loose granular materials on solid, flat surfaces in a well-drained area. Prevent mixing with foreign matter.
11. Provide lubricants and perform initial lubrication and all subsequent lubrication until Substantial Completion. Lubricants and lubrication shall be in accordance with equipment manufacturer's instructions.
12. Limit size and maintain stockpiles of construction materials in such a manner that they shall not block existing drainage or be hazardous to pedestrian or vehicular traffic in any way. Limitation relative to stockpiling of construction materials shall be controlled by Owner and Engineer. In event Contractor fails to satisfactorily modify his operations relative to stockpiling of construction materials upon order of Owner or Engineer, all Work except clean-up operations shall be stopped, and remain stopped, until order of Owner or Engineer has been complied with.
13. Unless otherwise permitted in writing by Engineer, building products and materials such as cement, grout, plaster, gypsum board, particleboard, resilient flooring, acoustical tile, paneling, finish lumber, insulation, wiring, etc., shall be stored indoors in a dry location. Building products such as rough lumber, plywood, concrete block, and structural tile may be stored outdoors under a properly secured waterproof covering.
14. Mechanical, electrical, and plumbing equipment shall not be staged or stored outdoors unless equipment intended for outdoor use.
15. All piping and ducts shall be stored to keep them free of dirt and debris.
16. Protect plumbing fixtures and brass- or chromium-plated trim, valves, and piping from damage. Cover fixtures during work of finishing trades.
17. Cover factory finished equipment during work of finishing trades, such as fan coils, fin tubes, etc.
18. Protect cooling and/or heating coils with temporary filter media during construction.
19. Arrange storage of materials and equipment to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
20. Contractor shall be responsible for maintenance and protection of all equipment, materials, and products placed in storage and shall bear all costs of storage, preparation for transportation, transportation, re-handling, and preparation for installation.
21. See individual sections for special requirements.

22. Evidence of damage from water or other contaminants to any equipment, materials, products, or other elements to be incorporated into Work shall be cause for rejection of said elements.
 23. Materials and equipment shall be delivered and stored in such a manner as to not block access to public or private property, disrupt Owner's access for operation or maintenance of his facility or interfere with safety access or equipment.
 24. Unless stated otherwise in these Contract Documents, Owner has no indoor space available for storage of material or equipment.
 25. Location of Contractor's on-site storage facilities shall be coordinated with Owner. Contractor shall be responsible for unloading and moving materials and equipment and shall not assume that Owner has equipment available for that purpose.
 26. Contractor shall maintain all storage areas, and any other area where materials are being used, in a safe, orderly, neat and clean condition. Materials shall be kept in their original containers until ready for immediate use and shall be segregated. Containers shall be kept covered and only approved containers shall be used for storage, transport, mixing or cleaning. Empty containers shall be disposed of off-site on a regular basis. Cleaning materials and dirty rags shall not be permitted to accumulate on Site or in storage areas.
 27. Replace, at no charge to Owner, any equipment, materials, components, or appurtenances damaged or otherwise not in acceptable condition as a result of storage and delivery.
 28. All equipment, materials, components, and appurtenances are subject to inspection at any time at Engineer's or Owner's request.
 29. All equipment, materials, components, and appurtenances shall be stored in a manner to prevent warpage and distortion and, using wooden or other material acceptable to equipment manufacturer, to evenly distribute weight. Any equipment, materials, components, and appurtenances stored more than one unit high, if permitted by equipment manufacturer only, shall be stored level and evenly supported by blocks or spacers.
- G. Noise Criteria – Unless otherwise specified, noise levels for all operating equipment shall not exceed 90 dB at 5 feet from equipment and 75 dB at 50 feet from equipment when measured on A scale of a calibrated sound level meter at slow response and 70 dB when measured from adjacent property line(s). Noise criteria shall be met without use of special external barriers or enclosures.
- H. Equipment Installation.
1. Contractor shall field verify all dimensions and elevations and shall notify Engineer of any specific differences.
 2. Install all equipment strictly in accordance with written and verbal requirements and recommendations of manufacturer and in accordance with these Contract Documents. Further, install all equipment in strict conformance to equipment manufacturer's written instructions, drawings, recommendations, and all oral and written directions provided by manufacturer or their representatives who may supervise or observe Work. Conflicts of information shall be called to attention of Engineer before proceeding with Work.
 3. Provide all necessary equipment (including temporary equipment, measuring devices, etc.), materials (including temporary materials, lubricants, chemicals, etc.) and labor necessary for initial system startup, testing, and operation. Grades of oil and grease for all equipment shall be in accordance with recommendations of equipment manufacturer.

Contractor shall account for fact that many of other plant systems may or may not be online when equipment is started up and tested.

4. Contractor shall be responsible for ensuring that all equipment is rigidly and accurately anchored into position. Contractor shall be responsible for providing all necessary foundation bolts, plates, nuts, washers, and other fasteners not provided by equipment manufacturer.
5. Equipment manufacturer shall provide Contractor with engineering and technical support related to specified equipment, and participate in commissioning, startup, testing, and training of Owner's personnel as required by Contract Documents and as necessary to allow Contractor to provide a complete and operable system. Refer to other portions of this Section and individual equipment specification sections for additional details and requirements.
6. Provide jointly to Owner and Engineer, in accordance with this Section, a complete Equipment Start-up Report and Certification form found in Section 01 99 00 executed by equipment manufacturer or their approved representative stating that equipment has been properly installed, tested to their satisfaction, that all final adjustments required have been made, and equipment shall be warranted as required by individual equipment specification requirements.

I. Field Tests.

1. Preliminary and final field tests shall all be done in presence of Engineer and equipment manufacturer or their approved representative.
2. All testing instruments and gauges necessary for conducting tests shall be furnished by Contractor. Installed instruments and gauges shall be used whenever possible if calibrated and approved for purpose. Calibrate all installed instruments and gauges and attach a cloth tag showing date of calibration. Portable test equipment used in field testing shall be calibrated in presence of Engineer or suitable written evidence attesting to accuracy of equipment shall be submitted.
3. All equipment shall be tested before it is covered or insulated. All accessory equipment which may be damaged by conditions during test shall be isolated or otherwise protected.
4. Preliminary Field Tests: Preliminary tests shall be made after installation of equipment. Contractor shall furnish all labor, materials and instruments to perform all preliminary field tests of equipment. Make all changes, adjustments and replacements required to comply with requirements of Contract Documents. Demonstrate that:
 - a. Equipment is properly installed in location and orientation specified these specifications or shown on Drawings.
 - b. Units are in proper alignment.
 - c. Equipment is prepared for operation in strict accordance with Contract Documents and with manufacturer's recommendations.
5. Final Acceptance Tests: Perform final tests prior to startup. Provide services of manufacturer's representative if required by Schedule of Equipment Testing and Manufacturer's Services or in individual equipment specification section. Unless otherwise specified in detailed equipment specifications, Contractor shall furnish all labor, materials, water, air, oil, power, fuel, chemicals, test equipment, and other items required to conduct field tests, including any retests. Furnish equipment and instruments, including pressure gauges and flow meters, necessary for all acceptance tests even if that

equipment is not part of final installation. Schedule final acceptance test to consist of following checks as a minimum:

- a. That equipment is properly installed, lubricated, adjusted and aligned.
 - b. That equipment meets all specified performance requirements in every detail and performs its intended function without any unusual vibration, noise or other signs of possible malfunction, such as overloading or overheating of any parts.
 - c. Perform motor field tests as specified in Section 11 05 13. Tests shall verify that all no time while equipment was tested under specified performance requirements that motors were overloaded.
 - d. Where equipment is capable of operation in more than one mode or equipment performs more than one function, each operational mode or function shall be checked for proper performance.
 - e. All controls, both mechanical and electrical, shall be checked individually for proper connection and operation.
 - f. That there are no mechanical defects in any of parts.
 - g. All field tests shall be conducted with clean water from public water supply system. Contractor shall provide all temporary flow measurement devices as necessary to achieve accurate measurement of pumped flow during field tests.
 - h. Units can pass size of solids specified and type of liquid for which units are to be used.
6. Promptly adjust, repair, modify, or replace any components of system which fail to meet all specified requirements with no change to Contract Price or Contract Time. Retest entire system after adjustments, repairs, modifications, and replacements have been made. Repeat adjustment/repair/modification/replacement and testing procedure until all issues are resolved and system operates in full compliance with Contract Documents and equipment manufacturer's specifications and requirements and results are acceptable to Engineer. All such work shall be at Contractor's expense. Owner and Engineer shall review and approve of any modifications proposed by Contractor necessary to correct any issues prior to Work commencing.
 7. All testing and all adjustments, repairs, modifications, or replacements necessary to bring equipment into compliance with Contract Documents shall be at Contractor's expense with no change to Contract Price or Contract Time.
 8. If Contractor fails to make these correction, or if improved equipment again fails to meet guarantees or specified requirements, Owner, notwithstanding his having made partial payment for work and materials which have entered into manufacture of said equipment, may reject said equipment and order Contractor to remove it from premises at Contractor's expense.

1.18 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Contractor's Options.

1. Products Specified by Reference Standards or by Description Only: Select a product meeting those standards or description.

2. Products Specified by Naming One or More Manufacturers with a provision of substitution. Select a specified product or submit a request for substitution for a manufacturer not specifically named.
3. Products Specified by Naming Several Manufacturers: Select product of a named manufacturer meeting specifications.
4. Product specified by naming only one manufacturer: Provide product specified.

B. "Or Equal".

1. When phrase "Or Equal", "Or Approved Equal", or other similar phrases appears in Contract Documents:
 - a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor in written application is functionally equal to that named and sufficiently similar so that no change in related Work will be required, as determined from information provided by Contractor or obtained by Engineer, it may be considered by Engineer as an "or-equal" item, in which case review and approval of proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of requirements for approval of proposed substitute items.
2. No "or equal" shall be ordered, installed or utilized by Contractor until Engineer's review is complete and then only after written approval of said use is provided by Engineer to Contractor.
3. Contractor shall provide all data, including that requested by Engineer, in support of any proposed "or equal" at Contractor's expense.
4. Engineer shall be allowed reasonable time to evaluate each proposal or submittal. Engineer may require Contractor to furnish additional data about proposed item. Engineer shall be sole judge of acceptability.
5. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or equal" item, proposed material or equipment shall be considered a proposed substitute item, in which case Contractor shall abide by all requirements concerning a substitute item with no change to Contract Price or Contract Time.

C. Limitations of "Or Equals" shall be same as those for substitutions as described herein.

C. Limitations of Substitutions.

1. Submit requests for substitutions within 15 days after Effective Date of Contract, and prior to issuance of subcontracts or purchase orders. Requests made after this stipulated period shall not be considered; Contractor shall provide specified products. Requests made prior to Bid Opening date shall not be considered unless stated otherwise in product detailed specification section.
2. Requests for substitutions after stipulated time period shall only be considered in case of product unavailability or other conditions beyond control of Contractor. Contractor shall submit written evidence of product unavailability or other conditions with request for substitution.
3. Substitutions shall not be considered when indicated on shop drawings or product data submittals without separate formal request, regardless of whether request is made by prime Contractor or any subcontractors, or when acceptance shall require substantial revision of Contract Documents.

4. Do not order or install substitute products without written acceptance.
5. Only one request for substitution for each product shall be considered. When substitution is not accepted, provide specified product.
6. Engineer shall determine acceptability of substitutions.

D. Contractor's Representation.

1. In making request for substitution, Contractor represents:
 - a. He has personally investigated proposed product or method, and determined that it is equal to or superior in all respects, including performance requirements, basic function, and quality, to that specified or credit or addition offered represents a fair or superior difference in value.
 - b. He shall provide same warranty for substituted product as for product or method specified, unless substitution has a superior warranty. Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
 - c. He shall coordinate installation of accepted substitution into Work, making such changes as may be required for Work to be complete in all respects with no change to Contract Price or Contract Time.
 - d. He waives all claims for changes in Contract Price and Contract Time related to substitution which may subsequently become apparent.
 - e. Cost data is complete and includes all related cost under Contract.
 - f. He shall reimburse Owner costs incurred by Owner for review and any subsequent redesign services by Engineer, including Engineer's revisions to Contract Documents, and Engineer's assistance in connection with review by authorities when re-approval is required, if Engineer determines that item of material or equipment proposed by Contractor is a substitute item.
 - g. Proposed substitution does not affect dimensions shown on Drawings.
 - h. Any fees and royalties associated with proposed substitution shall be paid by Contractor.
 - i. Maintenance and service parts shall be locally available for proposed substitution.
 - j. Proposed substitution shall have no effect on applicable codes.

E. Requests for Substitutions.

1. All submittals shall comply with this Section.
2. Submit digital request for substitution to Engineer for review and approval.
3. Limit each request to one product. Requests concerning more than one product shall be rejected and not reviewed.
4. Submit request that contains complete data substantiating compliance of proposed substitution with Contract Documents. Submittals shall include, as appropriate, following information on proposed substitution:

- a. Complete dimensional information and technical data, including drawings, samples, and laboratory tests.
 - b. Complete information on changes to drawings, specifications, and other elements of Work which proposed substitution shall require for its proper installation.
 - c. Complete side-by-side comparison of qualities of proposed substitution with that specified. Comparison shall definitively show that substitution is at a minimum equivalent to or superior in terms of quality, performance, and appearance than specified product. Samples and other substantiating data shall be provided for review. Clearly mark manufacturer's literature to indicate equality in performance. Differences in quality of materials and construction shall be indicated and justified. Failure to provide side-by-side comparison shall result in substitution being rejected without review.
 - d. Effect on construction schedule.
 - e. Cost data comparing proposed substitution with product specified. Provide an itemized estimate of all costs or credits that shall result directly or indirectly from acceptance of proposed substitution.
 - f. Any required license fees or royalties.
 - g. Availability of maintenance service, and source of replacement materials.
 - h. List of names, locations, and telephone numbers of three (3) similar projects on which proposed product was used, date of installation, Engineer's name and telephone number, and Owner's name and telephone number.
5. Identify product by Specifications section number. Provide manufacturer's name and address, trade name of product, and model or catalog number. List fabricators and suppliers as appropriate.
 6. Attach shop drawing and other product data as specified herein.
 7. Engineer shall review requests for substitutions with reasonable promptness, and notify Contractor, in writing, of decision to accept or reject requested substitution. Failure to object to a listed item shall not constitute a waiver of requirements of Contract Documents.

1.19 PROTECTION OF EXISTING FACILITIES

- A. Contractor shall be responsible for safety of existing structures, infrastructure, and all other existing elements on project site whether above or below ground level, and shall use all precaution to avoid damage to such elements. Wherever water, sewer lines, or other underground utilities or above-grade utilities are broken, damaged or disconnected, they shall be replaced promptly with a minimum interruption of service and incident shall be recorded and reported to Engineer, Owner, and utility owner. Locations of existing utilities shown on plans are approximate and for Contractor's assistance only. Contractor shall be responsible for determining exact locations of all existing utilities.
- B. Interference with any property owned and operated by Owner and utilities furnishing water, electricity, natural gas, transportation and communication service, shall have approval of existing company or department as to methods and manner of construction used by Contractor, and Contractor shall pay all costs incidental to maintenance of service and for replacement of poles, anchors, or other existing works disturbed by construction of this Work.

- C. Contractor shall, at his own cost and expense, sustain in their places and permanently protect from direct or indirect injury any and all utilities, structures and property in vicinity of his Work, whether over or underground, or which appear within trench or excavations, and Contractor shall assume all costs and expenses for direct or indirect damage which may be occasioned by injury to any of them.
- D. All trees, shrubs and like at Site shall be preserved and protected by Contractor, except those that are specifically indicated to be removed with no change to Contract Price or Contract Time.
- E. Contractor shall protect adjacent and other property from damage and shall repair and restore to satisfaction of Owner and other property owners any and all existing facilities, structures, equipment, surfaces, finishes or other features which may become damaged or disturbed as a result of Work of this Contract or activity of his personnel.
- F. Contractor shall replace all culverts, pavement, driveways, fences, shrubs, lawns, trees, and any other public or private property damaged as a result of Work performed under this Contract. All such replacement shall be done in accordance with applicable specifications and no separate or extra payment shall be made. In all cases, said replacement shall be at least equal to original conditions.
- G. For any property damaged by Contractor during Work, obtain from property owner an executed Certificate of Property Restoration found in Section 01 99 00 and provide to Engineer prior to Substantial Completion.
- H. Contractor shall excavate, locate and verify existing utilities in advance of his operations.
- I. Contractor shall be responsible for removal of any materials necessary to gain access to sanitary and storm sewer manholes. Any pavement or soil removed from manhole covers shall be replaced unless otherwise directed by Engineer.
- J. Contractor shall take precautions to prevent materials and/or debris from entering existing sanitary and storm sewer systems. Any damage to existing pipes or manholes caused by or resulting from Contractor's operations shall be repaired with no change to Contract Price or Contract Time.
- K. Contractor shall restore all surfaces, including fine grading and restoration of all physical features, within completion date of Contract. If weather conditions do not permit permanent restoration of surfaces within this time period, Contractor shall complete permanent restoration of surfaces at earliest date weather conditions permit completion of this Work.
- L. In event Contractor fails to expeditiously complete required permanent restoration to satisfaction of Owner, Owner may impose set-off against payments due to Contractor to secure reimbursement for Owner's effort and expenses to have permanent restoration provided by others
- M. Prior to construction, notify owners of existing facilities, including local Police and Fire Departments, of general scope, nature and planned progress schedule of Work.
- N. Notify owners of nearby underground facilities when excavating or blasting is to take place in a particular area, allowing them reasonable time to institute precautionary procedures or preventive measures which they deem necessary for protection of their facilities.

1.20 STARTING OF SYSTEMS

- A. System Startup.

1. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
2. Verify that tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
3. Verify that wiring and support components for equipment are complete and tested.
4. Execute startup under supervision of responsible manufacturer's representative in accordance with manufacturers' instructions.
5. Verification that all final acceptance tests have been performed.
6. Verification that all piping and valves have been properly tested, disinfected as necessary, and labeled in accordance with appropriate sections of Specifications.
7. Verification that all safety equipment is installed and fully functional.
8. Verification that all indicating and annunciating systems are installed and fully functional.
9. Verification that all utilities are operable.
10. Verification that all equipment Operations and Maintenance Instruction manuals are available to Owner. Startup shall not commence until approved manuals have been provided to Owner.
11. 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.
12. Equipment manufacturer and Contractor shall make adjustments to equipment and related appurtenances at Contractor's expense until equipment meets or exceeds specified requirements with test data to confirm compliance. If adjustments cannot be made to allow equipment to meet specified requirements, provide written explanation for why equipment that fails to meet specified requirements.
13. Complete training, instruction, and demonstrations to Owner's personnel.
14. Submit a written report with all test data, including failed testing, in accordance with this Section indicating that equipment or system has been properly installed and is functioning correctly. Submit completed "Equipment Startup Report and Certification" form found in Section 01 99 00 for each piece of equipment.

B. Demonstration and Instructions.

1. Complete demonstrations to and instructions of Owner's personnel before commencing Equipment Startup Period.
2. Coordinate demonstration and instruction schedule with Engineer and Owner for various equipment and systems.
3. Demonstrate operation and maintenance of Products to Owner's personnel prior to date of Substantial Completion.

4. Demonstrate project equipment by a qualified manufacturer's representative who is knowledgeable about Project.
5. 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.
6. Demonstrate start up, operation, control, adjustment, trouble shooting, servicing, maintenance, and shutdown of each item of equipment.
7. Amount of time required for instruction on each item of equipment and system, as well as any specialized instruction, is that specified in individual sections.
8. For each demonstration and instruction session, execute "Training Attendance Record" form found in Section 01 99 00 and provide pdf to Engineer in conformance with this Section.

C. Services of Manufacturers Representative.

1. Unless stated otherwise in individual specification sections, arrange for equipment manufacturer to furnish services of a certified and qualified representative of manufacturer to provide services described herein and elsewhere in these Contract Documents. Representative shall be a direct full-time employee of manufacturer. Manufacturer shall obtain written approval of Engineer prior to using anyone as a representative that is not a direct, full-time employee of manufacturer.
2. Factory representatives shall arrive at site with all tools, instruments, equipment, documentation or other materials necessary to perform required services.
3. Duration of visits is described in individual specification sections. Where no specific duration of visit is listed, length of time shall be such to allow equipment representative ample time to follow requirements outlined in this Section and individual technical section covering particular equipment item. Times indicated in schedule shall be actual on-site time performing indicated tasks. Travel time and time spent at site if not properly prepared or equipped to perform required service shall not be charged against allotted on-site time. If manufacturer does not fully utilize allotted time for representative, manufacturer shall provide a credit to Owner for those unused services or schedule a return of a representative for unused time during period or periods after Substantial Completion agreeable to Owner.
4. Within 30 days of Notice to Proceed, Contractor shall submit a detailed schedule of training to be performed by manufacturer's representatives in accordance with specifications for Owner's and Engineer's review. Training schedule shall identify equipment on which training needs to take place, and training dates, times, and personnel involved.
5. All training shall be performed so as to occur between 7:00 a.m. to 3:00 p.m. Eight hours of on-site service time from manufacturer's representative shall constitute one day of service. Dates and times for training shall be coordinated with Owner in advance and shall be performed on dates and at times convenient for Owner's personnel to be present.
6. Training schedule shall be updated monthly by Contractor.
7. Upon completion of training on each piece of equipment, complete Equipment Training Certification form found in Section 01 99 00.
8. Installation Service – Check and certify installation, recommend or make adjustments and change calibrations for optimum performance and supervise initial operation and field

testing of equipment. Supervise correction of any defective or faulty work before and after acceptance by Owner.

9. Final acceptance – Supervise equipment startup, field testing, final acceptance testing, and performance testing in accordance with this Section. Services shall include, as necessary, on-site presence of a qualified PLC programmer to assist in any required changes in equipment controls programming.
10. Instructions – Instruct Owner’s operating and maintenance personnel in operation and proper maintenance and repairs of equipment. A written report by representative covering instructions given shall be sent to Owner, Engineer and Contractor.
11. Certification of Equipment Compliance – Submit written certification jointly to Owner, Engineer and Contractor that equipment supplied or manufactured by their organization has been installed and tested to their satisfaction, and that all final adjustments thereto have been made. Certification shall include date of final acceptance field test, as well as a listing of all persons present during tests.

D. Materials, Supplies, and Utilities.

1. Special tools for maintenance and minor repairs, spare parts, etc. shall be furnished in accordance with other sections of Specifications. Contractor’s mechanics shall have adequate tools on hand to supplement requirements of this Section.
2. All electric and other utilities required during startup and initial operation, until issuance of Certificate of Substantial Completion, shall be provided by Contractor.
3. All consumables, including chemicals, fuel oil, parts, etc. related to any of systems to be started shall be supplied by Contractor at his cost until equipment has been successfully started, all required documentation supplied to Engineer and approved, and a Certificate of Substantial Completion issued.

E. Equipment Performance Period.

1. Unless otherwise specified in Contract Documents, each and every item of equipment shall be operated in service without failure for an Equipment Performance Period of fourteen (14) calendar days, as a condition for substantial completion. For items of equipment which are part of a system, all items of equipment in system, must undergo Equipment Performance Period simultaneously.
 - a. Equipment Performance Period may not commence until following have been completed:
 - 1) Preparation Period has been successfully completed.
 - 2) Equipment manufacturers have certified installation and provided startup reports describing equipment operates as intended and in full conformance with Contract Documents, including successful completion of Functional Test Period.
 - 3) All controls, alarms, and telemetry are operational;
 - 4) All equipment wiring, piping, etc. have been labeled;
 - 5) All safety equipment is installed and fully functional;
 - 6) All equipment-related operations and maintenance manuals have been reviewed and accepted by Engineer in accordance with this Section; and

- 7) All equipment training for Owner's personnel has been completed in accordance with this Section and individual equipment sections.
- b. Equipment and systems shall operate continuously without any kind of malfunction, failure, deviations outside established guidelines, incidents of abnormal operation, unscheduled shutdowns, or interruption to perform and shall meet all design and performance criteria specified in individual specification sections for entire Equipment Performance Period to be considered acceptable. For equipment, such as pumps, that may normally cycle on and off while in service, or equipment which is only utilized for parts of a day in normal service, Equipment Performance Period is overall in-service time, including normal off cycles.
 - c. If an item of equipment fails for any reason or in any way during Equipment Performance Period, or fails to perform in accordance with specifications during Equipment Performance Period, Equipment Performance Period shall start over from "zero" upon Contractor correcting issue(s).
 - d. Equipment manufacturer and Contractor shall make adjustments to equipment and related appurtenances at Contractor's expense until equipment meets or exceeds specified requirements with test data to confirm compliance. If adjustments cannot be made to allow equipment to meet specified requirements, provide written explanation for why equipment fails to meet specified requirements.
 - e. Contractor shall be responsible for all operation and preventive, routine and corrective maintenance of equipment during Equipment Performance Period, including responding to any alarms or failures during normal working and non-working hours, 24 hours per day, seven days per week.
 - 1) If an item of equipment or a system develops a problem or fails during Equipment Performance Period, Contractor shall immediately respond, troubleshoot and correct issue(s) or switch to a backup.
 - 2) Contractor shall provide a legible, detailed, daily maintenance and operation log for all operating equipment, from time equipment is operational until Substantial Completion. Documented data shall include date, equipment description, model number, serial number, hours of operation, and maintenance schedule. Logs shall be made available for Owners and Engineers review.
 - 3) If, in opinion of Owner and Engineer, Contractor fails to respond in a timely and effective manner, and if such failure may damage other equipment or facility or adversely affect treatment process or service to public, Owner's personnel may respond and take necessary corrective action. Owner may impose set-off against payments due to Contractor to secure reimbursement for cost to Owner of any such response and action.
 - 4) Owner shall not be obligated to respond, and such response or non-response by Owner shall not relieve Contractor from liability for damage to public or private property caused by an equipment failure during Equipment Performance Period, or for making permanent repairs or corrections to failed equipment. Contractor shall not have nor make any claim against Owner for actual or alleged damages to equipment, facility or public or private property due to Owner's response or action or failure to respond or act.
 - 5) Cost of utilities consumed during Equipment Performance Period shall be borne by Owner. Disposal of process related material, such as residuals or sludge, collected or generated during Equipment Performance Period shall be by Owner. Fuel, lubricants parts and chemicals used during Equipment

Performance Period shall be provided by Contractor, unless otherwise specified or agreed to in advance.

2. Equipment Performance Testing.
 - a. One criteria for successful completion of Equipment Performance Period for all systems shall be demonstration by Contractor that equipment is capable of meeting following test criteria:
 - 1) All equipment shall demonstrate that they meet or exceed design criteria as specified in their individual specification sections.
 - b. Cost of all testing associated with this Equipment Performance Period until successful completion shall be borne by Contractor. Contractor shall be responsible for providing all necessary test equipment, including consumables and equipment not available at facility, to verify compliance with specified test criteria.
 - 1) Testing shall be performed by Contractor's personnel under direct supervision of Owner's personnel.
3. During Equipment Performance Period, Contractor shall operate equipment in various modes or combinations and process variations as described below. This Work shall include, when practical, simulation of extreme conditions so as to check response of control devices, bypass functions, standby power generators, pumping cycles, etc.
4. s or combinations and process variations as described below. This Work shall include, when practical, simulation of extreme conditions so as to check response of control devices, bypass functions, standby power generators, pumping cycles, etc.

F. Services of Manufacturers Representative.

1. Unless stated otherwise in individual specification sections, arrange for equipment manufacturer to furnish services of a certified and qualified representative of manufacturer to provide services described herein and elsewhere in these Contract Documents.
 - a. Qualifications of Manufacturer's Representative.
 - 1) Representative shall be a direct full-time employee of manufacturer and subject to approval of Owner and Engineer. Representative shall be completely knowledgeable and formally trained in manufacturing, installation, operation, and maintenance of equipment and shall be authorized to make required compliance certification. Manufacturer shall obtain written approval of Engineer prior to using anyone as a representative that is not a direct, full-time employee of manufacturer.
 - a) A sales representative does not qualify as a representative, unless documentation is provided to Engineer as described herein showing that this person has been specifically and formally trained by manufacturer in installation, operation, and maintenance of equipment and is authorized to make required compliance certification.
 - 2) Where equipment has significant process complexity, furnish services of engineering personnel knowledgeable in process involved and function of equipment.
 - b. Contractor shall submit no less than 30 days before first manufacturer's representative is required to be onsite a list of all manufacturers' representatives to

be utilized for this Project. Along with list, Contractor shall provide written certification from each manufacturer that their proposed representative(s) have been trained in installation, operation, and maintenance of equipment and are authorized to make required compliance certification(s).

2. Manufacturer representatives shall arrive at site with all tools, instruments, equipment, documentation or other materials necessary to perform required services.
3. Time period for supervision and instructions is stated in individual equipment specification sections. Where no specific duration of visit is listed, length of time shall be such to allow manufacturer's representative ample time to follow requirements outlined in this Section and individual technical section covering particular equipment item. Times indicated in schedule shall be actual on-site time performing indicated tasks. Travel time and time spent at site if not properly prepared or equipped to perform required service shall not be charged against allotted on-site time. If manufacturer does not fully utilize allotted time for representative, manufacturer shall provide a credit to Owner for those unused services or schedule a return of a representative for unused time during period or periods after Substantial Completion agreeable to Owner.
4. Owner and Engineer shall have right to witness activities of manufacturers' representatives during installation, testing, all three periods of equipment/system startup, and adjustment.
5. Owner reserves right to video tape, at his expense, on-site activities of manufacturers' representatives, including training. Neither Contractor nor equipment supplier or manufacturer shall be entitled to any change in Contract Price or Contract Time as a result of Owner's videotaping. It is understood that videotaping, if performed, shall be strictly for Owner's use in training its employees and that video tapes shall not be made available by Owner to any other party. Owner shall provide duplicate video tapes of representative's activities, if requested by respective supplier or manufacturer, at supplier or manufacturer's expense.
6. Within 30 days after Notice to Proceed commencement work date, Contractor shall submit a preliminary schedule of training to be performed by manufacturer's representatives in accordance with specifications for Owner's and Engineer's review. Schedule shall list equipment on which training needs to take place.
 - a. Training schedule shall be updated monthly by Contractor.
7. All training shall be performed so as to occur between 7:00 a.m. to 3:00 p.m. Eight hours of on-site service time from manufacturer's representative shall constitute one day of service. Dates and times for training shall be coordinated with Owner in advance and shall be performed on dates and at times convenient for Owner's personnel to be present and may have to be scheduled outside of Contractor's normal working hours.
8. Training schedule shall be updated monthly by Contractor.
9. Upon completion of training on each piece of equipment, complete Equipment Training Certification form found in Section 01 99 00.
10. Contractor shall provide manufacturer with a minimum of 14 calendar days, or more as may be required by equipment manufacturer, prior to manufacturer's services being required. Contractor shall be responsible for any delays and any additional time required for manufacturer's representative to resolve equipment installation and/or operation problems due to a lack of coordination between supplied equipment and Contract Documents such as, but not limited to, dimensions, electrical problems or performance.

11. Arrange for manufacturer's representative to visit Sites on occasions after Substantial Completion if required by individual Specification Sections. Purpose of these visits shall be to review equipment operation, assist operators in correcting operational problems, basic inspection of equipment, and additional plant personnel training.
12. Installation Service: Check and certify installation, recommend or make adjustments and change calibrations for optimum performance and supervise initial operation and field testing of equipment. Supervise correction of any defective or faulty work before and after acceptance by Owner. Provide services during Preparation Period as described herein.
13. Final acceptance – Supervise all three periods of equipment/system startup in accordance with this Section. Services shall include, as necessary, on-site presence of a qualified PLC programmer to assist in any required changes in equipment controls programming. Provide services during Functional Test Period as described herein.
 - a. Startup reports shall document full compliance with Contract Documents and clearly identify any deviations from requirements of Contract Documents.
 - b. Startup Report shall include measured operating parameters applicable to equipment, such as current draw per phase, pressure, RPM, flow, temperature, etc. to clearly show compliance with requirements of Contract Documents.
14. Instructions: Instruct Owner's operating and maintenance personnel in operation and proper maintenance and repairs of equipment during Functional Test Period. A written report by manufacturer's representative covering instructions given shall be sent to Owner, Engineer and Contractor.
 - a. Instructional and training services by equipment manufacturer's representative shall include following:
 - 1) Provide all instruction as required to ensure understanding of all operating and maintenance procedures by Owner designated personnel.
 - 2) Instruct Owner's personnel in operation and maintenance of equipment and systems. Provide all necessary instruction to satisfaction of Owner.
 - 3) Explain use of Operating and Maintenance Manuals.
 - 4) Tour building areas involved and identify:
 - a) Maintenance and access points.
 - b) Control locations and control equipment.
 - 5) Explain Operating Sequences.
 - a) Identify location and show operation of switches, valves, etc., used to start, stop, and adjust systems.
 - b) Explain use of flow diagrams, operating sequences, diagrams, etc.
 - c) Demonstrate operation through complete cycle(s) and full range of operation in all modes, including testing and adjusting relevant to operation.

- 6) Explain use of control equipment, including temperature settings, switch modes, available adjustments, reading of gauges, and functions that must be serviced only by authorized manufacturer's representative.
 - 7) Explain Trouble Shooting Procedures.
 - a) Demonstrate commonly occurring problems.
 - b) Note procedures which must be performed by manufacturer's personnel.
 - 8) Explain Maintenance Procedures and Requirements.
 - a) Point out items requiring periodic maintenance.
 - b) Demonstrate typical preventive maintenance procedures and recommend typical maintenance intervals.
 - c) Demonstrate other commonly occurring maintenance procedures not part of preventive maintenance program.
 - d) Identify maintenance materials to be used.
 - 9) Furnish all special tools (if any) and/or test equipment required for proper instruction of Owner's personnel. Special tools and/or test equipment shall be distributed in "sets" with each two participants having a "set" to Work with and retain upon completion of instruction. Each participant shall sign for their special tools at start of instruction session, and copies of assignment documents shall be provided to Engineer.
15. Certification of Equipment Compliance: At completion of Preparation Period and Functional Test Period, and Equipment Test Period as required, submit written certification jointly to Owner, Engineer and Contractor that equipment supplied or manufactured by their organization has been installed and tested to their satisfaction, and that all final adjustments thereto have been made. Certification shall include date of final acceptance field test, as well as a listing of all persons present during tests.
16. If manufacturer's representative needs to connect a computer to a PLC connected to Owner's data network, representative shall comply with following and any other stipulations required by Owner:
- a. Representative's computer shall have latest versions of operating systems and most up to date virus protection software. If these requirements cannot be adhered to or verified, PLC shall be disconnected from network prior to connection to any external computer.
 - b. Contractor shall be responsible for any costs incurred by Owner due to introduction of any malicious software onto Owner's network due to failure to fully comply with these requirements.
17. Manufacturer shall provide quantity of representatives for durations indicated and at time intervals described in individual specification sections, as required, after substantial completion. If not specified in individual specification sections, additional services of manufacturer's representative after substantial completion shall not be required.
18. Demonstration and Testing.
- a. Demonstrate operation and maintenance of equipment to Owner's personnel before commencing Equipment Performance Period.

- b. Coordinate demonstration and instruction schedule with Engineer and Owner for various equipment and systems. Attend coordination meetings convened by Engineer.
- c. At least two weeks prior to proposed training, Contractor shall submit for Owner's review and approval a training outline or lesson plan, along with operations and maintenance manual table of contents, clearly indicating subject matter and duration of each segment and depth of detail proposed to be presented at training session.
 - 1) Training shall follow, but not be limited to, operations and maintenance manual. No training shall be performed in absence of a previously approved lesson plan or outline.
 - 2) No training shall be performed in absence of a previously approved lesson plan or outline.
 - 3) Prior to scheduling training sessions, any and all equipment manuals, as specified elsewhere, shall be submitted to and accepted by Engineer. No training shall be performed in absence of previously approved equipment manuals.
 - 4) Training which is provided that does not follow approved lesson plans or outlines, or where manufacturer's representative is not properly prepared or qualified shall not be accepted by Owner as meeting training requirements.
 - 5) Training shall be scheduled at least two weeks in advance so as to provide Owner an opportunity to adjust Work schedules to permit all interested personnel to attend.
 - 6) Any differences in training and operations and maintenance manual shall be documented and certification provided stating that warranty will remain valid if operations staff follows either operations manual or onsite training.
- d. Demonstrate operation and maintenance of Products to Owner's personnel prior to date of Substantial Completion.
- e. Demonstrate Project equipment by a qualified manufacturer's representative who is knowledgeable about Project.
- f. For equipment or systems requiring seasonal operation, perform demonstration for other season within 6 months of initial training.
- g. 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.
- h. Demonstrate start up, operation, control, adjustment, trouble shooting, servicing, maintenance, and shutdown of each item of equipment.
- i. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- j. Amount of time required for instruction on each item of equipment and system, as well as any specialized instruction, is that specified in individual sections, and as specified herein.
- k. For each demonstration and instruction session, execute "Training Attendance Record" form found in Section 01 99 00 and provide four (4) copies to Engineer

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 00 10

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Temporary Construction Facilities and Utilities.
 - 2. Temporary Controls.
 - 3. Erosion and Sediment Control.
- B. Related documents:
 - 1. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions (if included), and Division 01 Specifications Sections, apply to this Section.

1.02 TEMPORARY CONSTRUCTION FACILITIES AND UTILITIES

- A. In accepting Contract, Contractor assumes full responsibility for sufficiency and safety of all temporary structures, facilities, utilities, controls, or Work and for any damage which may result from their failure or their improper construction, maintenance or operation and shall indemnify and save harmless Owner and Engineer from all claims, suits or actions and damages or costs of every description arising by reason of failure to comply with Contract Documents.
- B. Construction Work Areas.
 - 1. Contractor shall limit his operations, storage of equipment and materials, and parking of his employees to areas designated on Contract Drawings and as directed by Engineer.
 - 2. Contractor shall maintain Work area in a manner that shall not obstruct operations or traffic flow of existing facilities nor interfere with existing facilities operations. Contractor shall proceed with Work in an orderly manner, maintaining construction Site free of debris and unnecessary equipment or materials.
 - 3. Contractor shall be responsible for providing and maintaining all temporary facilities necessary for proper, safe and efficient performance of Work and for safety, health and welfare of personnel.
 - 4. Contractor is solely responsible for safety and security of material storage area. Temporary fencing shall be constructed at Contractor's expense.
 - 5. Contractor shall erect or provide temporary storage facilities as required for protection of mechanical and electrical equipment and materials as recommended by manufacturers of such equipment and materials.
- C. Temporary Utilities.
 - 1. Electric Power – Contractor shall provide, maintain, and pay for all temporary electric power from utility source for all areas of Site as required for his work and that of all subcontractors. Contractor shall pay all costs for installation, use, and removal of

temporary electric power during Contract period. All temporary electric power installations shall conform to specific provisions of NEC, NESC, OSHA, and applicable state and local codes, standards, and regulations.

2. Water Service – Contractor shall provide, maintain, and pay for suitable quality potable water service required for his construction operations and those of subcontractors including consumption by workers. Contractor shall coordinate with Owner and Engineer for use of potable water from Site. Contractor shall provide all temporary piping required to bring potable water to point of use and install acceptable metering devices.
3. Sanitary Services – Contractor shall provide and maintain sanitary facilities and enclosures for his employees, employees of subcontractors, and employees of Engineer during construction period. Facilities shall comply with regulations of local and state health departments and other applicable regulations and ordinances.
4. Temporary Heating, Cooling, and Ventilating.
 - a. Contractor shall provide and maintain necessary heating and related equipment for his employees, employees of subcontractors, and employees of Engineer during construction period. Contractor shall make all arrangements and pay all fuel costs and shall supervise and maintain all heating units. All equipment shall meet and be maintained to be OSHA and all other applicable regulations and ordinances.
 - b. Any part of a building or its contents that becomes damaged because of lack of heat shall be repaired or replaced at expense of Contractor. Except as otherwise noted, temperature in all areas of construction and in all parts of new buildings shall be kept above 55 degrees F unless indicated otherwise in product sections. Maximum temperatures in building shall be 75 degrees F during heating season.
 - c. No temporary cooling facilities are required unless otherwise deemed necessary by Contractor. If required, Contractor shall provide, maintain, and pay for required facilities.
 - d. Contractor shall provide, maintain, and pay for temporary ventilation equipment to ventilate enclosed areas to achieve cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases for his operations and those of subcontractors.
5. Temporary Lighting – Contractor shall provide, maintain, and pay for all necessary lighting for his operations and those of subcontractors.

D. Temporary Fences and Barriers.

1. Contractor shall provide, maintain, and pay for any fencing and barriers, such as barricades, fencing, cones, and barrels, as necessary to protect Work, prevent unauthorized access to Work areas, to protect existing facilities and adjacent properties from damage from construction operations and demolition, and to delineate construction areas from public usage areas for safety purposes.
2. Contractor shall also provide temporary fencing for any existing fencing disturbed by his operations.

E. Access Roads.

1. Contractor shall provide and maintain temporary access roads as required to accomplish Work. Roads shall be free for use by all personnel involved in Project, and be adequate for transportation of persons, materials, equipment and products to construction area.

2. Contractor shall maintain roads in serviceable condition, free of obstructions, potholes, ponded water, debris, accumulated snow and ice, until completion of Project or until permanent access roads are installed.
- F. Parking – Contractor shall arrange and coordinate with Owner and Engineer for surface parking areas to accommodate all construction personnel involved with Project. No parking shall be allowed in areas of Owner’s property not specifically designated by Owner for such purpose. When Owner’s Site space is not adequate, Contractor shall provide additional off-site parking with no change to Contract Price or Contract Time.
- G. Maintenance of Traffic.
1. Contractor shall maintain and regulate traffic within Contract Limits in accordance with all applicable state, county, and local regulations.
 2. Conduct operations so as to maintain and protect access for vehicular and pedestrian traffic to and from properties adjoining or adjacent to those areas affected by construction activities, and to subject public to a minimum of delay and inconvenience.
 3. Erect suitable signs, barricades, railings, etc., including warning lights, to alert traveling public. Danger lights shall be provided by Contractor as required. Provide trained watchmen and flagmen as necessary to maintain and regulate traffic. Provide detours, temporary roadways and walkways or other facilities as required by owner of roadway on which travel may be obstructed as a result of Work.
 4. Contractor shall keep roads clear of materials and debris to fullest extent possible due to construction activities.
- H. Progress Cleaning.
1. Contractor shall maintain areas free of waste materials, debris, and rubbish. Contractor and subcontractors shall store unused tools and equipment at his yard or base of operations.
 2. Roads adjacent to Sites shall be kept clean of mud, dirt, and debris from construction operations. Contractor shall, on a daily basis as necessary, clean adjacent roads of debris and as ordered by Owner and other authorities having jurisdiction over roads.
- I. Temporary Buildings.
1. As necessary, Contractor shall provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.
 2. Construction – Framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces suitable for environment and in conformance with local and state building codes.

1.03 TEMPORARY CONTROLS

- A. Dust Control – Contractor shall provide positive methods and apply dust control materials to minimize raising dust from construction operation, and provide positive means to prevent airborne dust from dispersing into atmosphere. Streets shall be maintained in a clean, non-muddy, non-dusty condition by sweeping and/or water cleaning on a daily basis. Use of calcium chloride, petroleum-based materials, or other methods not permitted by federal, state, or local ordinances, for dust control are prohibited.

- B. Water Control – Contractor shall provide methods to control surface water to prevent damage to Project, Site, or adjoining properties. Contractor shall control and dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of Site or to adjoining areas. Contractor shall provide, operate, and maintain pumping equipment as necessary to control water.
- C. Debris Control – Contractor shall maintain all areas under his control free of extraneous debris and prevent accumulation of debris at Site, storage and parking areas, or along access roads and haul routes. Contractor shall schedule periodic collection and disposal of debris as necessary to prevent accumulation.
- D. Pollution Control – Contractor shall continuously maintain Site to prevent and/or remove any and all litter, mud, dirt, and loose materials from Site and adjacent areas. Contractor shall provide methods, means, and facilities required to prevent contamination of soil, water, or atmosphere by discharge of noxious and toxic substances and pollutants produced by construction operations. Contractor shall provide equipment and personnel, perform emergency measures required to contain any spillage, and to remove contaminated soils or liquids.
- E. Noise Control – Contractor shall take adequate measures for keeping noise levels, as produced by construction equipment to safe and tolerable limits as set forth by Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), and local and state agencies. Maximum allowable noise level outside of normal working hours, as defined in Section 01 00 05, shall be 55 decibels (dBA) at 50 feet from source.
- F. Construction procedures that are prohibited include, but are not limited to:
 - 1. Dumping of spoil material into any stream corridor, any wetlands, any surface waters, or at unspecified locations.
 - 2. Indiscriminate, arbitrary, or capricious operation of equipment in any stream corridors, any wetlands or any surface waters.
 - 3. Pumping of silt-laden water from trenches or other excavations into any surface waters, and stream corridors, or any wetlands.
 - 4. Damaging vegetation beyond extent necessary for construction of facilities.
 - 5. Disposal of trees, brush, and other debris in any stream corridors, any wetlands, any surface waters, or at unspecified locations.
 - 6. Permanent or unspecified alteration of flow line of a stream or other waterway.
- G. Protection of Work – Contractor shall protect installed Work from damage and deterioration due to floods, driving rain, wind, snow storms or freezing temperatures; provide special protection where specified in individual Specification Sections.
- H. Security – Contractor shall provide security and facilities to protect his Work, and that of subcontractor's including existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
- I. Maintenance of Flows.
 - 1. Contractor shall, at his expense, provide for and maintain flow of all potable water force mains, sanitary sewers, storm sewers, drainage ways, watercourses, house services and other similar facilities encountered during course of Work. No pipe or channel shall be permanently blocked, plugged, cut or otherwise interrupted without written permission of Owner, regardless of apparent condition, appearance or status thereof.

2. Sewage shall not be pumped or discharged onto ground or allowed to flow into storm sewers, drainage ways or surface waters.
 3. Contractor shall provide, maintain, and operate all temporary facilities including but not limited to dams, plugs, pumping equipment, conduit and all other equipment necessary to handle sewage or storm water flow before it reaches points where it would interfere with Work, convey it past Work, and return it to appropriate facilities downstream of Work.
- J. Maintenance of Utilities – Utilities, including water, sewer, electricity, telephone, gas, alarm services, cable TV, etc. serving private or public users shall be maintained as continuously as possible. Interruptions of utilities shall be coordinated no less than 5 days in advance with Owner and Engineer and owner of affected property. Utilities shall be restored to satisfaction of Owner, Engineer, and property owner and in accordance with all applicable codes, rules and regulations. Contractor shall bear all costs of maintaining or restoring utilities, whether Work thereof is performed by Contractor or utility owner.

1.04 REMOVAL OF TEMPORARY FACILITIES, UTILITIES, AND CONTROLS

- A. Removal of Temporary Facilities and Utilities – At such time or times that any temporary construction facilities, utilities, or controls are no longer required for Work, Contractor shall remove said temporary facilities, utilities, and controls. Site shall be left in a condition that shall restore original drainage, be evenly graded, and be left with an appearance equal to, or better than, before temporary facilities, utilities, or controls were installed.

1.05 EROSION AND SEDIMENT CONTROL

A. References.

1. Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101).
2. General NPDES Permit for Discharges Associated with Construction Activities, Permit No. TNR100000.
3. Tennessee Erosion and Sediment Control Handbook.

B. Performance Requirements.

1. Erosion Control – Erosion control procedures, including, but not limited to mulching, shall be utilized on Site by Contractor as required. Erosion control shall occur as required and immediately following completion of Site clearing.
2. Sediment Control.
 - a. Care should be taken not to damage or kill vegetation by excessive watering or by damaging silt accumulation in discharge area. Settling basins, plastic filter fabrics or other control measures should be used where necessary to protect vegetation and to achieve environmental objectives to allow sediment to settle out of runoff waters that come in contact with construction, before such water enters any surface waters.
 - b. Proper treatment and disposal of water from dewatering operations shall, at a minimum, require use of a sedimentation/filtration system as necessary to remove suspended matter and other possible contaminants such as spilled fuel, lubricants, etc. Design and operation of settling basin(s) and/or filter(s) shall be sufficient to protect environment in accordance with all pertinent state and local regulations. Contractor shall be responsible for maintaining such compliance at all times during dewatering operations.

3. Work covered by this Section relates to erosion and sediment control on all cut and fill operations, excavation, backfill, or other construction activities within limits of Site, within any temporary or permanent easements, and within any borrow site used during construction. Contractor is responsible for developing erosion and sediment control plan utilizing methods outlined in this section or any additional methods deemed necessary. Erosion and sediment control plan shall be submitted to Engineer prior to any Work being undertaken on this Project. Contractor shall furnish, install and maintain erosion control measures outlined in his erosion and sediment control plan. Contractor shall adjust and update erosion and sediment control plan and provide additional erosion control devices and measures with no change to Contract Price or Contract Time should results of initial plan fail to comply with applicable laws, regulations, and codes.
4. Conform to all erosion and sediment control measures permitted by authorities having jurisdiction.
5. Temporary erosion and sediment control measures shall be installed as first step in construction and shall not be removed until permanent cover is completely established and stabilized.

C. Erosion and Sediment Control Plan.

1. Taking into account specific constraints or other criteria outlined herein, Contractor shall prepare a detailed plan which sets forth his program of operations to effectively control erosion and sediment-runoff at all times during construction and during one-year guarantee period following completion of Work.
2. One copy shall be furnished to Owner, one copy to Engineer, and at least one copy shall be kept at Site at all times and shall be made available for examination by authorized representatives of regulatory agencies having jurisdiction over Project.

D. Contractor's Responsibility to Comply with Law.

1. Intent of this Section is to provide a written plan to insure that all applicable laws where Project is located are met. Since Contractor is responsible for construction means and methods which in turn are responsible for insuring that construction does not harm water of state where Project is located, Contractor is solely responsible for insuring that above-mentioned laws and regulations are met.
2. Observe government policy established by United States Environmental Protection Agency (USEPA) Memorandum 78-1.
3. Observe requirements set forth by Federal Highway Administration Task Force 25.

E. Maintenance.

1. Temporary erosion and sediment control features installed by Contractor shall be acceptably maintained by Contractor until no longer needed or until permanent erosion control methods are installed. Any materials removed shall become property of Contractor.
2. In event that temporary erosion and pollution control measures are required due to Contractor's negligence, carelessness, or failure to install permanent controls as a part of Work as scheduled, such work shall be performed by Contractor at his own expense.
3. Any erosion and sediment control devices which become damaged, clogged or otherwise non-functional shall be immediately replaced by Contractor, without basis for change in Contract Price or Contract Time.

4. Adjustment.
 - a. If planned measures do not result in effective control of erosion and sediment runoff to satisfaction of regulatory agencies having jurisdiction over Project, Contractor shall immediately adjust his program and/or institute additional measures so as to eliminate excessive erosion and sediment-runoff.
 - b. If Contractor fails or refuses to comply promptly, Engineer may issue an order stopping all or part of Work until satisfactory corrective action has been taken. No part of time lost due to any such stop orders shall be made subject of a claim for change in Contract Time or Contract Price or damages by Contractor.
- F. Prohibited Construction Practices – Prohibited construction practices include but shall not be limited to following:
 1. Dumping of spoil material into any stream corridor, any wetlands, and any surface waters or at unspecified locations, even with permission of property owner.
 2. Indiscriminate, arbitrary or capricious operation of equipment in any stream corridors, any wetlands or any surface waters.
 3. Pumping of silt-laden water from trenches or other excavations into any surface waters, any stream corridors or any wetlands.
 4. Damaging vegetation adjacent to or outside of access road or right-of-way.
 5. Disposal of trees, brush and other debris in any stream corridors, any wetlands, any surface water or at unspecified locations.
 6. Permanent or unspecified alteration of flow line of stream.
 7. Open burning of construction Project debris.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 76 00

PROTECTION OF EXISTING FACILITIES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Location of facilities
2. Notification of owners and authorities.
3. Coordination and preparation.
4. Protection of facilities.
5. Relocation of facilities.
6. Protection of sewers and storm drains.
7. Protection of water mains near sewers.
8. Abandonment of utilities.
9. Restoration of property markers.

B. Related Documents:

1. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions (if included), and Division 01 Specifications Sections, apply to this Section.

C. Contractor shall be responsible for safety of existing structures whether above or below ground level, and shall use all precaution to avoid damage to such structures. Wherever water, sewer lines, or other underground utilities are broken, damaged or disconnected, they shall be replaced promptly with a minimum interruption of service and incident shall be recorded and reported to Engineer. Locations of existing utilities shown on plans are approximate and for Contractor's assistance only. It is Contractor's responsibility to determine exact locations of all existing utilities.

D. Interference with any property owned and operated by Owner and utilities furnishing water, electricity, natural gas, transportation and communication service, shall have approval of existing company or department as to methods and manner of construction used by Contractor, and Contractor shall pay all costs incidental to maintenance of service and for replacement of poles, anchors, or other existing works disturbed by construction of this work.

1.02 GENERAL

- A. Contractor shall, at his own cost and expense, sustain in their places and permanently protect from direct or indirect injury any and all utilities, structures and property in vicinity of his work, whether over or underground, or which appear within trench or excavations, and Contractor shall assume all costs and expenses for direct or indirect damage which may be occasioned by injury to any of them.

- B. All trees, shrubs and like at construction site shall be preserved and protected by Contractor, except those that are specifically indicated to be removed at no additional cost to Owner.
- C. Contractor shall protect adjacent and other property from damage and shall repair and restore to satisfaction of Owner and other property owners any and all existing facilities, structures, equipment, surfaces, finishes or other features which may become damaged or disturbed as a result of work of this Contract or activity of his personnel.
- D. Contractor shall replace all culverts, pavement, driveways, fences, shrubs, lawns, trees, and any other public or private property damaged as a result of work performed under this Contract. All such replacement shall be done in accordance with applicable specifications and no separate or extra payment shall be made. In all cases, said replacement shall be at least equal to original conditions.
- E. For any property damaged by Contractor during Work, obtain from property owner an executed Certificate of Property Restoration found in Section 01 99 00 and provide to Engineer prior to Substantial Completion.
- F. Contractor shall excavate, locate and verify existing utilities in advance of his operations.
- G. Contractor shall be responsible for removal of any materials necessary to gain access to sanitary and storm sewer manholes. Any pavement or soil removed from manhole covers shall be replaced unless otherwise directed by Engineer.
- H. Contractor shall take precautions to prevent materials and/or debris from entering existing sanitary and storm sewer systems. Any damage to existing pipes or manholes caused by or resulting from Contractor's operations shall be repaired at no additional cost to Owner.
- I. Contractor shall restore all surfaces, including fine grading and restoration of all physical features, within completion date of Contract. If weather conditions do not permit permanent restoration of surfaces within this time period, Contractor shall complete permanent restoration of surfaces at earliest date weather conditions permit completion of this work.
- J. In event Contractor fails to expeditiously complete required permanent restoration to satisfaction of Owner, Owner reserves right to have permanent restoration completed by others and cost of such work shall be deducted from payment owed to Contractor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 LOCATION OF FACILITIES

- A. Locations of all utilities shown on Contract Drawings are approximate only.
- B. Prior to construction, verify size and location of existing underground facilities near or adjacent to project.
 - 1. Consult with Tennessee One-Call and owners of facilities and arrange for field stake-out or other markings to show locations.
 - 2. Perform exploratory excavation at key junctures and other critical points to aid in ascertaining locations. No additional compensation shall be provided for exploratory excavations.

- C. Report field stake-out findings and results of exploratory excavations to Engineer if possible changes in project location or design are indicated because of suspected interferences with existing facilities. Allow Engineer sufficient time to determine magnitude of changes and to formulate instructions in that regard.
- D. If location of an existing underground facility is uncertain, apply careful excavation and probing techniques during construction to locate and avoid damage to same.
- E. In event Contractor fails to consult with Tennessee One-Call and/or owners of facilities, or fails to provide reasonable and sufficient time for owners to research and identify possible conflicts, or fails to observe and protect identified underground facilities, and such facilities are damaged or destroyed by Contractor's operations, Contractor shall be responsible for any and all direct, indirect or consequential costs incurred by Owner and other owners as a result of such failure.
 - 1. In such an event, Owner may order Contractor to make immediate permanent or temporary repairs of damaged facilities, at Contractor's sole expense, as directed by Owner and to Owner's satisfaction, or Owner may elect to have repairs performed by others, with cost thereof to be borne by Contractor and deducted from monies otherwise due Contractor.
 - 2. In event of a conflict between this work and that of existing utilities, no payment shall be made to Contractor for delays caused by relocation of existing utility by Engineer if Contractor has not performed necessary excavation to locate conflicting utilities.

3.02 NOTIFICATION OF OWNERS AND AUTHORITIES

- A. Prior to construction, notify owners of existing facilities, including local Police and Fire Departments, of general scope, nature and planned progress schedule of Work.
- B. Notify owners of nearby underground facilities when excavating or blasting is to take place in a particular area, allowing them reasonable time to institute precautionary procedures or preventive measures which they deem necessary for protection of their facilities.
- C. Contractor shall coordinate with proper utility companies whenever utility protection is needed to be performed by utility company. Agreement shall be made between Contractor and utility company concerning scheduling of protection work and payment for such work. All costs for protection of existing utilities performed by utility company shall be paid by Contractor at no additional expense of Owner. Contractor shall not perform utility protection work unless permissions are received in writing, from utility company, and filed with Engineer.
- D. When existing utilities, such as sewer, water, gas, telephone or electric power are damaged or disturbed during construction, immediately notify affected utility owner, Owner, and Engineer.
 - 1. Contractor shall not at any time operate or repair facilities of respective utility companies unless permission is received in writing from utility company and filed with Engineer.
- E. Notify Police and Fire Departments, including affected owners, immediately if hazardous conditions are created or have potential for occurring, as a result of damage to an existing facility or as a result of other activities at project site. Hazardous conditions could be created from: fire, explosion, escape of gas, escape of fuel oil, gasoline or industrial fluids, downed electrical wires, and disrupted underground electrical cables.

3.03 COORDINATION AND PREPARATION

- A. Discuss anticipated work schedule with local authorities and owners of utilities at preconstruction meeting, including procedures to be followed if one or more utilities are damaged or disrupted. Develop contingency plans to address Contractor's role in repair of damaged utilities.
- B. Make preparations beforehand to repair and restore damaged utilities, including arrangements for standby materials and equipment to be promptly assembled at site and utilized immediately.
- C. Adjust work schedules and personnel assignments as necessary to conform to requirements of utility owner whose utility is to be temporarily interrupted during construction. Cooperate with utility owner in this regard to minimize time of interruption.
- D. Make preparations for and conform to applicable federal, state, and local regulations regarding use of proper safeguards and procedures when excavation and/or blasting is to take place in close proximity to existing facilities and structures.

3.04 PROTECTION OF FACILITIES

- A. Plan and conduct construction operations so that operation of existing facilities near or adjacent to Work, including electric, telephone, sewer, water, gas or drainage utilities, are sustained insofar as requirements of project shall permit.
- B. Protect existing facilities from damage or movement through installation of adequate support systems and use of proper equipment, including application of careful excavation and backfilling techniques in sensitive areas.
- C. In locations where blasting is to take place, and in cooperation with owners of nearby facilities, provide special protection and support of underground facilities which may be vulnerable to damage by virtue of their physical location or condition, and which could create hazardous conditions if damaged.
- D. Existing utilities and other facilities which are damaged by Contractor's construction operations shall be promptly repaired by Contractor to satisfaction of affected owner or, if he so elects, that owner shall perform repairs with his own forces. Under either arrangement, such repair work shall be done at Contractor's expense.
- E. When aboveground visible facilities such as poles, wires, cables, fences, signs or structures constitute an unavoidable interference, notify Engineer and consult with affected owner regarding temporary removal and later restoration of interfering item. Arrange with that owner to remove and later restore interfering item to satisfaction of owner, subject to approval of project Owner; or, allow affected owner to perform such work with his own forces. Under either arrangement, such work shall be done at Contractor's expense.
- F. Take all necessary precautions to prevent fires at or adjacent to work, buildings, and other facilities. No burning of trash or debris is permitted. If permanent fire extinguishers are used, they shall be recharged and in "new" condition when turned over to Owner.
- G. Utilize equipment mats or other protective devices over existing underground utilities to prevent damage.

3.05 RELOCATION OF FACILITIES

- A. If location or position of an existing gas or water pipe, public or private sewer or drain, conduit or structure be such as, in opinion of Engineer, to require its removal, realignment or change, such alteration shall be an additional mutually-agreed-upon cost to Owner for work of

removal, realignment or change unless previously identified in Contract Documents, in which case removal, realignment, or change shall be at no additional cost to Owner.

- B. Uncovering, supporting and sustaining such facility before its removal or before and after its realignment or change shall be Contractor's responsibility as part of work of his Contract.
- C. Contractor shall be entitled to extension of time for completion of entire Work as Engineer determines that entire Work was delayed by removal, realignment or change of such obstruction.

3.06 PROTECTION OF SEWERS AND STORM DRAINS

- A. Where existing sanitary sewers or storm drain systems are being replaced or interrupted provide temporary bypass pumping or piping to maintain flow around that segment of Work such that no back-ups occur in existing systems.
- B. Existing sanitary sewer laterals damaged in work or temporarily disconnected shall be restored to operation by end of each work day. Existing sanitary sewer laterals crossing over new pipelines to be restored in accordance with details shown on Drawings.
- C. Maintain existing manholes, catch basins, and other utility structures in their pre-work condition. Any material or debris entering same due to Contractor's operation shall be promptly removed. Prevent disturbed areas from draining into catch basins.

3.07 PROTECTION OF WATER MAINS NEAR SEWERS

- A. Where a minimum 10-foot horizontal separation or minimum 18 inch vertical separation (bottom of water pipe to top of sewer pipe) cannot be maintained between a water main and sewer line, one or more of following remedies shall be incorporated in work:
 - 1. Sewer lines shall be encased in Mix "D" concrete for a length of 10 feet on either side of water main.
 - 2. Both water main and sewer line shall be constructed of pressure type joints of ductile iron pipe, and shall be pressure tested to 100 psi to assure water-tightness.
 - 3. One full length of water main shall be centered over sewer line, so that both joints shall be as far from sewer as possible.
 - 4. Relocate water main to obtain 18-inches minimum vertical separation.

3.08 WORK IN VICINITY OF NATURAL GAS MAINS

- A. Contractor shall contact, in writing, gas main owner no less than 7 days prior to exposing these facilities. Contractor shall not expose any listed or located gas main unless a representative of gas main owner is contacted and has opportunity to be present during Work.
- B. No work shall take place in proximity of gas mains until facilities are located and marked. These locations and markings shall be protected and maintained by Contractor throughout construction duration in affected area.
- C. When working in general vicinity of gas mains, extreme care shall be taken. All excavation within 3 feet of mains shall be done by hand in order to protect pipe and its corrosion control wrapping.
- D. All state and local rules and regulations for safety and protection of personnel and gas mains shall be adhered to while work is being performed in vicinity of gas mains.

- E. Gas main owner may provide their own special protection for exposed gas mains. Contractor shall cooperate with and provide safe access for gas main owner's personnel in installation of such protection.
- F. Contractor shall notify Engineer of his contacts of gas main owner prior to exposing mains and shall schedule for gas main owner's personnel to be on site not less than 48 hours prior to exposing gas mains.

3.09 ABANDONMENT OF UTILITIES

- A. Remove existing utilities to be abandoned within limits of trench excavation, or impinging on trench limits.
- B. Open ends of abandoned utilities, or those scheduled for abandonment, shall be bulkheaded by Mix "D" concrete; or by ductile iron plugs or caps in small diameter water mains.
- C. Abandoned pipes 8-inch diameter or larger shall be completely filled with flowable fill or other approved material prior to bulkheading open end(s).
- D. Abandoned manholes and water valve casings shall be backfilled to grade with approved trench backfill material.
- E. Frames, covers, grates, water valve casing, sections of water piping, hydrants (including standpipe and boot) valves and other items to be abandoned shall, if ordered by Owner, be salvaged for re-use and be delivered to Owner's property yard.

3.10 RESTORATION OF PROPERTY MARKERS

- A. Property corner markers, boundary monuments, etc., disturbed or moved by Contractor's operation shall be restored, in conformance with property deed description, by a licensed land surveyor. Restoration of property corner markers or boundary monuments shall be certified by said surveyor on a map prepared by him which shows work accomplished. One copy of map shall be given to property owner and one copy given to project Owner.

END OF SECTION

SECTION 01 77 13

CLOSEOUT

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Contract Closeout.
2. Cleaning and Restoration.
3. Project Record Documents.
4. Operation and Maintenance Data.
5. Warranties and Bonds.
6. Spare Parts and Maintenance Materials.

B. Related documents:

1. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions (if included), and Division 01 Specifications Sections, apply to this Section.
2. Division 26 – Electrical
3. Division 40 – Process Integration

1.02 CONTRACT CLOSEOUT

A. Substantial Completion:

1. When Contractor considers Work is substantially complete submit written certification that following are complete and Work is ready for a walkthrough inspection by Owner and Engineer.
 - a. Final cleanup has been completed.
 - b. Contract Documents have been reviewed.
 - c. Work has been inspected by Contractor for compliance with Contract Documents.
 - d. Work has been completed in accordance with Contract Documents and ready for inspection by Owner and Engineer.
 - e. Equipment and systems have been started up, tested, adjusted and balanced, as applicable, and are fully operational.
 - f. Equipment operational period, if required, has been successfully completed.
 - g. Operation of systems has been demonstrated to Owner's personnel.

- h. Certifications that any outstanding work can be entirely complete within 60 days of request for substantial completion.
 - i. All permits from local authorities have been provided to Engineer.
 - j. All temporary facilities have been removed from project site.
2. Contractor shall provide list of any items that need to be completed or corrected at time of certification and reasons for being incomplete.
3. Before Certificate of Substantial Completion is issued, submit to Engineer following or demonstrate to satisfaction of Owner and Engineer that following are in place and functioning reliably in accordance with Contract Documents:
- a. All manufacturer performance affidavits.
 - b. All manufacturer equipment certifications.
 - c. All equipment, structural, piping, mechanical, electrical, and all project components requiring testing has been completed and test data and reports issued to Engineer.
 - d. All lab test reports.
 - e. Manufacturer's certified installation and startup reports.
 - f. Control, alarm, and telemetry systems.
 - g. Painting, including inspection by paint manufacturer in accordance with Division 26.
 - h. Final cleaning in accordance with this Section.
 - i. Acceptable means have been provided for safe and efficient access to equipment by Owner's personnel for operation and maintenance, and all required environmental and housekeeping facilities are available (e.g., weather protection, ventilation, heat, light, water for washdown, alarms, platforms, ladders, etc.).
 - j. Record drawings and documents and electrical interconnection data. Provide Record Documents Certification form found in Section 01 99 00 with submittal.
 - k. Equipment operations and maintenance manuals in accordance with this Section.
 - l. Owner's training.
 - m. Spare parts, tools, special tools, and accessories including all spare parts transfer forms.
 - n. Equipment performance periods have been completed.
 - o. All warranties and bonds, including those for specific equipment and systems. Refer to other portions of this Section.
 - p. Contractor's notarized warranty letter, indicating that Contractor guarantees work for one year and provides a one-year warranty to Owner from Date of Substantial Completion for all Work.
 - q. Code inspection reports.

- r. Electrical inspection reports.
 - s. Temporary utilities have been terminated and payments for those services have been satisfied.
 - t. All items salvaged for Owner's future use during demolition have been turned over to Owner.
 - u. All other submittals as required by Contract Documents prior to Substantial Completion.
 - v. Certification that all work items previously itemized to Contractor, whether verbally or in writing prior to issuance of a Punch List, have been completed in their entirety.
 - w. All releases enabling Owner full and unrestricted use of Work and access to all services and utilities.
 - x. Copy of all construction photographs as required by Section 01 00 05.
 - y. Successful equipment startups as described in Section 01 00 05.
 - z. All materials consumed during startup, including spare parts, air filters, grease, oil, etc. have been replaced.
 - aa. Certificate of Property Restoration from each property owner whose land was disturbed during Work. Use form included in Section 01 99 00.
 - bb. Photograph and video release in accordance with Section 01 00 05.
 - cc. All door keys and codes have been turned over Owner.
4. Upon request from Contractor, Owner and Engineer shall proceed with initial walkthrough inspection or advise Contractor in writing of items to be completed before an initial walkthrough inspection shall be made.
 5. Upon initial walkthrough inspection, should Engineer and Owner determine that Work is not substantially complete; Contractor shall be promptly notified in writing listing observed deficiencies.
 6. When deficiencies have been remedied in conformance with General Conditions, Contractor shall submit a second written notice of substantial completion to Engineer.
 7. When Engineer and Owner find Work is substantially complete, Engineer shall prepare a Certificate of Substantial Completion in accordance with provisions of General Conditions, including a Punch List of items to be completed.
 8. Punch List issued as part of Substantial Completion shall list deficient items along with an estimated value to correct items. Value of retainage after Substantial Completion shall be no less than twice estimated value to correct Punch List items.
 9. All warranties and guarantees required by Contract Documents shall commence on Date of Substantial Completion as granted by Owner.

B. Final Acceptance:

1. When Contractor considers Work is complete, submit written certification that:

- a. All deficient Work identified during walkthrough inspection(s) and any subsequent observed deficiencies have been corrected. Use Engineer-prepared Punch List of incomplete or deficient items indicating that each item has been completed. Add to Punch List any items discovered after Certificate of Substantial Completion certificate was issued.
 - b. Work is completed in its entirety and in compliance with Contract Documents and ready for Final Inspection.
2. Contractor shall include copies of all final change order requests with certification of final completion.
 3. Should Engineer and Owner consider that Work is incomplete or defective, Contractor shall be promptly notified in writing, listing observed deficiencies.
 4. When deficiencies have been remedied in accordance with General Conditions, send a second written notice of final completion.
 5. When Engineer and Owner find that Work is acceptable under Contract Documents, Engineer shall issue a Notice of Final Acceptance of Work and consider Application for Final Payment.
 6. All warranties and guarantees required by Contract Documents shall commence on Date of Final Acceptance as granted by Owner.

C. Re-inspection Fees:

1. Should status of completion of Work require re-inspection by Engineer (including his professional consultants) due to failure of Work to comply with Contractor's claims on initial final inspection, Owner shall deduct amount of Engineer's compensation (including that of his professional consultants) for re-inspection services from Final Payment to Contractor.

D. Application for Final Payment.

1. Submit final Application for Payment in accordance with procedures and requirements stated in Conditions of Contract. Final payment shall include all change orders.
2. If required, Engineer shall prepare a final Change Order, reflecting approved adjustments to Contract Sum not previously made by Change Orders.
3. Final Application for Payment shall be accompanied by following documents:
 - a. Contractor's notarized warranty letter, indicating that Contractor guarantees Work for one year from date of Final Acceptance.
 - b. Letter from Contractor certifying that all documents called for in Contract Documents have been supplied to Owner and Engineer.
 - c. Contractor's letter certifying that all materials used in installation and construction of Work comply with Contract Documents.
 - d. Contractor's Affidavit of Payment of Debts and Claims, indicating that Contractor has paid or otherwise satisfied all obligations to suppliers, vendors, laborers, and subcontractors (AIA Document G706).

- e. Contractor's Affidavit of Release of Liens, indicating Contractor and his subcontractors and suppliers release Owner from any liens associated with project (AIA Document G706A).
- f. Affidavit of Release of Liens from every subcontractor and materials supplier, indicating that they release Owner from any liens associated with project (AIA Document G706A).
- g. Waiver of Lien from Contractor and every one of his subcontractors and materials suppliers indicating that once they receive final payment, they waive all their rights to any future liens concerning Work and release any current liens that might be pending.
- h. Statement by Contractor's surety that Performance Bond, Labor and Material Payment Bond, and all other bonds related to project shall remain in force for guarantee period.
- i. Consent of Surety Company to Final Payment (AIA G707).
- j. Renewal Certificates of Insurance showing that Contractor's insurance shall remain in force for two years after final payment.
- k. Evidence of compliance with requirements of governing authorities.
- l. Certification that locations and elevations of Work are in conformance with Contract Documents and indicate any substantive deviations per Section 01 00 05.
- m. All construction photographs not previously turned over to Engineer.
- n. Releases from permitting authorities that all restoration and permit requirements have been satisfactorily completed.
- o. Releases from permitting authorities and property owners shall comply with following:
 - 1) Furnish Engineer written releases from property owners or public agencies where side agreements or special easements have been made, or where Contractor's operations have not been kept within Owner's construction right-of-way.
 - 2) In event Contractor is unable to secure written releases:
 - a) Inform Engineer of reasons.
 - b) Owner or its representatives shall examine Site, and Owner shall direct Contractor to complete Work that may be necessary to satisfy terms of side agreement or special easement.
 - c) Should Contractor refuse to perform this Work, Owner reserves right to have it done by separate contract and deduct cost of same from Contract Price, or require Contractor to furnish a satisfactory bond in a sum to cover legal Claims for damages.
 - d) When Owner is satisfied that Work has been completed in agreement with Contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if: (i) Contractor's failure to obtain such statement is due to grantor's refusal to sign, and this refusal is not based upon any legitimate Claims that

Contractor has failed to fulfill terms of side agreement or special easement, or (ii) Contractor is unable to contact or has had undue hardship in contacting grantor.

1.03 CLEANING AND RESTORATION

- A. Execute final cleaning prior to Substantial Completion walkthrough inspection.
- B. Contractor shall leave project site in a condition that is equal to pre-construction condition or better. Acceptance of site shall be compared to photos, videos, and Owner's acceptance of site.
- C. Buildings and Facilities:
 - 1. Employ experienced workmen or professional cleaners for final cleaning.
 - 2. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process shall not fall on wet, newly painted surfaces.
 - 3. Vacuum clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy.
 - 4. Vacuum and dust inside of cabinets.
 - 5. Clean all lighting fixtures and electrical equipment.
 - 6. Wash and polish all metal surfaces.
 - 7. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces and of concealed spaces.
 - 8. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to shine finish.
 - 9. Repair, patch, and touch up marred surfaces to specified finish to match adjacent surfaces for all surfaces marked, soiled, scratched, dented, or otherwise damaged. Surfaces shall include all surfaces installed during Work and surfaces existing before Work but damaged during Work. Damage to finished surfaces shall be repaired to Owner's satisfaction prior to substantial completion.
 - 10. Clean interior and exterior glass.
 - 11. Dust all interior surfaces.
 - 12. Finished floors shall be thoroughly cleaned, sealed, and given a final coat of wax.
 - 13. Clean screens on air intake vents.
 - 14. Replace filters of operating equipment and clean ducts, blowers, and coils of ventilation units operated during construction.
 - 15. Clean debris from roofs, gutters, downspouts, and drainage systems.
 - 16. All exposed piping shall be free of dust or dirt.

17. Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver over such materials and equipment in a bright, clean, polished and new-appearing condition. Use cleaning materials appropriate for surface and material being cleaned.

D. Site Cleanup:

1. Broom clean paved surfaces affected by Work; rake clean other surfaces of grounds.
2. Remove all grease and oil stains on pavement and sidewalks caused by Contractor's equipment.
3. Contractor shall remove from site all plant, material, tools and equipment belonging to him, and leave site with an appearance acceptable to Engineer and Owner.
4. Site shall be free of rocks, stones or pebbles. All disturbed and reseeded areas shall be raked with a rock rake and shall be raked completely in two different directions. All rocks to be removed from site.
5. Any landscape feature scarred or damaged by Contractor's equipment or operations shall be restored as nearly as possible to its original condition at Contractor's expense. Engineer shall decide what method of restoration shall be used.
6. Post-Construction Cleanup or Obliteration
 - a. Contractor shall obliterate all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other vestiges of construction.
7. For pipelines, storm sewers, catch basins, manholes, and all building floor drains, prior to their activation or at conclusion of project, Contractor shall thoroughly clean all of new pipes by flushing with water for fluid lines, or compressed air for gas lines. Debris cleaned from lines shall be removed from lowest access point. Water for flushing shall be provided per Section 33 13 00 by Owner. Compressed air shall be provided by Contractor.
8. Refer to Section 32 90 00 for additional details.
9. Restore all parking and staging areas in accordance with this Section and Section 32 90 00.

E. Submittals.

1. Submit completed "Certificate of Property Restoration" form found in Section 01 99 00 for every property damaged during construction executed by each property owner.

F. In event Contractor is required to return to project for warranty work or punch list items, cleaning of area shall be required and shall be cleaned to level that Owner received project.

G. Painting of all equipment shall be performed and Contractor shall paint in accordance with Section 09 96 00 of these specifications. Touch-up painting shall include surface preparation, priming, and finish coats. Spot painting shall not be allowed.

1.04 PROJECT RECORD DOCUMENTS

- A. Records documents shall fully and completely illustrate all work as finally constructed.
- B. In addition to requirements in General Conditions, maintain at site for Owner, one record copy of:

1. Contract drawings.
2. Specifications (Project Manual).
3. Addenda.
4. Reviewed shop drawings, product data and samples.
5. Change orders and other modifications to Contract including Engineer's Field Orders.
6. Testing reports.
7. Field test records.
8. Inspection certificates.
9. Manufacturer's certificates.
10. Fixed equipment manuals.
11. Equipment training certificate.
12. Equipment start-up certificate.
13. Guarantee documentation form.
14. Spare parts transfer form.

C. Recording information.

1. Record information for all disciplines on one (1) set of documents.
2. Make entries within 24 hours after receipt of information that a change in Work has occurred.
3. Legibly mark in red ink or pencil to show all changes in, or directly associated with, Work. Changes shall be so recorded to be suitable for re-production. Keep entire set of drawings current on day-to-day basis.
4. Changes shall be so recorded to be suitable for re-production. Ensure that entries are complete and accurate, enabling future reference by Owner.
5. Record information concurrently with construction progress. Do not conceal any work until required information is recorded. For any concealed items, including all buried, imbedded, or concealed piping or conduit including fixtures, fittings, valves, and accessories, measure location to visible and accessible features of structure.

D. Contract Drawings: Neatly and legibly mark each item to indicate actual construction. Following list shall not be considered an all inclusive list.

1. Indicate any changes to project component locations or elevations.
2. Indicate any additions to deletions of project components.
3. Indicate any relocation of project components from what is shown on Contract Drawings.
4. Denote any area where any existing utility was repaired, replaced or relocated. Show correct location if plan location was incorrect.

5. Note and accurately locate all existing underground utilities encountered during construction, whether shown on Drawings or not.
6. Indicate measured horizontal and vertical locations of all underground utilities, valves, etc. referenced to building exterior lines.
7. Show direction of flow of pipe and depth of piping underground.
8. Include details not on original Contract Drawings.
9. Note change in materials, such as pipe materials, and sizes.
10. Update schematics, schedules, and diagrams.
11. Provide references to related shop drawings and modifications.
12. Show changes in topographical contours of finished earth surfaces.
13. Update detail sheets with details actually used. Add and delete details to reflect actual details utilized.
14. Changes due to changed field conditions.
15. Changes made by Owner or Engineer regardless of whether such changes have been described or noted in other documents such as field orders, change orders, etc.
16. Show correct elevations for inverts and manhole tops: inverts to nearest hundredth and tops to nearest tenth.
17. Specifically for electrical work:
 - a. Accurately record final routing of all ductbanks and handhole locations including dimensions from buildings or other fixed objects as reference points.
 - b. Show actual locations of grounding electrodes.
 - c. Revise motor control center elevation views as required.
 - d. Show branch circuit arrangements on a typed legend for panelboards provided under this Project. Correct existing field legends where modifications are made to existing panelboards.
18. Show distance of pipeline location off edge of pavement at 100 foot intervals.
19. Show corrected stationing and horizontal location dimension for all piping and structures.
20. For Water and Force Main Construction:
 - a. Show unusual connections to existing mains in detail. (Schematic, where necessary).
 - b. Show correct horizontal alignment and grade, including centerline elevations for all mains installed to grade.
 - c. Show correct stationing of tees, bends (horizontal and vertical), valves, air release valves, blow-off chambers.

- d. Show perpendicular distances from hydrant to water main and from hydrant to valve. If connection to water main is by a parallel or over main tee, so indicate this on Record Drawings.
 - e. Show perpendicular distances from valves and other underground accessories to visible and accessible aboveground permanent structures.
- E. Updating of record documents shall be a condition of payment. If Contractor fails to keep copies of record documents up to date at frequency stipulated above, Engineer and Owner shall be authorized to withhold payment until record documents are fully up to date. Engineer and Owner shall be permitted to review record documents as frequently as deemed necessary to ascertain status of record documents, but in no case less than on a monthly basis prior to each progress meeting.
- F. In addition to above requirements, Contractor shall throughout project have record measurement surveys performed as conditions warrant. These surveys shall include rim elevations of all installed new manholes and structures, invert elevation of pipes at manholes and structures, and length of all new pipe as measured between centers of manholes or structures, as well as angles between centerlines of pipes and tie distances, from all utility frames and covers installed by Contractor to a minimum of three fixed objects, with sketches and notes, as appropriate. All measurements shall be made to nearest 0.01 foot.
- G. Project Manual: Neatly and legibly mark each item with felt tip marking pens to record actual construction, including:
 - 1. Changes made by Addenda, Amendments, Modifications, Change Orders, and Field Orders.
 - 2. Manufacturer, trade name and catalog number of each product and item actually installed.
- H. Submittal.
 - 1. Submit at least one copy of record documents to Engineer for review at least 30 days prior to application for Substantial Completion. Deliver documents under provisions of this Section.
 - 2. At request for Substantial Completion, deliver Record Documents and samples under provisions of this Section. Final payment shall not be made until Record Documents are deemed satisfactory by Engineer.
 - 3. Record Documents must include Certification form included in Section 01 99 00.
 - 4. Transmit with cover letter in duplicate, listing:
 - a. Date.
 - b. Project title and number.
 - c. Contractor's name, address and telephone number.
 - d. Title and number of each Record Document.
 - e. Certification that each document submitted is complete and accurate.
 - f. Signature of Contractor or his authorized representative.
 - 5. Engineer may request that Contractor expand on changes noted on Record Documents.

1.05 OPERATION AND MAINTENANCE DATA

A. General Requirements.

1. All equipment, devices or materials furnished by Contractor as a part of work shall be accompanied by all information, instructions and data necessary for proper and complete care, operation, maintenance and repair of equipment, device or material by Owner's personnel. Required information, instructions and data shall be prepared and compiled by manufacturer of equipment, device or material.
2. In addition to any specific requirements of other sections of these Contract Documents, equipment manuals shall be required for any and all items containing moving parts, electric or electronic wiring or components, pneumatic or hydraulic devices or components, or requiring regular or special maintenance, cleaning or lubrication. In addition to major items of equipment, this requirement for submission of equipment manuals is intended to also apply to such items as locksets, door, gate and window hardware, finishes, carpeting and upholstery, furniture, electrical and lighting system components, fixtures and accessories, HVAC system components, fixtures and accessories, valves, piping system components, fixtures and accessories, plumbing system components, fixtures and accessories, etc.
3. Where any item of equipment includes components or subassemblies manufactured by other than equipment manufacturer, all pertinent information for subassemblies shall be included in equipment manual prepared and compiled by equipment manufacturer.
4. Information contained in equipment manual which is not applicable to specified item furnished under this Contract shall be clearly lined out or obliterated.

B. Submittal Procedures.

1. When specified in individual specification Sections or in Section 01 05 00, submit manufacturers' printed operation and maintenance instructions for equipment and systems supplied for this project in conformance with this Section and Section 01 05 00.
2. Submit one (1) copy of preliminary drafts of manuals in specified format. Engineer shall review draft and return one (1) copy with comments. All draft manuals shall be delivered to Engineer prior to payment of more than 60 percent of contract value as described in original submitted Schedule of Values and not as modified by subsequent change orders.
3. If preliminary manual is returned with a status of "resubmit requested information", a revised draft manual is not required to be submitted. If preliminary manual is returned with a status of "amend and resubmit", Contractor shall submit one (1) copy of revised manuals in specified format addressing all of Engineer's comments prior to submittal. Engineer shall review draft and retain copy and shall only return comments concerning revised manual to Contractor. All revised draft manuals shall be delivered to Engineer prior to payment of more than 70 percent of contract value as described in original submitted Schedule of Values and not as modified by subsequent change orders.
4. System startups shall not commence until all draft operation and maintenance manuals have been reviewed and accepted, with exception of field startup reports and other details that cannot be incorporated into manuals until after startup. Draft manuals shall be available during system startups.
5. After system startups have been completed and all required reports and other documentation has been submitted and accepted by Engineer, submit one (1) review copy of near-final operations and maintenance manual to Engineer for review and approval. Manual shall be returned to Contractor with any comments needing to be addressed.

6. Once Contractor has satisfactorily addressed all remaining Engineer's comments concerning manuals, Contractor shall provide one (1) finalized hard copy of each manual to Engineer addressing all previous submittal comments. Contractor shall also provide manuals in Adobe Portable Document Format (PDF) format on flash drives. Contractor shall supply four (4) flash drives. Each flash drive shall have a directory structural that clearly delineates each equipment name and appropriate specification section. Each flash drive shall be supplied with protective plastic sheet envelope with loops for attachment to binder rings.
7. Finalized manuals shall be accepted prior to Substantial Completion.
8. After review and acceptance by Engineer of draft and finalized manuals, distribute copies in accordance with this Section and Section 01 05 00. Provide copies for required record documents described in this Section.
9. Contractor shall allow Engineer an average of 45 days of review time for all operation and maintenance submittals and Contractor shall incorporate this time into his work schedule. Submittal review time shall not be considered grounds for a Contract time extension unless overall average for all operational and maintenance submittals exceeds 45 days, even if review time for any single submittal exceeds 45 days.
10. With each submittal for each manual, provide a completed "Operations and Maintenance Manual Checklist" form found in Section 01 99 00.

C. Format.

1. Prepare data in form of an instructional manual.
2. Binders: Shall be commercial heavy-duty quality 3-ring binders for 8-1/2 inch by 11-inch pages with hardback, durable cleanable plastic covers, D-size maximum ring size. When multiple binders are used, correlate data into related consistent groupings. Binders shall be identical for all manuals.
3. Cover: Shall identify each volume with typed or printed title "OPERATION AND MAINTENANCE INSTRUCTIONS." List title of Project, and identify subject matter of contents. When multiple volumes are provided for same system, indicate volume number and total number of volumes.
4. Arrange content by system under Section numbers and sequence of Table of Contents of this Project Manual.
5. Internally subdivide binder contents with permanent page dividers, logically organized by product or major component as described below; with tab titling clearly typed under reinforced laminated plastic tabs.
6. Text: Manufacturer's printed data, or neatly typewritten data on 20 lb. paper.
7. Drawings: Provide with reinforced punched binder tab and bind in with text. Fold larger drawings to size of text pages.
8. Folded Drawings and Small Items: Provide in heavy-duty three-ring plastic pockets inserted into binder. Pockets shall be of appropriate size for binder sizes provided.

D. Contents, Each Volume.

1. Table of contents:
 - a. Title of product.

- b. Name, address and telephone number of Engineer with names of responsible parties.
 - c. Name, address and telephone number of Contractor with names of responsible parties.
 - d. A schedule of products and systems, indexed to content of volume.
 - e. If multiple volumes are provided for equipment or system, table of contents shall provide identical listings indicating contents of every volume within each volume with clear indication of which contents are in each manual.
2. For each product or system, list names, addresses and telephone numbers of subcontractors, manufacturers, suppliers, and manufacturer's local service representative, include local source of supplies and replacement parts.
 3. Product data: Mark each sheet to clearly identify products and component parts, and data applicable to installation. Delete or otherwise cross-out non-applicable information.
 4. Drawings: Supplement product data with drawings as necessary to clearly illustrate relations of component parts of equipment and systems, and to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
 5. Typed text: As required to supplement product data. Provide a logical sequence of instructions for each procedure incorporating manufacturer's instructions specified in Section 01 00 05.
 6. Approved Shop Drawings: Incorporate all approved shop drawings regarding any system components in their entirety into manuals. Shop drawings shall adequately describe interrelationship between all system components.
 7. Start-Up Instructions: Provide manufacturer delivery, storage, preparation, assembly, erection, installation; start up, adjusting, balancing, and finishing instructions as specified in Section 01 00 05 for each system component. These instructions shall be part of operations and maintenance manuals regardless of whether they were submitted for review under Section 01 00 05.
 8. Care and cleaning of all finishes. Where applicable, list of paints used with color and other pertinent data.
 9. Conflicts: Identify any conflicts between manufacturer's instructions and Contract Documents.
 10. Certifications: Provide copies of any manufacturer certifications provided under Sections 01 00 05 and 01 99 00.
 11. Performance affidavit.
 12. Reports: Provide copies of any manufacturer field startup reports including air and water balance reports, training reports and other testing data and reports.
 13. Warranties and bonds: Provide copies of all documentation.
- E. Manual for Equipment and Systems.
1. Each item of equipment and each system: Include description of unit or system, and list all component parts. Include function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of all replaceable parts. Operation and

maintenance instructions for individual components should be included; however, written instructions, drawings, and schematics must cover complete system, not just specific components.

2. Design criteria: Provide detailed list of all significant design criteria.
3. General arrangement drawings and general arrangement detail drawings, as required.
4. Erection drawings, as required.
5. A complete bill of materials for all equipment, including weights.
6. Parts List: Provide complete parts lists and parts diagrams for all equipment, including motors and drive units, showing manufacturer's identification numbers for each part.
7. Process and Instrumentation Diagrams (P&ID) specifically reflecting components and equipment provided for this project and as modified in field during installation.
8. Electrical and Control Schematics: Provide wiring diagrams and schematics, elementary control diagrams, and one-line diagrams. Provide panelboard circuit directories including electrical service characteristics, controls and communications. Include as-installed color coded wiring diagrams. Include labeled terminations. Schematics shall be project specific and reflect actual equipment installed including all modifications made in field. Provide interconnection data or diagrams for factory-wired components.
9. Operating procedures: Include erection, installation, start-up, break-in, and routine normal operating instructions and sequence. Include regulation, adjustments, control, stopping, dust-down, and emergency instructions. Include summer, winter, and any special operating instructions. Include any relevant technical bulletins and diagrams.
10. Maintenance procedures: Include preventative and routine procedures and guide for trouble-shooting, disassembly instructions, and alignment, adjusting, balancing and checking instructions for all system components.
11. Major overhaul or repair procedures including diagrams, measurements, clearances, tolerances, adjustment settings, alignment and calibration procedures, torque specs, etc.
12. Provide list of all original manufacturer's spare parts provided and spare parts available and other items supplied with equipment or system identified by name and by manufacturer part number. Include manufacturer's current prices and recommended quantities to be maintained in storage.
13. Provide a servicing and lubrication schedule and list of lubricants required. List lubricants by name and manufacturer part number.
14. Include manufacturer's printed operating and maintenance instructions.
15. Include following from controls manufacturer:
 - a. Sequence of operation.
 - b. As-installed control diagrams.
16. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
17. Provide list of special tools required for operation and maintenance of equipment.

18. Maintenance schedule: At end of each equipment section, provide a detailed maintenance schedule clearly itemizing tasks that should be performed and their frequency. Schedule shall include:
 - a. List and frequency of maintenance activities, other than lubrication.
 - b. List of lubrication frequency and application points.
 - c. List of approved lubricant types (weight or grade and recommended manufacturers) and method of application.
19. Motor and Drive List: List of all motors and drives provided with details of significant design criteria.
20. Additional requirements: As specified in individual Specifications Sections.
21. Provide a listing in Table of Contents for design data, with a tabbed fly sheet and space for inserting data.

1.06 WARRANTIES AND BONDS

- A. All warranties and bonds shall commence on Date of Substantial Completion unless acceptance is delayed beyond this date in which case warranty and bonds shall start on date of acceptance.
- B. General Warranty.
 1. Contractor shall warrant all equipment, materials, products, and workmanship provided by Contractor under these Contract Documents for a period of 12 months after date of Substantial Completion of Work by Owner.
 2. If, during warranty period; (i) any equipment, materials, or products furnished and/or installed by Contractor are found to be defective in service by reason of Contractor's faulty process, structural and/or mechanical design or specifications, or (ii) any equipment, materials, or products furnished and/or installed by Contractor are found to be defective by reason of defects in material or workmanship or by their failure to meet fully requirements of Contract Documents; Contractor shall, within 15 days, after receipt of written notice from Owner, repair or cause to be repaired such defective equipment, materials or products, or replace such defective equipment, materials or products to full satisfaction of Owner.
 3. In event of multiple equipment failures of major consequence prior to expiration of 1-year warranty described herein, affected equipment shall be disassembled, inspected, and modified or replaced as necessary to prevent further occurrences. All related components that may have been damaged or rendered non-serviceable as a consequence of equipment failure shall be replaced. A new 12-month warranty against defective or deficient design, workmanship, and materials shall commence on day that item of equipment is reassembled and placed back into operation. As used herein, multiple equipment failures shall be interpreted to mean two or more successive failures of same kind in same item of equipment or failures of same kind in two or more items of equipment. Major equipment failures may include, but are not limited to, cracked or broken housings, piping, or vessels, excessive deflections, bent or broken shafts or structural members, broken or chipped gear teeth, overheating, premature bearing failure, excessive wear, or excessive leakage around seals. Equipment failures which are directly and clearly traceable to operator abuse, such as operating equipment in conflict with published operating procedures, or improper maintenance, such as substitution of unauthorized replacement parts, use of incorrect lubricants or chemicals, flagrant over- or under-lubrication, and use of maintenance procedures not conforming with published maintenance instructions, shall

be exempted from scope of 1-year warranty. Should multiple equipment failures occur in a given item or type of equipment, all equipment of same size and type shall be disassembled, inspected, modified or replaced, as necessary, and re-warranted for 1 year.

4. Contractor shall, at his own expense, furnish all labor, materials, tools and equipment required and shall make such repairs and removals or shall perform such work or reconstruction as may be made necessary by any structural or functional defect or failure resulting from neglect, faulty workmanship or faulty materials, in any part of Work performed by him. Such repair shall also include refilling of trenches, excavations or embankments which show settlement or erosion after backfilling or placement.
5. Except as noted on Drawings or as specified, all structures such as embankments and fences shall be returned to their original condition prior to completion of contract. Any and all damage to any facility not designated for removal, resulting from Contractor's operations, shall be promptly repaired by Contractor at no cost to Owner.
6. In event Contractor fails to proceed to remedy defects of which he has been notified within 15 days of date of such notice, Owner reserves right to cause required materials to be procured and work to be done, as described in Contract Documents, and to hold Contractor and sureties on his bond liable for cost and expense thereof.
7. In case of an emergency where, in opinion of Engineer, delay could cause serious loss or damage, corrections or replacement may be made prior to or concurrent with notice being sent to Contractor. All expenses in connection with such corrections or replacement, including costs for professional services, shall be charged to Contractor.
8. Neither foregoing paragraphs nor any provision in Contract Documents, nor any special guarantee time limit implies any limitation of Contractor's liability with law of place of construction.

C. Special Warranties and Bonds.

1. Special warranties above and beyond general 1-year guarantee by Contractor are indicated in each individual specification sections. Special warranties, including equipment warranties from equipment manufacturers, shall cover same circumstances as general warranty except as further clarified below and in each individual specification section.
2. Warranties shall be acceptable only from equipment manufacturer. Warranties from suppliers or installers shall not be acceptable.
3. Warranties shall be executed by principles of company providing warranty and shall contain raised seal of that company.
4. Equipment warranties and support shall cover all components of each specified system described in individual specification sections and all other system components provided by equipment manufacturer regardless of manufacture or source.
5. Equipment manufacturer shall, at his own expense, furnish all labor, materials, tools and equipment required and shall make such repairs and removals or shall perform such work or reconstruction as may be made necessary by any structural or functional defect or failure resulting from faulty workmanship or faulty materials in any part of Work provided or supplied by him.
6. Preparation of Submittals.
 - a. Obtain warranties and bonds, executed in duplicate and executed by principles of company providing warranty and shall contain raised seal of that company. Leave

date of beginning of time of warranty blank until Date of Substantial Completion or other specified date is determined.

- b. Verify that documents are in proper form, contain full information, and are notarized.
 - c. Co-execute submittals when required.
 - d. Owner shall be named as beneficiary.
 - e. Warranty period shall commence at Date of Substantial Completion.
 - f. Retain warranties and bonds until time specified for submittal.
 - g. Warranties and guarantees shall be in accordance with General Conditions. Requirements may be added to or modified in individual Specification Sections.
 - h. By supplying a product under contract, manufacturer and Contractor jointly agree that all manufacturers' warranties, expressed or implied, pass through Contractor to Owner. This warranty obligation starts on date specified above and survives any inspection by, delivery to, acceptance by or payment by Owner or Contractor for goods furnished by manufacturer. Further, this warrants that equipment designed, manufactured and/or used meets all applicable federal, state and local laws, rules and regulations, including applicable OSHA standards. This requirement does not change or limit requirements for performance affidavits described in Section 01 05 00.
7. All warranties shall be submitted prior to Date of Substantial Completion, or for items of work when acceptance is delayed beyond date of Substantial Completion, submit within 10 days after acceptance, listing date of acceptance as beginning of warranty period.

1.07 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Submit Spare Parts Transfer Form found in Section 01 99 00 for all parts provided to Owner in accordance with Section 01 00 05.
- B. Prepare detailed listing of spare parts required, including quantity, supplier name, and specification section.
- C. Delivery, storage, and maintenance of spare parts shall be in accordance with Section 01 00 05.
- D. Provide quantities of products, spare parts, maintenance tools and maintenance materials specified in individual Sections to be provided to Owner, in addition to that required for completion of Work. Verify that these items were transferred to Owner prior to request for Substantial Completion.
- E. Spare parts shall be identical to those installed in Work. Include quantities in original purchase from supplier of manufacturer to avoid variations in manufacture.
- F. Use of Spare Parts.
 - 1. Spare parts are for Owner's sole use after guarantee/warranty period is over. Spare parts shall not be utilized by Contractor, equipment manufacturer, or any other party except Owner to accomplish repair, maintenance, or replacement work before or during guarantee/warranty period without written permission of Owner.

- a. Any spare parts agreed by Owner to be used during guarantee/warranty period shall be replaced immediately by Contractor or equipment manufacturer at no additional cost to Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 99 00
REFERENCE FORMS

PART 1 GENERAL

1.01 SUMMARY

A. Related Documents:

1. Following forms listed below and included herein are referenced from other sections in Contract Documents.
 - a. Change Control Form.
 - b. Equipment Start-up Report and Certification.
 - c. Equipment Training Certification.
 - d. Training Attendance Record.
 - e. Operation and Maintenance Manual Checklist.
 - f. Warranty Documentation Form.
 - g. Submittal Label.
 - h. Concrete Pre-placement Checklist.
 - i. Record Documents Certification.
 - j. Motor Testing Summary Sheet.
 - k. Piping Disinfection Summary Sheet.
 - l. Gravity and Force Main Piping Flushing and Leakage/Pressure Testing Summary Sheet.
 - m. Water-Tight Structure Other than Manholes Leakage Testing Summary Sheet.
 - n. Manhole Vacuum Leakage Testing Summary Sheet.
 - o. Water Tank/Filter Tank Disinfection Summary Sheet.
 - p. Low Pressure Air Testing of New Sewers Summary Sheet.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)



CHANGE CONTROL FORM NO.

Date Issued:		Project:	
Project No.:		Contractor:	
This Document is a: <input type="checkbox"/> Request for Proposal <input type="checkbox"/> Field Order <input type="checkbox"/> Work Change Directive <input type="checkbox"/> Contractor Change Request			
Description of Change <i>(attach necessary supporting documentation):</i>			
Initiated By: <input type="checkbox"/> Contractor <input type="checkbox"/> Engineer <input type="checkbox"/> Owner <input type="checkbox"/> Resident Project Representative			
Drawing(s) Reference:		Spec. Reference:	
RFI Reference:		Date of RFI:	
Attachments:			
REQUEST FOR PROPOSAL/CHANGE REQUEST			
We propose to perform the Work or make the Claim described above for the following change in Contract Price and Contract Times:			
<input type="checkbox"/> No Change in Contract Amount is Required		<input type="checkbox"/> A Change in Contract Amount is Required:	
<input type="checkbox"/> No Change in Contract Time is required		<input type="checkbox"/> A Change in Contract Time is Required:	
WORK CHANGE DIRECTIVE			
You are directed to proceed to make the changes to the Work described in this Work Change Directive. Any change in Contract Price or Contract Time will be determined in accordance with the General Conditions.			
FIELD ORDER			
This Field Order issued in accordance with the General Conditions for minor changes in the Work without changes in the Contract Price or Contract Time. If you consider that a change in Contract Price or Contract Times is required, notify the Engineer immediately and before proceeding with the proposed Work.			
AUTHORIZING SIGNATURES			
ENGINEER:	CONTRACTOR:	OWNER:	RESIDENT PROJECT REPRESENTATIVE:
_____	_____	_____	_____
_____	_____	_____	_____
(print name)	(print name)	(print name)	(print name)
Date: _____	Date: _____	Date: _____	Date: _____



EQUIPMENT START-UP REPORT AND CERTIFICATION

Date: _____
Owner: _____
Contract No.: _____
SSR Project No.: _____

Manual No.: _____
Submittal No.: _____
Spec. Section: _____
Submittal Description: _____
Equipment Serial No.: _____

I, _____, an authorized representative of
_____, hereby certify that above-mentioned piece of
equipment/system:

- Has been properly installed and aligned;
- Has been accurately calibrated and adjusted;
- Has been lubricated in accordance with manufacturer's recommendations;
- Is free from any undue stress imposed by connection piping or anchor bolts;
- Operation and maintenance manuals for above-mentioned piece of equipment have been delivered to Owner;
- Has been operated under all process variations listed in Section 01 88 23 and 01 88 26, if applicable.
- Has been operated under full load conditions and performed satisfactorily without leaks, excessive vibration, abnormal noise, and in complete conformance with Specifications.
- Is a follow-up visit required (Yes / No) If so, when _____.

Recommendations made by Manufacturer's Service Representative:

If applicable, please attach a copy of manufacturer's start-up report along with recorded test data.

Owner Representative Signature

Date

Contractor Representative Signature

Date

Manufacturer Representative Signature

Date

Engineer Representative Signature

Date



**EQUIPMENT TRAINING
CERTIFICATION**

Date: _____
Owner: _____
Contract No.: _____
SSR Project No.: _____

Manual No.: _____
Submittal No.: _____
Spec. Section: _____
Submittal Description: _____
Equipment Serial No.: _____

I, _____, an authorized representative of
_____, hereby certify that training for above-mentioned
piece of equipment/system:

- Has been properly performed;
- Owner has been fully trained and understands operation of equipment;
- Owner understands and has been trained to modify controls associated with equipment;
- Operation and maintenance manuals for above-mentioned piece of equipment have been delivered to Owner, and;
- If specified, a flash drive with video/audio of training session was made and a copy has been forwarded to Owner.

Attach a copy of Equipment Start-up Report and Training Attendance sheet to this Training Certification.

Owner Representative Signature

Date

Contractor Representative Signature

Date

Manufacturer Representative Signature

Date

Engineer Representative Signature

Date



TRAINING ATTENDANCE RECORD

Date: _____ Manual No.: _____
 Owner: _____ Submittal No.: _____
 Contract No.: _____ Spec. Section: _____
 SSR Project No.: _____ Equip. Description: _____
 _____ Equip. Serial No.: _____

Attendees			
Name (please print)	Signature	Representing	Tools Received
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
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			<input type="checkbox"/>



OPERATION AND MAINTENANCE MANUAL CHECKLIST

Date: _____
 Owner: _____
 Contract No.: _____
 SSR Project No.: _____

Manual No.: _____
 Submittal No.: _____
 Spec. Section: _____
 Submittal Description: _____

Checklist	Contractor		Engineer	
	Satisfactory	N/A	Accept	Deficient
Table of contents (included at front of multiple volumes, if applicable)				
Title page (incl. title of equipment; name, address, telephone, and responsible party for Engineer and Contractor)				
All comments from equipment shop drawing submittal(s) addressed and correctly incorporated into manual				
Schedule of products and systems, if applicable				
Subcontractor information, if applicable				
Manufacturer information				
Local representative/supplier information				
Nearest service center information				
Local source of supplies and replacement parts				
Equipment model number				
Equipment serial number				
Product/equipment data with non-applicable information deleted/crossed-out				
Design criteria, performance curves, engineering data, motor data, and schematics provided for each piece of equipment				
For building products, provide product data, catalog numbers, color, texture, composition, technical bulletins, necessary re-ordering information, etc.				
Bill of material for all equipment, including weights				
Supplemental drawings provided (e.g., general arrangement), if necessary				
Installation instructions				
Erection drawings, if necessary				
Start-up and shutdown procedures				
Safety precautions/instructions				
Normal operations instructions, including logical sequence of operation and limiting conditions				
Emergency operations instructions				
Special operating instructions (e.g., cold and warm weather operation), if applicable				
Lubrication data (trade names of lubricants) and schedule				

Checklist	Contractor		Engineer	
	Satisfactory	N/A	Accept	Deficient
Care and cleaning of all materials finishes, if applicable				
Preventative and routine maintenance and care data, including disassembly and alignment/calibration and balancing/checking, and schedules				
Troubleshooting guides				
Maintenance and repair procedures, including major overhauls, and schedules				
Removal and replacement instructions				
Spare parts and supply lists (include part manufacturer and number and recommended quantities; denote wear items, and long delivery time items)				
List of special tools required for maintenance, if applicable				
Detailed parts list with exploded view				
Electrical and control schematics (e.g., wiring diagrams/schematics, one-line diagrams, panelboard circuit directories, as applicable)				
Process and instrumentation diagrams (P&IDs), if necessary				
Sequence(s) of operation, if necessary				
Valve schedule with tag numbers and valve functions keyed to P&IDs				
Warranty information (also bond information, if applicable)				
Copy of equipment performance affidavit or equipment certification, if applicable				
Final approved shop drawings included in back of manual				
Identify any conflicts between information in O&M manual(s) and Contract Documents				
Testing equipment and special tools information				
Factory shop testing results				
Field test results and reports, including any air or water balance reports, and data collected during startup				
Equipment installation/startup certification				
Operator instruction/training certification (including attendance sheet)				
Motor test report(s), if applicable				
Additional information required by specific equipment/product specification section, if any				

Note: This manual submittal is a final submittal and should include all corrections to submittal package. Information in this submittal should be site specific and include complete descriptions of furnished equipment.

Contractor's Signature



WARRANTY DOCUMENTATION FORM

Owner: _____
 Contact Name: _____
 Contract No.: _____
 SSR Project No.: _____

Page _____ of _____
 Date _____

System, Equipment, or Area ID	Start Date	End Date	Contact	Company	Phone

 Contractor Signature

 Engineer Signature

 Date

 Date

SUBMITTAL LABEL

Project Name:	SSR Project No.:
Date:	Submittal No.:
To:	From:
Subcontractor/Supplier:	Product:
	Manufacturer:
Drawing Ref.:	Spec. Ref.:

REVIEW STAMPS

Contractor	Engineer

Contractor's Certification

I certify that I have reviewed attached shop drawings and to best of my knowledge and belief, that review, verification of products and materials required, field dimensions, adjacent construction Work, installation requirements, and coordination of information, is in accordance with requirements of Work and complies with Contract Documents, with following exceptions (explain or list any and all known exceptions; attach separate piece of paper if necessary).

- 1.
- 2.
- 3.

By: _____
(Authorized Signature)

CONCRETE PRE-PLACEMENT CHECKLIST

Project Name

Notification to Owner/Manager of Scheduled Placement (minimum 48 hours in advance)

Person Notified: _____ Date: _____ Time: _____

Date Scheduled for Placement: _____

Time Scheduled for Placement: _____ AM/PM

Estimated Quantity of Concrete to be Placed: _____ Cu. Yds.

Planning Information

Location: Water Containment Structure Building Foundation Other: _____

Placement Type: Mud Mat Slab Wall Grade Beam Topping Other: _____

Additional Description: _____

Required Mix: "A"-General Use "B"-Water Contact "C"-Topping "CF"-Topping "D"-Mud Mat/Fill "E"-Sidewalk/Curb

Maximum W/C Ratio: 0.44 0.42 0.44 0.50 0.42

Finish Requirements: _____

Curing Procedure/Type or Method: _____

Special Requirements: _____

Weather Protection: _____

Pre-Placement Inspection (Check all that apply and have been verified as ready)

Imbeds in Place:	Electrical	Mechanical	Plumbing	Sleeves
Floor Drain Elevations Set:	Elevations _____	_____	_____	_____
Form Work:	Plumb/Square/Tolerances	Form Ties in Place	Ties – Correct Quantity	Dimensions Correct
Anchor Bolts:	Thread Protection	Thread Protection	Layout	Spacing
Water Stop:	Installed	Straight	Fastened/Supported	Welded
Key Ways:	In Place	Straight	Fastened/Supported	
Re-Bar:	In Place	Connect Spacing	Correct Cover	Support
Equipment On-Hand:	Pump (1 or 2)	Hoses Vibrator	Floats Protection	Coring Heat Other: _____

Additional Remarks: _____

Acknowledgements (All listed parties must initial or sign as indicated)

Construction Layout: _____ (Contractor Surveyor Initials)
 Rebar Installation: _____ (Concrete Rebar Foreman Initials)
 Forms and Embeds/Inserts: _____ (Concrete Forms Foreman Initials)
 Placement Foreman: _____ (Concrete Placement Foreman Initials)
 CPC Form Completion: _____ (RPR Initials)

Contractor Signature: _____ Date: _____

RECORD DOCUMENTS CERTIFICATION

_____, CONTRACTOR on _____
(Contractor)

(Project title per Contract Documents)

hereby certifies that enclosed Record Documents show all changes made during construction and have been compiled in accordance with Section 01 78 39 of Contract Documents.

ATTACHMENTS:

- 1. Contract Drawings.
- 2. Contract Specifications.
- 3. Addenda.
- 4. Reviewed shop drawings.
- 5. Requests for information.
- 6. Field orders
- 7. Work change directives.
- 8. Change orders.
- 9. Field test records.
- 10. Inspection certificates.
- 11. Manufacturer's certificates.
- 12. Fixed equipment manuals.
- 13. Equipment training certificate.
- 14. Equipment start-up certificate.
- 15. Warranty documentation form.
- 16. Spare parts transfer form.

CONTRACTOR _____ (SEAL)
(Name of sole ownership, corporation or partnership)

(Signature of Authorized Representative) (SEAL)

(Affix corporate seal here)

Title: _____

ATTEST:

Name _____
(Please Type)

Title _____

Note: Attest for a corporation must be by corporate secretary; for a partnership by another partner; for an individual by a Notary.

CERTIFICATE OF PROPERTY RESTORATION

Date: _____

Project: _____

Contractor: _____

Property Owner: _____

Property Address: _____

Contractor for this Project has cleaned up and restored my property to my satisfaction where property was disturbed during construction.

- I agree.
- I do not agree (please explain below).

Property Owner

Date

Witness

Date

Please explain why you do not agree that your property was cleaned up and restored properly:

MOTOR TESTING SUMMARY SHEET

PROJECT INFORMATION

Job No.: _____ Location: _____
Project: _____ Contractor: _____
Contractor's Representative: _____ Observed by: _____

GENERAL EQUIPMENT INFORMATION

Equipment Description: _____ Equipment No.: _____
Equipment Location: _____
Drawing Numbers: _____
MCC/Panel No.: _____ Section/CKT. No.: _____
Control CKT. No.: _____

NAMEPLATE DATA

Motor Manufacturer: _____ HP: _____ RPM: _____ S.F.: _____
Voltage: _____ Phase: _____ F.L. Amp: _____ KVA Code: _____ Deg. Rise: _____
Serial No.: _____ Other: _____
Locked Rotor KVA: _____ Efficiency: _____

PRESTART CHECKS

	Date
Lubrication Checked (Motor and Driven Equipment)	_____
Motor Rotates Freely	_____
Overload Heater Size/Setting: _____ (located at starter)	_____
Control Circuit Tested	_____
Breaker Size (Frame Size/Trip Element Rating): _____	_____
Motor Insulation Resistance (Megger)	_____
Test Volts: _____ (500V for up to 250V motors and 1000V for up to 600V motors); Test Duration - 1 minute	
Phase A to Gnd: _____ Phase B to Gnd: _____ Phase C to Gnd: _____	
Phase A to B: _____ Phase B to C: _____ Phase C to A: _____	

(over)

MOTOR TESTING SUMMARY SHEET (CONT.)

UNCOUPLED DATA

(Provide this only when motor is shipped, uncoupled. Do not uncouple motor from drive to test.)

Bus Voltage:_____ Inrush Current:_____ Amps:_____ Sec Run in Time:_____

Average Running Current: A:_____ B:_____ C:_____ Rotation*:_____

RPM:_____

Performed by:_____ Date:_____

Approved by (test engineer):_____ Date:_____

COUPLED DATA

Bus Voltage:_____ Inrush Current:_____ Amps:_____ Sec Run in Time:_____

Average Running Current: A:_____ B:_____ C:_____ Rotation*:_____

RPM:_____ System Lineup/Conditions:_____

Test Equipment Control Nos.:_____

Remarks:_____

Performed by:_____ Date:_____

Approved by (test engineer):_____ Date:_____

*As viewed from motor outboard end.

PIPING DISINFECTION SUMMARY SHEET

Job No.: _____ Location: _____

Project: _____

Contractor: _____

Contractor's Representative: _____ Observed by: _____

Date: _____ Weather: _____ Temperature: _____

Section Tested: _____ ft. of _____-inch diameter pipe

Discharge Rate (gal/min): _____ Application of _____% hypochlorite solution @ gal/min
 _____ mg/l initial total chlorine residual @ end of line at _____(time)

_____ mg/l initial total chlorine residual @ end of 24 hours at _____(time)

Method of measuring chlorine residual: _____

Line flushed at _____ gal/min for _____ hours _____ minutes on _____(date)

Bacteria sample collected at: _____(location) at _____date/time)

Bacteria sample results _____ meet _____ do not meet state and/or county drinking water standards for total coliform.

Line Ready for Service on _____(date) _____(time)

Line Put into Service on _____(date) _____(time)

<p>WITNESS: OWNER/ENGINEER _____ Name _____ Title _____ Signature _____</p>	<p>WITNESS: CONTRACTOR _____ Name _____ Title _____ Signature _____</p>
--	--

**GRAVITY AND FORCE MAIN PIPE
FLUSHING AND PRESSURE/LEAKAGE TESTING SUMMARY SHEET**

Job No.: _____ Location: _____

Project: _____

Contractor: _____

Contractor's Representative: _____ Observed by: _____

FLUSHING

Date: _____ Weather: _____ Temperature: _____

Section Flushed: _____ ft. of _____-inch diameter pipe

Line Flushed for: _____ hours _____ minutes @ _____ gallons/minute

Line Flushed Through: _____ Manhole No.: _____ or Hydrant: _____-inch tap

Method of Measuring Flow: _____

PRESSURE AND LEAKAGE TESTING

Date: _____ Weather: _____ Temperature: _____

Section Tested: _____

Pipe Length: _____ (feet) Pipe Diameter: _____ (inches) Lay Lengths: _____ (feet)

Time Started: _____ Time Finished: _____ Elapsed Time: _____ (minutes)

Test Pressure: @ Start: _____ (psi) @ Finish: _____ (psi)

Allowable Leakage (calculated; see below): _____ (gallons) Actual Leakage: _____ (gallons)

PASS: _____ **FAIL:** _____

(over)

**GRAVITY AND FORCE MAIN PIPE
FLUSHING AND PRESSURE/LEAKAGE TESTING SUMMARY SHEET
(CONT.)**

Leakage Calculation:

Ductile Iron Pipe/HDPE Pipe:

$$L = \frac{S \times D \times \sqrt{P}}{133,200^*}$$

Where:

- L** = Allowable Leakage (gallons/hour)
- S** = Length of Pipe Tested (feet)
- D** = Nominal Pipe Diameter (inches)
- P** = Average Pressure during Test (psi)

* Refer to AWWA C600 for additional allowable leakage against closed metal-seated valves

PVC Pipe:

$$L = \frac{N \times D \times \sqrt{P}}{7,400}$$

Where:

- L** = Allowable Leakage (gallons/hour)
- N** = Number of Joints
- D** = Nominal Pipe Diameter (inches)
- P** = Average Pressure during Test (psi)

* Refer to AWWA C600 for additional allowable leakage against closed metal-seated valves

<p>WITNESS: OWNER/ENGINEER _____</p> <p>Name _____</p> <p>Title _____</p> <p>Signature _____</p>	<p>WITNESS: CONTRACTOR _____</p> <p>Name _____</p> <p>Title _____</p> <p>Signature _____</p>
---	---

**WATER-TIGHT STRUCTURE OTHER THAN MANHOLES
LEAKAGE TESTING SUMMARY SHEET**

Job No.: _____ Location: _____

Project: _____

Contractor: _____

Contractor's Representative: _____ Observed by: _____

LEAKAGE TESTING

Date: _____ Weather: _____ Temperature: _____

Structure Tested: _____

Date & Time Started: _____ Date and Time Finished: _____

Elapsed Time: _____ (hours)

Water Elevation at Start of Test: _____ (inches)

Water Elevation at Finish of Test: _____ (inches)

Change in Depth during Test: _____ (inches)

Allowable Change in Water Elevation (calculated; see below): _____ (inches)

PASS: _____ **FAIL:** _____

Leakage Calculation:

$$D = \frac{0.006 \times V}{A}$$

Where:

D = Allowable Change in Depth (inches) *

V = Volume of Structure (cubic feet)

A = Surface Area of Structure (square feet)

* Based on an allowable leakage rate of 1/20 of 1.0-percent of basin volume

Date Structure Ready to be Placed into Service: _____

Date Structure Placed into Service: _____

<p>WITNESS: Owner/Engineer _____ Name _____ Title _____ Signature _____</p>	<p>WITNESS: Contractor _____ Name _____ Title _____ Signature _____</p>
---	---

MANHOLE VACUUM LEAKAGE TESTING SUMMARY SHEET

Job No.: _____ Location: _____

Project: _____

Contractor: _____

Contractor's Representative: _____ Observed by: _____

LEAKAGE TESTING

Date: _____ Weather: _____ Temperature: _____

Manhole Tested: _____ Diameter of Manhole: _____ (feet)

Required Test Period: _____ (seconds; based on size of Manhole; see Section 33 13 00)

Date & Time Started: _____ Date and Time Finished: _____

Elapsed Time: _____ (seconds)

Vacuum at Start of Test: _____ (in Hg) Vacuum at End of Test: _____ (in Hg)

Change in Vacuum: _____ (in Hg) Allowable Change in Vacuum: _____ (in Hg)

PASS: _____ **FAIL:** _____

WITNESS: Owner/Engineer _____ Name _____ Title _____ Signature _____	WITNESS: Contractor _____ Name _____ Title _____ Signature _____
---	---

**WATER TANK/FILTER TANK
DISINFECTION SUMMARY SHEET**

Job No.: _____ Location: _____

Project: _____

Contractor: _____

Contractor's Representative: _____ Observed by: _____

DISINFECTION

Date: _____ Weather: _____ Temperature: _____

Structure Tested: _____

Date & Time Started: _____ Date and Time Finished: _____

Elapsed Time: _____ (hours and minutes)

Method of Measuring Free Chlorine Residual: _____

Free Chlorine Residual at Start of Test: _____ (mg/L)

Free Chlorine Residual at Finish of Test: _____ (mg/L)

Change in Free Chlorine Residual during Test: _____ (mg/L)

Allowable Change in Free Chlorine: _____ (mg/L)*

PASS: _____ **FAIL:** _____

* Based on type of structure disinfected as defined in Section 33 13 00.

FLUSHING AND BACTERIA SAMPLING

Date of Tank Flushing: _____ Chlorine Residual at Time of Sampling: _____ (mg/L)

Date & Time Samples Collected: _____

Location of Sample Collection: _____

Date & Time Samples Tested: _____

Results of Bacteria Testing: _____ (colonies/mL)

PASS: _____ **FAIL:** _____

Date Structure Ready to be Placed into Service: _____

Date Structure Placed into Service: _____

WITNESS: Owner/Engineer _____ Name _____ Title _____ Signature _____	WITNESS: Contractor _____ Name _____ Title _____ Signature _____
---	---

LOW PRESSURE AIR TESTING OF NEW SEWERS SUMMARY SHEET

Job No.: _____ Location: _____

Project: _____

Contractor: _____

Contractor's Representative: _____ Observed by: _____

Date: _____ Weather: _____ Temperature: _____

Section Tested (List MHs)	Length (feet)	Diameter (inches)	Material	Time Start/ Time Finish	Time Interval (minutes)	Air Pressure Initial / Final (psig)	Total Pressure (psig)	Pass/ Fail
To								
To								
To								
To								
To								
To								
To								
Comments:								

<p>WITNESS: Owner/Engineer _____ Name _____ Title _____ Signature _____</p>	<p>WITNESS: Contractor _____ Name _____ Title _____ Signature _____</p>
--	--

CONFINED SPACE ENTRY PERMIT

Location:			Type of Space:						
Reason for Entry									
Atmospheric Hazards:			<input type="checkbox"/> Oxygen deficiency						
			<input type="checkbox"/> Combustible gas						
			<input type="checkbox"/> Toxic contaminants						
Physical Hazards:			<input type="checkbox"/> Chemical/Biological						
			<input type="checkbox"/> Noise						
			<input type="checkbox"/> Other _____						
Hazard Controls:			<input type="checkbox"/> Personal Protective Equipment						
			<input type="checkbox"/> Other _____						
Beginning Date:		Beginning Time:	A.M.	Ending Date:	Ending Time:				
			P.M.		A.M.				
					P.M.				
Authorized Personnel									
Entrants' Names with Dept.			Attendants' Names with Dept.						
Required Equipment									
Communication Methods with Entrants:									
<input type="checkbox"/> Voice									
<input type="checkbox"/> Radio									
<input type="checkbox"/> Phone									
<input type="checkbox"/> Visual									
<input type="checkbox"/> Rope signals									
<input type="checkbox"/> Other _____									
Communication Methods to Contact Emergency Services:									
<input type="checkbox"/> Phone									
<input type="checkbox"/> Radio									
<input type="checkbox"/> Other _____									
Personal Protective Equipment:									
<input type="checkbox"/> Coveralls									
<input type="checkbox"/> Tyvek® suit									
<input type="checkbox"/> Leather gloves									
<input type="checkbox"/> Chemical Resistant gloves									
<input type="checkbox"/> Welding gloves									
<input type="checkbox"/> Welding hood									
<input type="checkbox"/> Eye protection									
<input type="checkbox"/> Hearing protection									
<input type="checkbox"/> Respiratory protection									
<input type="checkbox"/> Safety shoes/boots									
<input type="checkbox"/> Hard Hat									
<input type="checkbox"/> Harness/life line									
<input type="checkbox"/> Tripod/winch									
<input type="checkbox"/> Other _____									
Traffic Control:			Hot works:						
<input type="checkbox"/> Barricades			<input type="checkbox"/> Yes (Hot Works Permit required)						
<input type="checkbox"/> Vests			<input type="checkbox"/> No						
<input type="checkbox"/> Flags									
<input type="checkbox"/> Signs									
Atmospheric Testing									
Type of Gas Monitor: _____			Date of Last Calibration: _____						
Tests	Acceptable Entry Conditions	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Oxygen	19.5-23.5%								
Combustible Gas	Below 10% LEL								
Carbon Monoxide	0-25 ppm								
Initials of Tester									
Approvals									
Entry Supervisor (Print) _____			(Sign) _____						
I assumed the responsibility of Entry Supervisor on (date) _____ at (time) _____									
Entry Supervisor (Print) _____			(Sign) _____						
This Confined Space Entry Permit has been revoked because: _____									
Entry Supervisor (Print) _____			(Sign) _____						
Comments: _____									

END OF SECTION

SECTION 26 00 00
GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This section specifies the basic electrical requirements for this project as well as the general requirements which apply to the work of Division 26 in addition to those stipulated in Division 01. Should any discrepancies exist between the requirements of Division 26 and those found in Division 01; the more stringent requirement shall govern except where the two requirements are contradictory in which case the Division 01 requirements shall govern.
- B. The electrical work required for this project consists of furnishing all labor, equipment and materials necessary to obtain complete and operational electrical systems as indicated on the drawings and as specified herein.
- C. The Contractor shall furnish all material and labor as required for the installation of the new electric service per the local power company's requirements. The Contractor shall coordinate with the local power company for all requirements.
- D. The Contractor shall furnish all material and labor as required for the installation of the new telecom service(s) per the local service provider(s)' requirements. The Contractor shall coordinate with the local service provider(s) for all requirements.
- E. The Contractor shall furnish and install all communications wiring and equipment and will make all final communications connections after empty conduit systems have been installed as specified herein.

1.02 CODES, STANDARDS AND PERMITS:

- A. The installation shall comply with the following:
 - 1. All applicable local and state wiring ordinances.
 - 2. The National Electrical Code (NFPA-70-2017).
 - 3. All applicable provisions of the Occupational Safety and Health Act (OSHA).
 - 4. Requirements of the power and telephone companies furnishing services to the project.
 - 5. International Building Code (2015 Edition).
 - 6. International Energy Conservation Code (2015 Edition).
 - 7. Americans with Disabilities Act (ADA).
- B. This contractor shall apply for, obtain, and pay for all permits required. At the conclusion of the installation, he/she shall secure a certificate of inspection, properly signed by the

controlling building department, which shall state that all rules have been complied with and that the work is satisfactory.

- C. The contractor is responsible for providing a complete installation in compliance with all applicable codes and local amendments or ordinances. Should any part of the plans or specifications be found in conflict with applicable codes or ordinances, the contractor shall notify the engineer prior to submitting his/her bid or shall provide required adjustments and rework at no cost to the Owner.

1.03 TRADE NAMES AND EQUALS

- A. Manufacturer's trade names or catalog numbers used in these specifications and indicated on the drawings denote type, size, quality, and design of equipment desired.
- B. Where equipment is specified as "equal", or "approved equal", it shall mean equal in the opinion of the engineer. This contractor is free to offer substitutions for consideration as equal after the contract is signed; however, he shall be prepared to furnish specified materials where substitutions are not approved.

1.04 DELIVERY, STORAGE, AND HANDLING OF MATERIAL AND EQUIPMENT

- A. The contractor shall be responsible for the purchase, delivery, and storage of all materials and equipment indicated to be supplied under this section of the specifications, and it shall be his/her responsibility to schedule the delivery of materials and equipment at such stages of the work as will permit uninterrupted construction of all phases of the work.
- B. Where owner furnished equipment is to be turned over to this contractor for installation, it shall be the responsibility of this contractor to receive such equipment and store in a safe, dry location.
- C. This contractor shall do all required rigging, hoisting, transporting, etc., of all equipment furnished under this contract, and shall further furnish any additional structural members, as may be required, for the proper support of any and all equipment furnished hereunder.

1.05 USE OF DOCUMENTS

- A. The scope of the electrical work for this project is not limited to the requirements of any one drawing, any portion of the drawings, any one specification division, or any portion of the specifications whose main theme is electrical. The scope of the electrical work for this project consists of all electrical work required to obtain complete and operating systems and equipment as indicated on or as can be reasonably inferred from all drawings and specifications.
- B. The drawings indicate diagrammatically the general arrangement of circuits and outlets, locations of switches, panelboards, electrically operated equipment & appliances and other

work. This data is as accurate as planning can determine, but accuracy is not guaranteed. Field verification of all dimensions, locations, levels, etc., to suit field conditions is directed.

- C. Should interferences prevent the installation of conduit, setting of junction boxes and cabinets, arrangement of lighting fixtures and method of suspension, etc., in the locations indicated on the drawings, the necessary deviations therefrom must be made without additional cost to the owner, where relocation is not over five (5) feet from the location shown on the drawings.
- D. Review all drawings and adjust all work to conform to all conditions shown therein. Discrepancies between different drawings, or between drawings and specifications or codes and regulations governing the installation shall be brought to the attention of the Owner's Representative prior to the date of bid opening.
- E. The locations of equipment, motors, etc., as indicated on the drawings are approximate only. Verify all dimensions with the appropriate equipment installer before rough-in. Where conduit, wiring, service equipment, lights, switches, or other electrical equipment interfere with construction; remove, relocate and rearrange such material and equipment as required to make a complete and satisfactory installation.
- F. Motor sizes indicated on the drawings are approximate only and are subject to change to suit the standard motor drives of the various equipment manufacturers. Check electrical characteristics of supplied and/or installed motors and adjust sizes of wiring and protective devices.
- G. Electrical connection types and sizes indicated on the drawings are approximately only and are subject to change based on final equipment selections. Check electrical characteristics of supplied equipment and adjust wiring and overcurrent protective devices sizes.
- H. Any offsets in conduit required or necessary to avoid interferences with structure, or the work of other trades, etc., shall be made at no additional cost to the owner.

1.06 COORDINATION

- A. The electrical contractor shall coordinate his/her work with other subcontractors and the owner to prevent any delay in the proper installation and completion of the work.
- B. The electrical contractor shall review submittal data of other trades prior to ordering material and shall adjust sizes and ratings of electrical connections and overcurrent protective devices as required based on actual equipment nameplate data.
- C. The electrical contractor shall coordinate the procurement and installation of all electrical devices, disconnects, plugs, switches, wiring, conduits, etc. with that of other trades in order to provide a complete and satisfactory installation of all assemblies, systems, and equipment.
- D. This contractor shall use every precaution to protect the work of others, and he/she will be held responsible for all damage done by his workers to the work of other trades. He/she shall

also protect his work from danger of breakage, dirt, foreign materials, etc., and shall replace all work so damaged.

- E. Coordinate phases of the work with the owner and other trades to allow the owner to continue normal business operations throughout the duration of the project. Any necessary power outages shall be scheduled for other than the owner's hours of operation or be pre-arranged with the owner.

1.07 MANUFACTURER'S RECOMMENDATIONS

- A. Unless specifically indicated otherwise, all equipment and materials shall be installed in accordance with the recommendations of the manufacturer. Adjust conductor and overcurrent protective devices sizes as required to comply with these recommendations or requirements. A copy of the manufacturer's installation documents shall be kept in the job superintendent's office and shall be available to the owner's representative at all times.

1.08 CUTTING AND PATCHING

- A. This contractor shall be responsible for all cutting and patching required for the installation of his work, and he/she shall employ workers skilled in the trades required for all cutting and patching work.
- B. This contractor shall be responsible for the proper location of all chases, recesses, and openings required for his work.
- C. This contractor shall provide all sleeves, etc., required for the introduction and placement of his work, and shall be responsible for the correct location of same.
- D. Beams or columns shall not be pierced without permission of the structural engineer, and then only as directed.

1.09 PROTECTION OF FLOORS

- A. This contractor's attention is directed to the need to protect finished floors, and he will be held responsible for damage he may do to finished floors. Where heavy equipment is to be moved across finished floors, this contractor shall make provisions to protect the floor.
- B. Where pipe cutting and threading operations are carried on by this contractor, he shall provide a suitable covering material over the floor which will assure that oil and pipe cuttings do not come in contact with the finished floor. Temporary floor covering shall be plywood or other materials as may be approved by the engineer.
- C. This contractor shall remove all temporary floor covering, as he completes his work in each area. Any damage resulting from activities of this contractor shall be repaired at his own expense.

1.10 PAINTING

- A. Painting of materials and equipment furnished under the electrical portion of the contract, if required, will be done under a separate section of the project specifications. The electrical contractor shall, however, refinish and restore to the original condition and appearance, all electrical equipment which has sustained damage to manufacturer's finish paint.
- B. All electrical equipment shall be provided with factory applied prime and finish paint, unless otherwise specified.

1.11 SHOP DRAWINGS (SUBMITTALS)

- A. Refer to Section 01 33 00 "Submittal Procedures."
- B. Refer to individual Division 26 specification sections for submittal data requirements.

1.12 RECORD DRAWINGS

- A. Refer to Section 01 78 39 "Project Record Documents."

1.13 MAINTENANCE MANUALS

- A. Refer to Section 01 78 23 "Operation and Maintenance Data."

1.14 TESTS AND ADJUSTMENTS

- A. Furnish all materials, labor, instruments, etc., and all other services required for a complete and satisfactory test and adjustment of all electrical systems and equipment. Tests and adjustments shall be made prior to acceptance by local inspection authorities.
- B. Test all circuits to determine that they are free of short circuits and that phase conductors are not grounded.
- C. Check all motor controllers to determine that properly sized overload devices are installed.
- D. Verify overcurrent protective devices are installed in accordance with the manufacturer's recommendations or as required by code based on actual nameplate data and make adjustments as required to comply.
- E. Check all electrical equipment for proper operation.

- F. Correct or replace at no additional cost to the Owner all equipment and/or wiring which tests prove to be defective or operating improperly.
- G. Thoroughly familiarize the Owner's designated representative with the proper operating procedures and maintenance requirements for all electrical systems and equipment.

1.15 TEMPORARY CONSTRUCTION POWER AND LIGHTING

- A. This contractor shall furnish and install all temporary wiring for construction power and lighting for the project as required.
- B. A temporary electrical service, if required, for construction power and lighting shall be obtained by this contractor in the name of the owner, who will pay all power and energy charges. Any cost for the temporary service connection shall be paid by this contractor.
- C. All temporary wiring for construction shall conform to Article 590 of the National Electrical Code and all applicable rules and regulations of OSHA.

1.16 FEEDER, SWITCH AND DEVICE RATINGS

- A. The sizes of feeders, motor starters, switches, protective devices, and other electrical devices indicated on the drawings are based on the average current or horsepower ratings of equipment of the same general types and sizes upon which the designs of the various systems are based. Horsepower and current ratings indicated on the drawings are for guidance only and shall not limit the size of the equipment or feeders.
- B. Check the current and horsepower ratings of all proposed or supplied equipment and adjust the sizes of all feeders, starters, switches, protective devices and other electrical devices as required to provide proper protection and satisfactory operation. This shall include increasing to the next larger size, or decreasing to the next smaller size, any individual feeder, starter, switch, protective device, or other electrical device to match actual equipment ratings. No sizes shall be decreased without approval in writing from the Engineer.

1.17 EXCAVATION AND BACKFILLING

- A. Perform all excavation and backfilling required for electrical work including necessary sheathing and bracing in accordance with the requirements of Division 31, "EARTHWORK."
- B. Dispose of all surplus backfill material in a manner approved by the Owner's designated representative.

1.18 SAFETY DEVICES

- A. Electrical equipment and wiring used during construction shall be installed and insulated in a manner to insure the safety of personnel.
- B. Provide suitable guards, signs, etc. to protect personnel from “hot” wiring in panelboards, junction boxes, etc. during the construction period.

1.19 GUARANTEE

- A. The contractor shall guarantee to the owner all work performed under this contract to be free from defects in workmanship and material for a period of one (1) year from date of final acceptance. Defects arising during this period will be promptly remedied by the contractor at his own expense upon notice by the owner. All lamps for lighting fixtures shall be excluded from this guarantee, but one (1) complete and operative set of lamps for lighting fixtures shall be in place at the time of final acceptance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 26 05 19
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
1. Copper building wire rated 600 V or less.
 2. Connectors, splices, and terminations rated 600 V and less.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.01 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. General Cable Technologies Corporation.
 2. Service Wire Co.
 3. Southwire Company.
- C. Standards:
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 2. RoHS compliant.
 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- E. Conductor Insulation:

1. Type THHN and Type THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

2.02 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
 1. Material: Copper.
 2. Type: Two hole with long barrels.
 3. Termination: Crimp.

PART 3 - EXECUTION

3.01 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

3.02 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN/THWN-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway unless otherwise noted.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway unless otherwise noted.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway unless otherwise noted.
- E. All circuits served by variable frequency drives (VFD): Type XHHW-2, single conductors in raceway.
- F. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway unless otherwise noted.

- G. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway unless otherwise noted.
- H. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway unless otherwise noted.

3.03 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 26 05 33 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 26 05 29 "Hangers and Supports for Electrical Systems."

3.04 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.05 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 26 05 53 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.06 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 26 05 44 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.07 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 07 84 13 "Penetration Firestopping."

END OF SECTION

SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes grounding and bonding systems and equipment.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.02 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. ERICO; a brand of nVent.
 - 2. Harger Lightning & Grounding.
 - 3. Thomas & Betts Corporation; A Member of the ABB Group.

2.03 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B3.
 - 2. Stranded Conductors: ASTM B8.

2.04 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Conduit Hubs: Mechanical type, terminal with threaded hub.
- D. Water Pipe Clamps:
 - 1. Mechanical type, two pieces with stainless-steel bolts.
 - a. Material: Die-cast zinc alloy.
 - b. Listed for direct burial.

2.05 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.

PART 3 - EXECUTION

3.01 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Structural Steel: Welded connectors.

3.02 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.03 GROUNDING SEPARATELY DERIVED SYSTEMS

- A. Generator: Install grounding electrode(s) at the generator location. The electrode shall be connected to the equipment grounding conductor and to the frame of the generator.

3.04 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.05 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
- C. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.

3.06 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
- C. Grounding system will be considered defective if it does not pass tests and inspections.
- D. Report measured ground resistances that exceed the following values:
1. Service-entrance rated automatic transfer switch: 10 ohms.
- E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 26 05 29
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Steel slotted support systems.
2. Conduit and cable support devices.
3. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32- inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. B-line, an Eaton business.
 - b. Thomas & Betts Corporation; A Member of the ABB Group.
 - c. Unistrut; Part of Atkore International.
 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 3. Material for Channel, Fittings, and Accessories: Stainless steel, Type 304.
 4. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their

supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325.
5. Toggle Bolts: Stainless-steel springhead type.
6. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.01 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 1. NECA 1.
 2. NECA 101
 3. NECA 102.
- B. Comply with requirements in Section 07 84 13 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for raceways and boxes specified in Section 26 05 33 "Raceways and Boxes for Electrical Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 1. Secure raceways and cables to these supports with two-bolt conduit clamps.

3.02 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength

will be adequate to carry present and future static loads within specified loading limits.

Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
1. To Wood: Fasten with lag screws or through bolts.
 2. To New Concrete: Bolt to concrete inserts.
 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 4. To Existing Concrete: Expansion anchor fasteners.
 5. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP- 69.
 6. To Light Steel: Sheet metal screws.
 7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

END OF SECTION

SECTION 26 05 33
RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
1. Metal conduits and fittings.
 2. Nonmetallic conduits and fittings.
 3. Metal wireways and auxiliary gutters.
 4. Boxes, enclosures, and cabinets.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.01 METAL CONDUITS AND FITTINGS

- A. Metal Conduit:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Allied Tube & Conduit; a part of Atkore International.
 - b. Republic Conduit.
 - c. Wheatland Tube Company.
 2. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 3. GRC: Comply with ANSI C80.1 and UL 6.
 4. ARC: Comply with ANSI C80.5 and UL 6A.
 5. FMC: Comply with UL 1; aluminum.
 6. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- B. Metal Fittings: Comply with NEMA FB 1 and UL 514B.
1. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing

agency, and marked for intended location and application.

2. Fittings, General: Listed and labeled for type of conduit, location, and use.
- C. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.02 NONMETALLIC CONDUITS AND FITTINGS

A. Nonmetallic Conduit:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. CANTEX INC.
 - b. Condux International, Inc.
 - c. Thomas & Betts Corporation; A Member of the ABB Group.

B. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

C. Nonmetallic Fittings:

1. Fittings, General: Listed and labeled for type of conduit, location, and use.
2. Fittings for RNC: Comply with NEMA TC 3; match to conduit type and material.

2.03 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 3R unless otherwise indicated, and sized according to NFPA 70.

1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

2.04 BOXES, ENCLOSURES, AND CABINETS

A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

- B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.
- D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- E. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

PART 3 - EXECUTION

3.01 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: ARC.
 - 2. Concealed Conduit, Aboveground: ARC.
 - 3. Underground Conduit: RNC, Type EPC-40-PVC, directburied.
 - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 4X, stainless steel.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated.
 - 1. Exposed: GRC.
 - 2. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - 4. Boxes and Enclosures: NEMA 250, Type 1.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

3.02 INSTALLATION

- A. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for hangers and supports.
- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Do not fasten conduits onto the bottom side of a metal deck roof.
- D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- E. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for hangers and supports.
- F. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- G. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- H. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- I. Support conduit within 12 inches of enclosures to which attached.
- J. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 2 inches of concrete cover in all directions.
- K. Stub-ups to Above Recessed Ceilings:
 - 1. Use GRC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- L. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

- M. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- N. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where an underground service raceway enters a building or structure.
 - 2. Conduit extending from interior to exterior of building.
 - 3. Where otherwise required by NFPA 70.
- O. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations.
- P. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between the box and cover plate or the supported equipment and box.
- Q. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- R. Locate boxes so that cover or plate will not span different building finishes.
- S. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- T. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.03 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
 - 1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 31 20 00 "Earth Moving" for pipe less than 6 inches in nominal diameter.
 - 2. Install backfill as specified in Section 31 20 00 "Earth Moving."
 - 3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of

run and complete backfilling with normal compaction as specified in Section 31 20 00 "Earth Moving."

4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
5. Underground Warning Tape: Comply with requirements in Section 26 05 53 "Identification for Electrical Systems."

3.04 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF SECTION

SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Color and legend requirements for conductors.
 - 2. Labels.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Comply with NFPA 70.
- B. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

2.02 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 - 1. Legend: Indicate voltage and system or service type.
- B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.
 - 1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue

3. Colors for 240-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
4. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
5. Color for Neutral: White.
6. Color for Equipment Grounds: Green.

C. Equipment Identification Labels:

1. Black letters on a white field.

2.03 LABELS & TAPES

A. Self-Adhesive Labels: Polyester, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

1. Minimum Nominal Size:
 - a. 1-1/2 by 6 inches for raceway and conductors.
 - b. 3-1/2 by 5 inches for equipment.
 - c. As required by authorities having jurisdiction.

B. Underground-Line Warning Tape:

1. Tape:
 - a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - b. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
2. Color and Printing:
 - a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
 - b. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".
 - c. Inscriptions for Orange-Colored Tapes: "TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE".

3. Tag: Type ID:

- a. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core; bright colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
- b. Width: 3 inches.
- c. Overall Thickness: 5 mils.
- d. Foil Core Thickness: 0.35 mil.
- e. Weight: 28 lb/1000 sq. ft..
- f. Tensile according to ASTM D 882: 70 lbf and 4600 psi.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.
- E. Self-Adhesive Labels:
 1. On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.
- F. Underground Line Warning Tape:
 1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches overall.

3.02 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
- D. Equipment Identification Labels:
 - 1. Indoor Equipment: Self-adhesive label.
 - 2. Outdoor Equipment: Laminated acrylic or melamine sign.

END OF SECTION

SECTION 27 13 23

COMMUNICATIONS OPTICAL FIBER BACKBONE CABLING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Type OFNR optical fiber cable.
 - 2. Optical fiber cable connecting hardware, patch panels, and cross-connects.

1.2 COORDINATION

- A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

1.3 ACTION SUBMITTALS

- A. Product Data:
 - 1. For each type of product.
- B. Shop Drawings:
 - 1. System Labeling Schedules:
 - a. Electronic copy of labeling schedules, in software and format selected by Owner.
 - 2. Cabling administration drawings and printouts.
 - 3. Wiring diagrams showing typical schematic arrangement, including the following:
 - a. Cross-connects.
 - b. Patch panels.
 - c. Patch cords.
 - 4. Cross-Connect and Patch-Panel Drawings: Detail mounting assemblies and show elevations and physical relationship between installed components.
- C. Certificates:
 - 1. For each type of product.
- D. Field Quality-Control Submittals:
 - 1. Optical fiber cable testing plan.
 - 2. Field quality-control reports.

1.4 INFORMATIONAL SUBMITTALS

- A. Source Quality-Control Submittals:
 - 1. Source quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For optical fiber cable, splices, and connectors.

PART 2 - PRODUCTS

2.1 TYPE OFNR OPTICAL FIBER CABLE

- A. Description: This category covers jacketed optical fiber cable for use as risers in vertical runs in shaft or between floors within buildings in accordance with Article 770 of NFPA 70 containing no electrically conductive materials.
- B. Performance Criteria:
 - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 - 2. Listing Criteria: UL CCN QAYK; including UL 1651.
 - 3. General Characteristics:
 - a. Performance: TIA-568.3.
 - b. Inside Plant Mechanical Properties: ICEA S-83-596.
 - c. Inside-Outside Plant Mechanical Properties: ICEA S-104-696.
 - d. Jacket:
 - 1) Cable cordage jacket, fiber, unit, and group color in accordance with TIA-598.
 - 2) Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.
- C. Type OFNR, Designation OM1, Multimode Optical Fiber Cable
 - 1. Additional Characteristics:
 - a. Construction: TIA-492AAAA; 62.5 μm core diameter, 125 μm cladding diameter.
 - b. Minimum Overfilled Modal Bandwidth-Length Product: 200 MHz-km at 850 nm wavelength; 500 MHz-km at 1300 nm wavelength.
 - 2. Options:
 - a. Configuration: 12-fiber, tight buffer, optical fiber cable.

- b. Maximum Attenuation: 3.50 dB/km at 850 nm wavelength; 1.5 dB/km dB/km at 1300 nm wavelength.
- c. Jacket Color: Orange.

2.2 FIBER CABLE

- A. Description: This category covers jacketed optical fiber cable for use in vertical runs in plenums, ducts, or other spaces used for environmental air within buildings in accordance with Article 770 of NFPA 70 containing noncurrent-carrying electrically conductive materials.
- B. Performance Criteria:
 - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 - 2. Listing Criteria: UL CCN QAYK; including UL 1651.
 - 3. General Characteristics:
 - a. Performance: TIA-568.3.
 - b. Inside Plant Mechanical Properties: ICEA S-83-596.
 - c. Inside-Outside Plant Mechanical Properties: ICEA S-104-696.
 - d. Jacket:
 - 1) Cable cordage jacket, fiber, unit, and group color in accordance with TIA-598.
 - 2) Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inch.

2.3 OPTICAL FIBER CABLE HARDWARE

- A. Performance Criteria:
 - 1. Fiber Optic Connector Intermateability Standard (FOCIS) specifications of TIA-604 series.
 - 2. TIA-568.3.
- B. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.
 - 1. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.
- C. Patch Cords: Factory-made, dual-fiber cables in 36 inch lengths.
- D. Connector Type: Type SC complying with TIA-604-3 connectors.
- E. Plugs and Plug Assemblies:
 - 1. Male; color-coded modular telecommunications connector designed for termination of single optical fiber cable.

2. Insertion loss not more than 0.25 dB.
3. Marked to indicate transmission performance.

F. Jacks and Jack Assemblies:

1. Female; quick-connect, simplex and duplex; fixed telecommunications connector designed for termination of single optical fiber cable.
2. Insertion loss not more than 0.25 dB.
3. Marked to indicate transmission performance.
4. Designed to snap-in to patch panel or faceplate.

2.4 SOURCE QUALITY CONTROL

A. Tests and Inspections:

1. Test and inspect multimode optical fiber cables, by, or under supervision of, qualified electrical testing laboratory recognized by authorities having jurisdiction, in accordance with TIA-526-14 and TIA-568.3 before delivering to site. Affix label with name and date of qualified electrical testing laboratory's certification of system compliance.
2. Test and inspect pre-terminated optical fiber cable assemblies, by, or under supervision of, qualified electrical testing laboratory recognized by authorities having jurisdiction, in accordance with TIA-526-14 and TIA-568.3 before delivering to site. Affix label with name and date of qualified electrical testing laboratory's certification of system compliance.

B. Nonconforming Work:

1. Cables that do not pass tests and inspections will be considered defective.

C. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate backbone cabling with protectors and demarcation point provided by communications service provider.

3.2 SELECTION OF OPTICAL FIBER TYPE

A. Installed in Vertical Shaft or Floor-to-Floor Riser:

1. Nonconductive:
 - a. Type OFNR in listed plenum communications raceway.

B. Installed in Location Other Than Riser or Plenum:

1. Nonconductive: Type OFNR in metallic conduit.

3.3 INSTALLATION OF OPTICAL FIBER BACKBONE CABLES

- A. Optical fiber backbone cabling system must provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.
- B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters may not be used as part of backbone cabling.
- C. Comply with BICSI N1, NECA NEIS 1, and NECA NEIS 301.
- D. Backbone cabling system must comply with transmission standards in TIA-568.1.
- E. Telecommunications Pathways and Spaces: Comply with TIA-569.
- F. Wiring Methods:
 1. In Raceway: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters[and except in accessible ceiling spaces, in attics, and in gypsum board partitions where unenclosed wiring method may be used]. Conceal raceway and cables except in unfinished spaces.
 2. In Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- G. Optical Fiber Cabling Installation:
 1. Comply with TIA-568.1 and TIA-568.3.
 2. Comply with BICSI ITSIMM, Ch. 6, "Cable Termination Practices."
 3. Terminate all cables; no cable may contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
 4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inch and not more than 6 inch from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 5. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
 6. Bundle, lace, and train cable to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
 7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
 8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps may not be used for heating.
 9. In communications equipment room, provide 10 ft long service loop on each end of cable.

10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
11. Cable may be terminated on connecting hardware that is rack or cabinet mounted.

H. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Cable may not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

I. Installation of Cable Exposed under Raised Floors:

1. Install plenum-rated cable only.
2. Install cabling after flooring system has been installed in raised floor areas.
3. Coil cable 6 ft long not less than 12 inch in diameter below each feed point.

J. Group connecting hardware for cables into separate logical fields.

3.4 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569, Annex A, "Firestopping."
- C. Comply with BICSI ITSIMM, "Firestopping" Chapter.

3.5 GROUNDING

- A. Install grounding in accordance with BICSI ITSIMM, "Grounding (Earthing), Bonding, and Electrical Protection" Chapter.
- B. Comply with TIA-607 and NECA/BICSI-607.
- C. Locate grounding bus bar to minimize length of bonding conductors. Fasten to wall allowing at least 2 inch clearance behind grounding bus bar. Connect grounding bus bar with minimum 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
- D. Bond metallic equipment to grounding bus bar, using not smaller than 6 AWG equipment grounding conductor.

3.6 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA-606.
- B.
 1. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.

- C. Cable Schedule: Install in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish electronic copy of final comprehensive schedules for Project.
- D. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.
- E. Cable and Wire Identification:
 - 1. Label each cable within 4 inch of each termination and tap, where it is accessible in cabinet or junction or outlet box, and elsewhere as indicated.
 - 2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
 - 3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 ft.
 - 4. Label each unit and field within distribution racks and frames.
 - 5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use different color for jacks and plugs of each service.
- F. Labels must be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA 606, for the following:
 - 1. Flexible vinyl or polyester that flexes as cables are bent.

3.7 FIELD QUALITY CONTROL

- A. Field tests and inspections must be witnessed by Engineer.
- B. Tests and Inspections:
 - 1. Visually inspect optical fiber jacket materials for qualified electrical testing laboratory certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568.1.
 - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - 3. Optical Fiber Cable Tests:
 - a. Test instruments must meet or exceed applicable requirements in TIA-568.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - b. Link End-to-End Attenuation Tests:

- 1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in one direction in accordance with TIA-526-14, Method B, One Reference Jumper.
- 2) Attenuation test results for backbone links must be less than 2.0 dB. Attenuation test results must be less than those calculated in accordance with equation in TIA-568.1.

C. Nonconforming Work:

1. Cables will be considered defective if they do not pass tests and inspections.
2. Remove and replace defective cables and retest.

D. Collect, assemble, and submit test and inspection reports.

1. Data for each measurement must be documented.
2. Data for field quality-control report submittals must be printed in summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from instrument to computer, saved as text files, and printed and submitted.

END OF SECTION

SECTION 40 90 00

INSTRUMENTATION AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

A. Requirements:

1. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions (if included), and Division 01 Specifications Sections, apply to this Section.

B. Description of Work:

1. Furnish to Owner a fully integrated and completely functional Control System (System) as specified herein and indicated on Contract Drawings. Primary equipment controlled and monitored by System shall include all programmable logic controllers (PLC) within the system.
2. Furnish, configure and commission all SCADA and networking hardware, software, control panels, control devices and instrumentation as specified herein and indicated on Contract Drawings as required to facilitate system operation.
3. Furnish, install, configure and commission all software as specified herein and as required to facilitate system operation.
4. Develop all control logic, graphical operator interface screens, historical and trend databases, and reports as specified herein and as required to facilitate system operation.
5. Integrator shall furnish Record Drawings in accordance with Section 01 00 05 for control panel drawings and wiring diagrams, network diagrams, and electrical interlocking diagrams for all equipment included in Scope of Work including existing systems where new equipment or instrumentation is being added.
6. Integrator shall be responsible for checkout, calibration, testing and startup of all furnished equipment and control panels.
7. Integrator shall be responsible for system level checkout, calibration, testing and startup in order to provide an integrated and fully functional System to Owner.
8. Furnish all PLC programming required to achieve an integrated and fully functional system as specified herein. All PLC programming and tag names shall be consistent and conform to Rockwell Automation's programming conventions and standards.
9. Furnish, install and commission all Control Panels, RTU Panels, PLC equipment and operator interface terminals.
10. Furnish and install cellular communication equipment as specified herein.
11. Furnish and install desktop network firewall/security appliance.
12. Configure real time and historical trending as specified herein.
13. Modify existing Microsoft Excel operational reports for collection of data from new PLCs.

1.02 QUALITY ASSURANCE

- A. Integrator's attention is directed to fact that all specified instruments and controls must form a completely integrated system and, as such, Integrator shall become familiar with requirements necessary to provide equipment specified for System regardless of manufacture and shall be responsible to Contractor for complete and satisfactory operation of entire control system.
 - 1. These specifications cover the intended function of equipment, but do not necessarily cover all details necessary for a complete, operable and functional system. The contractor shall supply all devices and appurtenances necessary to provide a complete, operable and fully functional system as indicated on Contract Drawings or specified herein.
- B. Instrumentation and Control System Integrator:
 - 1. Shall design and furnish a complete, integrated and fully functional control system, warranted to perform intended functions as indicated on Contract Drawings or as specified herein.
 - 2. Shall provide system integration for control systems furnished by other equipment manufacturers on this project.
 - 3. Shall be responsible for reviewing all submittals and obtaining all necessary data from individual manufacturers to determine necessary interface requirements for operation, control and/or monitoring between various process manufacturers' equipment, Owner's existing systems, and system being supplied by Integrator.
- C. Contractor:
 - 1. Shall be fully and solely responsible for work of Integrator and solely responsible to Owner for supplying a complete and fully integrated system.
 - 2. Shall provide personal superintendence and direction of work, maintaining and supplying complete supervision over and coordination between all subcontractors employed by him and Integrator.
 - 3. Shall furnish Integrator with all submittals for review and comment.
 - 4. Shall be responsible for defining limits of his subcontractor's work.
 - 5. Shall be responsible for setting of instruments (including alarms, etc. as provided under other sections).
- D. Technical services:
 - 1. Upon completion of equipment installation, provide services of a qualified field engineer for a period of not less than ten (10) 8-hour days for System commissioning, calibration, start-up, and testing of equipment.
 - 2. Minimum days specified above do not relieve Integrator from providing sufficient service to place complete System into satisfactory operation.

1.03 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 00 05.
- B. Product data: Within 90 calendar days after Contractor has received Owner's Notice to Proceed, submit:

1. Component manufacturing data sheet indicating pertinent data and identifying each component by item number and nomenclature as indicated on drawings and in specifications.
2. Component drawings showing dimensions, mounting and external connection details.
3. Wiring schematics, each on a single drawing with full description of operation. Component identification on schematics shall be as indicated above.
4. A system schematic of hardware with component manufacturing data sheets for each item, including all ancillary and peripheral components and software.
5. If applicable, path or coverage study with system diagrams for wireless telecommunications systems.
6. A printed copy of following:
 - a. Equipment and Instrument List with PLC and HMI tag names.
 - b. Preliminary OIT/HMI graphics screens inclusive of local OIT and modifications to Wonderware InTouch screens, with a complete description of each screen.
 - c. A draft Functional Specification of System, incorporating items (a) and (b) above, fully detailing how entire System shall operate and be controlled by Owner. Functional Specification shall include a Process Narrative.
 - d. Functional Specification shall also include preliminary examples of all reports to be supplied.
 - e. Sample forms and reports:
 - 1) Instrument/Loop Checkout Form
 - 2) I/O Verification Report
 - 3) System Checkout Report

C. Provide Operation and Maintenance manuals complying with provisions of Section 01 78 23.

1. Operating instructions shall incorporate a final functional description of supplied equipment or system, including panel layouts, material lists, equipment manuals, recommended spare parts lists, and wiring schematics which reflect as-built modifications.
2. Special maintenance requirements particular to system shall be clearly defined along with special calibration and test procedures.
3. As part of operation and maintenance manuals, provide following:
 - a. As-built Equipment and Instrument List with PLC and HMI tag names.
 - b. As-built OIT/HMI graphics screens with complete operating instructions for each screen, including pop-up windows and alarm and trend screens.
 - c. Electronic copies of all PLC programs, documented in programming software format with no password protection.

- d. Electronic copies of all OIT/HMI application, including database in development software format with no password protection.
 - e. Device and instrument calibration, scaling and configuration information with each point identified by PLC and HMI tag name, if applicable.
 - f. Final Functional Specification and Process Narrative.
 - g. Printouts of all supplied reports including instructions for running each report and for modifying report contents.
 - h. If applicable, wireless path or coverage study with as-built system diagrams, configuration information and operational data (link strength, noise, fade margins, etc.).
- D. Provide the Engineer for approval any changes, additions, corrections, etc. required to Bid Documents that are needed to accommodate system being proposed. Changes, additions, corrections, etc. shall be at Contractor's expense and shall be included in his Bid.

1.04 COORDINATION OF WORK

- A. Integrator shall be responsible for reviewing all other information contained in Contract Documents that could affect this portion of work.
- B. Plans and specifications, especially instrumentation/electrical and wiring requirements, have been formulated in an attempt to satisfy conditions for any system proposed. However, a vendor may find that some changes or additional conduit and wiring from that indicated may be required to accommodate particular equipment being proposed. Should this be case, vendor shall include in his bid price, all changes or additional requirements necessary for system. After award of contract, revised drawings must be submitted for approval indicating any changes prior to any changes being implemented.

1.05 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. Comply with pertinent provisions of Section 01 00 05.
- B. Schedule delivery of equipment to coordinate with project completion schedule.
 - 1. Each item of equipment to be tagged with identifying number shown on Shop Drawings.
- C. Contractor's attention is directed to fact that equipment has delicate components and extreme care shall be taken in handling to avoid internal and/or external damages.
- D. Damaged equipment shall not be accepted.
- E. Equipment not for immediate use shall be stored inside a building, with enclosures under protective coverings and shall be fully protected from moisture, extreme heat and vibration.

1.06 SPARE PARTS

- A. Contractor shall furnish one (1) of every component furnished under this section to Owner for shelf spare (excluding desktop computers/servers, printers and supplies, test equipment and handheld configurators, enclosures, internal mounting panels, internal panel lights, terminals, wires, labels, DIN rail, wire duct and cable management devices, conduit and fittings, transformers, receptacles, and non-special connectors).
- B. Contractor shall furnish a complete list of every spare part including equipment tag number and location where part is installed.

1.07 WARRANTY

- A. Comply with pertinent provisions of Section 01 77 13. There shall be a one year warranty on all work and equipment supplied under this section commencing from time of substantial completion of project as specified in Section 01 77 13. Owner shall have complete access to System during warranty period.
- B. Integrator shall provide capability for secure remote troubleshooting and warranty support of System. Minimum capability shall be via secure firewall virtual private network connection configured and maintained by the Owners' Information Technology department and provided under Division 26 and indicated on Contract Drawings. Internet service shall be provided by Owner.
- C. Contractor shall provide an 8-hour response time in normal working hours, five days per week for length of warranty period.
 - 1. For any service visit during this period, provide Owner and Engineer with a written report stating reason for equipment failure and recommendations to prevent recurrence.

1.08 RELATED WORK UNDER THIS CONTRACT

- A. Following items of related work are specified in other sections.
 - 1. Auxiliary contacts in motor starters for control interlocks – Division 26.
 - 2. Installation and power wiring of motor starters, disconnect switches and variable frequency drives - Division 26.
 - 3. Field control and communication wiring - Divisions 26, 27, and 40.
 - 4. Power wiring for control system - Divisions 26, 27, and 40.
 - 5. Communication and networking equipment and cabling – Divisions 26, 27, and 40.
 - 6. Section 43 21 17 – Vertical Turbine Pumps

1.09 REFERENCE STANDARDS

- A. All work must be performed in accordance with requirements of following pertinent standards and legal codes and ordinances:
 - 1. Standard Building Code and Publications referred to therein.
 - 2. Life Safety Code, NFPA No. 101.
 - 3. Occupational Safety and Health Act (OSHA).
 - 4. National Electrical Code (NEC).
 - 5. American National Standards Institute (ANSI)
 - 6. Standards and Periodicals Listings, Underwriters Laboratories.
 - 7. For work not specifically listed above, use standards and codes of National Fire Protection Association (NFPA).

1.10 INSTRUCTIONS TO OWNER

A. Following items shall be required.

1. During system commissioning and after System Acceptance, Integrator shall provide two (2) sessions, eight (8) hours each of operational instruction to Owner's operating personnel. Instruction manuals shall be submitted to Owner's representative and approved prior to start of training sessions. Manuals shall be distributed at training sessions. Training for plant operators shall consist of hands-on training in a class room environment at job site during normal working hours.
2. Integrator shall provide one (1) session, four (4) hours of instruction to Owner's maintenance and engineering personnel on operation and maintenance of System. Manual prepared by Integrator shall be used for this instruction.
3. General class requirements.
 - a. Submit lesson plans to Owner's representative for training phases to include type of training to be provided and a list of reference material for review and approval by Owner.
 - b. Training Program: Accomplish training program as specified. A training day is defined as 8 hours of instruction including two 15-minute breaks and excluding lunch time, Monday through Friday. Conduct onsite training after acceptance run of system at a time mutually agreeable between Contractor and Owner. Training shall be provided to designated operating personnel identified by Owner in functional operations of system and procedures that personnel shall follow in systems operation. This phase of training shall include but not be limited to:
 - 1) Operation of equipment
 - 2) Setpoint adjustments
 - 3) Diagnostics and failure recovery procedures
 - 4) Alarms and alarm response
 - 5) Historical and trended data
 - 6) Maintenance and calibration

PART 2 PRODUCTS

2.01 GENERAL

A. Control System Integrator:

1. Programming and Integration of the control system shall be by the Owner's SCADA System Engineer:

Gaines, Williams & Associates, Inc.
Robert Gaines
901-734-6306
robert@gaineswilliams.com

or pre-approved alternate.

- B. System shall consist of a combination of individual control and monitoring sub-systems, each configured to perform a specific function associated with total plant operational scheme.
- C. All equipment and materials shall be new, unused and proved by previous use of similar products to be completely suitable for service intended.
- D. All control panels shall be fabricated and assembled according to contract documents including adherence to wire numbering scheme, etc.
- E. All of equipment shall be manufacturer's latest and proven design. Specifications and drawings call attention to certain features but do not purport to cover all details of design of System. Completed system shall be compatible with functions required and other equipment furnished by Contractor.
- F. All electrical components of system shall be powered by 120V AC, single phase, 60 cycle current, except as otherwise indicated on Contract Drawings or as specified herein.
- G. All contacts for control, remote motor operated, or electrically operated equipment shall be rated not less than 10 amperes at 120V AC unless otherwise specified herein.
- H. All systems and individual components, whether panel or field mounted units, shall be protected from voltage and/or current surges which may originate as a result of lightning or other external causes.
 - 1. Protective equipment to be provided by control panel suppliers and installed in accordance with manufacturer's recommendations.
 - 2. Schematics of instruments submitted for approval to Engineer shall indicate how this protection shall be provided and identify items of equipment which shall be used for this purpose.
- I. Integrator shall supply Record Drawings containing all necessary information for proper maintenance and operation of System in accordance with Section 01 78 39.
 - 1. Full network and input/output (IO) wiring diagrams indicating field devices associated with each IO point and including designation of spare IO points. Drawings shall be furnished in printed 11 x 17 format, electronic PDF format and editable AutoCAD format.
 - 2. Wire log table showing connections (wire terminations) between all furnished components to be supplied to facilitate field wiring.
 - 3. Interconnection information between system components and equipment found in other sections of these Specifications shall be complete with all necessary interconnection information.
 - 4. Notes which refer to equipment manufacturer's drawings for proper interconnection shall not be acceptable.
 - 5. Provide within 30 days after startup and after any field modifications.
- J. To be considered an "approved equal", Contractor shall demonstrate in writing, to satisfaction of Owner and Engineer at time of shop drawing submittal that manufacturer has produced specified type and size of equipment that has been in successful operation for a minimum period of five years prior to bid date and will seamlessly interface with the existing equipment. If equipment other than that specified is furnished the Contractor shall furnish programming, development and configuration software for alternate equipment.

K. Temperature Control.

1. Panels shall be sized and/or provided with necessary ancillary equipment to adequately dissipate heat generated by equipment mounted on or in panel in order to maintain interior panel temperature below limits that could cause component damage or deterioration. Need for temperature control equipment shall also be based on and account for range of ambient temperatures for locations where panels are located.
2. Furnish cooling fans with air filters if required to dissipate heat.
3. For panels outdoors or in unheated areas, furnish thermostatically controlled heaters to maintain temperature above 40 degrees Fahrenheit.
4. Any addition of ancillary equipment or other components to maintain temperatures at acceptable limits shall not affect specified NEMA rating of any control panel in any way.

2.02 POWER SUPPLIES

- A. General instrument DC power supplies shall be a 120V AC input and 24V DC output, 100W minimum, -10°C to 60°C operating temperature range without derating, short circuit protection, over-voltage protection, over-temperature protection, handle high inrush currents without shutdown, high efficient > 90% switching technology, 35mm DIN rail mounting for horizontal or vertical, screw terminals for up to #12 AWG wire, UL508 listed, full CE compliance for safety, emissions and ingress protection and require no internal or external fan cooling. Power supplies shall be Allen-Bradley XLP Series, Sola/Hevi-Duty SDN series or Phoenix Contact.

2.03 ELECTRICAL CONTROL WIRING

- A. All field wiring shall comply with National Electrical Code and Division 26 “Electrical”.
- B. All control wiring shall be furnished and installed by Division 26 and installed by Electrical Contractor.
- C. All wiring shall be in conduit as specified in Division 26.
- D. Ethernet and fiber optic cable shall be as specified in Division 27.
- E. Single pair analog cable shall be tinned copper, polyethylene insulated, twisted pair with 100% aluminum-polyester shield coverage, 16 AWG stranded tinned copper drain wire and chrome PVC jacket. Cable shall be Belden 8719 or approved equal.
- F. Single triad (3-conductor) analog cable shall be tinned copper, polyethylene insulated conductors with 100% aluminum-polyester shield coverage, 18 AWG stranded tinned copper drain wire and chrome PVC jacket. Cable shall be Belden 8770 or approved equal.
- G. Multiple pair analog cable shall be tinned copper, polyethylene insulated, twisted pair with 100% aluminum-polyester shield coverage, 18 AWG or larger stranded tinned copper drain wire and chrome PVC jacket. Conductor wire size shall be 16 AWG or larger. Cable shall be Belden or approved equal.
- H. Discrete copper internal control panel shall be UL rated Type E-16 single conductor stranded silver plated copper with extruded TFE Teflon insulation. Wire shall be suitable for operation 600 volts as specified in National Electric Code, at conductor temperatures not to exceed 200°C. Wire shall be resistant to acid, alkalis, oil, flame, moisture, solvents and fungus. Wire color code shall be as follows:
1. Black - 24 and 120V AC power

- | | | | |
|----|------------------|---|---|
| 2. | White | - | 24 and 120V AC neutral |
| 3. | Green | - | Ground |
| 4. | Red | - | Control & PLC input/output wiring |
| 5. | Blue | - | 24V DC positive |
| 6. | Blue/White Strip | - | 24V DC negative |
| 7. | Yellow | - | Circuit conductors which remain energized when supply disconnecting means is off. |

2.04 ELECTRIC/ELECTRONIC INPUT DEVICES

- A. System shall maintain specified analog end-to-end accuracy throughout warranty period from sensor to controller readout.
- B. Sensors (transducers) shall be appropriately packaged for location.
 - 1. Architectural housing for space mounting.
 - 2. Weatherproof/sunshield housing for outdoors.
 - 3. Thermal well housing for water applications.
 - 4. Protective housing for duct mounting.
- C. Sensor/transducer shall be selected to withstand ambient conditions where:
 - 1. Moisture or condensation is a factor.
 - 2. Vibration exists from ductwork, equipment, etc.
 - 3. Reasonably expected transient conditions exist for temperatures, pressures, humidity's, etc. outside normal sensing range.
- D. Sensor/transducer shall be appropriately selected to most closely match expected sensing range.
- E. System accuracy of sensed conditions shall be as follows:
 - 1. +/- .1 inch for filter status differential up to a 0-5 inch water column range.
 - 2. +/- 1% for pressure switches.
 - 3. +/- 0.50% for water flow.
- F. Water flow switches shall be solid state flow switches operating on thermal dispersion principle.
- G. All electronics and transmitters mounted outdoors shall be furnished with sunscreen and shall be rated for outdoor service.

2.05 SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

- A. The system shall be a Human Machine Interface (HMI) – Programmable Logic Controller (PLC) based system communicating via Ethernet over a combination Fiber Optic Cable, Copper Cable, Microwave Radio System and Cellular VPN Communications.
- B. The system shall control and monitor the Roger Hawkins Water Treatment Plant, South Water Treatment Plant, six (6) remote water towers/tanks and two (2) remote booster pump stations. Communications between the plants and remote stations is an existing microwave radio system which is to remain in place and functional.
- C. The Roger Hawkins Water Treatment Plant consists of three (3) high service pumps, three (3) well pumps, one (1) back wash pump, aerators, clarifiers, four (4) gravity filters with two (2) air scour blowers, lime feed system, chlorine feed system and fluoride feed system.
- D. The South Water Treatment Plant consists of six (6) high service pumps, four (4) well pumps (1 local, 1 remote communicating via existing 900MHz radio and 2 remote (well pumps 8 & 9 that will have cellular communications added as part of this project)), two (2) backwash pumps, six (6) gravity filters, lime feed system, chlorine feed system and fluoride feed system.
- E. The Fort Hudson Ground Storage Tank includes two (2) local pump stations and site valving.

2.06 SCADA SYSTEM HARDWARE

- A. The Programmable Logic Controller (PLC), Input/Output modules and communication modules shall be a combination of Allen-Bradley ControlLogix, CompactLogix and Micrologix 1400 as specified on each bill of materials and in compliance with the Owners standards and existing system. All programmable logic controllers shall be as specified, no exceptions.
- B. Two (2), Desktop Operator Workstations, Dell Optiplex small form factor plus, shall be furnished. The workstations shall be complete with the following and at a minimum meet the following specifications:
 - 1. Intel Core i7-13700 (30MB cache, 16 cores, 24 threads, 5.10 GHz)
 - 2. Windows 11 Pro 64 Bit operating system
 - 3. Performance Graphics Card, 4 GB VRAM, 4 video channels
 - 4. 64 GB: 2 X 16 GB, DDR5
 - 5. 1 TB SSD Class 40 drive
 - 6. Microsoft Office 365 one-year license
 - 7. 1 RJ45 Ethernet Port 10/100/1000 Mbps
 - 8. Dell wireless keyboard and mouse
 - 9. Dell UltraSharp 27 4K USB hub monitor, 27", two (2) per workstation with stand
 - 10. All interconnecting cables required
 - 11. Uninterruptible power supply

2.07 SCADA SOFTWARE

- A. Integrator shall furnish, configure, and commission the following software. During commissioning of the system, the Contractor shall transmit through the Engineer all software download install files. The Contractor shall register all software to the Owner and provide serial number and product key information. Upon substantial completion the Owner shall have the latest available release of the following software packages.
 - 1. Two (2) licenses of HMI runtime software Rockwell Software FactoryTalk View Site Edition Standalone Station Unlimited Displays, HMI Software shall be complete with all communication software/servers required or approved VTScada equal.
 - 2. One (1) license of FactoryTalk View Studio for FactoryTalk View Studio SE or approved VTScada development software equal.

2.08 FIREWALL – SECURITY APPLIANCE

- A. Furnish Dell SonicWall Gen 7 TZ670 security appliance complete with three (3) years SonicWall comprehensive gateway security suite, licensed for twenty five (25) SSL VPN clients and complete with 120VAC power.

2.09 CELLULAR MODEMS

- A. The cellular router shall be a full-featured cellular router which can operate over public and private LTE networks, with features to assist in network control and management, dual SIMs for failover connectivity, VLAN support and include one RJ-45 Ethernet port and one RJ-45 serial port for supporting both RS-232 and RS485. The cellular router shall include DIN rail clip kit. The Integrator shall coordinate with the Owner to match the router with the correct service provider. Cellular routers shall be Digi IX10.
- B. The Integrator shall furnish three (3) year subscription to Digi Remote Manager.
- C. The cellular router shall be provided with a Panorama Antennas Wireless N-MIMO Cell and GPS antenna with mounting bracket and extension antenna cable as required.

2.10 INTERCONNECTING CABLES

- A. Integrator shall furnish all Ethernet cables and all associated fiber optics cables and parts including WIC fiber optics cable interface boxes, fiber optics connectors, fiber optics cable termination kits, etc.

2.11 UNINTERRUPTIBLE POWER SUPPLY (UPS)

- A. For each computer system provide one (1) Uninterruptible Power Supply (UPS) System to provide transient protection and backup AC power. The UPS system shall provide true online power protection to prevent any break in power. The UPS system shall provide continuous, clean sine wave power for a period of at least 15 minutes after loss of commercial power. The unit shall also provide brownout protection to boost sags in AC power.
- B. The UPS system shall be UL 1449 listed for surge protection with a mean time between failure of at least 100,000 hours. The unit shall have passed ANSI/IEEE C62.41 Categories A and B. RF noise isolation shall be accomplished using a full-time advanced multi-stage filter. Noise (RF) Isolation shall not exceed 60 dB common-mode or 80 dB normal-mode.
- C. The UPS shall be sized for the capacity specified on the bill of materials.
- D. The UPS system shall be manufactured by APC, Sola or approved equal.

2.12 SCADA CONTROL PANEL REQUIREMENTS

- A. All Control and RTU panels shall be shop fabricated per the contract documents and UL508A listed. Equipment shall be furnished exactly as shown in the documents and in Bills of Materials, no exceptions. The Contractor shall be responsible for layout modifications based on any or equal substitutions. If equipment other than those listed on control panel bills of materials and specified herein is furnished the Contractor shall provide control panel fabrication drawings and wiring diagrams, original editable bid drawings will not be supplied. All drawings shall be furnished in electronic format in AutoCAD 2023 Electrical.
- B. All wiring shall be installed in white plastic wire duct with covers.
- C. All wiring shall be such that analog signal, AC power and control signals and communications signal are all routed, ducted, bundled or installed in conduit separate raceways. No mixing of services shall be allowed.
- D. All analog signal and communications cable shall be 100% shielded.
- E. Terminals (excluding ground terminals) shall be high density (maximum 0.25" wide, finger safe, single circuit, multi-rail mount, 600V AC/DC, 30 A and suitable for wire size up to #12 AWG. Terminals for 120 VAC wiring shall be white, 24 VAC wiring shall be gray and 24 VDC shall be blue. Terminals shall be Allen-Bradley No. 1492-J4.
- F. Ground terminals shall be single circuit (green/yellow color code) grounding terminal blocks, maximum 0.50" wide, wire size up to #16 AWG and be 35mm DIN rail mount. Terminals shall be Allen-Bradley No. 1492-WG4.
- G. Fused terminals shall be single circuit fusible terminal block with neon blown fuse indicator, 300V AC, 15 A, suitable for wire size up to #12 AWG and be 35mm DIN rail mount. Fused terminals shall be Allen-Bradley No. 1492-H4 for AC power and 1492-H5 for DC power.
- H. Circuit Breakers shall be single circuit thermal magnetic type, finger safe screw terminal, 277V AC, amp rating as indicated on contract drawings, suitable for wire size up to #6 AWG and be 35mm DIN rail mount. Circuit breakers shall be Allen-Bradley 1492-SPM1C-XXX.
- I. Panel mounted analog IO surge suppressors shall be din rail mountable, single-pair with shield terminal surge suppression modules. The modules shall mount on standard 35mm din rail and protect against over-voltage and sneak currents. Analog surge suppressors shall be Allen-Bradley 4983-DD24. All analog IO shall be equipped with surge suppressors at the terminating control panel and field instrument.
- J. Line voltage surge suppressors shall protect against over voltage and filter common mode and normal mode noise, have nanosecond reaction time, power line tracking and failure indicator. Line voltage surge suppressors shall be Sola/Hevi-Duty STV25K-10S.
- K. Selector switches shall be 30.5 mm Type 4X, maintained position, watertight and oil tight with standard knob operators and the number of positions required by the Cycles of Control and contract documents. Each switch position shall activate a contact closure dedicated to that position. Selector switches shall be Allen-Bradley 800T or approved equal.
- L. Pushbuttons shall be 30.5 mm Type 4X, momentary spring return, watertight and oil tight with flush head unit. Depressing the switch shall activate contact closure.
- M. Pilot light units shall be 30.5 mm Type 4/13, 120 VAC LED, watertight and oil tight.
- N. Relays shall be 120 VAC double pole double through relays complete with base. Relays shall be Allen-Bradley 700-HK or approved equal.

- O. Current sensing switches shall be split-core single-phase AC current sensor. The unit shall be complete with user selectable adjustments for current sensing mode, trip point and trip delay. Current sensing switches shall be Kele, SSAC, Veris Hawkeye or approved equal.
- P. All control panels which contain PLC equipment (processor, IO, etc.) shall include an uninterruptible power supply (UPS). The UPS shall supply be of a capacity as shown on the bill of materials line-interactive technology continually supplying output power filtered from electrical noise and transients while charging battery, output shall be sine wave waveform, buck and boost output voltage by raising or lowering output power, have user replaceable batteries, voltage regulation of +/- 7% RMS, frequency regulation of +/- 0.5 Hz, frequency synchronization rate of +/- 5 Hz and a frequency slew rate of 1 Hz per second. UPS's shall be manufactured by APC, Sola or approved equal.
- Q. DIN mounting rail shall be symmetrical 35 mm rail. DIN rail shall be Allen-Bradley #1492-DR1 or approved equal.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. If applicable, refer to Section 26 05 00, "Basic Requirements for Electrical" for requirements applying to all sections of Division 26, 27, 28, and 40 including, but not limited to, following:
 - 1. Coordination
 - 2. Workmanship, Materials and Equipment
 - 3. Manufacturer's Recommendations
 - 4. Protection of Work
 - 5. Utility Connections
 - 6. Patching
 - 7. Painting and Identification
 - 8. Adjustments
 - 9. Contractors Test and Balance
 - 10. Clean-Up

3.02 ENCLOSURES

- A. For all input/output devices which require field interface devices, these devices where practical shall be mounted in a local control/field interface panel (LCP/FIP). All other field interface devices shall be mounted at point of field interface in a separate enclosure suitable for location. Integrator shall provide an enclosure which protects device(s) from dust, moisture, conceals integral wiring and moving parts.
- B. All wiring to and from LCP/FIP shall be to screw type terminals. Analog or communications wiring may use FIP as a raceway without terminating. Use of wire nuts within FIP is prohibited.
- C. All wiring within LCP/FIP's shall be run in plastic raceway to give a neat and organized appearance.

3.03 FIELD DEVICE IDENTIFICATION

- A. All I/O field devices (except space sensors) that are not mounted within FIP's shall be identified with stainless steel engraved name plates.
- B. Identification shall match instrument tags in Contract Documents.
- C. Calibration settings shall be marked with paint or indelible ink.
- D. Each terminal strip termination shall be tagged with an identification that matches control drawings.
- E. Outside of each LCP/FIP shall be identified with an engraved plastic label matching identification name shown on control drawings prepared by Integrator. Lettering shall be in white against a black background.

3.04 MARKING

- A. Each control component shall be plainly and permanently marked, with number or symbol as it appears on control diagram, on an engraved stainless steel tag furnished by manufacturer.
- B. Where one control diagram serves more than one system additionally identify with system number.
- C. Junction box covers shall be marked to indicate that they are a part of control system.

3.05 IDENTIFICATION

- A. All control wires and cables shall be labeled. Wire, cable, terminal and fuse labels shall consist of complete wire number matching exactly number shown on control wiring diagrams, custom printed on a single pressure sensitive, self-adhesive tape which wraps entire circumference of wire or cable. Hand writing or combining multiple labels to make number shall not be permitted.

3.06 OPERATION AND MAINTENANCE INSTRUCTIONS

- A. Furnish one copy, electronic and printed, of Operation and Maintenance manuals.

3.07 CONTROL DIAGRAMS

- A. Control diagrams shall show all control wiring, except that a common symbol may be used for a common electrical control power supply.
- B. Diagrams shall show all interlock wiring or control wiring to control equipment whether equipment is furnished as part of Section 40 90 00 or by others. Any wiring other than power wiring (line to disconnect to starter to motor) shall be shown except following:
 - 1. Internal wiring of packaged factory pre-wired equipment.

3.08 SYSTEM TEST AND STARTUP

- A. Verify each field instrument wiring termination and submit a completed Instrument/Loop Checkout form.
- B. Utilizing control system, force all output signals to each controlled device to operate equipment across its entire operating range, verify physical state matches commanded state

and verify status feedback signal matches actual state. Simulate input from each instrument across its entire operating range. Submit a completed I/O Verification report.

- C. Verify system operation and control as defined in approved System Functional Specification and submit a completed System Checkout report.

3.09 HUMAN MACHINE INTERFACE GRAPHICS DEVELOPMENT

- A. The HMI project and PLC systems shall have tags that share the same name in each database. The Integrator shall submit proposed database layout, tag naming convention and memory allocation to the Owner and Owners representative for approval prior to beginning development.
- B. No custom scripting developed in software other than that specified for this project shall be allowed. All scripting shall be performed utilizing tools in software specified for this project.
- C. HMI projects shall comply with ISA S88 and 101 standards.
- D. There shall be no hidden or password protected logic, the Owner shall have full access to all logic.
- E. Custom developed add on instructions (AOI) or user defined data types shall be open logic. These instructions and data types shall not be locked preventing the Owner from accessing base code.
- F. Screens shall be consistently designed with an upper status bar and lower navigation bar that are an integral part of each screen, not overlay screens. The top bar shall display current communication status to each site, logged in user and login/logout button. The bottom bar shall display navigation buttons to access system screens.
- G. The graphical user interface shall be a layered system starting with an overview map locating all facilities controlled and monitored in the system. The overview map shall have active buttons for selection of each site. Each site shall have an overview of the site with active buttons to select an area of the site. Each area plan shall have active indication of levels, flows, analytical values, etc. at the location of each sensor. From each area screens each system shall be selectable, which when selected shall to a detailed representation of the equipment in the system.
 - 1. Overall site screen shall include the approximate location of selected equipment labeled to match installation.
 - 2. Area screens shall include the approximate location of all major equipment and instrumentation sensors. Equipment and instruments shall be labeled as on the contract drawings. The sensors shall also have active indication of the current value being sensed by the sensor.
 - 3. The detailed system screens shall show all sensors and automatic control devices. There shall be active indication of sensed values by each sensor. The current status of all valves (open/closed) and motors (running/stopped) shall be indicated. Each controlled device shall be a selectable item, which when selected shall display an H-O-A mode selector for the device. Modes for controlled devices shall be as follows:

Variable Speed Motors	-	Hand-Off-Auto
Single Speed Motors	-	Hand-Off-Auto
Modulating Valves	-	Manual-Off-Auto

2-position Valves - Open-Close-Auto

There shall be a ‘HAND-OFF-AUTO’ selector for each major piece of equipment which shall transfer all controlled devices for the piece of equipment to the selected mode. Selector screens for modulating valves and motors shall include a bar graph and numerical indication of position or speed. The screen shall also include slide bar and numerical input for manual control of variable speed/position equipment.

4. All analog input values shall be logged and trended. All trended values shall be logged to a data file as directed by the Owner. The log file shall have a descriptive name with the date as part of the name. All analog values shall be trended and historically logged. The trend screens shall be permanent screens developed in a logical manner based on process and equipment as approved by the Owner.
5. The system shall include a “Log On” screen in which an operator enters a login I.D. and password. There shall be five (5) levels of password security.
6. General screen features:
 - a. All screens shall display current time, date and logged-in user.
 - b. All screens shall display indication of an active alarm.
 - c. All screens shall have a common navigation bar allowing one touch access to the alarm screen, log-in screen, home screen and trend screen directory.

3.10 PROGRAMMABLE LOGIC CONTROLLER PROGRAM DEVELOPMENT

- A. The HMI project and PLC systems shall have tags that share the same name in each database. The System Contractor shall submit proposed database layout, tag naming convention and memory allocation to the Owner and Owners representative for approval prior to beginning development.
- B. PLC projects shall comply with ISA S88 and 101 standards.
- C. There shall be no password protected logic preventing the Owner’s full access.
- D. Custom developed add on instructions (AOI) or user defined data types shall be open logic. These instructions and data types shall not be locked preventing the Owner from accessing base code.
- E. The PLC project shall be developed with sub-routines and tasks separating operating equipment and process functions in a logical manner. This separation of logic shall be as follows with added routines as necessary:
 1. General
 2. Analog Scaling
 3. Communications
 4. High service pumps
 5. Well pumps
 6. Chemical feed
 7. Alarms

3.11 FUNCTIONAL DESCRIPTION

- A. The raw water feed system shall include setpoints based on clearwell level that will start and stop selected well pumps based on the setpoints. There shall be four (4) on-off zones associated with the clearwell with the capability to associate selected well pumps with each zone. Selected well pumps shall start and stop based on the associated zone setpoints.

END OF SECTION

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