

AlexRenew

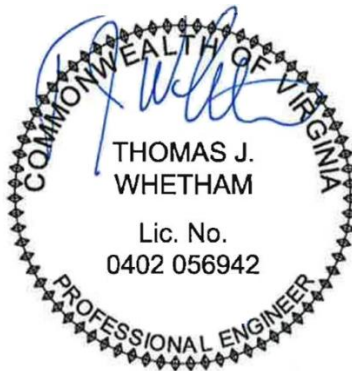
Potomac Yard Pump Station

Ventilation Improvements and Odor Control System

Contract No. 21-023

September 2021

Specifications (Bid Set)



Brown and Caldwell

Alexandria, Virginia

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AlexRenew

Potomac Yard Pump Station

Ventilation Improvements and Odor Control System

Contract No. 21-023

Specifications

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SECTION 00 11 10
INVITATION TO BID

GENERAL NOTICE

Alexandria Renew Enterprises (Owner) is requesting Bids for the construction of the following Construction Project (Project):

POTOMAC YARD PUMP STATION
VENTILATION IMPROVEMENTS AND ODOR CONTROL SYSTEM
CONTRACT NO. 21-023

Sealed bids will be received in the Issuing Office, Alexandria Renew Enterprises, 1800 Limerick Street, Alexandria, VA 22314, until Thursday, October 14, 2021, at 4:00 PM local time. At this time bids will be publicly opened and read aloud.

The Project includes the following Work:

Replacement of the existing odor control system with a new activated carbon adsorber odor control system, modifications to ductwork, addition of aluminum channel and wet well cover system, covering existing bar screen, addition of centrifugal fans, and associated instrumentation, controls and electrical construction.

POINT OF CONTACT

The Point of Contact for all matters is:

Maryam Zahory, Purchasing Agent
Alexandria Renew Enterprises
1800 Limerick Street
Alexandria, Virginia 22314
Phone: 703-549-3381, ext. 2207
Email: purchasing@alexrenew.com

OBTAINING THE BIDDING DOCUMENTS

Electronic copies of Bidding Documents for the Project can be found at Alexandria Renew Enterprises website <https://alexrenew.com/lets-do-business-together> and the Commonwealth of Virginia website <https://eva.virginia.gov/>.

All official notifications will be offered through the Alexandria Renew Enterprises website. The Owner is not responsible for Bidding Documents, including addenda, if any, obtained from sources other than the AlexRenew website.

PRE-BID CONFERENCE

A mandatory pre-bid conference for the Project will be held virtually on September 29, 2021 from 10:00 am to 10:45 am local time. The purpose of this conference is to allow potential respondents an opportunity to present questions and obtain clarification relative

to any facet of this Invitation to Bid. The pre-bid conference will be followed by an in-person Pump Station site visit at 1:00 pm at 1901 Potomac Yard Trail, Alexandria, Virginia 22301. Parking is limited at the site. Street parking is available in/around the pump station and attendees should plan to park on the street. Attendees shall arrive at the Pump Station by 12:45PM and shall wear appropriate PPE (boots, hard hat, safety glasses, hearing protection).

Respondents attending the pre-bid meeting and/or the site visit must pre-register by sending an email with the subject: RFP 21-023 ITB Conference & Site Visit to purchasing@alexrenew.com by 4:00 P.M. EDT on Thursday, September 23, 2021. Email shall contain the firm's name and the name(s) and email addresses of: (1) the individuals who would like to participate in the virtual meeting and (2) the name of the individual who would like to participate in the tour. A maximum of (2) two people may attend the virtual meeting from each firm and a maximum of (1) one person may attend the in-person tour. All site visitors must be pre-approved. One (1) primary and one (1) alternate name can be submitted for the Pump Station site tour to allow for last minute substitutions due to unforeseen circumstances. Tour attendees must wear masks and practice social distancing.

Any prospective bidder requiring "reasonable accommodation" under the Americans with Disabilities Act, must contact the designated Point of Contact by telephone no later than 4:00 PM local time on September 27, 2021.

QUESTIONS AND ADDENDA

All questions relating to this solicitation shall be submitted to the Purchasing Agent via email to purchasing@alexrenew.com. For a question to be considered, the subject line of the email must state the following: "ITB No. 21-023 Questions". Questions should be succinct and must include the submitter's name, title, company name, company address, and telephone number. Prior to the award of a contract resulting from this solicitation, potential respondents are prohibited from contacting AlexRenew staff other than the Purchasing Agent. All questions must be received by 4:00 PM local time on October 4, 2021. Any questions received after this date may not be answered.

Changes to the Bidding Documents, if any, will be in the form of formal Addenda that will be posted on the AlexRenew website. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

INSTRUCTIONS TO BIDDERS

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

END OF SECTION

Section 00 20 00
INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT
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This solicitation was issued using the Competitive Sealed Bidding procurement process as defined and authorized in the Virginia Public Procurement Act (VPPA) § 2.2-4302.1. The Contract(s) resulting from this solicitation shall be subject to the terms and conditions as set forth herein, or elsewhere in the Owner's and other applicable Laws and Regulations.

It is the Owner's intent that this Invitation to Bid (ITB) permits competition. It shall be the Bidder's responsibility to advise the Purchasing Agent in writing if any language, requirement, specification, etc., or any combination thereof, inadvertently restricts or limits the requirements stated in this ITB to a single source. Such notification must be received by Purchasing Agent no later than fifteen (15) days prior to the date set for acceptance of Bids

ARTICLE 1- DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. *Issuing Office:* Alexandria Renew Enterprises, 1800 Limerick Street, Alexandria, VA 22314
 - B. *Owner's Website:* <https://alexrenew.com/lets-do-business-together>

ARTICLE 2- BIDS RECEIVED

- 2.01 Bids will be received until the date and time specified in the Invitation to Bid.

ARTICLE 3- COPIES OF BIDDING DOCUMENTS

- 3.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents) for the Owner's Website. *See the Agreement for a list of the Contract Documents.* It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete Bidding Documents, by Bidder itself or by its prospective Subcontractors and Suppliers.
- 3.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use.
- 3.03 All Addenda issued by the Owner will be available through the Owner's Website.
- 3.04 Electronic Documents
- A. When the ITB or Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified, typically in Adobe PDF.

- B. All Electronic Bidding Documents will be subject to the same limitations set forth in 3.01 and 3.02 above.

ARTICLE 4- PRE-BID CONFERENCE

- 4.01 A mandatory pre-bid conference will be held at the time and location indicated in the Invitation to Bid. Representatives of Owner and Engineer, if applicable, will be present to discuss the Project.
- 4.02 Questions received at the pre-bid conference may be answered verbally. However, oral statements may not be relied upon and will not be binding or legally effective.
- 4.03 A list of attendees may be distributed as an Addendum at Owner's discretion following the pre-bid conference.

ARTICLE 5- INTERPRETATIONS AND ADDENDA

- 5.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.
- 5.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to the Owner in writing via an email to the Purchasing Agent. For a question to be considered, the subject line of the email must state the following: "ITB No. 21-023 Questions". Questions should be succinct and must include the submitter's name, title, company name, company address, and telephone number.
 - A. Contact information for the Purchasing Agent is as follows:
purchasing@alexrenew.com.
 - B. Prior to the award of a contract resulting from this solicitation, bidders are prohibited from contacting AlexRenew staff other than the Purchasing Agent.
- 5.03 Questions received by the Purchasing Agent less than 14 days prior to the date for opening of Bids, or later than the date specified in the Invitation to Bid may not be answered. (*The date stated in Invitation to Bid takes priority.*)
- 5.04 Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by Addenda delivered through the Owner's Website as indicated in the Advertisement or ITB.
- 5.05 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

ARTICLE 6- BID SECURITY

- 6.01 A Bid must be accompanied by Bid security, when required as specified on the Bid Form and the project is valued at more than \$500,000, made payable to Owner in an amount of five (5) percent of Bidder's maximum Bid price and in the form of a certified

- check, bank money order, or Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents.
- 6.02 The Successful Bidder will be required to provide a performance and payment bonds in the amount of 100 percent of the Contract value.
- 6.03 All bonds shall be in a form acceptable to the Owner, which may include a cashier's check, certified check, or bond executed by a company licensed to do business in the Commonwealth of Virginia as allowed by §2.2-4336 – §2.2-4338 of the Code of Virginia.
- 6.04 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required performance and payment bonds, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and furnish the required performance and payment bonds within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, not exceeding the difference between the bid for which the bond was written and the next low bid, or the face amount of the bid bond, whichever is less (§2.2-4336-C). Such forfeiture will be Owner's exclusive remedy if Bidder defaults by failure to execute and furnish the required performance and payment bonds and Contract materials as described herein.
- 6.05 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Contract or 61 days after the Bid opening, or the duration of effective bid submittals specified in the ITB or Request for Qualifications/Proposals, whereupon Bid security furnished by such Bidders will be released.
- 6.06 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.
- 6.07 Bid security may be waived by the Owner for contracts in excess of \$100,000 but less than \$500,000. Where a Bid security is waived, prospective bidders shall be prequalified for each project in accordance with §2.2-4317. However, Owner may waive prequalification requirements of a bidder with a current Class A contractor license for contracts in excess of \$100,000 but less than \$300,000 per §2.2-4336.

ARTICLE 7- CONTRACT TIMES

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

ARTICLE 8- SUBSTITUTE AND “OR EQUAL” ITEMS

- 8.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or “or-equal” items. In cases in which the Contract allows the Contractor to request that Owner authorize the use of a substitute or “or-equal” item of material or equipment, application for such acceptance may not be made to and will not be considered by Owner until after the Effective Date of the Contract.
- 8.02 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, and as supplemented by Addenda if applicable. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.

ARTICLE 9- SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 9.01 A Bidder must be prepared to retain specific Subcontractors and Suppliers for the performance of the Work if required to do so by the Bidding Documents or in the Specifications. If a prospective Bidder objects to retaining any such Subcontractor or Supplier and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.
- 9.02 The apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work within five days after Bid opening:
- Odor Control System Supplier.
- 9.03 The key categories of the Work include odor control equipment procurement and installation, electrical power and control, ventilation equipment and ductwork installation, and aluminum cover system installation.
- 9.04 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a substitute, Bidder’s Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.
- 9.05 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors and Suppliers. A Bidder declining to make requested substitutions will constitute grounds for forfeiture of the Bid security. Any Subcontractor or Supplier, so listed and against which Owner makes no written objection prior to Notice of Award will be

deemed acceptable to Owner subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

ARTICLE 10- PREPARATION OF BID

- 10.01 The Bid Form is included with the Bidding Documents.
- 10.02 All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
- 10.03 If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words “No Bid” or “Not Applicable.”
- 10.04 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.
- 10.05 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.
- 10.06 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.
- 10.07 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.
- 10.08 A Bid by an individual must show the Bidder’s name and official address.
- 10.09 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.
- 10.10 All names must be printed in ink below the signatures.
- 10.11 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.
- 10.012 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.

- 10.13 The Bid must contain evidence of Bidder's authority to do business in the State of Virginia, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid, or Bidder must provide a statement on Bidder's letterhead certifying their exemption from this requirement.
- 10.14 Bidder's State of Virginia contractor license number or a covenant by Bidder to obtain said license within the time for acceptance of Bids.

ARTICLE 11- BASIS OF BID

11.01 Lump Sum

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

11.02 Series of Lump Sums

- A. Bidder shall submit a Bid for each lump sum item as set forth on the Bid Form and shall compute and enter the total of all lump sum items in the space provided on the Bid Form.
- B. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the arithmetically correct sum.

11.03 Unit Price

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

11.04 Total Bid Price

- A. The Total Bid Price will be the total of all Lump Sum items plus the Total of All Unit Price Bids.

ARTICLE 12- SUBMITTAL OF BID

- 12.01 The required Bid Form is provided in the solicitation. One (1) fully completed Bid Form with longhand signature, and one (1) exact electronic copy of the original Bid on Universal Serial Bus (USB) flash drive or other approved media shall be submitted in a sealed envelope or package, no later than the date and time specified in the Invitation to Bid, above. Electronic files must be in MS Word, Adobe Acrobat (PDF), or Excel format. Bidders shall include a notarized statement that the electronic version is a true copy of the printed version. The exterior of the sealed envelope or package shall be clearly marked with the ITB number and title along with the name of the Bidder submitting the Bid. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED".
- 12.02 Late, unsealed, and electronic bids will not be accepted. A Bidder's failure to submit a bid with a fully completed Bid Form, using the Bid Form provided in this solicitation, shall be cause for rejection of that Bidder's Bid. A Bid will be rejected if its corresponding Bid Form is not signed in the designated space by a person authorized to legally bind the Bidder.
- 12.03 Modification of or additions to the Bid Form may be cause for rejection of the Bid; however, Owner reserves the right to decide, on a case by case basis, in its sole discretion, whether or not to reject such a Bid as nonresponsive. As a precondition to Bid acceptance, Owner may, in its sole discretion, request that the Bidder withdraw or modify any such modifications or additions which do not affect quality, quantity, price, or delivery.
- 12.04 Bids and all documents related to this solicitation submitted to Owner by a Bidder or a prospective Bidder shall, upon receipt by Owner, become the property of Owner.
- 12.05 Submission of a signed Bid Form is certification by the respective Bidder that it read the solicitation documents carefully and fully intends to comply with all the requirements stated in the solicitation or by law. Bidder further certifies that it will accept an award made to it as result of the submission.

ARTICLE 13- MODIFICATION AND WITHDRAWAL OF BID

- 13.01 No Bid may be withdrawn after it is filed with the Owner but prior to the time set for the opening of Bids unless the Bidder makes a request in writing to the Owner prior to the time set for the opening of Bids. Requests must be delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

- 13.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 13.03 After the opening of Bids, a Bidder may withdraw its Bid from consideration if the price of the Bid is substantially lower than other Bids due solely to a mistake therein, provided the Bid was submitted in good faith, the mistake was a clerical mistake as opposed to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of the Bid, which unintentional arithmetic error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the Bid sought to be withdrawn. If a Bid contains both clerical and judgment mistakes, a Bidder may withdraw his Bid from consideration if the price bid would have been substantially lower than the other Bids due solely to the clerical mistake, that was an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of a Bid that can be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the Bid sought to be withdrawn. The Bidder must give notice in writing to Owner of a claim of right to withdraw its Bid and provide all original work papers, documents and other materials used in the preparation of the Bid sought to be withdrawn, within two (2) business days after the conclusion of the Bid opening procedure.
- 13.04 All Bids will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner, or as specified in the Invitation to Bid.
- 13.05 No Bid may withdrawn under this section when the result would be the awarding of the Contract to another Bid of the same Bidder, or in which the withdrawing Bidder has any interest.

ARTICLE 14- OPENING OF BIDS

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

ARTICLE 15- BIDS TO REMAIN SUBJECT TO ACCEPTANCE

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

ARTICLE 16- EVALUATION OF BIDS AND AWARD OF CONTRACT

- 16.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, quality or quantity of the Work.
- 16.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to be nonresponsive. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder.
- 16.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner, then Owner will reject the Bid as nonresponsive.
- 16.04 If Owner awards the Contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid without consideration of proposed substitutions not specifically identified as approved in the Bidding Documents.
- 16.05 In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- 16.06 For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.
- 16.07 This procedure is only used to determine the lowest bid for comparison and contractor selection purposes. The Contract Price for compensation and payment purposes remains the Bid price shown in the Bid Form.
- 16.08 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.
- 16.09 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 17- BONDS AND INSURANCE

- 17.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds, other required bonds (if any), and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by required bonds and insurance documentation.

17.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

ARTICLE 18- SIGNING OF AGREEMENT

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

END OF SECTION

SECTION 00 41 00
BID FORM

NOTE TO BIDDER: THE FULL LEGAL NAME OF THE FIRM OR ENTITY SUBMITTING THIS BID MUST BE WRITTEN IN THE SPACE PROVIDED BELOW. THIS BID FORM, AND ALL OTHER DOCUMENT(S) REQUIRED BY THE SOLICITATION TO BE SUBMITTED WITH THIS BID FORM, INCLUDING, BUT NOT LIMITED TO ALL ISSUED ADDENDA, MUST BE FULLY AND ACCURATELY COMPLETED AND SIGNED BY A PERSON AUTHORIZED TO LEGALLY AND CONTRACTUALLY BIND THE BIDDER, OR THE BID MAY BE REJECTED.

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

ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted by:

LEGAL NAME OF ENTITY:	
CONTRACTOR LICENSE:	
FORMER NAMES: (Insert all other names that this entity has been known by in the past twenty (20) years)	
AGE OF THE ENTITY: How many years this entity has been in business under the current name?	
PRINCIPAL PLACE OF BUSINESS:	
TELEPHONE NO.	FAX NO.
CORPORATE WEBSITE	
DUNS NUMBER:	
FORM OF ORGANIZATION: _____ CORPORATION; _____ PARTNERSHIP/JOINT VENTURE; _____ LIMITED LIABILITY COMPANY; _____ INDIVIDUAL	
NAME OF STATE WHERE THE ENTITY WAS FORMED:	
IDENTIFICATION NO. ISSUED TO THE FIRM BY STATE CORPORATE COMMISSION (SCC): If Bidder is exempt from the SCC authorization requirement, it shall include a statement on the entity's letterhead with its application certifying their exemption from this requirement. _____	
BIDDER'S STATUS: Please initial one: _____ MINORITY OWNED; _____ WOMAN OWNED; _____ NEITHER	

--

1.02 This Bid is submitted to:

Alexandria Renew Enterprises
Office of the Purchasing Agent
1800 Limerick Street
Alexandria, VA 22314

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

ARTICLE 2—ATTACHMENTS TO THIS BID.

2.01 The following documents are submitted with and made a condition of this Bid:

- A. Required Bid security;
- B. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids; or a statement on the Bidder’s letterhead certifying their exemption from this requirement; and
- C. Contractor’s license number as evidence of Bidder’s State Contractor’s License or a covenant by Bidder to obtain said license within the time for acceptance of Bids.

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

3.01 *Total Bid Price (Lump Sum)*

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

Total Bid Price (Total of all Lump Sum Items)	\$
---	----

ARTICLE 4—TIME OF COMPLETION

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

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

5.01 *Bid Acceptance Period*

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

5.02 *Instructions to Bidders*

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

5.03 *Receipt of Addenda*

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

Addendum Number	Addendum Date

5.04 *Assigned Goods and Services*

- A. *Not Used.*

ARTICLE 6—BIDDER’S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Bidder’s Representations*

- A. In submitting this Bid, Bidder represents the following:
 - 1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
 - 2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 - 3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 - 4. Bidder has carefully studied the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

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

6.02 *Bidder's Certifications*

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation (as described in Code of Virginia Section 59.1-68.6 et seq.).
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.

3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
 4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 6.02.A:
 - a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
 - b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition, or (d) any act of fraud punishable under the Virginia Governmental Frauds Act (Code of Virginia §18.2-498.1 et seq.).
 - c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
 - d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.
- B. The Bidder certifies and warrants that to the best of its knowledge and belief and except as otherwise disclosed, it does not have any organizational conflict of interest, which is defined as a situation in which the nature or work under the contract and the bidder's organizational, financial, contractual or other interest are such that award of the contract may result in the Bidder receiving an unfair competitive advantage, or the Bidder's objectivity in performing the contract work may be impaired. The Bidder agrees that if after being awarded it discovers an organizational conflict of interest with respect to being awarded, it shall make an immediate and full disclosure in writing to Owner which shall include a description of the action which the Bidder has taken or intends to take to eliminate or neutralize the conflict.

ARTICLE 7—TRADE SECRETS OR PROPRIETARY INFORMATION

Trade secrets or proprietary information submitted by a Bidder in connection with a procurement transaction shall not be subject to public disclosure under the Virginia Freedom of Information Act or the Virginia Public Procurement Act. However, except as provided in the Virginia Public Procurement Act, all proceedings, records, contracts and other public records relating to procurement transactions shall be open to the inspection of any citizen, or any interested person, firm or corporation, in accordance with the Virginia Freedom of Information Act. (Cost estimates relating to a proposed procurement transaction prepared by or for a public body shall not be open to inspection.) Therefore, trade secrets or proprietary information submitted by a Bidder in connection with this Bid shall not be subject to the Virginia Freedom of Information Act (§ 2.2-3700 et seq.); however, in order to invoke this protection, the Bidder shall (i) invoke the protections of this section prior to or upon submission of the data or other materials, (ii) identify the data or other materials to be protected, and (iii) state the reasons why

protection is necessary. A Bidder shall not designate as trade secrets or proprietary information (a) the entire Bid; (b) any portion of the Bid that does not contain trade secrets or proprietary information; or (c) line item prices or total Bid prices.

A. Please mark one:

() **Yes**, the Bid I have submitted **does** contain trade secrets and/or proprietary information. () **No**, the Bid I have submitted **does not** contain any trade secrets and/or proprietary information.

If Yes, you must clearly identify below (attaching additional pages as necessary) the exact data or other materials to be protected and list all applicable page numbers of the Bid containing such data or materials:

STATE THE SPECIFIC REASON(S) WHY PROTECTION IS NECESSARY:

NOTE: If you fail to identify the data or other materials to be protected and state the reasons why such protection is necessary in the space provided above, you have not invoked the protection, accordingly, effectively the Bid will be open for public inspection consistent with applicable law.

ARTICLE 8—BIDDER QUESTIONNAIRE

NOTE: Use additional pages to explain circumstances, provide detailed description of the situation and full documentation if the answer to any of the questions below is “YES”.	
DEBARMENT, DISQUALIFICATION AND OR SUSPENSION:	
Is the entity or any of its principals are currently debarred, suspended or disqualified from submitting responses to AlexRenew, or any other state, local or federal entities? If yes, please explain the circumstances.	___ YES ___ NO
CLAIMS/FINAL RESOLUTION/JUDGMENTS:	
Has any Legal Action occurred on, or in conjunction with, any project(s) performed by the Bidder, any affiliate, or their officers, partners or directors in the last five (5) years? “Legal Action” shall include civil or criminal litigation, administrative, proceedings, indictments, arbitrations or the like. If yes, please explain the circumstances.	___ YES ___ NO
TERMINATION/FAILURE TO COMPLETE:	
Has the Bidder ever been terminated for work awarded to it, or failed to complete a project in the last five (5) years? This includes termination for default (or cause) or for the convenience of the owner. If yes, please explain the circumstances.	___ YES ___ NO
BREACH, DEFAULT:	
Within the last five (5) years, has Bidder been disqualified, removed, or otherwise declared in material breach or default of any contract by a public agency? If yes, please explain the circumstances.	___ YES ___ NO

RELEASE FROM CONTRACT APPLICATION, BIDS OR AWARD: Has the Bidder filed a request to be released from a solicitation, bid selection or award of any contract within the last five (5) years? If yes, please explain the circumstances.	___ YES ___ NO
FAILURE TO EXECUTE A CONTRACT: Within the last five (5) years, has the Bidder ever failed to provide required insurance certificates, surety bonds, or other forms that resulted in it not being awarded a contract for which it had been selected for award? Within the last five (5) years, has Bidder had a bid security exercised for any reason? If yes, please explain the circumstances.	___ YES ___ NO
BANKRUPTCY: Has the Bidder filed for bankruptcy in the last seven years, or is currently the debtor in a bankruptcy case? If yes, please explain the circumstances.	___ YES ___ NO

BIDDER hereby submits this Bid as set forth above:

INDICATE THE NAME AND CONTACT INFORMATION OF THE PERSON WHO CAN RESPOND AUTHORITATIVELY TO ANY QUESTIONS REGARDING THIS BID (i.e., PROJECT MANAGER):

NAME (PRINTED): _____

TITLE: _____

E-MAIL ADDRESS: _____

TELEPHONE. NO.: _____

The undersigned swears or affirms under the penalty of perjury and upon personal knowledge that the contents of the Bid are true and correct and in full compliance with the entire Bidding Documents.

The undersigned swears or affirms under the penalty of perjury that the Bidder, its agents, servants and/or employees, to the best of his/her knowledge and belief, have not in any way colluded with anyone for and on behalf of the Bidder an unfair advantage over others, nor have they colluded

with anyone for and on behalf of the Bidder, or themselves, to gain any favoritism in the award of any contract resulting from this Bid.

NAME OF AND TITLE OF BIDDER'S REPRESENTATIVE

SIGNATURE OF BIDDER'S REPRESENTATIVE

END OF SECTION

SECTION 00 43 00
STANDARD BID BOND
CONTRACT NO. 21-023

BOND NO. _____

KNOW ALL MEN BY THESE PRESENTS, that _____

_____ hereinafter called the "Principal", and _____

_____ a corporation duly organized under the laws of the State of _____

having its principal place of business at _____

_____ in the State of _____

and authorized to do business in the Commonwealth of Virginia, as Surety,

are held and firmly bound unto _____,

as Owner, hereinafter called the Obligee, in the amount of five percent (5%) of the Bid Amount

_____ (Total Base Bid plus all Additive Bid Items),
bid by the Principal, for the payment whereof, Principal and Surety bind themselves, their heirs,
administrators, successors, ad assigns, jointly and severally, firmly by these presents.

The condition of this obligation are as follows. This Bid Bond shall guarantee that the Principal will not withdraw his bid during the period of sixty (60) days following the opening of bids; that if his bid is accepted, Principal will enter into a formal contract with the Owner in accordance with the Contract between Owner and Contractor, Form included as a part of the Invitation to Bid (ITB Documents); the Principal shall submit properly executed and authorized Performance Bond and Labor and Material Payment Bonds within fifteen (15) days after the Principal has received notice of acceptance of his bid; Principal and Surety shall be jointly and severally liable to the Owner for the difference between the amount specified in said bid and such larger amount for which the Owner may contract with another party to perform the work covered by said bid, up to the amount of the bid guarantee. This amount represents the damages to the owner on account of the default of the bidder in any particular thereof.

The Surety represents to the Principal and to the Obligee that it is legally authorized to do business in the Commonwealth of Virginia.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals and have executed this instrument in six separately signed counterparts, each one of which shall be deemed an original, 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.

Signed and sealed this _____ day of _____, 20_____.

Principal

By _____

Surety

By _____

Attorney-In-Fact

IMPORTANT: The Surety executing bonds must appear on the Treasury Department's most current list (Department Circular 570 as amended and supplemented) and be authorized to transact business in the Commonwealth of Virginia.

END OF SECTION

SECTION 00 52 00
AGREEMENT

This Agreement is by and between Alexandria Renew Enterprises (“Owner”) and [name of contracting entity] (“Contractor”).

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

Owner and Contractor hereby agree as follows:

ARTICLE 1—WORK

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

- Demolition of identified ductwork in the screen room and compactor room.
- Demolition of influent channel and wet well grating and supports.
- Demolition of existing odor control unit, carbon adsorber tank, and appurtenant bollards, housekeeping pads, anchors, etc.
- Providing temporary odor control during construction of the Work.
- Providing new exhaust fans and supports.
- Providing new odor control system, control panels and instruments including support and housekeeping pad.
- Providing new aluminum cover system for the influent channels and wet wells including covers, cover supports, penetrations and ductwork connections.
- Providing bar screen cover plate to enclose the bar screen from the influent channel up through and including the components in the compactor room.
- Providing new FRP ductwork and supports.
- Providing disconnect switches for fans.
- Providing electrical motor starters in the existing motor control center.
- Providing conduit and wire for power and control of the new fans, instruments and equipment.
- Programming for the existing control panel PLC and SCADA to add I/O for SCADA monitoring.

ARTICLE 2—THE PROJECT

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

Potomac Yard Pump Station
Ventilation Improvements and Odor Control System
Contract No. 21-023

ARTICLE 3—ENGINEER

3.01 The Owner has retained Brown and Caldwell (“Engineer”) to prepare the design for this project.

ARTICLE 4—CONTRACT TIMES

4.01 *Time is of the Essence*

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

4.02 *Contract Times*

A. The Work will be substantially complete within 216 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 244 days after the date when the Contract Times commence to run.

4.03 *Milestones*

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

1. Not used.

4.04 *Liquidated Damages*

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

1. *Substantial Completion:* Contractor shall pay Owner \$250 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.
2. *Completion of Remaining Work:* After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$500 for each day that expires after such time until the Work is completed and ready for final payment.
3. *Milestones:* Not used.

B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner’s sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess,

or consequential, for such delay, except for special damages (if any) specified in this Agreement.

- C. The parties agree that the per diem measure of liquidated damages is a reasonable measure of the damages Owner is likely to suffer in case of delay, and Contractor agrees that it will not challenge the per diem amounts of liquidated damages imposed pursuant to this Paragraph 4.05. Contractor hereby waives any defense as to the validity of any liquidated damages stated herein on the grounds that such liquidated damages are void as penalties not reasonably related to actual damages. The parties further agree that the liquidated damages set forth in this Paragraph 4.05 shall be the Owner’s sole remedy for delay as a result of Contractor’s failure to achieve the completion dates within the times required by this Agreement. The Owner may, but shall not be obligated to, deduct any liquidated damages that become due from any unpaid amounts then or which thereafter become due to the Contractor under the Contract Documents. Any liquidated damages not so deducted from any unpaid amounts due the Contractor shall be immediately due and payable to the Owner upon demand

ARTICLE 5—CONTRACT PRICE

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

- A. Lump sums included in the Contract Price:

Lump Sum Amount	
Description	Extended Price
Lump Sum Contract Price	\$

- B. Allowances: Not used.

- C. Unit Price Work: Not used.

D. Total of Lump Sum Amount, Allowances, and Unit Price Work (subject to final Unit Price adjustment) is \$[]. The amount listed here is the Contract Price.

ARTICLE 6—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

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

6.02 *Progress Payments and Retainage*

- A. Owner shall make progress payments on the basis of Contractor’s Applications for Payment during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner

and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.
 - a. 95 percent of the value of the Work completed (with the balance being retainage).
 - b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 150 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 *Consent of Surety*

- A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

6.05 *Interest*

- A. All amounts not paid when due as provided in Article 15 of the General Conditions shall bear interest at the rate of half percent (0.5%) per month.

ARTICLE 7—CONTRACT DOCUMENTS

7.01 *Contents*

- A. The Contract Documents consist of all of the following, and shall be in the following order of precedence:
 1. Written Amendments, Change Orders and Work Change Directives
 2. Agreement, inclusive of the Exhibits to this Agreement (enumerated as follows):
 - a. None.
 3. Performance bond and Payment bond, each together with their respective powers of attorney)
 4. General Conditions and Supplementary Conditions

5. Specifications – Division 01
6. Specifications – Divisions 02 through 44
7. Drawings, with figure dimensions taking precedence over scaled dimensions, and detailed Drawings taking precedence over general Drawings
8. Contractor's Bid
9. Instructions to Bidders

For the avoidance of doubt, each of the above Contract Documents shall be deemed to include any Addenda to such Contract Document.

10. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 Contractor's Representations

- A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:
1. Contractor has examined and carefully studied the Contract Documents, including Addenda.
 2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 4. Contractor has carefully studied the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
 5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
 6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
9. Contractor has given Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Owner is acceptable to Contractor.
10. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

8.02 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:
 1. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
 2. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition, or (d) any act of fraud punishable under the Virginia Governmental Frauds Act (Code of Virginia §18.2-498.1 et seq.).
 3. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
 4. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

8.03 *Assigned Goods and Services*

- A. Not used.

8.05 *Standard General Conditions*

- A. The General Conditions that are made a part of this Contract are a modified Engineers Joint Contract Documents Committee (EJCDC®) C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee. Copyright© 2018 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. Those portions of the text that originated in EJCDC documents remain subject to copyright. At the Contractor’s request, the Owner will provide modifications to the standard wording of the General Conditions in a “track changes” (redline/strikeout) format.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.
This Agreement will be effective on the date is countersigned by Owner.

Owner:

(typed or printed name of organization)
By: _____
(individual's signature)
Date: _____
(date signed)
Name: _____
(typed or printed)
Title: _____
(typed or printed)

Contractor:

(typed or printed name of organization)
By: _____
(individual's signature)
Date: _____
(date signed)
Name: _____
(typed or printed)
Title: _____
(typed or printed)
(If [Type of Entity] is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest: _____
(individual's signature)
Title: _____
(typed or printed)
Address for giving notices:

Designated Representative:
Name: _____
(typed or printed)
Title: _____
(typed or printed)
Address:

Phone: _____
Email: _____
License No.: _____
(where applicable)
State: _____

END OF SECTION

SECTION 00 61 00
PERFORMANCE BOND

<p>Contractor Name: [Full formal name of Contractor] Address (<i>principal place of business</i>): [Address of Contractor’s principal place of business]</p>	<p>Surety Name: [Full formal name of Surety] Address (<i>principal place of business</i>): [Address of Surety’s principal place of business]</p>
<p>Owner Name: Alexandria Renew Enterprises Mailing address (<i>principal place of business</i>): 1800 Limerick Street Alexandria, VA 22314</p>	<p>Contract Description (<i>name and location</i>): [Owner’s project/contract name, and location of the project] Contract Price: [Amount from Contract] Effective Date of [Date from Contract: Contract]</p>
<p>Bond Bond Amount: [Amount] Date of Bond: [Date] <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i></p>	
<p>Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.</p>	
Contractor as Principal	Surety
_____ <i>(Full formal name of Contractor)</i>	_____ <i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature)(Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, including but not limited to correction of defective Work as required therein, which is incorporated herein by reference. Provided, that any alteration which may be made in terms of the Contract, or in the Work to be done under it, or the giving by the Owner of any extension of time for the performance of the Contract, or any other alterations, extension, forbearance on the part of either or both of the Owner or Contractor to the other party shall not in any way release the Contractor and the Surety, or either of them, their heirs, executors, administrators, successors, or assigns from their liability hereunder, notice to the Surety of any such alteration, extension, or forbearance being hereby waived.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:
 - 3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;
 - 3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
 - 3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.
4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
 - 5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

- 5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;
- 5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or
- 5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
 - 5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
 - 5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.
6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, or if the Surety proceeds as provided in Paragraphs 5.1, 5.2 or 5.3 and then fails to perform, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.
7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
 - 7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
 - 7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and
 - 7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.
9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be

reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.
12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.
13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond. If any provision of this Bond is held to be illegal, invalid or unenforceable, such provision shall be fully severable and this Bond shall be construed and enforces as if such illegal, invalid or unenforceable provision had never been part of this Bond, and the remaining provisions of this Bond shall remain in full force and effect and shall not be affected by the illegal, invalid or unenforceable provision, or by its severance from this Bond.
14. The failure or refusal of the Owner to take any action, proceeding or step to enforce any remedy or exercise any right under the Construction Contract or the taking of any action proceeding or step by the Owner, acting in good faith upon the belief that same is permitted, shall not in any way release the Contractor or the Surety, or any of them, or their respective executors, administrators, successors or assigns from liability under this Bond. The Surety hereby waives notice of any amendment, indulgence or forbearance made, granted or permitted by the Owner.
15. Definitions
 - 15.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
 - 15.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.
 - 15.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

- 15.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 15.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
16. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

END OF SECTION

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SECTION 00 61 50
STANDARD LABOR AND MATERIAL PAYMENT BOND

<p>Contractor Name: [Full formal name of Contractor] Address (<i>principal place of business</i>): [Full formal name of Contractor]</p>	<p>Surety Name: [Full formal name of Surety] Address (<i>principal place of business</i>): [Full formal name of Contractor]</p>
<p>Owner Name: Alexandria Renew Enterprises Mailing address (<i>principal place of business</i>): 1800 Limerick Street Alexandria, VA 22314</p>	<p>Contract Description (<i>name and location</i>): [Owner's project/contract name, and location of the project] Contract Price: [Amount, from Contract] Effective Date of [Date, from Contract: Contract]</p>
<p>Bond Bond Amount: [Amount] Date of Bond: [Date] (<i>Date of Bond cannot be earlier than Effective Date of Contract</i>)</p>	
<p>Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Labor and Material Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.</p>	
Contractor as Principal	Surety
(Full formal name of Contractor)	(Full formal name of Surety) (<i>corporate seal</i>)
By: _____ (Signature)	By: _____ (Signature)(Attach Power of Attorney)
Name: _____ (Printed or typed)	Name: _____ (Printed or typed)
Title: _____	Title: _____
Attest: _____ (Signature)	Attest: _____ (Signature)
Name: _____ (Printed or typed)	Name: _____ (Printed or typed)
Title: _____	Title: _____
<p><i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i></p>	

The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

1. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
2. A claimant is defined as one having a direct contract with the Contractor or with a subcontractor of the Contractor for labor, material, or both for use in the performance of the Contract. A "subcontractor" of the Contractor, for the purposes of this bond only, includes not only those subcontractors having direct contractual relationship, but also any other contractor that undertake to participate in the Work, which the Contractor is to perform under the aforesaid Contract, whether there are one or more intervening subcontractors contractually positioned between it and the Contractor (for example, a subcontractor). "Labor" and "Material" shall include, but not limited to, public utility services and reasonable rentals of equipment, but only for periods when the equipment rented is actually used at the work site.
3. Any claimant who has a direct contractual relationship with the Contractor and who has performed labor or furnished material in accordance with the Contract documents in furtherance of the Work provided in the Contract, who has not been paid in full therefor before the expiration of ninety (90) days after the day on which such claimant performed the last of such labor or furnished the last of such materials for which the claims payment, may bring an action on this bond to recover any amount due to him for such labor or material, and may prosecute such action to final judgment and have execution on the judgment. The Owner need not be a party to such action and shall not be liable for the payment of any costs, fees or expenses of any such suit.
4. Any claimant who has a direct contractual relationship with any subcontractor of the Contractor who has no contractual relationship, express or implied, with the Contractor may bring an action on this bond only if he has given written notice to the Contractor within ninety (90) days from the day on which claimant performed the last of the labor or furnished the last of materials for which he claims payment, stating with substantial accuracy the amount claimed and the name of the person for whom it the Work was performed or to whom the material was furnished. Notice to the Contractor shall be served by registered or certified mail, postage prepaid, in an envelope addressed to the Contractor at any place where his office is regularly maintained for transaction of business. Claims for sums withheld as retainages with respect to labor performed or material furnished shall not be subject to the time limitation in this paragraph.
5. No suit or action shall be commenced hereunder by any claimant.
 - a. unless brought within one year after the day on which the person bringing such action last performed labor or furnished or supplied materials, if being understood, however, that if any limitation embodied within this bond shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

- b. other than in a Virginia court of competent jurisdiction, with venue as provided by statute, or in the United States District Court for the district in which the project, or any part thereof is situated.
6. The amount of this bond shall be reduced by and to the extent of any payments made in good faith hereunder.
 7. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.
 8. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
 9. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond. If any provision of this Bond is held to be illegal, invalid or unenforceable, such provision shall be fully severable and this Bond shall be construed and enforces as if such illegal, invalid or unenforceable provision had never been part of this Bond, and the remaining provisions of this Bond shall remain in full force and effect and shall not be affected by the illegal, invalid or unenforceable provision, or by its severance from this Bond.
 10. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
 11. The failure or refusal of the Owner to take any action, proceeding or step to enforce any remedy or exercise any right under the Construction Contract or the taking of any action proceeding or step by the Owner, acting in good faith upon the belief that same is permitted, shall not in any way release the Contractor or the Surety, or any of them, or their respective executors, administrators, successors or assigns from liability under this Bond. The Surety hereby waives notice of any amendment, indulgence or forbearance made, granted or permitted by the Owner.

12. Definitions

12.1. *Claim*—A written statement by the Claimant including at a minimum:

- 12.1.1. The name of the Claimant;
- 12.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;
- 12.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
- 12.1.4. A brief description of the labor, materials, or equipment furnished;
- 12.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;

- 12.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
- 12.1.7. The total amount of previous payments received by the Claimant; and
- 12.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
- 12.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic’s lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of “labor, materials, or equipment” that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor’s subcontractors, and all other items for which a mechanic’s lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
- 12.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
- 12.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 12.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
13. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

END OF SECTION

SECTION 00 70 00
GENERAL CONDITIONS

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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.

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.

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.

Application for Payment—The document prepared by Contractor, in a form acceptable to Owner, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

Bid—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

Bidder—An individual or entity that submits a Bid to Owner.

Bidding Documents—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

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.

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.

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, or seeking other relief with respect to the terms of the Contract.

Claim

- a. A demand or assertion by Contractor to Owner, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times, or seeking other relief with respect to the terms of the Contract.
- b. A demand for money or services by a third party is not a Claim.

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.

Contract—The entire and integrated written contract between Owner and Contractor concerning the Work.

Contract Documents—Those items so designated in the Agreement, and which together comprise the Contract.

Contract Price—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.

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.

Contractor—The individual or entity with which Owner has contracted for performance of the Work, named as such in the Agreement.

Cost of the Work—See Paragraph 13.01 for definition.

Drawings—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

Effective Date of the Contract—The date, indicated in the Agreement, on which the Contract becomes effective.

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.

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.

Engineer—The individual or entity named as such in the Agreement.

Field Order—A written order issued by Owner which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

Governmental Unit – Means, other than Owner, any federal, state, or local government and any political subdivision or any governmental, quasi-governmental, judicial, public or statutory instrumentality, administrative agency, authority, body or entity.

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 as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.

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 Units.

Liens—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

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.

Notice of Award—The written notice by Owner to Contractor accepting Contractor's Bid.

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.

Owner—Alexandria Renew Enterprises, an authority duly organized and existing under the laws of the Commonwealth of Virginia.

Owner's Consultant -- An individual or entity having a contract with Owner to furnish services with respect to the Project as an independent professional associate or consultant and who is identified in the Contract Documents.

Owner-Related Party – Owner, Engineer, Owner's Consultant, Project Representative, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

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.

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.

Project Representative—The authorized representative of Owner assigned to assist Owner at the Site. As used herein, the term Project Representative includes any assistants or field staff of Project Representative.

Request for Proposals—A formal request from the Owner to public or selected Respondents or Bidders to submit a proposal. May be used in conjunction with or in place of an Invitation to Bid.

Request for Qualifications—A formal request from the Owner to public or selected Respondents or Bidders to submit a statement of qualifications. May be used in conjunction with or in place of an Invitation to Bid.

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.

Schedule of Submittals—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Owner’s review of the submittals.

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.

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.

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.

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.

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.

Submittal—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Owner, or that is indicated as a Submittal in the Schedule of Submittals accepted by Owner. 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 Owner, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

Substantial Completion—The time at which the Work (or a specified part thereof) has progressed to the point where 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.

Successful Bidder—Contractor.

Supplementary Conditions—The part of the Contract that amends or supplements these General Conditions.

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.

Technical Data – Those items expressly identified as Technical Data in the Supplementary Conditions, including but not limited to (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.

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.

Unit Price Work—Work to be paid for on the basis of unit prices.

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.

Work Change Directive—A written, signed directive from Owner to Contractor issued on or after the Effective Date of the Contract 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,” and the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import. Such words are used to describe an action or determination of Owner as to the Work. It is intended that such 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 Owner 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 9 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; or
 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents.
- 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*: No later than 15 days after Notice of Award, Contractor shall deliver to Owner the performance bond and payment bond required to be provided by Contractor in accordance with Article 6.
- B. *Evidence of Contractor's Insurance*: No later than 15 days after Notice of Award, Contractor shall deliver to Owner, with copies to each additional insured (as identified in Paragraph 6.03.C), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6.
- C. *Evidence of Owner's Insurance*: After receipt of all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in Paragraph 6.03.C), the certificates and other evidence of insurance required to be provided by Owner under Article 6.
- D. For the avoidance of doubt, Notice to Proceed will not be issued and Contractor shall not be permitted to begin Work at the Site until Contractor complies with its obligations in Paragraph 2.01.A and B above.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four (4) 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 (1) 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.

2.03 *Before Starting Construction*

- A. *Preliminary Submittals*: Within ten (10) days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Owner for timely review:
 - 1. a preliminary Progress Schedule in conformance with Division 01 of the Specifications 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 in conformance with Division 01 of the Specifications 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, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the Submittals 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 Preliminary Submittals*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Owner, Contractor, and others as appropriate, will be held to review the Submittals submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable Submittals are submitted to Owner.
 - 1. The Progress Schedule will be acceptable if it provides an orderly progression of the Work to completion within the Contract Times, and is compliant with the schedule requirements set forth in Division 01 of the Specifications. Such acceptance will not impose on Owner 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 if it provides a workable arrangement for reviewing and processing the required submittals.
 - 3. Contractor's Schedule of Values will be acceptable as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work and is compliant with the Schedule of Values requirements set forth in Division 01 of the Specifications.
 - 4. If a foregoing submittal is not acceptable, Contractor will have an additional 10 days to revise and resubmit the Submittal.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner 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 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 comprise the entire agreement between Owner and Contractor governing the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project. In resolving inconsistencies among two or more components of the Contract Documents, the precedence shall be as set forth in the Agreement.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to the Owner.
- 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. Owner is not responsible for any representation or purported agreement concerning conditions or contract requirements made by any employee, agent or representative of Owner prior to the Effective Date of the Contract, unless such representation or understanding is expressly stated in the Contract Documents.
- E. Owner 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. Each and every clause or other provision required by law to be inserted in these Contract Documents shall be deemed to be inserted herein, and they shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted, or if not correctly inserted, then upon the application of either party, the Contract Documents shall forthwith be amended to make such insertion.

G. Nothing in the Contract Documents creates:

1. any contractual relationship between Contractor and Engineer, Owner's Consultant, or Project Representative, or any third-party beneficiary rights to Contractor;
2. any contractual relationship between: (i) Owner, Engineer, Owner's Consultant, or Project Representative; and (ii) 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
3. any obligation on the part of Owner 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 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 Owner 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 Owner, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01. Contractor shall not be entitled to any adjustment for any unreported conflict, error, ambiguity, or discrepancy that Contractor had actual knowledge of.

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 Owner 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 Owner, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01. Contractor shall not be entitled to any adjustment for any unreported conflict, error, ambiguity, or discrepancy that Contractor had actual knowledge of.
3. Contractor shall not be liable to Owner 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 Owner 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 shall submit to Owner 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. Owner will be the final interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work, subject to Contractor's rights to submit a Claim in accordance with Article 12 hereof.

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 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 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, provided Contractor has complied with the requirements of Article 2 of these General Conditions.

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 Owner determines 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 Owner 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 submit updated Progress Schedules at the times and in the manner set forth in Division 01 of the Specifications. Updated Progress Schedules shall not change the Contract Times. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Paragraph 4.05 and 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 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 submit a request for 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 submit a request for 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. Weather conditions that are more severe than those for the five (5) year NOAA averages for the locale of the Project;
 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 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 also conditioned upon the provisions of 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 and obtain and pay for easements for permanent structures or permanent changes in existing facilities. 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, the Owner-Related Parties 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 any Owner-Related Party 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. If Contractor fails to comply with this Paragraph 5.02.B, Owner shall have the right to take corrective action and charge the costs of doing so to Contractor, including withholding amounts otherwise due Contractor to reimburse Owner's costs of doing so.
 - 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. If Contractor fails to comply with this Paragraph 5.02.C, Owner shall have the right to take corrective action and charge the costs of doing so to Contractor, including withholding amounts otherwise due Contractor to reimburse Owner's costs of doing so.
 - 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 reasonably 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.

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 any of its 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, but in no event later than 48 hours 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 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. *Owner's Review:* After receipt of written notice as required by the preceding paragraph, Owner will promptly review the condition in question; determine whether it is necessary 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; and advise Contractor in writing of its findings and conclusions.
- C. *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.

D. *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. *Shown or Indicated*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner shall not be responsible for the accuracy or completeness of any such information or data; and
2. the cost of all of the following shall be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data,
 - b. locating all Underground Facilities shown or indicated in the Contract Documents,
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.
3. In accordance with Paragraph 5.05.A.2, it is understood and agreed that the Contract Price includes all of the permanent and temporary Underground Facilities in their present or relocated positions, and Contractor agrees that no additional compensation will be allowed for normal delays, inconvenience, or damage sustained by Contractor due to any interference from said Underground Facilities, the operation of moving the Underground Facilities, the making of new connections thereto if required by the Contract Documents, or by any other requirements of the owner(s) of the Underground Facilities.

B. *Not Shown or Indicated*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, then Contractor shall, promptly (but in no event later than 48 hours) 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 in writing regarding such Underground Facility.

C. *Owner's Review:* Owner will:

1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings;
2. identify and communicate with the owner of the Underground Facility;
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 Contractor in writing of its findings and conclusions.

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

D. *Early Resumption of Work:* If at any time Owner determines that Work in connection with the Underground Facility may resume prior to completion of 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 Owner 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 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 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.

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 any of its 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. Where Hazardous Environmental Conditions are shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, Contractor shall take such action as is necessary, in accordance with applicable Laws and Regulations, to plan for and to remediate and render harmless all such Hazardous Environmental Conditions. Remediation plans for such known Hazardous Environmental Conditions shall be provided to Owner for approval prior to undertaking the remediation.

D. If Contractor encounters any unknown Hazardous Environmental Conditions at the Site, it shall stop Work immediately in the affected part of the Work to the extent required to avoid any such safety or health hazard until it has taken such action as is necessary, in accordance with pertinent Laws and Regulations, to protect the interests of any affected party. Contractor shall, immediately upon encountering any Hazardous Environmental Conditions at the Site, notify Owner and, if required by Laws and Regulations, all Governmental Units with jurisdiction over the Project or Site.

E. Contractor shall take all necessary measures required to ensure that Hazardous Environmental Conditions are remediated or rendered harmless in accordance with pertinent Laws and Regulations. Contractor shall, prior to proceeding with any such work: (a) obtain all environmental site assessments of the affected property and submit copies of such assessments to Owner for its approval; (b) develop remediation plans

for the Hazardous Environmental Conditions, subject to Owner's approval; and (c) obtain all pertinent permits to implement such plans. During the period of any investigation and remediation efforts, Contractor shall take all necessary measures to isolate and contain such Hazardous Environmental Conditions from the unaffected parts of the Work, and shall continue the Work to the maximum extent possible on unaffected parts of the Work.

- F. Except for those Hazardous Environmental Conditions set forth in Paragraph G below, Contractor will be entitled to submit a request for an adjustment to the Contract Price and/or Contract Time(s) to the extent Contractor's cost and/or time of performance have been adversely impacted by the presence, removal or remediation of unknown Hazardous Environmental Conditions. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
 - G. Notwithstanding anything to the contrary in the Contract Documents, Contractor shall bear full responsibility for the handling, treatment, storage, removal, remediation, avoidance, or other appropriate action (if any), with respect to: (a) any Hazardous Environmental Conditions present at, on, in or under, or migrating and/or emanating to or from the Site, that were generated by or brought or caused to be brought on the Site by any act or omission of Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible; (b) those Hazardous Environmental Conditions identified in paragraph C above; and (c) the creation or exacerbation of any Hazardous Environmental Condition due to the negligence, recklessness or willful misconduct of Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify, defend and hold harmless the Owner-Related Parties from and against all claims, losses, damages, liabilities and expenses, including attorneys' fees and expenses, arising out of or resulting from (a), (b) and/or (c) above.
 - H. 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.
- 5.07 *Historical Artifacts.*

- A. All articles of historical or scientific value, including but not limited to coins, fossils, and articles of antiquity, which may be uncovered by Contractor during the progress of the Work shall become Owner's property. Such findings shall be reported immediately to Owner, who will determine the method of removal, where necessary, and the final disposition thereof. If Contractor establishes that such discoveries have directly and materially impacted Contractor's cost or time of performance, then Contractor will be entitled to submit a request for an adjustment to the Contract Price and/or Contract Time(s) to the extent Contractor's cost and/or time of performance have been adversely impacted by the presence, removal or remediation of unknown Hazardous Environmental Conditions. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.

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 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 provide Owner with a required bond within the time required by Paragraph 2.01.A, Owner may exclude the Contractor from the Site and exercise Owner's termination for cause 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 Commonwealth of Virginia 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 Paragraph 6.03.C, 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 additional 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 Paragraph 6.03.C, 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. 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 those set forth in Paragraph 6.03.C) on each Subcontractor's commercial general liability and automobile liability insurance policy; and

2. Suppliers to purchase and maintain commercial general liability and any other insurance that is appropriate for their participation in the Project.

- H. 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.
- I. If Contractor has failed to provide Owner with the documents required by Paragraph 2.01.B within the time required by Paragraph 2.01.B, or has failed to 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 for cause rights under Article 16.
- J. 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.
- K. 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.
- L. The insurance and insurance limits required herein are minimums and 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.
- M. 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 30 days prior written notice (10 days if cancellation is for non-payment) 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 Owner and all other additional insureds.

6.03 *Contractor's Insurance*

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, Automobile Liability (unless the contractor does not own or lease any vehicles, in which case, hired and non-owned coverage is to be provided as part of the 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 the Supplementary Conditions or 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. In no case shall the period of coverage be terminated before a period ending one year after issuance of the final payment;
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 a waiver of subrogation in favor of the Owner and all additional insureds with regard to any claim covered by the insurance policies herein required; Such requirement for insurance policies to include waivers of subrogation shall also apply to any insurances required of subcontractors as denoted herein; and
6. include all necessary endorsements to support the stated requirements.

Contractor shall be responsible for any deductibles or self-insured retentions applicable to insurance policies carried as a result of these requirements.

C. *Additional Insureds:* The Contractor's commercial general liability, automobile 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 the Owner-Related Parties, 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*: As 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 commercially appropriate unless specifically provided for in the Supplementary Conditions or required by Laws and Regulations). Owner shall be an insured on the policy as its interests may appear.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur*: In addition to the limited coverage for existing property under builder's risk, the 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.
- 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 will provide Contractor advance notice of such occupancy or use and request that the Contractor provide such notice 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.
 - 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 the Engineer, Owner's Consultant, Project Representative, and 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. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against the Owner-Related Parties and all individuals or entities identified in the Supplementary Conditions as insureds, 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 unless the loss was sustained by the Owner as an additional insured on the Contractor's builder's risk 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 or additional insured clause. A named insured receiving insurance proceeds of \$500,000 or more 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 Owner has no 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 except under extraordinary circumstances. Contractor's superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communication given to or received from Contractor's superintendent shall be binding on Contractor. Contractor's superintendent must be acceptable to Owner.

7.03 *Labor; Working Hours*

- A. Contractor shall provide competent, skilled, 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. Contractor shall, upon demand from Owner, immediately remove any manager, superintendent, foreman or workman whom Owner may consider incompetent or undesirable.
- B. Contractor shall be fully responsible to Owner 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 Owner's observed holidays only with Owner's written consent, which will not be unreasonably withheld. Regular working hours shall be defined as 7 a.m. to 6 p.m. unless otherwise approved in advance by Owner.

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 Owner, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.
- D. Without limiting the responsibility or liability of Contractor pursuant to this Agreement, all warranties given by manufacturers on materials or equipment incorporated in the Work are hereby assigned by Contractor to Owner. If requested, Contractor shall execute formal assignments of said manufacturer's warranties to Owner. All such warranties shall be directly enforceable by Owner. Such assignment shall in no way affect Contractor's responsibilities and duties during the warranty period

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 Owner authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.

1. If Owner 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, Owner 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 Owner 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; and
 - 3) has a proven record of performance and availability of responsive service.
- 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. *Owner's Evaluation and Determination:* Owner will evaluate each "or-equal" request. Owner may require Contractor to furnish additional data about the proposed "or-equal" item. Owner will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Owner determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Owner will advise Contractor in writing of any negative determination.
- D. *Effect of Owner's Determination:* Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. Owner's denial of an "or-equal" request will be final and binding.
- E. *Treatment as a Substitution Request:* If Owner determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Owner 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 Owner 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 Owner to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Owner 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 Owner will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Owner may decide is appropriate under the circumstances.
 3. Contractor shall make written application to Owner 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. *Owner's Evaluation and Determination:* Owner will evaluate each substitute request. Owner may require Contractor to furnish additional data about the proposed substitute item. Owner will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Owner's review is complete and Owner determines that the proposed item is an acceptable substitute. Owner'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. Owner 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:* Whether or not Owner 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 Owner's Determination:* If Owner approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. Owner'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 Owner 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.
- 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 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, 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, Contractor shall indemnify and hold harmless the Owner-Related Parties 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. Additionally, in the event Owner is enjoined from the operation or use of the Work or any part thereof in connection with any dispute resolution proceeding, Contractor shall (at its sole expense) take all reasonable steps possible to procure for Owner the right to operate or use the Work or part thereof. If Contractor cannot so procure the aforesaid right within a reasonable time, Contractor shall then promptly (at Contractor's sole expense): (i) modify the Work so as to avoid infringement of any patent or other proprietary interest, or (ii) replace said Work with Work that does not infringe or violate any such patent or other proprietary interest, or (iii) remove said Work and refund any compensation theretofore paid to Contractor and pay to Owner any transportation costs and other expenses that may have been paid or incurred by them in connection with the Work so removed.

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.
- B. Certified water pollution control equipment and facilities are exempt from state Sales tax within the Commonwealth of Virginia. Owner will submit an application for sales tax exemption to the Virginia Department of Environmental Quality. Upon receipt of this application, the Virginia Department of Environmental will evaluate the application, if appropriate, and make a certification to the Virginia Department of Taxation. If approved, the Virginia Department of Taxation will provide a tax exemption certificate to Contractor.

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. Owner shall not 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 the Owner-Related Parties 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.
- D. Contractor shall keep fully informed of all Laws and Regulations in any manner affecting those engaged or employed in the Work or the materials used in the Work or in any way affecting the conduct of the Work.
- E. During the performance of the Contract, Contractor agrees as follows:
 - 1. Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where

there is a bona fide occupational qualification reasonably necessary to the normal operation of Contractor. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

2. Contractor, in all solicitations or advertisements for employees placed by or on behalf of Contractor, will state that such Contractor is an equal opportunity employer.
 3. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this paragraph.
 4. Contractor will include the provisions of the foregoing Paragraphs 1-3 in every subcontract or purchase order over \$10,000, so that the provisions will be binding upon each Subcontractor and Supplier.
- F. During the performance of this Contract, Contractor agrees to: (i) provide a drugfree workplace for Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in Contractor's workplace and specifying the action will be taken against employees or violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of Contractor that Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each Subcontractor and Supplier.
- G. Contractor represents that it does not, and during the performance of this Contract, it shall not, knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.
- H. Contractor represents that if it is organized as a stock or non-stock corporation, limited liability company, business trust or limited partnership or registered as a registered limited liability partnership, it is authorized to transact business in the Commonwealth of Virginia as a domestic or foreign business entity if required by law, and that it shall not allow its existence to lapse or its certificate of authority or registration to transact business in the Commonwealth of Virginia, if so required by law, to be revoked or cancelled at any time during the term of this Contract.
- I. Contractor acknowledges that Owner does not discriminate against faith-based organizations.

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 Owner for reference. Upon completion of the Work, Contractor shall deliver these record documents to Owner. Contractor shall certify, to

the best of its knowledge and belief, that the record documents delivered to Owner and the approved Samples are complete.

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. This safety representative shall work with Owner to ensure that no construction activities at the Site infringe upon any activities of Owner or its employees or the existing facilities located at the Site. Further, the safety representative shall work closely with Owner to ensure that Contractor's emergency plans do not adversely affect or infringe upon the emergency or regular operations of Owner's existing facilities or its emergency plans and operations.
- 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 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). If Contractor has not restored damaged property within 48 hours of written notice by Owner, or sooner in the case of an emergency, Owner may proceed with restoration of the property, improvements, or facilities deemed necessary. The cost thereof will be deducted from and monies due or which may become due Contractor under the Contract.
- 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 of the specific requirements of Contractor's safety program with which Owner'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, Owner has issued a written notice to 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.
- K. Owner reserves the right to suspend the Work or any portion thereof if, in its reasonable judgment, Contractor has or is violating the Contract or any requirement thereof, including but not limited to violations of Owner's safety programs or any Law or Regulation related to jobsite safety. Contractor shall not receive any adjustment in the Contract Price or Contract Time on the basis of such suspension, even if it is determined that no violation actually existed.

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.
- B. Contractor shall inform Owner of safety data sheets and hazard communications requirements to further ensure that Owner's employees and representatives are not exposed to hazards associated with any portion of the Project in which Owner's employees and representatives do not have prior specific knowledge.

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 Owner 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 Owner 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.

- B. Contractor shall immediately inform Owner if any condition exists or occurs which has the potential to inflict or cause an environmental health or safety risk to any employee or property of Owner.

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 Owner 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 Owner 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 Owner the services, materials, and equipment Contractor proposes to provide, and to enable Owner 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 Owner may require to enable Owner 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 Owner's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Owner's Review of Shop Drawings and Samples*

1. Owner will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Owner'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. Owner'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. Owner's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Owner'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 Owner has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Owner will document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Owner'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. Owner'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 Owner'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 Owner 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 Owner 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. Contractor shall be responsible for Engineer's charges to Owner for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample. 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 Owner in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
- b. Owner 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. Owner'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 Owner 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.
- 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 Owner;
 2. Payment by Owner of any progress or final payment;
 3. The issuance of a certificate of Substantial Completion by Owner 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 Owner;
 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 the Owner-Related Parties 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 the intentional misconduct or 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. Nothing herein shall require Contractor to indemnify any Owner-Related Parties for losses, damages, costs or judgments arising out of such party's own negligence.
- B. In any and all claims against an Owner-Related Party 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 Owner 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 Owner, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Owner.
- D. Owner 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, Owner'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.
- 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. The parties acknowledge, however, that the Site is an active work location for Owner and shall remain such for the duration of this Project, and that Contractor shall in no way interfere with or impede Owner's regular business activities.
- 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 Owner 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 Owner 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, then Owner shall be responsible for coordinating such entities with work of Contractor.
- B. Owner intends to have coordination meetings among Contractor and such other entities in an effort to manage the overall program associated with the work being performed at the Site. Contractor agrees that it will attend and participate in these logistics meetings and shall cooperate with Owner and such other entities to the extent reasonably necessary for the performance by such other entities of their work.

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 or an Owner-Related Party, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner; and (2) indemnify and hold harmless the Owner-Related Party 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 Owner and, if so designated in the Contract Documents, Owner's Project Representative or Owner's Consultant.

9.02 Replacement of Engineer

- A. Owner may at its discretion appoint an engineer to replace 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 *Safety Programs*

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

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

9.12 *Other Responsibilities*

A. The foregoing Paragraphs 9.01 through 9.11 shall not be construed to limit the other responsibilities of Owner set forth in these General Conditions.

ARTICLE 10— OWNER’S ROLE AND RIGHTS DURING CONSTRUCTION

10.01 General

- A. This Article 10 generally establishes Owner’s role and rights during construction, with the understanding that such role and rights are inclusive of other roles and rights that are set forth elsewhere in these General Conditions and other Contract Documents.
- B. Owner shall have the right to stop work whenever, in its sole discretion, Owner determines that such action is needed to prevent improper execution of the Work or to otherwise project Owner's interests.

10.02 Owner’s Representative

- A. Owner may furnish a Project Representative to assist Owner in providing more extensive observation of the Work or fulfill other responsibilities of Owner. If Owner elects to furnish a Project Representative, then Owner will notify Contractor in writing of the identity, authority and responsibilities of any such Project Representative.

10.03 Clarifications and Interpretations

- A. Owner will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as Owner may determine necessary, which shall be consistent with the intent of and reasonably inferable from the Contract Documents. Such written clarifications and interpretations shall be binding on Contractor. If Contractor disagrees with such clarifications and interpretations, or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a written clarification or interpretation, it may pursue its rights to submit a Claim in accordance with Article 12 hereof.

10.04 Authorized Variations in Work

- A. Owner may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and shall be binding on the Contractor, who shall perform the Work involved promptly. If the Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of such adjustment, it may pursue its rights to submit a Claim in accordance with Article 12 hereof.

10.05 Rejecting Defective Work

- A. Owner shall have authority to disapprove or reject Work which Owner believes to be defective, or that Owner believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Owner shall also have authority to require special inspection or testing of the Work as

provided in Paragraph 14.4, whether or not the Work is fabricated, installed, or completed.

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

- A. Owner 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.

10.07 *Limitations on Owner's Responsibilities*

- A. Owner 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. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- B. Owner 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.
- C. Owner'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.
- D. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Project Representative and Owner's Consultant, if any.

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, a Field Order, or a written amendment signed by Owner and Contractor.
- 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 must be approved by the Owner.

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; or (c) otherwise agreed upon in writing by the parties to be a change in the Work; 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 Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.
- C. Contractor agrees that duly executed Change Orders will constitute full resolution of all Contractor's rights arising out of or related to the subject matter of the Change Order, including but not limited to time extensions, delays, disruption and cumulative impact.

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 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.

11.04 *Field Orders*

- A. Owner 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 Contractor, which shall perform the Work involved promptly, unless the provisions of Paragraph B below are applicable.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then it shall, before proceeding with the Work, provide written notice to Owner of such position within three (3) days of its receipt of the Field Order. Contractor shall not proceed with the work until directed by Owner. If directed by Owner to proceed with the work, Contractor shall submit a Change Proposal within (ten) days of its receipt of the directive. Contractor's failure to provide the 3-day written

notice set forth above shall constitute a waiver of Contractor's right to seek an adjustment in the Contract Price or Contract Times for the Field Order.

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.
- 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 per 13.01.B1 and 13.01.B2 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 Owner to request an adjustment in the Contract Times or Contract Price; challenge a set-off against payment due or any other position taken by Owner; 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 Owner 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 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. *Owner's Initial Review*: If in its discretion Owner concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Owner may request that Contractor submit such additional supporting data by a date specified, prior to Owner beginning its full review of the Change Proposal.

4. *Owner's Full Review and Action on the Change Proposal*: Upon receipt of Contractor's supporting data (including any additional data requested by Owner), Owner will conduct a full review of each Change Proposal and 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 and provided to Contractor. If Owner does not take action on the Change Proposal within 60 days, then Contractor may at any time thereafter submit a letter to Owner indicating that as a result of Owner's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision*: Owner's decision is final and binding upon Contractor, unless Contractor appeals the decision by filing a Claim under Article 12.

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:* In the event Contractor appeals any Owner decision regarding Change Proposals, the provisions in this article shall govern the appeal.
- B. *Submittal of Claim:* Contractor shall deliver a Claim to Owner 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 21 days of the decision under appeal. The responsibility to substantiate a Claim rests with Contractor. 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:* Owner 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.
- D. *Partial Approval:* If Owner approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action Contractor invokes the procedure set forth in Article 17 for final resolution of disputes.
- E. *Denial of Claim:* If efforts to resolve a Claim are not successful, Owner may deny it by giving written notice of denial to Contractor. If Owner does not take action on the Claim within 30 days, then 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 Contractor invokes the procedure set forth in Article 17 for the final resolution of disputes.
- F. *Final and Binding Results:* If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, 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, foremen, safety representatives, and other personnel (other than any personnel of a position higher than a foreman) 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 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 the use, operating, maintenance, fuel, storage and other costs of all equipment and machinery owned by Contractor or a Contractor-related entity will be paid at the rates established by the most recent version of the Rental Rate Blue Book published by Nielsen/DATAQUEST, Inc. of Palo Alto, California, or its successors. The rental rates to be used shall be the published monthly rate divided by 176 to yield an hourly rate, which hourly rate shall be further adjusted by multiplying it by the Rental Rate Blue Book adjustment rate for the year the equipment was manufactured and by the regional factor contained in the Rental Rate Blue Book estimated hourly operating cost rate.

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 or intentional misconduct 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 or intentional misconduct 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, personnel above the position of foreman, 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 or intentional misconduct 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.

- 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 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. Owner will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Owner will review with Contractor Owner's preliminary determinations on such matters before rendering a written decision thereon. Owner's written decision thereon will be final and binding, 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 is more than 25% higher or lower than 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, its consultants and other representatives and personnel, 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 Owner 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 Governmental Unit having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such Governmental Unit, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Owner 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 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.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, 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 Owner, Contractor shall, if requested by Owner, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Owner timely notice of Contractor's intention to cover the same and Owner 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. *Owner's Rights:* Owner has the right 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 has actual knowledge will be given to Contractor.
- D. *Remedying Defective Work:* Contractor will start the process of remedying defective Work within five (5) days of Owner's notice of such defective Work. If Contractor does not effectuate such remedy within fourteen (14) days of Owner's notice, then Owner shall have the right to perform directly, or have performed by third parties, the necessary remedy, and the costs thereof shall be borne by Contractor. If the parties agree that the remedy will take longer than the 14-day period set forth above, they may mutually agree to modify the remedy period.
- 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 Units 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, 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. Owner has the right 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 Owner, then Contractor shall, if requested by Owner, uncover such Work for Owner's observation, and then replace the covering, all at Contractor's expense.
- C. If Owner considers it necessary or advisable that covered Work be observed by Owner or inspected or tested by others, then Contractor, at Owner's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Owner 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 Owner to correct defective Work, or to remove and replace defective Work as required by Owner, 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, and Owner's other contractors 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 Owner. 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. Contractor shall submit to Owner by the 25th day of the month an Application for Payment filled out and signed by Contractor covering the Work completed through the last day of the previous month, 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. Owner will, within 15 days after receipt of each Application for Payment, including each resubmittal, either notify Contractor in writing that Application for Payment has been approved or disapproved, in whole or in part, and the reasons for the disapproval.

2. By approving an Application for Payment, Owner will have relied upon the representations of Contractor that:

- 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 have been fulfilled.

3. In reviewing and acting upon Applications for Payment, Owner shall not be deemed to have represented that the inspections it has made (if any) to check the quality or the quantity of the Work as it has been performed have been exhaustive, or extended to every aspect of the Work in progress.

4. Owner may refuse to approve the whole or any part of any Application for Payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, may revise or revoke any payment approval previously made, as Owner may believe necessary, in its sole discretion, to protect itself 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. Owner 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. Fifteen (15) days after Owner's approval of an Application of Payment, the amount approved (subject to the provisions of Paragraph 15.01.E below, will be paid by Owner to Contractor.

E. Reductions in Payment by Owner

1. 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, Owner will give Contractor written notice 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 in writing that the entire Work is substantially complete and request that Owner issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner and Contractor, shall make an inspection of the Work to determine the status of completion. If Owner does not consider the Work substantially complete, Owner will notify Contractor in writing giving the reasons therefor.
- C. If Owner considers the Work substantially complete, Owner will prepare and deliver to Contractor a certificate of Substantial Completion which will fix the date of Substantial Completion. There shall be attached to the certificate a punch list of items to be completed or corrected before final payment. If Owner determines that the Work is not substantially complete, it shall so notify Contractor in writing, stating the reasons therefor.
- D. Prior to Owner issuing the 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 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 and Owner 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 in writing that Contractor considers any such part of the Work substantially complete and request Owner to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner and Contractor shall make an inspection of that part of the Work to determine its status of completion. If Owner does not consider that part of the Work to be substantially complete, Owner will notify Contractor in writing giving the reasons therefor. If Owner 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, Owner will promptly make a final inspection with 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 Owner, 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;
- 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; and
- f. a general release executed by Contractor waiving, upon receipt of final payment by Contractor, all Claims and other rights arising out of or related to the Contract, except those Claims specifically identified and listed in the general release that remain unsettled at the time of final payment, which Claims shall have been previously made in writing in accordance with this Contract, or which may be made in accordance with the terms of the Virginia Public Procurement Act.

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. *Owner's Review of Final Application and Approval of Payment:* If Owner is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Owner will, within 10 days after receipt of the final Application for Payment, approve such Application for Payment. Such approval will account for any set-offs against payment that are necessary in Owner's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. If Owner does not approve the Application for Payment, Owner will notify Contractor in writing the reasons for its disapproval, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

- C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Owner's approval of final payment pursuant to Paragraph B above.
- D. *Final Payment Becomes Due*: Owner shall set off against the amount approved 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 approval of the final Application for Payment.

15.07 *Waiver of Claims*

- A. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner, other than those specifically set forth in the general release required by Paragraph 15.06.A.2(f), which Claims shall have been previously made in writing in accordance with this Contract, or which may be made in accordance with the terms of the Virginia Public Procurement Act.

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.

15.09 Contractor Payments to Subcontractors

- A. Within seven (7) days after receipt of amounts paid by Owner to Contractor, Contractor shall take one (1) of the following two (2) actions with regard to Work performed by a Subcontractor:
 - 1. Pay Subcontractor for the proportionate share of the total payment received from Owner attributable to the Work performed by Subcontractor under the Contract; or
 - 2. Notify Owner and Subcontractor, in writing, of Contractor's intention to withhold all or a part of Subcontractor's payment with the reason for nonpayment.
- B. Individual Contractors and Subcontractors shall provide their social security numbers and Contractors organized as proprietorships, partnerships or corporations shall provide their federal employer identification numbers to Owner prior to the start of Work under this Contract.
- C. Contractor shall pay interest to Subcontractors on all amounts owed by Contractor that remain unpaid after seven (7) days following receipt by Contractor of payment from Owner for Work performed by Subcontractor under this Contract, except for amounts withheld as allowed in Paragraph.
- D. Unless otherwise provided under the terms of this Contract, interest on undisputed portion of unpaid invoices from Subcontractors shall accrue at the rate of one percent (1%) per month.
- E. Contractor shall include in each of its subcontracts a provision requiring each Subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower tier Subcontractor as set forth in this Paragraph.

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. 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. Notwithstanding the above, if Owner suspends Work or any portion thereof due to its reasonable judgment that Contractor has or is violating the Contract or any requirement thereof, including but not limited to violations of Owner's safety programs or any Law or Regulation related to jobsite safety, then Contractor shall not receive any adjustment in the Contract Price or extension of the Contract Times, even if it is determined that no violation actually existed.

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 Governmental Unit having jurisdiction; or
 4. Contractor's repeated disregard of the authority of Owner, Project Representative and/or Owner's Consultant.
- 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 related to Work completed by the Contractor but unpaid as of the

time of termination 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. 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, 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 any Governmental Unit, or (2) Owner fails for 90 days to pay Contractor any undisputed sums due under this Contract, then Contractor may, upon 7 days' written notice to Owner, and provided Owner does 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 Owner has failed for 30 days to pay Contractor any sum undisputed sums due under this Contract, Contractor may, 7 days after written notice to Owner, 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.

The party seeking to invoke these Article 17 processes shall provide written notice of the disputed matter to the other party in a "Notice of Request for Dispute Resolution" for which it wishes to use these Article 17 processes. The Notice of Request for Dispute Resolution shall identify the substance and basis for the disputed matter, along with the amount disputed, if any. The party receiving the Notice of Request for Dispute Resolution shall respond in writing within ten business days by setting forth that party's position with respect to the disputed matter raised in the Notice of Request for Dispute Resolution.

B. *Voluntary Mediation:* If the parties mutually agree to use voluntary mediation for any disputed matter, the mediation proceeding shall be conducted by a single, impartial mediator appointed by and under the rules of The McCammon Mediation Group. The parties shall split the hourly fees of the mediator 50/50, and each shall bear its respective legal fees and other costs. The mediation will take place at the Tysons Corner, Virginia offices of McGuireWoods, LLP, unless the parties agree otherwise. If they elect to seek mediation, each party shall participate in good faith in such mediation as a strict condition precedent to such party instituting any litigation authorized below. All communications and submissions concerning and during the mediation will be strictly confidential and inadmissible in any court proceeding.

C. *Litigation:* Any and all disputed matters which are unresolved following voluntary mediation, if pursued, shall be resolved exclusively by litigation in either the Circuit Court of the City of Alexandria, Virginia or the United States District Court for the Eastern District of Virginia. These two courts shall have exclusive and binding jurisdiction and venue over any and all disputes arising under the Contract. **THE PARTIES VOLUNTARILY WAIVE ANY AND ALL RIGHTS TO A TRIAL BY JURY. THE FACT FINDER SHALL BE THE COURT SITTING WITHOUT A JURY.**

1. If the disputed matter involves Contractor's Claim for costs or damages due to Owner's alleged delaying or disrupting Contractor in the performance of its Work under the Contract, Contractor shall be liable to Owner and shall pay it for a

percentage of all costs incurred by Owner in investigating, analyzing, negotiating, and litigating the Claim, which percentage shall be equal to the percentage of Contractor's total delay and disruption claim that is determined through litigation to be false or to have no basis in law or in fact.

2. If Owner has denied Contractor's Claim for costs or damages due to Owner's alleged delaying or disrupting Contractor in the performance of Work under the Contract, Owner shall be liable to and shall pay such Contractor a percentage of all costs incurred by the Contractor in investigating, analyzing, negotiating, and litigating the Claim, which shall be equal to the percentage of Contractor's total delay and disruption claim for which the Owner's denial is determined through litigation to have no basis or have been made in bad faith.

ARTICLE 18—MISCELLANEOUS

18.01 Giving Notice

- A. Whenever any provision of the Contract requires the giving of written notice to Owner 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 any other Owner-Related Party 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 Commonwealth of Virginia.

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.

18.11 *Independent Contractor*

- A. The relationship of Contractor to Owner shall be that of an independent contractor.

18.12 *Liens*

- A. The Site is owned by Owner, which is a public entity and, as such, cannot be subjected to a mechanics' lien. Contractor, on its own behalf and on behalf of its Subcontractors, hereby agrees not to permit any liens of any nature whatsoever, including but not limited to mechanics liens to be placed on the Site. In the event that a lien is placed on the Site, upon ten (10) days' notice so to do, Contractor will remove the lien, and if necessary will secure a bond to cover the amount of the lien. The payment bond shall be the sole and exclusive remedy for Subcontractors and Suppliers for nonpayment hereunder.

18.13 *Severability*

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

END OF SECTION

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SECTION 00 80 00
SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the General Conditions of the Construction Contract. The General Conditions remain in full force and effect except as amended. The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added—for example, “Paragraph SC4.05.”

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

- D. *Workers’ Compensation and Employer’s Liability*: Contractor shall purchase and maintain the following Virginia Statutory Workers’ Compensation and Employer’s Liability Insurance:

Workers’ Compensation and Related Policies	Policy limits of not less than:
Workers’ Compensation	
Commonwealth of Virginia	Statutory
Employer’s Liability	
Bodily injury by accident per accident	\$1,000,000
Bodily injury by disease per employee	\$1,000,000
Bodily injury by disease policy limit	\$1,000,000

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

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

Commercial General Liability	Policy limits of not less than:
General Aggregate – applicable on a per project basis	\$2,000,000
Products—Completed Operations Aggregate	\$2,000,000

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

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

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

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

Excess or Umbrella Liability	Policy limits of not less than: (per occurrence/general aggregate)
Total Contract Value of \$10 million or more	\$9,000,000
Total Contract Value \$3 million to \$9.99 million	\$4,000,000
Total Contract Value less than \$3 million	\$1,000,000

- K. *Using Umbrella or Excess Liability Insurance to Meet CGL and Other Policy Limit Requirements:* Contractor may meet the policy limits specified for employer’s liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary insurance policy’s policy limits and partial attribution of the policy limits of an umbrella or excess liability policy that is at least as broad in coverage as that of the underlying policy, as specified herein.
- L. *Builder’s Risk:* Contractor shall purchase and maintain builder’s risk insurance as required in Section 6.04 of the General Conditions (Section 00 70 00) and as further provided below. Such coverage shall be written on an ‘all risk’ (or ‘special perils’) basis and shall include, but not be limited to physical loss or damage during construction, operational testing and commissioning arising from fire, lightning,

explosion, collapse, wind, flood, storm, earth movement/earthquake and resulting damage from faulty workmanship or design. Such coverage shall include the Owner and other contractors and subcontractors as insureds.

Commercially reasonable sublimits for demolition, debris removal, property in transit, temporary works, damage to existing property, soft costs, landscaping, loss adjustment expenses, expediting expenses, and increased costs for building code compliance will be acceptable. Deductibles under the policy shall be no more than \$100,000.

END OF SECTION

SECTION 01 00 00 GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 WORK

- A. Work must comply with all applicable codes, shall be structurally sound and fit for intended use. Deviation from plans and specifications necessary for compliance shall be reported to the Owner and subject for approval.

1.02 REFERENCE STANDARDS

- A. The following is a list of standards which may be referenced in this section:
 - 1. Association Advancing Occupational and Environmental Health (ACGIH).
 - 2. National Fire Prevention Association (NFPA): Chapter 820.
 - 3. National Electrical Code (NEC).
 - 4. Virginia Occupational Safety and Health (VOSH): Article 1926.21 - Safety Training and Education.

1.03 DEFINITIONS AND ABBREVIATIONS

- A. ACGIH: Association Advancing Occupational and Environmental Health
- B. AlexRenew: Owner.
- C. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- D. Contaminated Material: Excavated or otherwise disturbed material that is not Hazardous Waste but contains one or more constituent concentrations, as determined through analysis and reporting on a dry-weight basis by an accredited testing laboratory, which equal or exceed:
 - 1. Current respective industrial soil Risk Screening Levels (RSL) as published by EPA Region III, with the exception of arsenic.
 - 2. Current respective Alexandria Tier 1 screening levels for soil as published by City of Alexandria Department of the Environment (ADOE).
 - 3. Allowable Arsenic Level (AAL).In addition, any man-made structure in an area designated as contaminated is also classified as contaminated and must be properly disposed of. Any

demolition waste from subsurface structures in contaminated zones must be handled as contaminated material.

- E. Disposal: Removal offsite of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- F. Earth: The word “earth,” whenever used as the name of the excavated material or material to be excavated, shall mean all kinds of material other than rock as defined herein.
- G. Engineer: The Design Engineer aka the Engineer of Record, who is an Owner’s authorized representative assigned to provide the project’s technical design and to make technical interpretations, reviews and acceptance.
- H. Inspector: The Owner’s authorized representative assigned to make any inspection of work performed and materials furnished. The Inspector has no authority to change or alter the Contract in any manner whatsoever.
- I. Owner: AlexRenew or its authorized representative.
- J. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- K. Resident Engineer: The authorized representative of the Owner in charge of one or more construction contracts. The Resident Engineer has no authority to change or alter the Contract in any manner whatsoever.
- L. WRRF: Water Resource Recovery Facility.

1.04 SUBMITTALS

- A. Informational Submittals:
 - 1. Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.
- B. For Approval:
 - 1. Temporary Control Submittals:
 - a. Noise control.
 - b. Odor control during construction.

1.05 COVID-19 CONSTRUCTION SAFETY GUIDELINES

- A. Adhere to and execute COVID-19 construction safety as outlined in the attached memorandum to “All Employers Working on AlexRenew’s Campus” from General Manager and CEO Karen Pallansch dated September 30, 2020.

1.06 PERMITS

- A. Contractor shall be responsible for obtaining any other licenses, certificates, registrations, approvals, fees, and permits in connection with the prosecution of the Work.
- B. Contractor shall comply with the Government of the City of Alexandria, Standard Contract Provisions Article 7 “Contractor’s Responsibilities” and all other appropriate City of Alexandria and Federal laws and regulations relative to permits, licenses, certificates and registrations.
- C. Contractor shall submit with each payment request, a list of all fees, including copies of invoices thereof to perform work included in the Contract.
- D. No separate payment will be made therefore. Include the costs of fees in the appropriate bid items on the Schedule of Prices.

1.07 TEMPORARY CONTROL PLANS

- A. Noise Control Plan:
 - 1. The Contractor shall comply with the City of Alexandria’s Noise Control Code, Title 11, Chapter 5, which sets the maximum permissible noise level as measured at the property line.
 - 2. Provide acoustical barriers so noise emanating from tools or equipment will not exceed legal noise levels or noise ordinances.
 - 3. Noise Control Plan: Propose plan to mitigate construction noise and to comply with noise control ordinances, including method of construction, equipment to be used, and acoustical treatments. Identify any additional plans to mitigate noise related to City waiver request for extended working hours.
- B. Odor Control During Construction Plan: Contractor shall plan so that odors from the pump station are controlled during construction of the Work from the beginning of the demolition phase of the project through startup and commissioning. To this end, the Contractor shall implement temporary odor control measures and monitor/report spot and daily average readings each day.

1. Furnish and install a temporary odor control system including activated carbon with a minimum flow rate capacity of 2,500 cfm. Provide temporary supply and exhaust ducting for the system. Focus collection of odors from the open channels and wet well and the compactor. In general, assume 2,000 cfm from the screen room and 500 cfm from the compactor room.

1.08 PROTECTION OF WORK AND PROPERTY

- A. Comply with Owner's safety rules while on Owner's property and Section 01 54 50, Construction Safety.
- B. Comply with the Owner's site access and security requirements, including, but not limited to the wearing of identification badges and site entry through guard stations at designated locations.
- C. Keep Owner informed of serious onsite accidents and related claims.
- D. Use of Explosives: No blasting or use of explosives will be allowed onsite.

1.09 EXISTING STRUCTURES AND UTILITIES

- A. All known utilities have been shown on the drawings according to the best information available. It is the Contractor's responsibility to contact all owners of structures or utilities above ground, on the ground, or below the ground, within the Project area so that said owners may stake or otherwise make or protect their facilities.
- B. Dimensions and locations of existing facilities are not necessarily exact. Where installation or connections of any part of the work to existing facilities are required, the Contractor shall verify such dimensions and locations in the field before the fabrication of any material or equipment, which is dependent on the correctness of such information.
- C. Contractor shall make no claim for delays or additional monies due to his failure to make his own investigations or verifications.
- D. Contractor must provide facilities and be responsible for the protection of all structures, buildings and utilities, underground, on the surface, or above ground against trenching, dewatering, or any other activity connected with the Work throughout the entire Contract Time.
- E. When structures and utilities have been properly shown or marked and are disturbed or damaged in the execution of the Work, they must be repaired immediately in conformance with best practice and the approval of the owner of the damaged utility or structure. Repairs and associated cost shall be the

responsible of the Contractor with no additional cost to the Contract Price or additional time to the Contract Time.

- F. When structures and utilities have not been properly shown or located as outlined above and are disturbed or damaged in the prosecution of the Work, take whatever steps are necessary for safety and notify the affected utility owner and avoid any actions which might further damage the structure or utility.

1.10 CONTRACTOR USE OF PREMISES

- A. Limit use of premises for Work, for storage, and for access, to allow for:
 - 1. The Owner occupancy.
 - 2. Work by other Contractors.
- B. Coordinate use of premises under direction of the Owner.
- C. Assume full responsibility for protection and safekeeping of products under this Contract.
- D. Obtain and pay for use of additional storage or work areas off site when needed and required for operations under this Contract.

1.11 CONTINUOUS OPERABILITY OF FACILITIES

- A. Continuous operation of all existing facilities is required unless otherwise stated and shall in no way be affected by Contract operations unless the Owner gives written permission to do so.

1.12 ACCESS TO SITE FOR INSPECTIONS

- A. The Contractor shall provide the representatives of the City, State, Federal Government, United States Environmental Protection Agency (EPA), United States Army Corps of Engineers (USCOE), United States Department of Labor, United States Occupational Safety and Health Administration (VOSH), and any other persons designated by the Owner with access to the work whenever it is in preparation or in progress.
- B. The Contractor shall provide all necessary and proper facilities for such access and inspection.
- C. The Contractor must also provide that the Grants Officer, the Comptroller General of the United States, or any authorized representative shall have access to any books, documents, papers, and records of the Contractor which

are pertinent to the project for the purpose of making audit, examination, excerpts, and transcriptions thereof.

1.13 TRESPASS

- A. Contractor will be solely responsible for any trespass upon adjacent property or injury thereto resulting from or in connection with his or her operations. He or she will be liable for any claims that may be made on account of trespass or the deposit of debris of any kind upon private and/or other public property.

1.14 ADDITIONAL CONTRACTS WITHIN PROJECT AREA

- A. The Owner reserves the right to let other contracts and to permit other utilities and their contractors to perform work within the general areas of this Contract.
- B. Such proposed Work is indicated on the Drawings to the extent that specific information relating thereto was available when the project was prepared. Whether or not such Work to be performed by others is indicated on the Drawings, the Contractor shall make such reasonable adjustments in his operations and schedules as the Owner may direct for the purpose of coordinating his work with that being performed by others.
- C. If any part of the work depends, for proper execution or results, upon the Work of any other contractor, the Contractor shall inspect and promptly report to the Owner any defects in such Work that render it unsuitable for proper execution of Contract Work. The Contractor's failure to so inspect and report such conditions of other contract Work affecting the Contract will constitute an acceptance of the other contractor's Work.
- D. No additional compensation over and above that reflected in the Schedule of Prices will be allowed for complying with the provisions of this Section.

1.15 TEMPORARY WATER SUPPLY

- A. Water is available for use at the pump station. Limit use of the water to the extent possible.

1.16 TEMPORARY CONSTRUCTION POWER

- A. It shall be the Contractor's responsibility to ensure that adequate power is available at all times and of sufficient capacity and characteristics to supply the proper voltage and current for the various types of construction, tools, motors, welding machines, lights, heating plant, pumps and work required.

- B. Contractor shall provide temporary constructions power as specified in Section 01 50 52, Contractor Facilities.

1.17 EQUIVALENT MATERIALS, PRODUCTS AND EQUIPMENT

- A. Whenever a material, article, system or sub-system is specified or described by using the name and/or model of a proprietary product or trademark or the name of the manufacturer or vendor, the specified item shall establish the type, function, and quality required; it shall be understood that the words "or approved equal" are implied whether or not they follow the proprietary enumeration.
- B. The Owner reserves the right to determine when proprietary items have no equivalency, and when uniformity of operations, interchangeability of parts, standard parts inventory, etc., are in the Owner's best interest.
- C. Requests for review of equivalency will be considered upon submission of sufficient information as described herein, to allow a complete review.
- D. Such requests will not be accepted from anyone other than the Contractor. Such submission must be made prior to purchase, fabrication, manufacture or use of the equivalent items under consideration.
- E. The Contractor is responsible for all delays caused by its failure to submit complete and accurate information with any request for approval of any material, article, system or subsystem, as an equivalent.
- F. Contractor Risk:
 - 1. If the Contractor includes in his bid or later proposes any material, product or equipment that he considers equivalent to that specified, the Contractor assumes all risk of any sort associated with acceptance or rejection of proposed equivalent items.
 - 2. The Contractor shall no right to make claim based upon his bid that includes a proposed equivalent items(s) of work which resulted in a lower bid amount for said item(s) or lower total bid.
- G. Submission Requirements: Each submission for equivalency review shall include:
 - 1. Justification for use of the proposed equivalent item(s), including evidence, as applicable, that Contract specified material, product or equipment is unobtainable or unobtainable within an acceptable time for Contract completion;

2. A description of the difference between specified items(s) and proposed equivalent item(s) and the comparative advantages and disadvantages of each;
 3. All relevant data addressing each specified parameter to show equivalency;
 4. A prediction of any effects the proposed change will have on operation and maintenance costs where applicable.
- H. Delays: The Contractor shall be responsible for all delays caused by its failure to submit complete and accurate information on or with a request for approval of any material, article, system or subsystem, as an approved equivalent.
- I. Supplemental Requirements:
1. Any tests required by the Owner to establish quality and performance standards shall be promptly conducted by or through the Contractor at no additional cost to the Owner.
 2. The Contractor shall submit any additional data requested by the Owner for the equivalency review.
 3. The Contractor shall satisfactorily accomplish all changes, including any engineering associated with use of equivalent items, at no additional cost to the Owner.
- J. The Contractor shall have no right of appeal to any decision rejecting the equivalency of any item.

1.18 HOLIDAYS

- A. The following days are recognized as legal holidays:
1. New Year's Day
 2. Memorial Day
 3. Juneteenth
 4. Independence Day
 5. Labor Day
 6. Thanksgiving Day
 7. Election Day
 8. Christmas Day
- B. Any day declared a holiday by the Owner shall be observed. When a holiday falls on a Sunday, the following Monday will be observed as a holiday. When a holiday falls on a Saturday, the proceeding Friday will be observed.

PART 2 GENERAL

2.01 GENERAL

- A. Materials shall be:
1. Newly manufactured specifically for the project, or
 2. New, unused materials obtained from manufacturer's inventory stock or the manufacturer's authorized distributor's stock, provided such materials have been manufactured within the past 2 years from the date of order, are totally in compliance with Specifications and, in either case, are so certified in writing by the manufacturer, and include manufacturer's warranties.
 3. Prohibited if from any source other than specified herein, or are re-conditioned, remanufactured or partly remanufactured.

PART 3 EXECUTION

3.01 STARTING WORK

- A. Start Work within 10 days following the date stated in the Notice to Proceed and execute with such progress as may be required to prevent delay to the general completion of the project. Execute Work at such items and in or on such parts of the project, and with such forces, material and equipment, as to complete the Work in the time established by the Contract. At all times, schedule and direct the Work so that it provides an orderly progression to completion within the specified time for completion.

3.02 PROTECTION OF WORK AND PROPERTY

- A. All facilities and utility lines within the construction area not to be abandoned, relocated, or reconstructed shall be protected and maintained in service by the Contractor.
- B. Short interruptions of certain services will be permitted when essential to the Contractor's operations as herein specified when approved by the Owner.
- C. Contractor shall provide and maintain such temporary supports, bypasses or protective devices as may be necessary to preserve the functions of the various utility systems throughout the duration of the Work.
- D. All damage to existing facilities which is attributable to the Contractor's activities shall be repaired by owner of the damaged facility or his designee, at the expense of the Contractor.

- E. All damage to existing water and/or sewer service connections attributable to the Contractor's activities shall be repaired or replaced in accordance with the City of Alexandria Plumbing Code and shall be performed by a plumber licensed in the City of Alexandria, at the expense of the Contractor.
- F. The Contractor will be held responsible for any collateral damage incurred while delivering equipment or materials while preparing for or providing work in this Contract.
- G. Contractor shall be required to restore to their original or better condition any yard surfaces, roadways, curbs, gutters or structures which are damaged by the Contractor's activities.
- H. Perform Work within right-of-way and easements in a systematic manner that minimizes inconvenience to property owners and the public.
- I. Maintain in continuous service existing oil and gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and other utilities encountered along line of the Work, unless other arrangements satisfactory to owners of said utilities have been made.
- J. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
- K. In areas where Contractor's operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by Contractor.
- L. Do not impair operation of existing sewer system. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, or other sewer structures.

3.03 TEMPORARY CONTROLS

- A. Execute noise and odor control plans.
- B. Air Pollution Control:
 - 1. Minimize air pollution from construction operations.
 - 2. City of Alexandria requires that Contractors shall not cause or permit vehicles to idle for more than 10 minutes when parked.

3. Burning of waste materials, rubbish, or other debris will not be permitted on or adjacent to Site.
4. Conduct operations of dumping rock and of carrying rock away in trucks to cause a minimum of dust.
5. To prevent dust, treat unpaved streets, roads, detours, or haul roads used in construction area with a dust-preventive treatment or, periodically, with water application. AlexRenew WRRF plant effluent shall be used for dust control applications. Strictly adhere to applicable environmental regulations for dust prevention.
6. Provide and maintain temporary dust-tight partitions, bulkheads, or other protective devices during construction to permit normal operation of existing facilities. Construct partitions of plywood, insulating board, plastic sheets, or similar material. Construct partitions in such a manner that dust and dirt from demolition and cutting will not enter other parts of existing building or facilities. Remove temporary partitions as soon as need no longer exists. Clean any dirt or dust entering operating buildings as a result of construction activities on a daily basis.
7. Provide load covers for all trucks carrying waste materials, rubbish, or debris, to minimize dust pollution.
8. The Engineer will monitor areas contiguous to the Contractor's immediate work and office areas for appreciable dust accumulation on vehicles, structures, equipment, etc. As directed by the Engineer, the Contractor shall clean structures and take any additional preventive measures to limit dust accumulation at no additional cost to the Owner.

C. Energy and Emissions Control:

1. The Contractor shall maintain an inventory record of all construction equipment either owned or rented for the Project. Include equipment make, model, engine size, specific emission controls, EPA Tier classified, etc. Make inventories available to the Engineer for review as requested.
2. Provide mufflers on all vehicles and equipment to reduce emissions.
3. Operate construction equipment and vehicles only when necessary to limit idling and emissions.
4. Maintain tire pressures on construction equipment per manufacturer's recommendation and keep records of maintenance on site.
5. The Contractor is encouraged to utilize EPA Tier 4 compliant construction equipment where available, based on rated engine power.
6. Utilized battery-operated or electric-powered compressors, hand tools, and other small construction equipment to the greatest extent practical except where physical access does not permit electrical equipment.

3.04 DELIVERY, STORAGE, AND HANDLING

- A. Contractor shall be responsible for handling, hauling, storing, and distributing all materials, equipment and surplus materials for the Contract as necessary or required, shall be provide suitable storage for materials and equipment during work progress, and be responsible for the protection, loss of, or damage to Contract materials and equipment until final Contract completion.
- B. Materials and equipment shall be placed so as not to injure any part of the Work or existing facilities and so that free access is available at all times to all parts of the Work.
- C. Storage and demurrage charges by transportation companies and vendors shall be borne by the Contractor.

END OF SECTION



To: All Employers Working on AlexRenew's Campus

From: Karen Pallansch, General Manager and CEO

Date: September 30, 2020

RE: Update to COVID-19 Construction Field Safety Guidelines

.....
This memo is effective as of September 30, 2020 and supersedes any preceding guidance, policy documents, or procedures issued related to the COVID-19 or State of Emergency. These guidelines apply to any work that will be done in areas where AlexRenew staff routinely works. This includes all buildings with staff offices, buildings where staff congregate, buildings that house treatment processes or equipment, and outdoor areas regularly accessed by AlexRenew staff. Access to these areas requires prior approval from the CEO. Access to the Control Room is strictly limited to only approved employees of AlexRenew.

The goal of these guidelines is to communicate reasonable, minimum expectations for providing a safe work site in light of the challenges posed by COVID-19. These guidelines are not all encompassing and employers may require additional measures they deem necessary. Guidelines are based on CDC, OSHA, and Virginia OSH recommendations and will be updated as more information is released.

These guidelines will be in effect until the CEO provides written notification that they are no longer necessary.

Safety Plans

- All visitors onsite must submit a Site-Specific Health and Safety Plan to the owner and resubmit every time it is updated internally. Safety plans should include a Job Hazard Assessment of tasks that can potentially expose employees to SARS-CoV-2 or COVID-19. Employers shall classify each employee according to the hazards they are potentially exposed to and establish the engineering, administrative and PPE controls required for each specific tasks.
- Employers that are working more than two consecutive days onsite must designate a supervisor to monitor and implement all recommended safety practices regarding the COVID-19 virus with all of their staff members. This person should have training commensurate with this hazard and all required industrial hygiene practices that may be required on the job site and will be responsible to maintain supplies of disinfectants and make sure that workers follow decontamination, hand washing, distancing, and PPE rules. This person should be the single point of contact for all employees to use if they have concerns/questions/symptoms, etc.
- Unless otherwise specified, employers must work with the owner to establish an assembly point for staff to perform daily Mandatory Health Screening, described below, before the start of work activities each day, that complies with the recommended social distancing parameters.

Site Access

- Employers will establish the minimum crew size necessary for safely accomplishing the task. Only the staff necessary for the task will be allowed on AlexRenew's campus.
- Employers will work with the AlexRenew Staff Lead (or the CM, if applicable) to obtain approval from the CEO prior to starting or restarting work at AlexRenew.
 - All employers must be listed on AlexRenew's Approved Essential Contractors and Suppliers List prior to accessing the site.

- Complete and submit the Approval Request form (Attachment A) by Tuesday prior to the week requested onsite.
- Contractor work within the EC Building, Building L, Bldg J Laboratory and Breakrooms are prohibited without the specific approval from AlexRenew. The Contractor is required to submit a Request for Restricted Area Access (Attachment B)

Mandatory Health Screening, COVID Positive Test, Tracing, Notifications and Reporting

- Employers shall not permit known COVID-19 or suspected COVID-19 employees or other persons to report to or be allowed to remain at work or on a job site until cleared for return to work or the job site by a medical professional.
- Employers will establish a daily screening protocol for arriving staff, to ensure that staff who are experiencing symptoms or who have been exposed to the virus do not enter the AlexRenew Campus. The daily screening protocol and forms must be included your Safety Plan. The daily screening protocol must be at least as restrictive as the health screening protocol (Attachment C).
- Daily screening must indicate when employees are experiencing symptoms consistent with COVID-19, and no alternative diagnosis has been made (e.g., tested positive for influenza). Such employees shall be designated by the employer as “suspected to be infected with SARS-CoV-2 virus. Symptomatic means the employee is experiencing symptoms similar to those attributed to COVID-19 including fever or chills, cough, shortness of breath or difficulty breathing, fatigue, muscle or body aches, headache, sore throat, new loss of taste or smell, congestion or runny nose, nausea or vomiting, or diarrhea. Symptoms may appear in 2 to 14 days after exposure to the virus.
- Employers must document the results of the screening and report results daily to the owner.
- When employers are notified of a known or suspected COVID-19 case who are been on the AlexRenew site within the last 14 days, the employer will inform AlexRenew immediately but no later than within 4 hours. The employer will work with AlexRenew and the health department to do contact tracing.
- Employers should make available to their employees flexible sick leave as appropriate and in compliance with local, state and federal laws.

Notifications

In addition to any notification requirements to employees or officials required by federal, state and local authorities, laws and regulations; the Contractor shall immediately notify the following:

1. AlexRenew COVID Coordinator: Alex.Rigby@AlexRenew.com
2. AlexRenew CM: James.Ohnigian@AlexRenew.com
3. Resident Engineer Project Specific
4. RE&I Site Safety Manager Project Specific

Reporting

In addition to any reporting requirements required by federal, state and local authorities, laws and regulations; the Contractor shall complete and email an AlexRenew Daily Summary Report (Attachment D) by 9am the following day to the RE&I Site Safety Manager.

Physical Distancing

- Employers shall communicate the importance of maintaining at least 6 feet of physical distance between themselves and others.

- Employers will prohibit their employees from congregating during meal times or breaks.
- Employers will minimize the amount of time that employees interact in person with AlexRenew staff.
- Virtual meetings and electronic tools must be available for meeting and interacting with work teams.
- In-person, face to face meetings are an option of last resort. If in-person, face to face meetings are necessary, they should be limited to less than 10 people, hosted in an area that allows for physical distancing (preferably outside), and all attendees must wear face coverings.
- Close proximity work clusters (i.e. multiple workers within a 6- radius) shall be limited to side by side work required by the type of work task and not gatherings to discuss sports, lunch, or work instructions.
- Employers will establish a vehicle policy that is at least as restrictive as AlexRenew's vehicle policy. (Attachment E)
- For employers who will spend more than one consecutive month on the AlexRenew campus, employers should consider establishing rotating team coverage to reduce number of employees working within a field trailer, while maintaining an appropriate level of on-site field management.

Face Coverings

- At a minimum, Employers will mandate the proper use of cloth face covering at all times when onsite as recommended by the Commonwealth of Virginia when not working in a construction environment that requires an OSHA required dust mask/respirator (i.e. demolition crew requiring protection from dust/silica). Refer to CDC for description of suitable cloth face coverings <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cloth-face-cover.html>
- Employees shall wear face coverings at all times when inside a building that is occupied by AlexRenew staff or when it may be expected to come into close contact with another person. *
- When outside, employees may lower their face covering below the nose when they are working within an exterior work area which is setup with a 6 feet exclusion zone between the edge of the work area and the open plant area.
 - a. The exclusion zone will be clearly bounded by barrels/cones and a continuous caution tape around the full perimeter.
 - b. No one is permitted to work within the exclusion zone without fully covered mouth and nose
 - c. Workers within the work area bounded by the exclusion zone must wear cover the mouth and nose with a face covering when unable to maintain 6 feet of distancing among each other.

*Conditions that may require lowering of face covering below the mouth when maintaining social distancing shall be limited to:

1. Performing heavy physical work and mouth covering inhibits heavy respiratory breathing
2. Prevents work related verbal communication to someone outside your 6 foot social distancing circle

Under no circumstances shall face coverings be lowered below the mouth or nose when unable to socially distance by more than 6 feet.

Handwashing, Hygiene, and Disinfection

- Employers shall communicate and reinforce with their employees the importance of handwashing and proper handwashing technique.
- If working in an area where there is no access to handwashing, employers shall provide hand sanitizer with at least 60% isopropyl alcohol, or shall establish a hand-washing station.
- Employers will require employees to disinfect surfaces in their work areas after they have completed the required task, between shifts and before leaving the worksite and will ensure that each employee disinfect their work area exit and entrance points, small tools and equipment at the beginning and end of each shift. If

working in an area that requires a continued AlexRenew staff presence (electric rooms, server rooms, office areas, stairwells, etc.), the employer will require staff to disinfect surfaces that have been touched or may have been contaminated with airborne particulate at the end of their work on that shift,

- Employers shall ensure only disinfecting chemicals and products are used that are approved by the Environmental Protection Act (EPA) and listed on List N for use against SARS-CoV-2 and emerging viral pathogens. Employers will train their staff and ensure the proper use of the disinfectant provided.
- All employers will provide sufficient access to hand sanitizer or disinfectant wipes (effective for virus per EPA, 60% alcohol or more).
- No spitting allowed (enforcement through disciplinary action will be taken).
- Employers shall ensure that areas on the AlexRenew where known COVID-19 and suspected COVID-19 employees worked are disinfected per CDC guidance (<https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html>) prior to allowing other people access to these areas. This requirement shall not apply if the area(s) in question have been unoccupied for seven or more days.

Quarantine and Return to Work

- Employers should follow CDC and State protocols for quarantining and isolating workers who have symptoms or who have had close contact with persons who are confirmed or suspected to have COVID-19.
- Employers shall establish a protocol for return to work that is in compliance with Section 40.C of Virginia OSHA's 12VAC25-220 Emergency Temporary Standard Infectious Disease Prevention: SARS-CoV-2 Virus that Causes COVID-19. (Attachment F)
- Employers shall establish protocols for quarantining after travel. Any employee (or approved visitor) who personally traveled, or who lives with someone who traveled, on a plane or Amtrak/VA Rail train shall self-quarantine for 14 days prior to entry or reentry to the site. Employer's policies should be at least as restrictive as AlexRenew's policies (Attachment G).

Communication

- Employers onsite for more than five consecutive business days will contact the owner with any updates to their Sites Safety Plan and provide a **daily** tailgate session reviewing site protocols with workers to mitigate potential spread of the virus. As information is changing continuously regarding COVID-19, these tailgates should occur daily and attendance and require worker signatures are required.

Deliveries

- UPS, FedEx shall deliver items to the Connex Box located next to the North Bridge Guard Booth. Deliveries to field offices or work locations are suspended. Employers shall self-retrieve their items **but shall disinfect Connex entry handles before unlatching and after closing up.**
- Other deliveries of large quantities of materials or large equipment are required to:
 - Remain outside the plant limit prior to 7am period.
 - Remain outside the plant limit until the driver makes contact with the Contractor regarding delivery location.
 - Remain in their trucks until met by the Contractor
- Drivers who do not know who they are delivering to or do not have contact phone numbers will be required to leave the plant premises. (So make sure your suppliers/vendors include sufficient information on the delivery ticket. The Security Guards will not be handing out maps anymore).
- Drivers may use the space designated for delivery personnel in the G Building to use the restroom. Drivers may not enter any other facility on site. Only one person is allowed in the space at a time.

Pulling Fiber in EC

Room Description	Number of Staff	Purpose



Board of Directors
John Hill, Chair
James Beall, Vice Chair
William Dickinson, Sec'y-Treas
Bruce Johnson
Adriana Caldarelli

Chief Executive Officer
Karen L. Pallansch, P.E., BCEE

General Counsel
McGuireWoods, LLP

COVID-19 HEALTH PRE-SCREENING

No one with symptoms of COVID-19 is allowed on the AlexRenew campus. All persons accessing the AlexRenew campus must attest that they have performed the following pre-screening.

If you answer yes to any of these questions, and no alternative diagnosis has been made by a licensed medical provider; stay home, self-quarantine as per CDC guidance, notify your supervisor, and seek medical attention.

Prescreening Questions

1. When you took your temperature did you have a fever of 100.4°F or higher?
Yes No
2. Do you have new chills that cannot be attributed to another health condition?
Yes No
3. Do you have a new cough that cannot be attributed to another health condition?
Yes No
4. Do you have new shortness of breath that cannot be attributed to another health condition?
Yes No
5. Do you have fatigue, muscle or body aches that cannot be attributed to another health condition?
Yes No
6. Do you have a headache that cannot be attributed to another health condition?
Yes No
7. Do you have a new sore throat that cannot be attributed to another health condition?
Yes No
8. Do you have a recent loss of taste or smell?
Yes No
9. Have you had persistent pain or pressure in the chest that cannot be attributed to another health condition?
Yes No
10. Congestion or runny nose that cannot be attributed to another health condition?
Yes No
11. Nausea or vomiting that cannot be attributed to another health condition?

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Alexandria's Water Transformers

A decorative graphic at the bottom of the page showing a splash of blue water with white highlights, creating a sense of movement and freshness.

Yes No

12. Diarrhea that cannot be attributed to another health condition?

Yes No

13. Have you been asked to self-isolate or quarantine by a doctor or other public health official?

Yes No

14. Have you had "close contact" with an individual diagnosed with COVID-19?

- *Being within 6ft of confirmed COVID-19 patient or non-confirmed symptomatic person for a more than 15 minutes.*
- *The timeframe for having contact with an individual also includes the 72-hour time period before the person became symptomatic*

Yes No

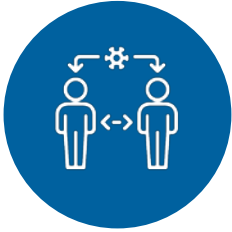
15. Have you had direct contact with infectious secretions from a confirmed COVID-19 patient or non-confirmed symptomatic person (being coughed or sneezed on)

Yes No



COVID-19 Personnel Vehicle Transport Guidelines

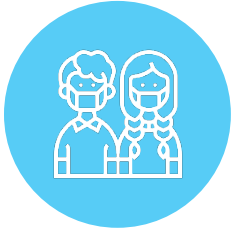
To mitigate exposure to COVID-19, the following is guidance for using company modes of transportation (sedans, SUVs, pick ups, electric vehicles). Minimizing risk of exposure can be accomplished with a combination of methods:



Physical distance throughout the trip



Limit number of employees in vehicles



Passenger hygiene practices



Vehicle hygiene practices



Education

Physical Distance Throughout the Trip

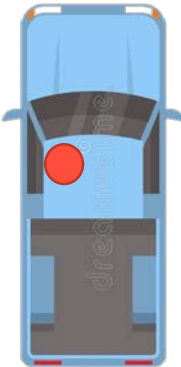
SEDAN/SUV/SUPER CREW TRUCK

2 Occupants



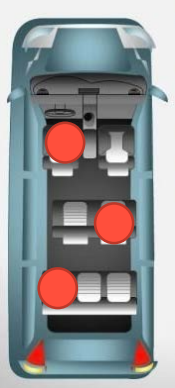
REGULAR PICKUP

1 Occupant;
Driver Only



PASSENGER VAN

of Occupants
Varies by Seating
Configuration;
1 passenger per
row



Tracking

Tracking can be done by a sign-in sheet that is kept with the vehicle. The record should be kept for a minimum of 4 weeks to allow for contact tracing if potential exposure occurs.

16VAC25-220, Emergency Temporary Standard

Infectious Disease Prevention:

SARS-CoV-2 Virus That Causes COVID-19

As Adopted by the

Safety and Health Codes Board

on July 15, 2020



VIRGINIA OCCUPATIONAL SAFETY AND HEALTH (VOSH) PROGRAM

VIRGINIA DEPARTMENT OF LABOR AND INDUSTRY (DOLI)

Effective Date: July 27, 2020

16VAC25-220

Emergency Temporary Standard

Infectious Disease Prevention: SARS-CoV-2 Virus That Causes COVID-19

16VAC25-220

16VAC25-220-10. Purpose, scope, and applicability.

A. This emergency temporary standard is designed to establish requirements for employers to control, prevent, and mitigate the spread of SARS-CoV-2, the virus that causes coronavirus disease 2019 (COVID-19) to and among employees and employers.

B. This standard shall not be extended or amended without public participation in accordance with the Virginia Administrative Process Act (§ 2.2-4000 et seq. of the Code of Virginia) and 16VAC25-60-170.

C. This standard is adopted in accordance with subdivision 6 a of § 40.1-22 of the Code of Virginia and shall apply to every employer, employee, and place of employment in the Commonwealth of Virginia within the jurisdiction of the VOSH program as described in 16VAC25-60-20 and 16VAC25-60-30.

D. This standard is designed to supplement and enhance existing VOSH laws, rules, regulations, and standards applicable directly or indirectly to SARS-CoV-2 virus or COVID-19 disease-related hazards such as, but not limited to, those dealing with personal protective equipment, respiratory protective equipment, sanitation, access to employee exposure and medical records, occupational exposure to hazardous chemicals in laboratories, hazard communication, § 40.1-51.1 A of the Code of Virginia, etc. Should this standard conflict with an

existing VOSH rule, regulation, or standard, the more stringent requirement from an occupational safety and health hazard prevention standpoint shall apply.

E. Application of this standard to a place of employment will be based on the exposure risk level presented by SARS-CoV-2 virus-related and COVID-19 disease-related hazards present or job tasks undertaken by employees at the place of employment as defined in this standard (i.e., very high, high, medium, and lower risk levels).

1. It is recognized that various hazards or job tasks at the same place of employment can be designated as very high, high, medium, or lower exposure risk for purposes of application of the requirements of this standard. It is further recognized that various required job tasks prohibit an employee from being able to observe physical distancing from other persons.

2. Factors that shall be considered in determining exposure risk level include, but are not limited to:

a. The job tasks being undertaken, the work environment (e.g. indoors or outdoors), the known or suspected presence of the SARS-CoV-2 virus, the presence of a person known or suspected to be infected with the SARS-CoV-2 virus, the number of employees and other persons in relation to the size of the work area, the working distance between employees and other employees or persons, and the duration and frequency of employee exposure through contact inside of six feet with other employees or persons (e.g., including shift work exceeding 8 hours per day); and

b. The type of hazards encountered, including potential exposure to the airborne transmission of SARS-CoV-2 virus; contact with contaminated surfaces or objects, such as tools, workstations, or break room tables, and shared spaces such as shared workstations, break rooms, locker rooms, and entrances and exits to the facility; shared work vehicles; and industries or places of employment where employer sponsored shared transportation is a common practice, such as ride-share vans or shuttle vehicles, car-pools, and public transportation, etc.

F. This standard shall not conflict with requirements and guidelines applicable to businesses set out in any applicable Virginia executive order or order of public health emergency.

G. 1. To the extent that an employer actually complies with a recommendation contained in CDC guidelines, whether mandatory or non-mandatory, to mitigate SARS-CoV-2 virus and COVID-19 disease related hazards or job tasks addressed by this standard, and provided that the CDC recommendation provides equivalent or greater protection than provided by a provision of this standard, the employer's actions shall be considered in compliance with this standard. An employer's actual compliance with a recommendation contained in CDC guidelines, whether mandatory or non-mandatory, to mitigate SARS-COV-2 and COVID19 related hazards or job tasks addressed by this standard shall be considered evidence of good faith in any enforcement proceeding related to this standard.

2. A public or private institution of higher education that has received certification from the State Council of Higher Education of Virginia that the institution's re-opening plans are in compliance with guidance documents, whether mandatory or non-mandatory, developed by the Governor's Office in conjunction with the Virginia Department of Health shall be considered in

compliance with this standard, provided the institution operates in compliance with its certified reopening plans and the certified reopening plans provide equivalent or greater levels of employee protection than this standard. A public school division or private school that submits its plans to the Virginia Department of Education to move to Phase II and Phase III that are aligned with CDC guidance for reopening of schools that provide equivalent or greater levels of employee protection than a provision of this standard and who operate in compliance with the public school division's or private school's submitted plans shall be considered in compliance with this standard. An institution's actual compliance with recommendations contained in CDC guidelines or the Virginia Department of Education guidance, whether mandatory or non-mandatory, to mitigate SARS-CoV-2 and COVID-19 related hazards or job tasks addressed by this standard shall be considered evidence of good faith in any enforcement proceeding related to this standard.

H. Nothing in the standard shall be construed to require employers to conduct contact tracing of the SARS-CoV-2 virus or COVID-19 disease.

16VAC25-220-20. Effective and expiration dates.

This emergency temporary standard shall take immediate effect July 27, 2020, upon publication in a newspaper of general circulation, published in the City of Richmond, Virginia.

With the exception of 16VAC25-220-80 B 10 regarding training required on infectious disease preparedness and response plans, the training requirements in 16VAC25-220-80 shall take effect on August 26, 2020. The training requirements under 16VAC25-220-80 B 10 shall take effect on September 25, 2020.

The requirements for 16VAC25-220-70 shall take effect on September 25, 2020.

This emergency temporary standard shall expire (i) within six months of its effective date, upon expiration of the Governor's State of Emergency, or when superseded by a permanent standard, whichever occurs first or (ii) when repealed by the Virginia Safety and Health Codes Board.

16VAC25-220-30. Definitions.

The following words and terms when used in this standard shall have the following meanings unless the context clearly indicates otherwise:

"Administrative control" means any procedure that significantly limits daily exposure to SARS-CoV-2 virus and COVID-19 disease related workplace hazards and job tasks by control or manipulation of the work schedule or manner in which work is performed. The use of personal protective equipment is not considered a means of administrative control.

"Airborne infection isolation room" or "AIIR," formerly a negative pressure isolation room, means a single-occupancy patient-care room used to isolate persons with a suspected or confirmed airborne infectious disease. Environmental factors are controlled in AIIRs to minimize the transmission of infectious agents that are usually transmitted from person to person by droplet nuclei associated with coughing or aerosolization of contaminated fluids. AIIRs provide (i) negative pressure in the room so that air flows under the door gap into the room, (ii) an air flow rate of 6-12 air changes per hour (ACH) (6 ACH for existing structures, 12 ACH for new construction or renovation), and (iii) direct exhaust of air from the room to the outside of the building or recirculation of air through a High Efficiency Particulate Air (HEPA) filter before returning to circulation.

"Asymptomatic" means a person who does not have symptoms.

"Building or facility owner" means the legal entity, including a lessee, that exercises control over management and record keeping functions relating to a building or facility in which activities covered by this standard take place.

"CDC" means Centers for Disease Control and Prevention.

"Cleaning" means the removal of dirt and impurities, including germs, from surfaces. Cleaning alone does not kill germs. But by removing the germs, cleaning decreases their number and therefore any risk of spreading infection.

"Community transmission," also called "community spread," means people have been infected with SARS-CoV-2 in an area, including some who are not sure how or where they became infected. The level of community transmission is classified by the CDC as:

1. "No to minimal" where there is evidence of isolated cases or limited community transmission, case investigations are underway, and no evidence of exposure in large communal settings (e.g., healthcare facilities, schools, mass gatherings, etc.);
2. "Moderate" where there is sustained community transmission with high likelihood or confirmed exposure within communal settings and potential for rapid increase in cases;
3. "Substantial, controlled" where there is large scale, controlled community transmission, including communal settings (e.g., schools, workplaces, etc.); or
4. "Substantial, uncontrolled" where there is large scale, uncontrolled community transmission, including communal settings (e.g., schools, workplaces, etc.).

"COVID-19" means Coronavirus Disease 2019, which is primarily a respiratory disease, caused by the SARS-CoV-2 virus.

"Disinfecting" means using chemicals approved for use against SARS-CoV-2, for example EPA-registered disinfectants, to kill germs on surfaces. The process of disinfecting does not necessarily clean dirty surfaces or remove germs, but killing germs remaining on a surface after cleaning further reduces any risk of spreading infection.

"Duration and frequency of employee exposure" means how long ("duration") and how often ("frequency") an employee is potentially exposed to the SARS-CoV-2 virus or COVID-19 disease. Generally, the greater the frequency or length of exposure, the greater the probability is for potential infection to occur. Frequency of exposure is generally more significant for acute acting agents or situations, while duration of exposure is generally more significant for chronic acting agents or situations. An example of an acute SARS-CoV-2 virus or COVID-19 disease situation would be an unprotected customer, patient, or other person coughing or sneezing directly into the face of an employee. An example of a chronic situation would be a job task that requires an employee to interact either for an extended period of time inside six feet with a smaller static group of other employees or persons or for an extended period of time inside six feet with a larger group of other employees or persons in succession but for periods of shorter duration.

"Economic feasibility" means the employer is financially able to undertake the measures necessary to comply with one or more requirements in this standard. The cost of corrective measures to be taken will not usually be considered as a factor in determining whether a violation of this standard has occurred. If an employer's level of compliance lags significantly behind that of its industry, an employer's claim of economic infeasibility will not be accepted.

"Elimination" means a method of exposure control that removes the employee completely from exposure to SARS-CoV-2 virus and COVID-19 disease related workplace hazards and job tasks.

"Employee" means an employee of an employer who is employed in a business of his employer. Reference to the term "employee" in this standard also includes, but is not limited to, temporary employees and other joint employment relationships, persons in supervisory or management positions with the employer, etc., in accordance with Virginia occupational safety and health laws, standards, regulations, and court rulings.

"Engineering control" means the use of substitution, isolation, ventilation, and equipment modification to reduce exposure to SARS-CoV-2 virus and COVID-19 disease related workplace hazards and job tasks.

"Exposure risk level" means an assessment of the possibility that an employee could be exposed to the hazards associated with SARS-CoV-2 virus and the COVID-19 disease. The exposure risk level assessment should address all risks and all modes of transmission including airborne transmission, as well as transmission by asymptomatic and presymptomatic individuals. Risk levels should be based on the risk factors present that increase risk exposure to COVID-19 and are present during the course of employment regardless of location. Hazards and job tasks have been divided into four risk exposure levels: very high, high, medium, and lower:

"Very high" exposure risk hazards or job tasks are those in places of employment with high potential for employee exposure to known or suspected sources of the SARS-CoV-2 virus (e.g.,

laboratory samples) or persons known or suspected to be infected with the SARS-CoV-2 virus, including, but not limited to, during specific medical, postmortem, or laboratory procedures:

1. Aerosol-generating procedures (e.g., intubation, cough induction procedures, bronchoscopies, some dental procedures and exams, or invasive specimen collection) on a patient or person known or suspected to be infected with the SARS-CoV-2 virus;
2. Collecting or handling specimens from a patient or person known or suspected to be infected with the SARS-CoV-2 virus (e.g., manipulating cultures from patients known or suspected to be infected with the SARS-CoV-2 virus); and
3. Performing an autopsy that involves aerosol-generating procedures on the body of a person known or suspected to be infected with the SARS-CoV-2 virus at the time of their death.

"High" exposure risk hazards or job tasks are those in places of employment with high potential for employee exposure inside six feet with known or suspected sources of SARS-CoV-2, or with persons known or suspected to be infected with the SARS-CoV-2 virus that are not otherwise classified as very high exposure risk, including, but not limited to:

1. Healthcare (physical and mental health) delivery and support services provided to a patient known or suspected to be infected with the SARS-CoV-2 virus, including field hospitals (e.g., doctors, nurses, cleaners, and other hospital staff who must enter patient rooms or areas);
2. Healthcare (physical and mental) delivery, care, and support services, wellness services, non-medical support services, physical assistance, etc., provided to a patient, resident, or

other person known or suspected to be infected with the SARS-CoV-2 virus involving skilled nursing services, outpatient medical services, clinical services, drug treatment programs, medical outreach services, mental health services, home health care, nursing home care, assisted living care, memory care support and services, hospice care, rehabilitation services, primary and specialty medical care, dental care, COVID-19 testing services, blood donation services, contact tracer services, and chiropractic services;

3. First responder services provided to a patient, resident, or other person known or suspected to be infected with the SARS-CoV-2 virus;

4. Medical transport services (loading, transporting, unloading, etc.) provided to patients known or suspected to be infected with the SARS-CoV-2 virus (e.g., ground or air emergency transport, staff, operators, drivers, pilots, etc.); and

5. Mortuary services involved in preparing (e.g., for burial or cremation) the bodies of persons who are known or suspected to be infected with the SARS-CoV-2 virus at the time of their death.

"Medium" exposure risk hazards or job tasks are those not otherwise classified as very high or high exposure risk in places of employment that require more than minimal occupational contact inside six feet with other employees, other persons, or the general public who may be infected with SARS-CoV-2, but who are not known or suspected to be infected with the SARS-CoV-2 virus. Medium exposure risk hazards or job tasks may include, but are not limited to, operations and services in:

1. Poultry, meat, and seafood processing; agricultural and hand labor; commercial transportation of passengers by air, land, and water; on campus educational settings in schools, colleges, and universities; daycare and afterschool settings; restaurants and bars; grocery stores, convenience stores, and food banks; drug stores and pharmacies; manufacturing settings; indoor and outdoor construction settings; correctional facilities, jails, detentions centers, and juvenile detention centers; work performed in customer premises, such as homes or businesses; retail stores; call centers; package processing settings; veterinary settings; personal care, personal grooming , salon, and spa settings; venues for sports, entertainment, movies, theaters, and other forms of mass gatherings; homeless shelters; fitness, gym, and exercise facilities; airports, and train and bus stations; etc.; and

2. Situations not involving exposure to known or suspected sources of SARS-CoV-2: hospitals, other healthcare (physical and mental) delivery and support services in a non-hospital setting, wellness services, physical assistance, etc.; skilled nursing facilities; outpatient medical facilities; clinics, drug treatment programs, and medical outreach services; non-medical support services; mental health facilities; home health care, nursing homes, assisted living facilities, memory care facilities, and hospice care; rehabilitation centers, doctors' offices, dentists' offices, and chiropractors' offices; first responders services provided by police, fire, paramedic and emergency medical services providers, medical transport; contact tracers, etc.

"Lower" exposure risk hazards or job tasks are those not otherwise classified as very high, high, or medium exposure risk that do not require contact inside six feet with persons known to

be, or suspected of being, or who may be infected with SARS-CoV-2. Employees in this category have minimal occupational contact with other employees, other persons, or the general public, such as in an office building setting; or are able to achieve minimal occupational contact through the implementation of engineering, administrative and work practice controls, such as, but not limited to

1. Installation of floor to ceiling physical barriers constructed of impermeable material and not subject to unintentional displacement (e.g., such as clear plastic walls at convenience stores behind which only one employee is working at any one time);
2. Telecommuting;
3. Staggered work shifts that allow employees to maintain physical distancing from other employees, other persons, and the general public;
4. Delivering services remotely by phone, audio, video, mail, package delivery, curbside pickup or delivery, etc., that allows employees to maintain physical distancing from other employees, other persons, and the general public; and
5. Mandatory physical distancing of employees from other employees, other persons, and the general public.

Employee use of face coverings for contact inside six feet of coworkers, customers, or other persons is not an acceptable administrative or work practice control to achieve minimal occupational contact. However, when it is necessary for an employee to have brief contact with others inside the six feet distance a face covering is required.

"Face covering" means an item normally made of cloth or various other materials with elastic bands or cloth ties to secure over the wearer's nose and mouth in an effort to contain or reduce the spread of potentially infectious respiratory secretions at the source (i.e., the person's nose and mouth). A face covering is not intended to protect the wearer, but it may reduce the spread of virus from the wearer to others. A face covering is not a surgical/medical procedure mask. A face covering is not subject to testing and approval by a state or government agency, so it is not considered a form of personal protective equipment or respiratory protection equipment under VOSH laws, rules, regulations, and standards.

"Face shield" means a form of personal protective equipment made of transparent, impermeable materials intended to protect the entire face or portions of the face from droplets or splashes.

"Feasible" as used in this standard includes both technical and economic feasibility.

"Filtering facepiece respirator" means a negative pressure air purifying particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium. Filtering facepiece respirators are certified for use by the National Institute for Occupational Safety and Health (NIOSH).

"Hand sanitizer" means an alcohol-based hand rub containing at least 60% alcohol, unless otherwise provided for in this standard.

"HIPAA" means Health Insurance Portability and Accountability Act.

"Known to be infected with the SARS-CoV-2 virus" means a person, whether symptomatic or asymptomatic, who has tested positive for SARS-CoV-2, and the employer knew or with reasonable diligence should have known that the person has tested positive for SARS-CoV-2.

"May be infected with SARS-CoV-2 virus" means any person not currently a person known or suspected to be infected with SARS-CoV-2 virus and not currently vaccinated against the SARS-CoV-2 virus.

"Occupational exposure" means the state of being actually or potentially exposed to contact with SARS-CoV-2 virus or COVID-19 disease related hazards at the work location or while engaged in work activities at another location.

"Personal protective equipment" means equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses. These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical, biological, or other workplace hazards. Personal protective equipment may include, but is not limited to, items such as gloves, safety glasses, shoes, earplugs or muffs, hard hats, respirators, surgical/medical procedure masks, gowns, face shields, coveralls, vests, and full body suits.

"Physical distancing" also called "social distancing" means keeping space between yourself and other persons while conducting work-related activities inside and outside of the physical establishment by staying at least six feet from other persons. Physical separation of an employee from other employees or persons by a permanent, solid floor to ceiling wall constitutes physical distancing from an employee or other person stationed on the other side of the wall.

"Respirator" means a protective device that covers the nose and mouth or the entire face or head to guard the wearer against hazardous atmospheres. Respirators are certified for use by the National Institute for Occupational Safety and Health (NIOSH). Respirators may be (i) tight-fitting, which means either a half mask that covers the mouth and nose or a full face piece that covers the face from the hairline to below the chin or (ii) loose-fitting, such as hoods or helmets that cover the head completely.

There are two major classes of respirators:

1. Air-purifying, which remove contaminants from the air; and
2. Atmosphere-supplying, which provide clean, breathable air from an uncontaminated source. As a general rule, atmosphere-supplying respirators are used for more hazardous exposures.

"Respirator user" means an employee who in the scope of their current job may be assigned to tasks that may require the use of a respirator in accordance with this standard or required by other provisions in the VOSH and OSHA standards.

"SARS-CoV-2" means a betacoronavirus, like MERS-CoV and SARS-CoV. Coronaviruses are named for the crown-like spikes on their surfaces. The SARS-CoV-2 causes what has been designated as the Coronavirus Disease 2019 (COVID-19).

"Signs of COVID-19" include trouble breathing, persistent pain or pressure in the chest, new confusion, inability to wake or stay awake, bluish lips or face, etc.

"Surgical/medical procedure mask" means a mask to be worn over the wearer's nose and mouth that is fluid resistant and provides the wearer protection against large droplets, splashes,

or sprays of bodily or other hazardous fluids, and prevents the wearer from exposing others in the same fashion. A surgical/medical procedure mask protects others from the wearer's respiratory emissions. A surgical/medical procedure mask has a loose fitting face seal. A surgical/medical procedure mask does not provide the wearer with a reliable level of protection from inhaling smaller airborne particles. A surgical/medical procedure mask is considered a form of personal protective equipment, but is not considered respiratory protection equipment under VOSH laws, rules, regulations, and standards. Testing and approval is cleared by the U.S. Food and Drug Administration (FDA).

"Suspected to be infected with SARS-CoV-2 virus" means a person who has signs or symptoms of COVID-19 but has not tested positive for SARS-CoV-2, and no alternative diagnosis has been made (e.g., tested positive for influenza).

"Symptomatic" means the employee is experiencing symptoms similar to those attributed to COVID-19 including fever or chills, cough, shortness of breath or difficulty breathing, fatigue, muscle or body aches, headache, new loss of taste or smell, sore throat, congestion or runny nose, nausea or vomiting, or diarrhea. Symptoms may appear in two to 14 days after exposure to the virus.

"Technical feasibility" means the existence of technical know-how as to materials and methods available or adaptable to specific circumstances that can be applied to one or more requirements in this standard with a reasonable possibility that employee exposure to the SARS-CoV-2 virus and COVID-19 disease hazards will be reduced. If an employer's level of compliance lags significantly behind that of the employer's industry, allegations of technical infeasibility will not be accepted.

"VOSH" means Virginia Occupational Safety and Health.

"Work practice control" means a type of administrative control by which the employer modifies the manner in which the employee performs assigned work. Such modification may result in a reduction of exposure to SARS-CoV-2 virus and COVID-19 disease related workplace hazards and job tasks through such methods as changing work habits, improving sanitation and hygiene practices, or making other changes in the way the employee performs the job.

16VAC25-220-40. Mandatory requirements for all employers.

A. Employers in all exposure risk levels shall ensure compliance with the requirements in this section to protect employees from workplace exposure to the SARS-CoV-2 virus that causes the COVID-19 disease.

B. Exposure assessment and determination, notification requirements, and employee access to exposure and medical records.

1. Employers shall assess their workplace for hazards and job tasks that can potentially expose employees to the SARS-CoV-2 virus or COVID-19 disease. Employers shall classify each job task according to the hazards employees are potentially exposed to and ensure compliance with the applicable sections of this standard for very high, high, medium, or lower risk levels of exposure. Tasks that are similar in nature and expose employees to the same hazard may be grouped for classification purposes.

2. Employers shall inform employees of the methods of and encourage employees to self-monitor for signs and symptoms of COVID-19 if employees suspect possible exposure or are experiencing signs of an oncoming illness.

3. Serological testing, also known as antibody testing, is a test to determine if persons have been infected with SARS-CoV-2 virus. Serological testing has not been determined if persons who have the antibodies are immune from infection.

a. Serologic test results shall not be used to make decisions about returning employees to work who were previously classified as known or suspected to be infected with the SARS-CoV-2 virus.

b. Serologic test results shall not be used to make decisions concerning employees who were previously classified as known or suspected to be infected with the SARS-CoV-2 virus about grouping, residing in or being admitted to congregate settings, such as schools, dormitories, etc.

4. Employers shall develop and implement policies and procedures for employees to report when employees are experiencing symptoms consistent with COVID-19, and no alternative diagnosis has been made (e.g., tested positive for influenza). Such employees shall be designated by the employer as “suspected to be infected with SARS-CoV-2 virus.”

5. Employers shall not permit employees or other persons known or suspected to be infected with SARS-CoV-2 virus to report to or remain at the work site or engage in work at a customer or client location until cleared for return to work (see subsection C of this section). Nothing in this standard shall prohibit an employer from permitting an employee known or suspected to be infected with SARS-CoV-2 virus from engaging in teleworking or other form of work isolation that would not result in potentially exposing other employees to the SARS-CoV-2 virus.

6. To the extent feasible and permitted by law, including but not limited to the Families First Coronavirus Response Act, employers shall ensure that sick leave policies are flexible and consistent with public health guidance and that employees are aware of these policies.

7. Employers shall discuss with subcontractors and companies that provide contract or temporary employees about the importance of employees or other persons who are known or suspected to be infected with the SARS-CoV-2 virus of staying home. Subcontractor, contract, or temporary employees known or suspected to be infected with the SARS-CoV-2 virus shall not report to or be allowed to remain at the work site until cleared for return to work. Subcontractors shall not allow their known or suspected to be infected with the SARS-CoV-2 virus employees to report to or be allowed to remain at work or on a job site until cleared for return to work.

8. To the extent permitted by law, including HIPAA, employers shall establish a system to receive reports of positive SARS-CoV-2 tests by employees, subcontractors, contract employees, and temporary employees (excluding patients hospitalized on the basis of being known or suspected to be infected with SARS-CoV-2 virus) present at the place of employment within the previous 14 days from the date of positive test, and the employer shall notify:

- a. The employer's own employees who may have been exposed, within 24 hours of discovery of the employees possible exposure, while keeping confidential the identity of the known to be infected with SARS-CoV-2 virus person in accordance with the

requirements of the Americans with Disabilities Act (ADA) and other applicable federal and Virginia laws and regulations; and

b. In the same manner as subdivision 8 a of this subsection, other employers whose employees were present at the work site during the same time period; and

c. In the same manner as subdivision 8 a of this subsection, the building or facility owner. The building or facility owner will require all employer tenants to notify the owner of the occurrence of a SARS-CoV-2-positive test for any employees or residents in the building. This notification will allow the owner to take the necessary steps to sanitize the common areas of the building. In addition, the building or facility owner will notify all employer tenants in the building that one or more cases have been discovered and the floor or work area where the case was located. The identity of the individual will be kept confidential in accordance with the requirements of the Americans with Disabilities Act (ADA) and other applicable federal and Virginia laws and regulations; and

d. The Virginia Department of Health within 24 hours of the discovery of a positive case; and

e. The Virginia Department of Labor and Industry within 24 hours of the discovery of three or more employees present at the place of employment within a 14-day period testing positive for SARS-CoV-2 virus during that 14-day time period.

9. Employers shall ensure employee access to the employee's own SARS-CoV-2 virus and COVID-19 disease related exposure and medical records in accordance with the standard

applicable to its industry. Employers in the agriculture, public sector marine terminal, and public sector longshoring industries shall ensure employees access to the employees' own SARS-CoV-2 virus and COVID-19 disease related exposure and medical records in accordance with 16VAC25-90-1910.1020, Access to Employee Exposure and Medical Records.

C. Return to work.

1. The employer shall develop and implement policies and procedures for employees known or suspected to be infected with the SARS-CoV-2 virus to return to work using either a symptom-based or test-based strategy, depending on local healthcare and testing circumstances. While an employer may rely on other reasonable options, a policy that involves consultation with appropriate healthcare professionals concerning when an employee has satisfied the symptoms based strategy requirements in subdivision 1 a of this subsection will constitute compliance with the requirements of this subsection.

a. For known or suspected to be infected with the SARS-CoV-2 virus employees the symptom-based strategy excludes an employee from returning to work until (i) at least three days (72 hours) have passed since recovery, defined as resolution of fever without the use of fever-reducing medications and improvement in respiratory symptoms (e.g., cough, shortness of breath) and (ii) at least 10 days have passed since symptoms first appeared.

b. The test-based strategy excludes an employee from returning to work until (i) resolution of fever without the use of fever-reducing medications, (ii) improvement

in respiratory symptoms (e.g., cough, shortness of breath), and (iii) negative results of an FDA Emergency Use Authorized COVID-19 molecular assay for detection of SARS-CoV-2 RNA from at least two consecutive respiratory specimens collected 24 hours or more apart (total of two negative specimens).

i. If a known or suspected to be infected with the SARS-CoV-2 virus employee refuses to be tested, the employer compliance with subdivision 1 a of this subsection, symptom-based strategy, will be considered in compliance with this standard. Nothing in this standard shall be construed to prohibit an employer from requiring a known or suspected to be infected with the SARS-CoV-2 virus employee to be tested in accordance with subdivision 1 b of this subsection.

ii. For purposes of this section, COVID-19 testing is considered a “medical examination” under § 40.1-28 of the Code of Virginia. The employer shall not require the employee to pay for the cost of COVID-19 testing for return to work determinations.

2. The employer shall develop and implement policies and procedures for known to be infected with SARS-CoV-2 asymptomatic employees to return to work using either a time-based or test-based strategy depending on local healthcare and testing circumstances. While an employer may rely on other reasonable options, a policy that involves consultation with appropriate healthcare professionals concerning when an employee has satisfied the time based strategy requirements in subdivision 2 a of this subsection will constitute compliance with the requirements of this subsection.

a. The time-based strategy excludes an employee from returning to work until at least 10 days have passed since the date of the employee's first positive COVID-19 diagnostic test assuming the employee has not subsequently developed symptoms since the employee's positive test. If the employee develops symptoms, then the symptom-based or test-based strategy shall be used.

b. The test-based strategy excludes an employee from returning to work until negative results of an FDA Emergency Use Authorized COVID-19 molecular assay for detection of SARS-CoV-2 RNA from at least two consecutive respiratory specimens collected 24 hours or more apart (total of two negative specimens).

i If a known to be infected with SARS-CoV-2 asymptomatic employee refuses to be tested, employer compliance with subdivision 2 a of this subsection, time-based strategy, will be considered in compliance with this standard. Nothing in this standard shall be construed to prohibit an employer from requiring a known to be infected with SARS-CoV-2 asymptomatic employee to be tested in accordance with subdivision 2 b of this subsection.

ii. For purposes of this section, COVID-19 testing is considered a “medical examination” under § 40.1-28 of the Code of Virginia. The employer shall not require the employee to pay for the cost of COVID-19 testing for return to work determinations.

D. Unless otherwise provided in this standard, employers shall ensure that employees observe physical distancing while on the job and during paid breaks on the employer's property, including policies and procedures that:

1. Use verbal announcements, signage, or visual cues to promote physical distancing.
2. Decrease worksite density by limiting non-employee access to the place of employment or restrict access to only certain workplace areas to reduce the risk of exposure.
3. An employer's compliance with occupancy limits contained in any applicable Virginia executive order or order of public health emergency will constitute compliance with the requirements in this subsection.

E. Access to common areas, breakrooms, or lunchrooms shall be closed or controlled.

1 If the nature of an employer's work or the work area does not allow employees to consume meals in the employee's workspace while observing physical distancing, an employer may designate, reconfigure, and alternate usage of spaces where employees congregate, including lunch and break rooms, locker rooms, time clocks, etc., with controlled access, provided the following conditions are met:

- a. At the entrance of the designated common area or room the employer shall clearly post the policy limiting the occupancy of the space, and requirements for physical distancing, hand washing and hand sanitizing, and cleaning and disinfecting of shared surfaces.

b. The employer shall limit occupancy of the designated common area or room so that occupants can maintain physical distancing from each other. The employer shall enforce the occupancy limit.

c. Employees shall be required to clean and disinfect the immediate area in which they were located prior to leaving, or the employer may provide for cleaning and disinfecting of the common area or room at regular intervals throughout the day, and between shifts of employees using the same common area or room (i.e., where an employee or groups of employees have a designated lunch period and the common area or room can be cleaned in between occupancies).

d. Hand washing facilities, and hand sanitizer where feasible, are available to employees. Hand sanitizers required for use to protect against SARS-CoV-2 are flammable and use and storage in hot environments can result in a hazard.

F. When multiple employees are occupying a vehicle for work purposes, the employer shall ensure compliance with respiratory protection and personal protective equipment standards applicable to the employer's industry.

G. Employers shall also ensure compliance with mandatory requirements of any applicable Virginia executive order or order of public health emergency.

H. Where the nature of an employee's work or the work area does not allow the employee to observe physical distancing requirements, employers shall ensure compliance with respiratory protection and personal protective equipment standards applicable to its industry.

I. Nothing in this standard shall require the use of a respirator, surgical/medical procedure mask, or face covering by any employee for whom doing so would be contrary to the employee's health or safety because of a medical condition; however, nothing in this standard shall negate an employer's obligations to comply with personal protective equipment and respiratory protection standards applicable to its industry.

J. Requests to the Department for religious waivers from the required use of respirators, surgical/medical procedure masks, or face coverings will be handled in accordance with the requirements of applicable federal and state law, standards, regulations and the U.S. and Virginia Constitutions, after Department consultation with the Office of the Attorney General.

K. Sanitation and disinfecting.

1. In addition to the requirements contained in this standard, employers shall comply with the VOSH sanitation standard applicable to its industry.

2. Employees that interact with customers, the general public, contractors, and other persons shall be provided with and immediately use supplies to clean and disinfectant surfaces contacted during the interaction where there is the potential for exposure to the SARS-CoV-2 virus by themselves or other employees.

3. In addition to the requirements contained in this standard, employers shall comply with the VOSH hazard communication standard applicable to the employers' industry for cleaning and disinfecting materials and hand sanitizers.

4. Areas in the place of employment where known or suspected to be infected with the SARS-CoV-2 virus employees or other persons accessed or worked shall be cleaned and

disinfected prior to allowing other employees access to the areas. Where feasible, a period of 24 hours will be observed prior to cleaning and disinfecting. This requirement shall not apply if the areas in question have been unoccupied for seven or more days.

5. All common spaces, including bathrooms, frequently touched surfaces, and doors, shall at a minimum be cleaned and disinfected at the end of each shift. All shared tools, equipment, workspaces, and vehicles shall be cleaned and disinfected prior to transfer from one employee to another.

6. Employers shall ensure that cleaning and disinfecting products are readily available to employees to accomplish the required cleaning and disinfecting. In addition, employers shall ensure use of only disinfecting chemicals and products indicated in the Environmental Protection Agency (EPA) List N for use against SARS-CoV-2.

7. Employers shall ensure that the manufacturer's instructions for use of all disinfecting chemicals and products are complied with (e.g., concentration, application method, contact time, PPE, etc.).

8. Employees shall have easy, frequent access and permission to use soap and water, and hand sanitizer where feasible, for the duration of work. Employees assigned to a work station where job tasks require frequent interaction inside six feet with other persons shall be provided with hand sanitizer where feasible at the employees work station. Mobile crews shall be provided with hand sanitizer where feasible for the duration of work at a work site and shall have transportation immediately available to nearby toilet facilities and handwashing facilities that meet the requirements of VOSH

laws, standards, and regulations dealing with sanitation. Hand sanitizers required for use to protect against SARS-CoV-2 are flammable, and use and storage in hot environments can result in a hazard.

9. It is recognized that various hazards or job tasks at the same place of employment can be designated as very high, high, medium, or lower as presenting potential exposure risk for purposes of application of the requirements of this standard. In situations other than emergencies, the employer shall ensure that protective measures are put in place to prevent cross-contamination.

L. Unless otherwise provided in this standard, when engineering, work practice, and administrative controls are not feasible or do not provide sufficient protection, employers shall provide personal protective equipment to their employees and ensure the equipment's proper use in accordance with VOSH laws, standards, and regulations applicable to personal protective equipment, including respiratory protection equipment.

16VAC25-220-50. Requirements for hazards or job tasks classified as very high or high exposure risk.

A. The requirements in this section for employers with hazards or job tasks classified as very high or high exposure risk apply in addition to requirements contained in 16VAC25-220-40, 16VAC25-220-70, and 16VAC25-220-80.

B. Engineering controls.

1. Employers shall ensure that appropriate air-handling systems:

- a. Are installed and maintained in accordance with manufacturer’s instructions in healthcare facilities and other places of employment treating, caring for, or housing persons with known or suspected to be infected with the SARS-CoV-2 virus; and
 - b. Comply with minimum American National Standards Institute (ANSI)/American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standards 62.1 and 62.2 (ASHRAE 2019a, 2019b), which include requirements for outdoor air ventilation in most residential and nonresidential spaces, and ANSI/ASHRAE/ASHE Standard 170 (ASHRAE 2017a), which covers both outdoor and total air ventilation in healthcare facilities. Based on risk assessments or owner project requirements, designers of new and existing facilities can go beyond the minimum requirements of these standards.
2. For employers not covered by subdivision 1 of this subsection, ensure that air-handling systems where installed are appropriate to address the SARS-CoV-2 virus and COVID-19 disease related hazards and job tasks that occur at the workplace:
 - a. Are maintained in accordance with the manufacturer’s instructions; and
 - b. Comply with subdivision 1 b of this subsection.
3. Hospitalized patients with known or suspected to be infected with the SARS-CoV-2 virus, where feasible and available, shall be placed in an airborne infection isolation room (AIIR).

4. Employers shall use AIIR rooms when available for performing aerosol-generating procedures on patients with known or suspected to be infected with the SARS-CoV-2 virus.

5. For postmortem activities, employers shall use autopsy suites or other similar isolation facilities when performing aerosol-generating procedures on the bodies of known or suspected to be infected with the SARS-CoV-2 virus persons at the time of their death.

6. Employers shall use special precautions associated with Biosafety Level 3 (BSL-3), as defined by the U.S. Department of Health and Human Services Publication No. (CDC) 21-1112 "Biosafety in Microbiological and Biomedical Laboratories" (Dec. 2009), which is hereby incorporated by reference, when handling specimens from known or suspected to be infected with the SARS-CoV-2 virus patients or persons.

7. To the extent feasible, employers shall install physical barriers, (e.g., clear plastic sneeze guards, etc.), where such barriers will aid in mitigating the spread of SARS-CoV-2 and COVID-19 virus transmission.

C. Administrative and work practice controls.

1. Prior to the commencement of each work shift, prescreening or surveying shall be required to verify each covered employee does not have signs or symptoms of COVID-19.

2. In healthcare facilities, an employer shall follow existing guidelines and facility standards of practice for identifying and isolating infected persons and for protecting employees.

3. An employer shall limit non-employee access to the place of employment or restrict access to only certain workplace areas to reduce the risk of exposure. An employer's compliance with occupancy limits contained in any applicable Virginia executive order or order of public health emergency will constitute compliance with the requirements of this paragraph.

4. An employer shall post signs requesting patients and family members to immediately report symptoms of respiratory illness on arrival at the healthcare facility and use disposable face coverings.

5. An employer shall offer enhanced medical monitoring of employees during COVID-19 outbreaks.

6. An employer shall provide all employees with job-specific education and training on preventing transmission of COVID-19, including initial and routine and refresher training in accordance with 16VAC25-220-80.

7. To the extent feasible, an employer shall ensure that psychological and behavioral support is available to address employee stress at no cost to the employee.

8. In health care settings, an employer shall provide alcohol-based hand sanitizers containing at least 60% ethanol or 70% isopropanol to employees at fixed work sites and to emergency responders and other personnel for decontamination in the field when working away from fixed work sites.

9. Provide face coverings to suspected to be infected with SARS-CoV-2 virus non-employees to contain respiratory secretions until the non-employees are able to leave the site (i.e., for medical evaluation and care or to return home).

10. Where feasible, employers shall:

- a. Implement flexible worksites (e.g., telework).
- b. Implement flexible work hours (e.g., staggered shifts).
- c. Increase physical distancing between employees at the worksite to six feet.
- d. Increase physical distancing between employees and other persons to six feet.
- e. Implement flexible meeting and travel options (e.g., use telephone or video conferencing instead of in person meetings; postpone non-essential travel or events; etc.).
- f. Deliver services remotely (e.g. phone, video, internet, etc.).
- g. Deliver products through curbside pick-up.

D. Personal protective equipment (PPE).

1. Employers covered by this section and not otherwise covered by the VOSH Standards for General Industry (16VAC25-90-1910), shall comply with the following requirements for a SARS-CoV-2 virus and COVID-19 disease hazard assessment and personal protective equipment selection:

- a. The employer shall assess the workplace to determine if SARS-CoV-2 virus or COVID-19 disease hazards or job tasks are present or are likely to be present that necessitate

the use of personal protective equipment (PPE). The employer shall provide for employee and employee representative involvement in the assessment process.

b. If such hazards or job tasks are present or likely to be present, the employer shall:

(1) Except as otherwise required in the standard, select and have each affected employee use the types of PPE that will protect the affected employee from the SARS-CoV-2 virus or COVID-19 disease hazards identified in the hazard assessment;

(2) Communicate selection decisions to each affected employee; and

(3) Select PPE that properly fits each affected employee.

2. The employer shall verify that the required SARS-CoV-2 virus and COVID-19 disease workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date of the hazard assessment; and the document as a certification of hazard assessment.

3. Unless specifically addressed by an industry specific standard applicable to the employer and providing for PPE protections to employees from the SARS-COV-2 virus or COVID-19 disease (e.g., 16VAC25-175-1926, 16VAC25-190-1928, 16VAC25-100-1915, 16VAC25-120-1917, or 16VAC25-130-1918), the requirements of 16VAC25-90-1910.132 (General requirements) and 16VAC25-90-1910.134 (Respiratory protection) shall apply to all employers for that purpose.

4. The employer shall implement a respiratory protection program in accordance with 16VAC25-90-1910.134 (b) through (d) (except (d)(1)(iii)), and (f) through (m), that covers each employee required to use a respirator.

5. Unless contraindicated by a hazard assessment and equipment selection requirements in subdivision 1 of this subsection, employees classified as very high or high exposure risk shall be provided with and wear gloves, a gown, a face shield or goggles, and a respirator when in contact with or inside six feet of patients or other persons known to be or suspected of being infected with SARS-CoV-2. Where indicated by the hazard assessment and equipment selection requirements in subsection D of this section, such employees shall also be provided with and wear a surgical/medical procedure mask. Gowns shall be large enough to cover the areas requiring protection.

E. Employee training shall be provided in accordance with the requirements of 16VAC25-220-80 of this standard.

16VAC25-220-60. Requirements for hazards or job tasks classified at medium exposure risk.

A. The requirements in this section for employers with hazards or job tasks classified as medium exposure risk apply in addition to requirements contained in 16VAC25-220-40, 16VAC25-70, and 16VAC25-80.

B. Engineering controls.

1. Employers shall ensure that air-handling systems where installed are appropriate to address the SARS-CoV-2 virus and COVID-19 disease related hazards and job tasks that occur at the workplace and:

- a. Are maintained in accordance with the manufacturer's instructions; and
- b. Comply with minimum American National Standards Institute (ANSI)/American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standards 62.1 and 62.2 (ASHRAE 2019a, 2019b), which include requirements for outdoor air ventilation in most residential and nonresidential spaces, and ANSI/ASHRAE/ASHE Standard 170 (ASHRAE 2017a), which covers both outdoor and total air ventilation in healthcare facilities. Based on risk assessments or owner project requirements, designers of new and existing facilities can go beyond the minimum requirements of these standards.

C. Administrative and work practice controls.

1. To the extent feasible, employers shall implement the following administrative and work practice controls:
 - a. Prior to the commencement of each work shift, prescreening or surveying shall be required to verify each covered employee does not have signs or symptoms of COVID-19.
 - b. Provide face coverings to suspected to be infected with SARS-COV-2 non-employees to contain respiratory secretions until the non-employees are able to leave the site (i.e., for medical evaluation and care or to return home).
 - c. Implement flexible worksites (e.g., telework).
 - d. Implement flexible work hours (e.g., staggered shifts).

- e. Increase physical distancing between employees at the worksite to six feet.
- f. Increase physical distancing between employees and other persons, including customers to six feet (e.g., drive-through physical barriers) where such barriers will aid in mitigating the spread of SARS-CoV-2 virus transmission, etc.
- g. To the extent feasible, install physical barriers (e.g., such as clear plastic sneeze guards, etc.), where such barriers will aid in mitigating the spread of SARS-CoV-2 virus transmission.
- h. Implement flexible meeting and travel options (e.g., using telephone or video conferencing instead of in person meetings; postponing non-essential travel or events; etc.).
- i. Deliver services remotely (e.g. phone, video, internet, etc.).
- j. Deliver products through curbside pick-up or delivery.
- k. Require employers to provide and employees to wear face coverings who, because of job tasks cannot feasibly practice physical distancing from another employee or other person if the hazard assessment has determined that personal protective equipment, such as respirators or surgical/medical procedure masks, was not required for the job task.
- l. Require employers to provide and employees in customer facing jobs to wear face coverings.

D. Personal protective equipment.

1. Employers covered by this section and not otherwise covered by the VOSH Standards for General Industry (16VAC25-90-1910) shall comply with the following requirements for a SARS-CoV-2 virus and COVID-19 disease related hazard assessment and personal protective equipment selection:

a. The employer shall assess the workplace to determine if SARS-CoV-2 or COVID-19 hazards or job tasks are present or are likely to be present that necessitate the use of personal protective equipment (PPE). The employer shall provide for employee and employee representative involvement in the assessment process. If such hazards or job tasks are present or likely to be present, the employer shall:

i. Except as otherwise required in the standard, select and have each affected employee use the types of PPE that will protect the affected employee from the SARS-CoV-2 virus or COVID-19 disease hazards identified in the hazard assessment;

ii. Communicate selection decisions to each affected employee; and

iii. Select PPE that properly fits each affected employee.

2. The employer shall verify that the required SARS-CoV-2 virus and COVID-19 disease workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date of the hazard assessment; and the document as a certification of hazard assessment.

3. Unless specifically addressed by an industry specific standard applicable to the employer and providing for PPE protections to employees from the SARS-COV-2 virus or

COVID-19 disease (e.g., 16VAC25-175-1926, 16VAC25-190-1928, 16VAC25-100-1915, 16VAC25-120-1917, or 16VAC25-130-1918), the requirements of 16VAC25-90-1910.132 (General requirements) and 16VAC25-90-1910.134 (Respiratory protection) shall apply to all employers for that purpose.

4. PPE ensembles for employees in the medium exposure risk category will vary by work task, the results of the employer's hazard assessment, and the types of exposures employees have on the job.

16VAC25-220-70. Infectious disease preparedness and response plan.

A. Employers with hazards or job tasks classified as:

1. Very high and high shall develop and implement a written Infectious Disease Preparedness and Response Plan;
2. Medium with 11 or more employees shall develop and implement a written Infectious Disease Preparedness and Response Plan.

B. The plan and training requirements tied to the plan shall only apply to those employees classified as very high, high, and medium covered by this section.

C. Employers shall designate a person to be responsible for implementing their plan. The plan shall:

1. Identify the name or title of the person responsible for administering the plan. This person shall be knowledgeable in infection control principles and practices as the principles and practices apply to the facility, service, or operation.

2. Provide for employee involvement in development and implementation of the plan.

3. Consider and address the level of SARS-CoV-2 virus and COVID-19 disease risk associated with various places of employment, the hazards employees are exposed to at those sites, and job tasks employees perform at those sites. Such considerations shall include:

a. Where, how, and to what sources of the SARS-CoV-2 virus or COVID-19 disease might employees be exposed at work, including:

i. The general public, customers, other employees, patients, and other persons;

ii. Known or suspected to be infected with the SARS-CoV-2 virus persons or those at particularly high risk of COVID-19 infection (e.g., local, state, national, and international travelers who have visited locations with ongoing COVID-19 community transmission and healthcare employees who have had unprotected exposures to known or suspected to be infected with SARS-CoV-2 virus persons); and

iii. Situations where employees work more than one job with different employers and encounter hazards or engage in job tasks that present a very high, high, or medium level of exposure risk.

b. To the extent permitted by law, including HIPAA, employees' individual risk factors.

For example, people of any age with one or more of the following conditions are at increased risk of severe illness from COVID-19: chronic kidney disease; COPD (chronic obstructive pulmonary disease); immunocompromised state (weakened immune system) from solid organ transplant; obesity (body mass index or BMI of 40 or higher);

serious heart conditions, such as heart failure, coronary artery disease, or cardiomyopathies; sickle cell disease; or type 2 diabetes mellitus). Also, for example, people with one or more of the following conditions might be at an increased risk for severe illness from COVID-19: asthma (moderate-to-severe); cerebrovascular disease (affects blood vessels and blood supply to the brain); cystic fibrosis; hypertension or high blood pressure; immunocompromised state (weakened immune system) from blood or bone marrow transplant, immune deficiencies, HIV, use of corticosteroids, or use of other immune weakening medicines; neurologic conditions, such as dementia; liver disease; pregnancy; pulmonary fibrosis (having damaged or scarred lung tissues); smoking; thalassemia (a type of blood disorder); type 1 diabetes mellitus; etc.).

c. Engineering, administrative, work practice, and personal protective equipment controls necessary to address those risks.

4. Consider contingency plans for situations that may arise as a result of outbreaks, such as:

a. Increased rates of employee absenteeism;

b. The need for physical distancing, staggered work shifts, downsizing operations, delivering services remotely, and other exposure-reducing workplace control measures such as elimination and substitution, engineering controls, administrative and work practice controls, and personal protective equipment, e.g., respirators, surgical/medical procedure masks, etc.

- c. Options for conducting essential operations with a reduced workforce, including cross-training employees across different jobs in order to continue operations or deliver surge services; and
 - d. Interrupted supply chains or delayed deliveries.
5. Identify basic infection prevention measures to be implemented:
- a. Promote frequent and thorough hand washing, including by providing employees, customers, visitors, the general public, and other persons to the place of employment with a place to wash their hands. If soap and running water are not immediately available, provide hand sanitizers.
 - b. Maintain regular housekeeping practices, including routine cleaning and disinfecting of surfaces, equipment, and other elements of the work environment.
 - c. Establish policies and procedures for managing and educating visitors to the place of employment.
6. Provide for the prompt identification and isolation of known or suspected to be infected with the SARS-CoV-2 virus employees away from work, including procedures for employees to report when they are experiencing symptoms of COVID-19.
7. Address infectious disease preparedness and response with outside businesses, including, but not limited to, subcontractors who enter the place of employment, businesses that provide or contract or temporary employees to the employer, and other persons accessing the place of employment to comply with the requirements of this standard and the employer's plan.

8. Identify the mandatory and non-mandatory recommendations in any CDC guidelines or Commonwealth of Virginia guidance documents the employer is complying with, if any, in lieu of a provision of this standard, as provided for in 16VAC25-220-10 G 1 and G 2.

9. Ensure compliance with mandatory requirements of any applicable Virginia executive order or order of public health emergency related to the SARS-CoV-2 virus or COVID-19 disease.

16VAC25-220-80. Training.

A. Employers with hazards or job tasks classified as very high, high, or medium exposure risk at a place of employment shall provide training on the hazards and characteristics of the SARS-CoV-2 virus and COVID-19 disease to all employees working at the place of employment regardless of employee risk classification. The training program shall enable each employee to recognize the hazards of the SARS-CoV-2 virus and signs and symptoms of COVID-19 disease and shall train each employee in the procedures to be followed in order to minimize these hazards.

B. The training required under subsection A shall include:

1. The requirements of this standard;
2. The mandatory and non-mandatory recommendations in any CDC guidelines or State of Virginia guidance documents the employer is complying with, if any, in lieu of a provision of this standard as provided for in section 16VAC25-220-10 G 1 and G 2;
3. The characteristics and methods of transmission of the SARS-CoV-2 virus;
4. The signs and symptoms of the COVID-19 disease;

5. Risk factors of severe COVID-19 illness with underlying health conditions;
6. Awareness of the ability of pre-symptomatic and asymptomatic COVID-19 persons to transmit the SARS-CoV-2 virus;
7. Safe and healthy work practices, including but not limited to, physical distancing, disinfection procedures, disinfecting frequency, ventilation, noncontact methods of greeting, etc.;
8. PPE:
 - a. When PPE is required;
 - b. What PPE is required;
 - c. How to properly don, doff, adjust, and wear PPE;
 - d. The limitations of PPE;
 - e. The proper care, maintenance, useful life, and disposal of PPE; and
 - f. Heat-related illness prevention including the signs and symptoms of heat-related illness;
9. The anti-discrimination provisions in 16VAC25-220-90; and
10. The employer's Infectious Disease Preparedness and Response Plan, where applicable.

C. Employers covered by 16VAC25-220-50 shall verify compliance with 16VAC25-220-80 A by preparing a written certification record for those employees exposed to hazards or job tasks classified as very high, high, or medium exposure risk levels. The written certification record shall

contain the name or other unique identifier of the employee trained, the trained employee's physical or electronic signature, the date of the training, and the name of the person who conducted the training, or for computer-based training, the name of the person or entity that prepared the training materials. If the employer relies on training conducted by another employer or completed prior to the effective date of this standard, the certification record shall indicate the date the employer determined the prior training was adequate rather than the date of actual training

D. The latest training certification shall be maintained.

E. When the employer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by 16VAC25-220-80 A, the employer shall retrain each such employee. Circumstances where retraining is required include, but are not limited to, situations where:

1. Changes in the workplace, SARS-CoV-2 virus or COVID-19 disease hazards exposed to, or job tasks performed render previous training obsolete;
2. Changes are made to the employer's Infectious Disease Preparedness and Response Plan; or
3. Inadequacies in an affected employee's knowledge or use of workplace control measures indicate that the employee has not retained the requisite understanding or skill.

F. Employers with hazards or job tasks classified at lower risk shall provide written or oral information to employees exposed to such hazards or engaged in such job tasks on the hazards and characteristics of SARS-COV-2 and the symptoms of COVID-19 and measures to minimize

exposure. The Department of Labor and Industry shall develop an information sheet containing information on the items listed in subsection G, which an employer may utilize to comply with this subsection.

G. The information required under subsection F shall include at a minimum:

1. The requirements of this standard;
2. The characteristics and methods of transmission of the SARS-CoV-2 virus;
3. The symptoms of the COVID-19 disease;
4. The ability of pre-symptomatic and asymptomatic COVID-19 persons to transmit the SARS-CoV-2 virus;
5. Safe and healthy work practices and control measures, including but not limited to, physical distancing, sanitation and disinfection practices; and
6. The anti-discrimination provisions of this standard in 16VAC25-220-90.

16VAC25-220-90. Discrimination against an employee for exercising rights under this standard is prohibited.

A. No person shall discharge or in any way discriminate against an employee because the employee has exercised rights under the safety and health provisions of this standard, Title 40.1 of the Code of Virginia, and implementing regulations under 16VAC25-60-110 for themselves or others.

B. No person shall discharge or in any way discriminate against an employee who voluntarily provides and wears the employee's own personal protective equipment, including but not limited

to a respirator, face shield, or gloves, or face covering if such equipment is not provided by the employer, provided that the PPE does not create a greater hazard to the employee or create a serious hazard for other employees.

C. No person shall discharge or in any way discriminate against an employee who raises a reasonable concern about infection control related to the SARS-CoV-2 virus and COVID-19 disease to the employer, the employer's agent, other employees, a government agency, or to the public such as through print, online, social, or any other media.

D. Nothing in this standard shall limit an employee from refusing to do work or enter a location that the employee feels is unsafe. 16VAC25-60-110 contains the requirements concerning discharge or discipline of an employee who has refused to complete an assigned task because of a reasonable fear of injury or death.

COVID-19 Travel Protocols

Remember: We are All Safer at Home

Scenario	Risk	Actions Taken	Return to Work
1. Business travel to in-person meetings or conferences.	HIGH	All business travel is canceled until October 15. Travel after October 15 must be approved by HR manager and CEO.	N/A
2. Personal travel on cruise ship.	HIGH	Employee notifies HR before they travel. Employee will be asked to quarantine.	Quarantined employees can return to work after 14 days without symptoms starting the day they returned home; or, after receiving two consecutive negative swab tests (>24 hours apart).
3. Personal travel on planes or trains.	HIGH	Employee notifies HR before they travel. Employee will be asked to quarantine.	Quarantined employees can return to work after 14 days without symptoms starting the day they returned home; or, after receiving two consecutive negative swab tests (>24 hours apart).
4. Personal travel using own vehicle to an area with increasing number of cases.	MED	Employee notifies HR before they travel. Employee works with HR to develop a safe travel plan to include wearing a face covering when getting gas or stopping in public places; practicing extra caution about hand washing and disinfection; limiting your exposure to others; and, avoiding busy places. Employee may be asked to quarantine upon return.	Quarantined employees can return to work after 14 days without symptoms starting the day they returned home; or, after receiving two consecutive negative swab tests (>24 hours apart).
5. Personal travel using own vehicle to an area with steady or decreasing number of cases.	LOW	Employee notifies HR before they travel. Employee works with HR to develop a safe travel plan to include wearing a face covering when getting gas or stopping in public places; practicing extra caution about hand washing and disinfection; limiting your exposure to others; and, avoiding busy places.	Upon return from travel.
6. Employee was in facility or crowd with someone who tested positive. Employee was not in close contact and has no symptoms.	LOW	Work may continue, continue to wear face coverings, wash hands frequently and maintain physical distance. Must continue perform health checks daily and report any symptoms.	N/A

SECTION 01 11 00 SUMMARY OF WORK

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. The completed Work will provide Owner with a ventilation system in the Potomac Yard Pump Station screen room and compactor room that achieves 12 air changes/hour and odor control of the odorous sources in these two rooms.
- B. The Work includes, but is not limited to, the major tasks listed below. The listing of major tasks in this section is not meant to imply anything whatsoever about the necessary construction sequencing of individual tasks, which must be carefully coordinated throughout the construction period.
1. Demolition of identified ductwork in the screen room and compactor room.
 2. Demolition of influent channel and wet well grating and supports.
 3. Demolition of existing odor control unit, carbon adsorber tank, and appurtenant bollards, housekeeping pads, anchors, etc.
 4. Providing temporary odor control during construction of the Work.
 5. Providing new exhaust fans and supports.
 6. Providing new odor control system, control panels and instruments including support and housekeeping pad.
 7. Providing new aluminum cover system for the influent channels and wet wells including covers, cover supports, penetrations and ductwork connections.
 8. Providing bar screen cover plate to enclose the bar screen from the influent channel up through and including the components in the compactor room.
 9. Providing new FRP ductwork and supports.
 10. Providing disconnect switches for fans.
 11. Providing electrical motor starters in the existing motor control center.
 12. Providing conduit and wire for power and control of the new fans, instruments and equipment.
 13. Programming the existing control panel PLC and SCADA to add I/O for SCADA monitoring.
- C. The words “provide”, “providing”, or “to be provided”, or any variation thereof, are used in the listing of major work tasks above, shall mean “furnish and install, complete and ready for final acceptance and operation in conformance with the Contract Documents.”

- D. Implicit in each task in the listing of major work tasks below is the overall task to “perform all miscellaneous Work under all of the various trades necessary to complete the intent of the Contract Documents, which is to provide a fully-functional, operating, and finished facility.”
- E. This Project is located at the Potomac Yard Pump Station, 1901 Potomac Yard Trail, Alexandria, Virginia. The pump station must remain in operation and key elements of this construction must be coordinated with the Owner. Sequencing construction and coordination of the work with the Owner is a project requirement.

1.02 RELATED WORK AT THE SITE

- A. The Contractor is hereby notified that there may be other construction contracts underway on the site during the performance of this contract.
- B. Other projects may be or become active during the term of this contract. See list in Section 01 31 13, Project Coordination and contact the Construction Manager for the most current information.
- C. Refer to Section 01 31 13, Project Coordination, for work restrictions and additional information.

1.03 OTHER AGENCIES/UTILITY OWNERS REVIEW/INSPECTION COSTS

- A. The Contractor shall pay directly to other agencies and utility owners all costs incurred by the agency/utility owner related to inspection, coordination meetings.

1.04 SEQUENCING

- A. The Contractor shall commence Work on the date specified in a written notice to proceed and all Work shall be completed as specified in Section 00 52 00, Agreement. The Contractor is reminded, however, that all Work shall be scheduled and proceed in such sequence as to avoid interference and delays to normal Owner operations.
- B. The requirements included hereinafter are necessary to minimize conflicts with ongoing Owner Facilities and other working contracts in the immediate vicinity. Whether or not such Work being performed by others is indicated on the Drawings, the Contractor shall make such reasonable adjustments in this operations and schedules as the Engineer may direct for the purpose of coordinating his Work with that in-progress by others.

1. The pump station must remain in service during the performance of the Work.
 2. Temporary odor control shall be provided and be maintained in operation as specified in Section 01 00 00.
 3. Provide temporary exhaust ventilation to maintain a minimum of 12 air changes per hour during the performance of the Work. CONTRACTOR may use existing supply and exhaust fans, in combination with temporary fans, to meet this requirement. Submit proposed temporary ventilation plan for approval.
 4. Complete bar screen, influent channel, and wet well cover Work while the systems remain in service. Exercise extreme caution while working around moving machinery and open channels and wells. Specifically address the performance of this work in the required health and safety plan.
- C. All roadways affording ingress to and egress from the work area shall be maintained in-service and kept free of obstructions at all times.
- D. The Contractor shall submit a Shutdown Period and/or Cut-In Schedule request for the Owner's approval prior to any interruption of existing services. Submit the schedule at least 10 days prior to the planned interruption.

1.05 SCHEDULING

- A. The Contractor shall commence Work when the Notice to Proceed is formally issued by the Owner. Refer to Section 01 32 00, Construction Progress Documentation, for additional information.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 15 20 CONSTRUCTION SECURITY

PART 1 GENERAL

1.01 SUMMARY

- A. Work specified in this section includes but is not limited to work site security program, entry control and restrictions.

1.02 SUBMITTALS

- A. Informational Submittals:
 - 1. Contractor Security Plan.

1.03 GENERAL

- A. Security Program:
 - 1. The Contractor shall:
 - a. Protect the Work including all field office trailers and their contents from theft, vandalism, and unauthorized entry.
 - b. Initiate a site security system and program, at the time of mobilization onto the work-site, which provides adequate security for site stored and installed material, product, and equipment.
 - c. Maintain the security program throughout the Contract duration.
 - d. Be responsible at all times for security of the storage compound and lay-down areas, and for all Contractor plant, material, equipment, and tools, as well as, for those belonging to subcontractors.
 - e. Provide the Owner with a list of 24-hour emergency phone numbers.
- B. Entry Control:
 - 1. The Contractor shall:
 - a. Comply with the Owner's site access and security requirements, including, but not limited to the wearing of Owner furnished identification badges and site entry through guard stations at designated locations.
 - b. Restrict entry of unauthorized personnel and vehicles onto the project or work site.
 - c. Maintain copies of vehicle insurance cards or other proof of insurance on-site for vehicles permitted on-site.

- d. Maintain an Employee/Visitor Log and make the log available to the Owner on request.
- C. Restrictions: The Contractor shall not allow cameras on site, or photographs to be taken except with prior approval of the Owner.

1.04 WORK SITE ENTRY IDENTIFICATION

- A. Contractors imbedded for six months or more on Owner facilities, or other work areas in this Contract.
 - 1. All persons (the Contractor and subcontractors) who need to work on-site be will be required to display an Owner furnished ID badge on their person. The Contractor shall provide the following for each employee as a pre-requisite to badging:
 - a. Name of company employing individual;
 - b. Recent 1" x ¾" head color photograph of individual;
 - c. Individual's name
 - d. Statement signed by the individual and the company's safety manager stating that the named individual has completed the site safety orientation training and has a valid V/OSHA 10-hour safety certification card.
 - e. \$30 badge deposit to be reimbursed when the badge is turned in following the completion of the employee's project assignment.
 - 2. Field staff new to the site that have not received an Owner ID shall be escorted by a Contractor employee with a valid ID to the Contractor's Field Trailer. The employee shall not be permitted to work on the site until such time that they have received their site safety orientation and have been issued a valid Owner ID.
 - 3. Each individual shall wear a hard hat bearing the company logo, their full name and an Owner furnished "Safety Trained" sticker.
 - 4. Each worker entering the Owner WRRF site or other work areas in this Contract will be expected to produce their ID card when requested to do so by uniformed security personnel or other Owner personnel or agents.
- B. The Contractor shall provide a list of new hires, guest visitors or supplier deliveries to security 24 hours in advance. No person or delivery shall be permitted entry unless they appear on the list. Supply the following information:
 - 1. Deliveries:
 - a. Name of firm suppling the materials (should match with packing slip).
 - b. Contractor contact person and phone number.
 - c. Site destination of delivery.
 - 2. Personnel:

- a. Name of new hire (or existing company employee who is new to site) or visitor.
 - b. Contractor contact person and phone number.
- C. Visitors shall be escorted by a Contractor employee with a valid ID to the Contractor's Field Trailer. The visitor shall not be permitted to leave the field trailer until such time that they have received their site safety orientation. Visitors shall always be escorted around the facility by a Contractor representative with a valid ID.

1.05 CONTRACTOR SECURITY PLAN

- A. Prior to the performance of any work the Contractor shall submit to the Owner for review and comment two copies of security plan commensurate with the needs of the project and signed by an officer of the Contractor. Adequacy of the security plan is the responsibility of the Contractor.
- B. The security plan shall:
- 1. Include employee site security and safety orientation program.
 - 2. Include security measures to protect Contractor employees and other persons from injury, prevent material damages, or avoid financial losses.
 - 3. Cover security procedures related to Contractor tools and equipment that shall be mobilized for the Work.
 - 4. Cover the Contractors Safety Plan, including awareness of work by the Plant or others on the site.
- C. The Owner will not review the Contractor security plan for adequacy.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 26 00 CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. This section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.02 RESPONSIBLE INDIVIDUAL

- A. Provide a letter indicating the name and address of the individual authorized to execute Modifications, and who will be responsible for informing others in the Contractor's employ and the Subcontractors of changes to the Work.

1.03 MINOR CHANGES IN THE WORK

- A. Supplemental instructions authorizing minor changes in the Work, not involving an adjustment to the Contract Sum or Contract Time, will be issued by the Resident Engineer using a Field Order Instructions form.

1.04 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time, will be issued by the Owner, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.
 - 1. Proposal requests issued by the owner are for information only. Do not consider them instruction either to stop work in progress, or to execute the proposed change.
 - 2. Unless otherwise indicated in the proposal request, within 2 days or 48 hours of receipt of the proposal request, submit a detailed estimate of cost necessary to execute the proposed change which complies with Articles 11 and 13 of the General Conditions and Part 3 below.
 - a. Include a list of quantities of products to be purchased and unit costs, along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

- B. Contractor-Initiated Change Order Proposal Requests: When latent or other unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the AlexRenew.
 - 1. Include a statement outlining the reasons for the change and the effect of change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
 - 2. Include a list of quantities of products to be purchased and unit costs along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Comply with requirements in General Conditions and Section 01 61 00, Common Product Requirements, if the proposed change in the Work requires the substitution of one product or system for a product or system specified.
- C. Proposal Request Form: Use Change Order Proposal Request Form provided by Owner.
- D. Proposal shall remain firm for a maximum period of 45 days after receipt by Resident Engineer.
- E. Owner's request for proposal or Contractor's failure to submit such proposal within the required time period will not justify a Claim for an adjustment in Contract Price or Contract Times (or Milestones).

1.05 CLAIMS

- A. Include, at a minimum:
 - 1. Specific references including:
 - a. Drawing numbers.
 - b. Specification section and article/paragraph number.
 - c. Submittals: type, number, date reviewed, Engineer's comment, as applicable, with appropriate attachments.
 - 2. Stipulated facts and pertinent documents, including photographs and statements.
 - 3. Interpretations relied upon.
 - 4. Description of:
 - a. nature and extent of Claim.
 - b. who or what caused the situation.
 - c. impact to the Work and work of others.

- d. discussion of claimant's justification for requesting a change to price or times or both.
5. Estimated adjustment in price claimant believes it is entitled to with full documentation and justification.
6. Requested Change in Contract Times: Including, but not limited to:
 - a. Progress Schedule documentation showing logic diagram for request.
 - b. documentation that float times available for Work have been used.
 - c. revised activity logic with durations including sub-network logic revisions, duration changes, and other interrelated schedule impacts, as appropriate.
7. Documentation as may be necessary as set forth below for Work Change Directive, and as Resident Engineer may otherwise require.

1.06 WORK CHANGE DIRECTIVES

- A. The Work Change Directive will contain a complete description of the change in the Work and designate the method to be followed to determine change in the contract Sum or Contract Times.
- B. Subsequent to a Work Change Directive issued by AlexRenew to the Contractor under Section 00 70 00, General Conditions, Article 11.03, the Contractor shall:
 1. Proceed promptly to execute changes in the Work in accordance with the Construction Change Directive.
 2. Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - a. After completion of the change, submit an itemize account and supporting data necessary to substantiate cost and time adjustments to the Contract.
- C. Effective Date of Work Change Directive: Date of signature by Owner, unless otherwise indicated thereon.

1.07 SUBMITTALS

- A. Submit name of the individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work
- B. Revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum/Price.

- C. Promptly revise progress schedules to reflect any changes in Contract Times, revise sub-schedules to adjust time for other items of work affected by the change, and submit.
- D. Promptly enter changes in Project Record Documents.

1.08 CHANGE ORDERS

- A. Procedure:
 - 1. The Owner will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time.
 - 2. The Owner may issue a Proposal Request or Notice of Change which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications. Contractor will prepare and submit an estimate within two (2) days, unless otherwise indicated in the proposal request.
 - 3. The Contractor may propose a change by submitting a request for change to the Owner, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation.
 - 4. Upon the Owner's approval of a Change Order Proposal Request, the Owner will issue a Change Order for signatures of the Owner and Contractor, as provided in the Conditions of the Contract
- B. In signing a Change Order, Owner and Contractor acknowledge and agree that:
 - 1. Stipulated compensation (Contract Price or Contract Times, or both) set forth includes payment for:
 - a. Cost of the Work covered by the Change Order
 - b. Contractor's fee for overhead and profit
 - c. Interruption of Progress Schedule
 - d. Delay and impact, including cumulative impact, on other Work under the Contract Documents
 - e. Extended overheads.
 - 2. Change Order constitutes full mutual accord and satisfaction for the change to the Work.
 - 3. Unless otherwise stated in the Change Order, all requirements of the original Contract Documents apply to the Work covered by the Change Order.

1.09 DOCUMENTATION OF CHANGE IN CONTRACT SUM/PRICE AND CONTRACT TIME

- A. Maintain detailed records of work done on a time and material or force account basis. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Work.
- B. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.
- C. On request, provide additional data to support computations:
 - 1. Quantities and description of products, labor, and equipment;
 - 2. Taxes, insurances and bonds;
 - 3. Overhead and profit;
 - 4. Justification for any change in Contract Time;
 - 5. Credit for deletions from Contract, similarly documented.
- D. Support each claim for additional costs, and for work done on a time and material or force account basis, with additional information:
 - 1. Origin and date of claim;
 - 2. Dates and times work was performed, and by whom;
 - 3. Time records and wage rates paid.
 - 4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

1.10 AS-BUILT CHANGE ORDER

- A. The total Bid Price will be determined as the sum of the products of the estimated quantity of each item and the unit price bid.
- B. The final Contract Price will be subject to adjustment according to final measured, used, or delivered quantities as stated herein, and the unit prices in the Bid will apply to such final quantities, except that unit prices will be subject to change by Change Order as stipulated herein.

1.11 REQUEST FOR INFORMATION (RFI) OR CLARIFICATION MEMO

- A. Procedures: Pursuant to paragraphs 3.03 and 10.03 of the General Conditions:
 - 1. Contractor: Initiate RFI using the RFI Form or the Owner-Selected Electronic System. Provide information required by Owner- provided form or the Owner-Selected Electronic System:
 - 2. Engineer: Upon receipt of Contractor's written RFI, will:

- a. Promptly review request to determine intent of Contract Documents and clarification necessary.
- b. Notify Contractor promptly if unable to meet Contractor's requested response date and indicate a tentative response date.
- c. Respond to RFI and/or issue a Clarification Memo in accordance with paragraph 10.03 of General Conditions.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CHANGE ORDER BREAKDOWN

- A. Contract prices shall be used for Change Order work where work is of similar nature; no other costs, overhead or profit will be allowed.
- B. When Contract prices are not appropriate and the nature of the change is known in advance of construction, the parties shall attempt to agree on a fully justifiable price adjustment and/or adjustment of completion time.
- C. When Contract prices are not appropriate, or the parties fail to agree on equitable adjustment, or in processing claims, equitable adjustment for Change Order work shall be per this section and shall be based upon the breakdown show in the following subsections. The Contractor shall assemble a complete cost breakdown that lists and substantiates each item of work and each item of cost.
 1. Labor: Payment will be made for direct labor cost plus payroll costs and fee per Article 11.07 of the General Conditions.
 2. Bond: Payment for additional bond cost will be made per bond rate schedule submitted to the Owner with the executed Contract.
 3. Materials: Payment for cost of required materials will be F.O.B. the job site plus fee per Article 11.07 of the General Conditions.
 4. Rented Equipment: Payment for required equipment rented from an outside company that is neither an affiliate of, nor a subsidiary of, the Contractor will be based on receipted invoices per Article 13.01.B.5.c. No additional allowance will be made for overhead and profit. The Contractor shall submit written certification to the Owner that any required rented equipment is neither owned by nor rented from the Contractor or an affiliate of or subsidiary of the Contractor.
 5. Contractor's Equipment: Payment for equipment and machinery owned by Contractor or a Contractor-related entity will be paid per Article 13.01.B.5.c. Payment for Contractor equipment made idle by delays attributable to the Owner will be based on one-half the derived rate under this subsection. Approved transportation charges will be paid (one

- way) from the nearest source if the equipment is brought to the project specifically for use on the change order work and is not to be used on any other work. No additional allowance will be made for overhead and profit.
6. Miscellaneous: No additional allowance will be made for general superintendence, use of individual pieces of equipment or small tools having a replacement value of less than \$1,000 and other costs for which no specific allowance is herein provided.
 7. Subcontract Work: Payment for additional necessary subcontract work will be based on applicable procedures in 1 through 6. Contractor's and subcontractors' fees limited per Article 11.07 of the General Conditions.
 8. Builder's Risk Insurance: Payment for additional contractor builder's risk insurance on change orders will be based on actual additional premiums with no additional fee.
- D. If directed, the Contractor shall submit to the Owner three (3) qualified bids for extra or changed work and materials, if similar Work is not being performed at job site. If directed, the Contractor shall submit daily time charges to the Owner each day for Change Order Work.
- E. Invoice for work included in the contract pursuant to a change order issued or recognized pursuant may only be submitted to the Owner following the Contracting Officer's issuance of a written modification of the contract price.

END OF SECTION

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SECTION 01 29 00 PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.02 FORMAT

- A. Application shall be on forms as supplied by the Owner.

1.03 DEFINITIONS

A. General:

1. Pay Item: An item of work specifically described and for which a price, either unit or lump sum is provided.
2. Pay Item Schedule (Schedule of Prices): A schedule showing the pay item number, the approximately quantity of each pay item, the price bid by the Contractor to be paid for each item of work performed under Contract, the total cost of each item, and the total amount bid by the Contractor.
3. Extra Work: Work other than that required either expressly or implied by the Contract in its executed form.

B. Measurement:

1. Lump-Sum Measurement:
 - a. Measurement will be for the entire item, unit of work, structure, or combination thereof, as specified.
 - b. Contractor shall show each applicable lump-sum item a fixed definable and measurable quantities where possible and unit prices there for as developed and assigned by the Contractor to the different features of the work. The summation of extensions of quantities and unit prices and related costs shall equal the amount of the lump-sum Contract Price or lump sum bid item indicated in the Bid Schedule of Prices.
 - c. Progress payments will be made in accordance with the Contractor's payment-apportioning program and from the approved progress schedule, reflecting the progress which occurred during the payment period.

2. Volume Measurement: Measurement will by the volume dimension indicated in the Bid Schedule of Prices.
3. Area Measurement: Measurement by area will be by the area dimensions as measured in the Field.
4. Linear Measurement: Linear measurement will by the linear dimension and unless otherwise indicated, items, components, or work to be measured on a linear basis will be measured at the centerline of the item in place.
5. Weight Measurement:
 - a. Measurement by weight shall be measured by scale or by handbook weights for the type and quantity of material actually furnished and used.
 - b. Trucks used to haul material being paid by weight shall be weighed empty daily and each loaded trip. Each truck shall bear a plainly legible identification mark.

1.04 SUBMITTALS

A. Schedule of Values:

1. Submit Preliminary Schedule of Values within fifteen (15) days after the tentative award of the Contract.
2. Submit finalized Schedule of Values within ten (10) days from the approval date of the Overall Construction Progress Schedule.
3. Submit three (3) copies of Schedule.
4. Submit schedule on Contractor's standard form in Excel (.xls) format.

B. Application for Payment Procedure:

1. Submit a draft Application for Payment for review. The cutoff date shall be five (5) working days prior to actual application due date or as otherwise agreed.
2. Submit Five (5) copies of each Application for Payment at time stipulated in Agreement.
3. Submit under transmittal letter.
4. Each Application for Payment shall include the following items, in order to be considered complete:
 - a. Monthly Health & Safety Report.
 - b. Monthly Quality Control Report; QC Backup for Completed Work.
 - c. Updated CPM Schedule and Progress Report.
 - d. Updated Shop Drawing Log.
 - e. Monthly Job Photos and Videos.
 - f. Virginia Clean Water Revolving Loan Fund Documentation (see Section 00 52 00, Agreement, Supplement).

- 1) MBE/ WBE Utilization Reporting Form (submitted quarterly).
- 2) Davis Bacon Compliance Reports (monthly).
- 3) American Iron and Steel documentation (monthly).
- 4) Verified information, product certifications, or assurance of compliance.
- 5) De Minimis updated product documentation, if the De Minimis clause is invoked on the project.
 - g. Copy of current Insurance Certifications.
 - h. Copy of Paid Invoices for material stored on-site (if applicable).
 - i. Copy of Paid invoices for material stored off-site (if applicable).
 - j. Application and Certificate for Payment.
 - k. Updated electronic copy of Record Drawings/Red-line Drawings.
 - l. Report for payments for public transit use.
5. Each Application for Payment shall be consistent with previous applications and payments as certified by the Contractor and paid by the Owner.
6. Application for Payment at Substantial Completion: After receipt of the Certificate of Substantial Completion, submit an Application for Payment showing 100 Percent completion for portion of the Work claimed as substantially complete minus the value of the punch list items.
7. Final Payment Application: Submit final Application for Payment with releases and supporting documentations not previously submitted and accepted.

1.05 PREPARATION OF APPLICATION

- A. Type required information
- B. Execute certification by signature of authorized officer.
- C. Use data on Bid Form and approved Schedule of Values. Provide dollar value in each column for each line item for portion of Work performed.
- D. List each authorized Change Order and an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of Work.
- E. Prepare Application for Final Payment as required in General Conditions.

1.06 CASH ALLOWANCES

- A. Consult with Engineer in selection of products or services. Obtain proposals from Suppliers and installers, and offer recommendations.

- B. Cash allowances will be administered in accordance with Paragraph 13.02 of General Conditions.
- C. Submit, with application for payment, invoice showing date of purchase, from whom the purchase was made, the date of delivery of the product or service, and the price, including delivery to the Site and applicable taxes.

1.07 SCHEDULE OF VALUES

- A. Format: Type on the Owner-provided forms or approved format.
- B. Prepare a separate Schedule of Values for each schedule of the Work under the Agreement.
- C. Coordinate listings with Progress Schedule.
- D. For items on which payments will be requested for stored products, list sub-values for cost of stored products.
- E. The Contractor's Schedule of Values shall include allocations for the following administrative and contractually required deliveries and related services required to be provided to the Authority throughout the duration of the contract.
 - 1. Health and Safety: Due before any work may take place in the field and updates are required with each monthly payment application.
 - a. Health & Safety.
 - b. Monthly Health & Safety Plan.
 - c. Injury & Accident Reports.
 - d. Monthly Implementation of Health & Safety Program (Maintain Daily - Payment Monthly).
 - e. Monthly Site Housekeeping Program (Maintain Daily - Payment Monthly).
 - f. Temporary Environmental Controls.
 - 2. Quality Control – Due before any work may take place in the field and updates are required with each monthly payment application.
 - a. Quality Control Plan.
 - b. Monthly Quality Control Report.
 - c. Monthly Implementation of Quality Control Program (Maintain Daily - Payment Monthly).
 - 3. Policies, Compliance – Due before any work may take place in the field and updates are required with each monthly payment application.
 - a. Copies of Insurance Policies.
 - b. Copies of Subcontractors Agreements & the Owner Approval Requests.

- c. Compliance Reports:
 - 1) MBE/WBE Monthly Report.
 - 2) Weekly Statement of Wages (Certified Payrolls).
4. Schedule of Values – Due before any work any take place in the field.
 - a. Schedule of Values:
 - 1) Initial – for first 120 days.
 - 2) Final – tied to the approved Construction Schedule.
5. Schedules – Due before any invoicing may take place and updates are required with each monthly payment application.
 - a. Preliminary Project Schedule.
 - b. Initial Baseline Construction Schedule.
 - c. Approved Baseline Construction Schedule.
 - d. Monthly Schedule Reports & Updates (includes Progress Payments Forecasts, Planned Manpower Histograms and Construction Equipment Utilization Reports).
 - e. Revised Baseline Schedules for Approved Time Extensions by Change Orders.
6. Construction Support: Due before any invoicing may take place and updates are required with each monthly payment application.
 - a. Pre-Construction Photos, Videos.
 - b. Pre-Construction Surveys.
 - c. Pre-Construction Notification of Differing Site Conditions.
 - d. Construction Permits from Regulatory Agencies.
 - e. Monthly Progress Photos, Videos.
 - f. Site Surveys for Maintaining Horizontal & Vertical Controls, Construction Layout.
 - g. Site Surveys for As-built Locations.
7. Construction Reports: Updates are prerequisite to monthly pay applications.
 - a. Daily Progress Reports.
 - b. Weekly Progress Reports.
 - c. Monthly Progress Reports.
8. Submittals for Technical Specifications:
 - a. Submittals, Initial - Final Approval:
 - 1) Delivery Schedule for Technical Submittals Divisions.
 - 2) Products, Materials and Samples to be utilized in the Work.
 - 3) Coordinated Layout Drawings.
 - 4) Shop Drawings.
 - 5) Calculations.
9. O & M Training: Milestones in the schedule are established for these Items, and pay application may not be made until these milestones are met. Also, follow on work elements may not be performed until these milestones are satisfied.
 - a. O & M Training.

- b. Lesson Plans, Preliminary.
 - c. Lesson Plans, Final.
 - d. Training Sessions, Initial.
 - e. Training Sessions, Follow-on.
 - f. Final Deliverables.
10. Equipment and System Commissioning: Milestones in the schedule are established for these Items, and pay application may not be made until these milestones are met. Also, follow on work elements may not be performed until these milestones are satisfied.
 - a. Installation Review(s).
 - b. Field Testing.
 - c. Equipment and System Check-out.
 - d. Operational Demonstration.
 - e. Performance Certification Testing.
 11. Project Record Drawings: Milestones in the schedule are established for these Items, and pay application may not be made until these milestones are met.
 12. Permits, Spares, Warranties: Milestones in the schedule are established for these Items, and pay application may not be made until these milestones are met. Also, follow on work elements may not be performed until these milestones are satisfied.
 - a. Regulatory Agency(s) Approvals:
 - 1) Alexandria Fire Department.
 - 2) Alexandria Permit Center - Certificate(s) of Occupancy.
 - b. Spare Parts Delivery and Turn-over.
 - c. Warranties: All Extended Warranties Delivered and Approved.
 13. All Remaining Deliverables: Final payment will not be made until this milestone is accomplished.
 - a. Delivery and Turn-over of all Required Final Contract Deliverables.
- F. Submit a sub-schedule for each separate stage of work specified in the Project Manual.
- G. Upon request of Engineer, provide documentation to support the accuracy of the Schedule of Values.
- H. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.
- I. Lump Sum Work:
1. Reflect specified cash and contingency allowances and alternates, as applicable.

2. List bonds and insurance premiums, mobilization, demobilization, preliminary and detailed progress schedule preparation, equipment testing, facility startup, and contract closeout separately.
 - a. Bonds and Project-Specific Insured: Payment shall be based on submitted invoices for premiums directly charged to the Contractor.
 - b. Mobilization: Payment shall not exceed 2 percent of the total Contract amount and shall be prorated over a minimum of a 4-month period.
 - c. Contractor Project Administration: Payment shall be based on Contractor-estimated monthly cost for Project administration and all associated costs, payable with each partial payment application. All costs shall be subject to review and approval by the Engineer.
 3. Breakdown remainder of Lump Sum Value by Activity ID as shown in the Baseline Schedule.
- J. An unbalanced or front-end loaded schedule will not be acceptable.
- K. Summation of the complete Schedule of Values representing all the Work shall equal the Contract Price.
- L. Submit Schedule of Values in a spreadsheet format compatible with latest version of MSExcel.
- M. Action:
1. No payment will be made for work performed on a lump sum contract or a lump sum item until the appropriate Schedule of Values is approved by the Owner.
 2. The equitable value of work deleted from a lump sum contract or lump sum item shall be determined from the approved Schedule of Values

1.08 SCHEDULE OF ESTIMATED PROGRESS PAYMENTS

- A. Within 30 days after the effective date of the Contract, Contractor shall furnish to the Owner a schedule of estimated monthly payments in a form acceptable to the Owner.
1. Provide table of estimated payments by month for entire contract duration aggregating in initial contract price. Table shall be in spreadsheet format compatible with latest version of MSExcel.
 2. Base estimated progress payments on initially acceptable progress schedule. Adjust to reflect subsequent adjustments in progress schedule

and Contract Price as reflected by modifications to the Contract Documents.

- B. The sum of all items listed shall equal the Contract Price.
- C. The cash flow projection shall be divided into month-by-month cash requirements, and shall be equated or tied to the Contractor's construction schedule in sufficient detail to indicate realistic costs and expenses for all elements of the project.
- D. The schedule shall be revised and resubmitted each time an Application for Payment varies more than 10 percent from the estimated payment schedule.
- E. No progress payments will be made until the cash flow schedule has been approved.

1.09 APPLICATION FOR PAYMENT

- A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment for each schedule and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized officer of Contractor.
- B. Application for Payment will be generated by Owner based on the updated schedule submittal and the schedule of values. Form will be provided to Contractor for signature.
- C. Provide separate form for each schedule as applicable.
- D. Include accepted Schedule of Values for each schedule or portion of lump sum Work and the unit price breakdown for the Work to be paid on a unit priced basis.
- E. Include separate line item for each Change Order and Work Change Directive executed prior to date of submission. Provide further breakdown of such as requested by Engineer.
- F. Preparation:
 - 1. Round values to nearest dollar.
 - 2. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form(s) for each schedule as applicable, a listing of materials on hand for each schedule as applicable, and such supporting data as may be requested by Engineer.

1.10 MEASUREMENT—GENERAL

- A. Weighing, measuring, and metering devices used to measure quantity of materials for Work shall be suitable for purpose intended and conform to tolerances and specifications as specified in National Institute of Standards and Technology, Handbook 44.
- B. Whenever pay quantities of material are determined by weight, weigh material on scales furnished by Contractor and certified accurate by state agency responsible. Obtain weight or load slip from weigher and deliver to Owner's representative at point of delivery of material.
- C. If material is shipped by rail, car weights will be accepted provided that actual weight of material only will be paid for and not minimum car weight used for assessing freight tariff, and provided further that car weights will not be acceptable for material to be passed through mixing plants.
- D. Vehicles used to haul material being paid for by weight shall be weighed empty daily and at such additional times as required by Engineer. Each vehicle shall bear a plainly legible identification mark.
- E. Haul materials that are specified for measurement by the cubic yard measured in the vehicle in transport vehicles of such type and size that actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each vehicle must bear a plainly legible identification mark indicating its water level capacity. Load vehicles to at least their water level capacity. Loads hauled in vehicles not meeting above requirements or loads of a quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for such material.
- F. Quantities will be based on ground profiles shown. Field surveys will not be made to confirm accuracy of elevations shown.
- G. Where measurement of quantities depends on elevation of existing ground, elevations obtained during construction will be compared with those shown on Drawings. Variations of 1 foot or less will be ignored, and profiles shown on Drawings will be used for determining quantities.
- H. Units of measure shown on Bid Form shall be as follows, unless specified otherwise.

Item	Method of Measurement
AC	Acre—Field Measure by Engineer

Item	Method of Measurement
CY	Cubic Yard—Field Measure by Engineer within limits specified or shown
CY-VM	Cubic Yard—Measured in Vehicle by Volume
EA	Each—Field Count by Engineer
GAL	Gallon—Field Measure by Engineer
HR	Hour
LB	Pound(s)—Weight Measure by Scale
LF	Linear Foot—Field Measure by Engineer
MFBM	Thousand Foot Board Measure—[Delivery Invoice] [Field Measure by Engineer]
SF	Square Foot
SY	Square Yard
TON	Ton—Weight Measure by Scale (2,000 pounds)

- I. Measurement of Linear Items: Where payment will be made based on linear quantities and on parameters other than length, those parameters shall be as follows:

Item	Measurement Parameters
Trench Safety System	Depth of Trench: 0 foot to 4 feet; 4 feet to 10 feet; over 10 feet in 2-foot increments. The depth of trench will be measured at intervals of 25 feet along the centerline of the trench. The depth of each measuring point will be the depth from existing at grade surface to bottom of pipe base, [A:] inches below pipe invert and will be used for computing the depth of trench for a distance of 25 feet ahead of the point of measurement. The depth figures indicated in Bid Form are inclusive to nearest 0.1 foot; that is, a trench depth measured as 11.9 feet will be paid for at the unit price for excavation 10 feet to 12 feet deep. A trench depth measured as 12 feet will be paid for at the unit price for excavation 12 feet to 14 feet deep.
Unclassified Trench Excavation	Depth of Trench: Same as Trench Safety System above.

Item	Measurement Parameters
Trench Backfill and Compaction	Depth of Trench: Same as Unclassified Trench Excavation above.

1.11 PAYMENT

A. General:

1. Progress payments will be made monthly.
2. The due date for Contractor's submission of monthly Application for Payment shall be established at the Preconstruction Conference.

B. Payment for all Lump Sum Work shown or specified in Contract Documents is included in the Contract Price. Payment will be based on a percentage complete basis for each line item of the accepted Schedule of Values.

C. Payment for Lump Sum Work covers all Work specified or shown within the limits or Specification sections as follows:

1. Limits of Work are as shown on the Drawings.
2. Limits of Work are as defined in Section 01 11 00, Summary of Work.
3. All Work shown on Drawings and in Specifications

1.12 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for following:

1. Loading, hauling, and disposing of rejected material.
2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
4. Material not unloaded from transporting vehicle.
5. Defective Work not accepted by Owner.
6. Material remaining on hand after completion of Work.

1.13 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings and preliminary operation and maintenance data is acceptable to Engineer.

- B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

1.14 PARTIAL PAYMENT FOR UNDELIVERED, PROJECT-SPECIFIC MANUFACTURED OR FABRICATED EQUIPMENT

- A. Notwithstanding above provisions, partial payments for undelivered (not yet delivered to Site or not stored in the vicinity of Site) products specifically manufactured for this Project, excluding off the shelf or catalog items, will be made for products listed below when all following conditions exist:
 - 1. Partial payment request is supported by written acknowledgment from Suppliers that invoice requirements have been met.
 - 2. Equipment is adequately insured, maintained, stored, and protected by appropriate security measures.
 - 3. Each equipment item is clearly marked and segregated from other items to permit inventory and accountability.
 - 4. Authorization has been provided for access to storage Site for Engineer and Owner.
 - 5. Equipment meets applicable Specifications of these Contract Documents.
- B. Payment of 15 percent of manufacturer's quoted price for undelivered, Project-specific manufactured equipment will be made following Shop Drawing approval. Thereafter, monthly payments will be made based on progress of fabrication as determined by Engineer, but in no case will total of payments prior to delivery exceed 75 percent of manufacturer's quoted price.
- C. Failure of Contractor to continue compliance with above requirements shall give cause for Owner to withhold payments made for such equipment from future partial payments.

1.15 PAYMENTS FOR PUBLIC TRANSIT USE

- A. The Owner will subsidize 50 percent of costs associated with mass transit use by the Contractor's workers for those workers who elect to use Metro, DASH, VRE or other forms of public transit to commute to the Project Site. These costs will not be considered as part of lump sum or unit price bid items included in the Contractor's bid.
- B. On a monthly basis, the Contractor shall collect receipts from workers utilizing public transit and submit copies with a summary of total costs and the amount to be reimbursed by the Owner. The report shall include a

statement certifying that all costs associated with public transit use are solely associated with job-related travel to the Project Site. Reimbursement of the subsidized cost will be made to the Contractor. Contractor will be responsible for distributing payment to his employees. The Owner reserves the right to audit the reimbursement documentation.

- C. Documentation shall be submitted with the monthly application for payment as a separate supplemental summary page.
- D. All administrative costs associated with payment of reimbursable public transit costs to individual workers shall be borne by the Contractor.
- E. Include a monthly tally of workers who have used public transit in the Sustainable Construction Log supplement provided in Section 01 32 00, Construction Progress Documentation.

1.16 SUBSTANTIATING DATA

- A. When the Owner requires substantiating information, submit data justifying line item amounts in question.
- B. Provide one copy of data with cover letter for each copy of submittal. Show Application number and date, and line item by number and description.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 31 13 PROJECT COORDINATION

PART 1 GENERAL

1.01 SUMMARY

- A. Work specified in this Section includes coordination requirements with other contractors at the site and with Owner workforce.
- B. Other contractors will be working concurrently at, and adjacent to, the existing site and are to be considered third-party beneficiaries to this Contract in respect to site access and scheduling, and the Contractor is assuming the liability from this contractual relationship. Contractor shall make reasonable adjustments to operations and schedule, as directed by the Owner, to coordinate Work under this Contract with work performed by others at the site.
- C. Development of the means and methods for the Contractor's sequence of construction is solely the responsibility of the Contractor.
- D. Section specifies administrative and supervisor requirements necessary for Project coordination.

1.02 DEFINITIONS

- A. MOPO: Maintenance of Plant Operations.

1.03 WORK BY OWNER AND BY SEPARATE CONTRACTORS

- A. The Owner reserves the right to perform work related to the project and to award separate contracts in connection with other portions of the Project or other Work at the site.
- B. The Contractor shall attend weekly plant-wide coordination meetings which will review look-ahead schedules for all active projects and scheduled plant-work to facilitate site-wide coordination amongst projects and with plant operations. The intent of the meeting to communicate and coordinate work, including lockout/tagout work, confined space entry, partial road closure requests in advance. Owner or Engineer will prepare meeting agenda with regular participant input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and distribute copies of minutes within 5 days after each meeting to participants and parties affected by meeting decisions.

- C. The Owner reserves the right to add or delete contracts, to modify the scope of contracts, or to modify schedules, any of which are to the benefit of the Owner. The schedule is provided as a tool to assist the Contractor in developing project costs and a project schedule, and to prepare for coordination of Work with the work of other contractors.
- D. Mutual Responsibility:
1. Contractor shall afford other contractors and the Owner reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall properly connect and coordinate the Work with that of the Owner, and other contractors to store its apparatus, materials, supplies, and equipment in such orderly fashion at the site of the Work as will not unduly or unreasonably interfere with the progress of the Work or the work of any other contractor.
 - a. If the execution or result of any part of the Work depends upon any work of the Owner or of any separate contractor, the Contractor shall, prior to proceeding with the Work, inspect and promptly report to the Owner in writing any apparent discrepancies or defects in such work that render it unsuitable for such proper execution or result of any part of the Work.
 - b. Failure of the Contractor to so inspect and report shall constitute an acceptance of the Owner's or separate contractor's work as fit and proper to receive the Work, except as to defects which may develop in the Owner's or separate contractor's work after completion of the Work and which the Contractor could not have discovered by its inspection prior to completion of the Work.
 2. Should the Contractor cause damage to the Work or property of any separate contractor on the Project, or to other Work on the Site, or delay or interfere with the Owner's Work on ongoing operations, facilities, or adjacent facilities, or said separate contractor's Work, the Contractor shall be liable for the same; and, in the case of another contractor, the Contractor shall attempt to settle said claim with such other contractor prior to such other contractor's institution of litigation or other proceedings against the contractor.
 3. If such separate contractor sues the Owner on account of any damage, delay, or interference caused by the Contractor, the Owner shall notify the Contractor, who shall defend the Owner in such proceedings at the Contractor's expense. If any judgment or award is entered against the Owner because of the actions or inaction of the Contractor, the Contractor shall satisfy the same and shall reimburse the Owner for all damages, expenses, attorney's fees, and other costs which the Owner incur as a result thereof.

4. Should a separate contractor cause damage to the Work or to the property of the Contractor, or cause delay of interference with the Contractor's performance of the Work, the Contractor shall present directly to said separate contractor any claim it may have as a result of such damage, delay, or interference (with an information copy to the Owner), and shall attempt to settle its claim against said separate contractor prior to the institution of litigation or other proceedings against said separate contractor.
 - a. In no event shall the Contractor seek to recover such damages from the Owner. The Contractor hereby warrants to the Owner that it will not seek to recover any costs, expenses (including, but not limited to, attorney's fees) or damages or other losses incurred by the Contractor as a result of any damage to the Work or property of the Contractor or any delay or interference caused by any separate contractor.
 - b. In order to carry out the intent of this Section, the Contractor agrees that privity of contract exists between Contractor and any separate contractor, as defined herein, for the purpose of disposing of the liabilities of obligations which are imposed upon said parties to each other as specified in this Section; and Contractor agrees to accept service of process and to sue and be sued in Contractor's own name in a litigation which may arise between Contractor and any separate contractor.
- E. Coordination of the Work: By entering into this Contract, Contractor acknowledges that there may be other contractors on the site whose work requires coordination with that of its own. Contractor expressly warrants and guarantees that he will cooperate with other contractors and will do nothing to delay, hinder, or interfere with the work of other separate contractors, or the Owner. The Contractor also expressly agrees that, in the event its Work is hindered, delayed, interfered with, or otherwise affected by a separate contractor, its sole remedy will be a direct action against the separate contractor as described in this Section. Contractor will have no remedy, and hereby expressly waives any remedy, against the Owner on account of delay, hindrance, interference, or other event caused by separate contractor.

1.04 SUBMITTALS

- A. Staff Names: Within 5 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.
 1. Post copies of the list in the Project meeting room, the temporary field office, and at each temporary telephone.

- B. Shutdown Period and/or Cut-In Schedule requests.
- C. Lockout/Tagout requests.
- D. Partial or Full Road Closure requests.
- E. List of Scheduled Site Deliveries (24 hours in advance).
- F. Contractor's Daily Reports.

1.05 RELATED WORK AT SITE

- A. General:
 - 1. Work is required within an active portion of an existing waste water pump station. The available construction working area is limited. The plant must remain in operation and cannot be completely shut down, except for limited outages described in the Contract Documents. The Owner must have access to all plant operational areas. Work must be coordinated with the Owner to allow plant operations.
 - 2. Other work that is either directly or indirectly related to scheduled performance of the Work under these Contract Documents, listed henceforth, is anticipated to be performed at Site by others.
 - 3. Coordinate the Work of these Contract Documents with work of others as including but not limited to those specified in General Conditions. Include sequencing constraints and project milestones specified herein as a part of Progress Schedule.

1.06 UTILITY NOTIFICATION AND COORDINATION

- A. Coordinate the Work with various utilities within Project limits. Notify applicable utilities prior to commencing Work, if damage occurs, or if conflicts or emergencies arise during the Work.
 - 1. Electricity Company: Dominion Virginia Power.
 - a. Telephone: 888-667-3000.
 - 2. Telephone Company: Verizon.
 - a. Telephone: 800-837-4966.
 - 3. Water Department: Virginia American Water Company.
 - a. Telephone: 703-549-0909.
 - 4. City of Alexandria Department of Transportation and Environmental Services.
 - a. Telephone: 703-838-4966.
 - 5. Gas Company: Washington Gas.
 - a. Telephone: 703-750-1000.

1.07 PROJECT MILESTONES

- A. General: Include the Milestones specified herein as a part of the Progress Schedule required under Section 01 32 00, Construction Progress Documentation.
- B. Project Milestones: Generally described in Section 00 52 00, Agreement.

1.08 HAZARDOUS LOCATIONS

- A. General: When construction activities require working in hazardous locations, all Work shall be carried out in accordance with VOSH Regulations.
- B. Refer to Supplemental Documents to this Contract.

1.09 FACILITY OPERATIONS

- A. Continuous operation of Owner's facilities is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.
- B. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of Owner's operations.
- C. When necessary, plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operations of Owner's facility.
- D. Do not close lines, open or close valves, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after authorization by Owner and Engineer. Such authorization will be considered within 10 business days after receipt of Contractor's written request.
- E. Install and maintain bypass facilities and temporary connections required to keep Owner's operations on line. Sequences other than those specified will be considered upon written request to Owner and Engineer, provided they afford equivalent continuity of operations.
- F. Do not proceed with Work affecting a facility's operation without obtaining Owner's and Engineer's advance approval of the need for and duration of such Work.

G. Relocation of Existing Facilities:

1. During construction, it is expected that minor relocations of Work will be necessary.
2. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, and other necessary items.
3. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.
4. Perform relocations to minimize downtime of existing facilities.
5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by Engineer.

1.10 ADJACENT FACILITIES AND PROPERTIES

A. Examination:

1. After Effective Date of the Agreement and before Work at Site is started, Contractor, Engineer, and affected property owners and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged by construction operations.
2. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.

B. Documentation:

1. Record and submit documentation of observations made on examination inspections in accordance with Section 01 32 33, Construction Photographs.
2. Upon receipt, Engineer will review, sign, and return one record copy of documentation to Contractor to be kept on file in field office.
3. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Contractor's operations, and is for the protection of adjacent property owners, Contractor, and Owner.

1.11 PROJECT TASKS

A. General:

1. Major tasks have been identified for the Owner's purposes. Although all Work is not listed herein, the tasks listed shall be understood to include

all accompanying tasks such as, but not limited to, sitework, interconnecting utilities and associated infrastructure, and applicable temporary provisions necessary to sequence the Work. Temporary provisions shall include pipeline endcaps, other utility terminations, and temporary utilities as necessary to allow operation of portions of the Work prior to completion of other portions of the Work, consistent with the Contractor's sequence of operations, although such provisions are not shown.

2. Task headings and descriptions set forth are descriptive only and are not intended to define the scope of Work included therein.
 - a. Demolition of grating, supports, existing odor control system, ductwork, and electrical components.
 - b. Installation of odor control system.
 - c. Installation of exhaust fans.
 - d. Installation of cover systems.
 - e. Installation of ductwork.
 - f. Electrical power and controls work.
 - g. Startup and commissioning.

1.12 SEQUENCE CONSTRAINTS

A. General:

1. This section defines specific limitations on the Contractor's sequence of operations to minimize impact of the Work on operation of existing wastewater pumping and plant electrical infrastructure.
2. To meet the overall objectives of the Project, certain tasks and task elements should be generally performed, completed, or substantially completed in the herein-specified sequences. However, two or more of the tasks or task elements may be pursued simultaneously when consistent with the requirements specified herein: the requirements of Article Sequence of Constraints, specified hereinafter; and the Project Schedule.
3. The specified sequences and tasks are not all-inclusive. They are intended to convey overall sequence requirements. The Contractor shall plan the Work, relocate facilities, reroute utilities, and provide for temporary connections and terminations as necessary in an appropriate sequence of operation to perform the Work, while minimizing interferences with and providing for continuous operation of the Owner's existing wastewater pumping facilities.
4. Major sequences have been identified for the Owner's purposes. Although all Work is not listed herein, the tasks listed shall be understood to include all accompanying tasks such as, but not limited to, sitework, interconnecting utilities and associated infrastructure, and

applicable temporary provisions necessary to sequence the Work. Temporary provisions shall include pipeline endcaps, other utility terminations, and temporary utilities as necessary to allow operation of portions of the Work prior to completion of other portions of the Work, consistent with the Contractor's sequence of operations, although such provisions are not shown.

5. To accommodate the Contractor's sequence of operations, subject to the constraints specified herein, it is anticipated that the Owner will assume partial utilization of portions of the Work.
6. All existing Owner facilities shall remain in continuous operation except as specified herein.
7. All outages shall be coordinated per Article Outages above.
8. Suggested general sequence of work.
 - a. Install temporary ventilation and odor control.
 - b. Demolish existing odor control system and accessories.
 - c. Demolish ductwork where indicated and as required to incorporate the new work.
 - d. Install bar screen cover plates.
 - e. Install new odor control system, instrumentation, and controls.
 - f. Install new exhaust fans.
 - g. Install new influent channel and wet well cover plate systems.
 - h. Install new ductwork and connections.
 - i. Complete electrical power and control work.
 - j. Startup odor control system and ventilation equipment, including but not limited to, balancing the air flow rates.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

- A. **Inspection of Conditions:** Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. **Manufacturer's Instructions:** Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. **Inspect Materials or equipment immediately upon delivery and again prior to installation.** Reject damaged and defective items. Provide written documentation to the Owner all of Water supplied damaged materials.

- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Owner for final decision.
- F. Recheck measurements and dimensions, before starting each installation.
- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible materials as necessary to prevent deterioration.
- H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering complete construction for that purpose.
- I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Owner for final decision.

3.02 OUTAGE LIMITATIONS

- A. The Contractor shall perform the Work under this Contract to meet the specified time given in the Contract Documents. All Work shall be scheduled and proceed in such sequence as to avoid interference and delays to normal operations.
- B. During the performance of the Work, the Contractor may need to temporarily interrupt the normal operations of portions of the existing facilities in order to drain, fill, disconnect and reconnect certain items of equipment, piping, conduits, electrical service, and other facilities.
- C. In order to keep a minimum any interference with proper operation of the existing facilities, such disconnections and reconnections shall be made only at such times and in such manner as approved by the Owner in writing. The Contractor shall be prepared to fully operate on a 24-hour per day basis with no additional compensation in order to comply with the limitations as specified herein.
- D. The requirements included herein are necessary to minimize conflicts with ongoing plant operations and other working contracts in the immediate vicinity. Whether or not such work being performed by others is indicated on

the Drawings, the Contractor shall make such reasonable adjustments in his operations and schedules as the Owner may direct for the purpose of coordinating his work with that in progress by others.

- E. All roadways affording ingress to and egress from the work area shall be maintained in service and kept free of obstructions at all times.
- F. The Contractor shall submit requests for outages and shutdowns as described in Article Site Management.
- G. Construction of the facilities under this project will be ongoing simultaneously with the daily routine operations of the plant.

3.03 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection damage or deteriorating at Substantial Completion.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

3.04 SITE MANAGEMENT

- A. All requests impacting the MOPO process/systems shall be made 3 weeks in advance.
- B. All other requests impacting the plant or requiring plant staff action (i.e. lockout/tagout minor panel or redundant system shall be made at least 7 days, respectively, in advance. If approved the Contractor shall provide a confirmation notice at least 1 working day in advance of the approved work task date. The Contractor shall not exceed the approved duration without prior coordination and approval.
- C. The Contractor shall make a written request for Partial or Full Road Closure Requests at least 3 or 7 days, respectively, in advance. If approved the Contractor shall provide a confirmation notice at least 1 working day in advance of the approved closure date. The Contractor shall not exceed the approved duration without prior coordination and approval.
- D. The Contractor shall provide a List of Scheduled Deliveries at least 24 hours in advance of the delivery.

- E. Contractor shall make Contractor's Daily Reports: A daily written and verbal report to the Owner's designated representative advising of the status of the Work, the prior day's accomplishments, activity planned for the current day and for at least 2 subsequent days, and any problems or delays that may be anticipated.

3.05 CUTTING, FITTING, AND PATCHING

- A. Cut, fit, adjust, or patch Work and work of others, including excavation and backfill as required, to make Work complete.
- B. Obtain prior written authorization of Engineer before commencing Work to cut or otherwise alter:
 - 1. Structural or reinforcing steel, structural column or beam, elevated slab, trusses, or other structural member.
 - 2. Weather-resistant or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Work of others.
- C. Refinish surfaces to provide an even finish.
 - 1. Refinish continuous surfaces to nearest intersection.
 - 2. Refinish entire assemblies.
 - 3. Finish restored surfaces to such planes, shapes, and textures that no transition between existing work and the Work is evident in finished surfaces.
- D. Restore existing work, Underground Facilities, and surfaces that are to remain in completed Work including concrete-embedded piping, conduit, and other utilities as specified and as shown on Drawings.
- E. Make restorations with new materials and appropriate methods as specified for new Work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.
- F. Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and fill voids.
- G. Remove specimens of installed Work for testing when requested by Engineer.

END OF SECTION

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SECTION 01 31 19 PROJECT MEETINGS

PART 1 GENERAL

1.01 GENERAL

- A. Engineer will schedule physical arrangements for meetings throughout progress of the Work, prepare meeting agenda with regular participant input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes within 5 days after each meeting to participants and parties affected by meeting decisions.

1.02 PRECONSTRUCTION CONFERENCE

- A. Contractor shall be prepared to discuss the following subjects, as a minimum:

1. Required schedules.
2. Status of Bonds and insurance.
3. Sequencing of critical path work items.
4. Progress payment procedures.
5. Project changes and clarification procedures.
6. Use of Site, access, office and storage areas, security and temporary facilities.
7. Major product delivery and priorities.
8. Contractor's safety plan and representative.
9. Sustainable Construction Log and related requirements.
10. Critical structures (special inspections).

- B. Attendees will include:

1. Owner's representatives.
2. Contractor's office representative.
3. Contractor's resident superintendent.
4. Contractor's quality control representative.
5. Subcontractors' representatives whom Contractor may desire or Engineer may request to attend.
6. Engineer's representatives.
7. Others as appropriate.

1.03 PRELIMINARY SCHEDULES REVIEW MEETING

- A. As set forth in General Conditions and Section 01 32 00, Construction Progress Documentation.

1.04 PROGRESS MEETINGS

- A. Engineer will schedule regular progress meetings at Site, conducted weekly to review the Work progress, Progress Schedule, Schedule of Submittals, Application for Payment, contract modifications, and other matters needing discussion and resolution.
- B. Attendees will include:
 - 1. Owner's representative(s), as appropriate.
 - 2. Contractor, Subcontractors, and Suppliers, as appropriate.
 - 3. Engineer's representative(s).
 - 4. Others as appropriate.

1.05 QUALITY CONTROL MEETINGS

- A. In accordance with Section 01 45 16, Contractor Quality Control.
- B. Scheduled by Engineer on regular basis and as necessary to review test and inspection reports, and other matters relating to quality control of the Work and work of other Contractors.
- C. Attendees will include:
 - 1. Contractor.
 - 2. Contractor's designated quality control representative.
 - 3. Subcontractors and Suppliers, as necessary.
 - 4. Engineer's representatives.

1.06 PREINSTALLATION MEETINGS

- A. When required in individual Specification sections, convene at Site prior to commencing the Work of that section.
- B. Require attendance of entities directly affecting, or affected by, the Work of that section.
- C. Notify Engineer 4 days in advance of meeting date.

- D. Provide suggested agenda to Engineer to include reviewing conditions of installation, preparation and installation or application procedures, and coordination with related Work and work of others.

1.07 COMMISSIONING MEETINGS

- A. Schedule and attend a minimum of six facility startup meetings. The first of such meetings shall be held prior to submitting testing plans, as specified in Section 01 91 00, Equipment System Commissioning, and shall include preliminary discussions regarding such plans.
- B. Agenda items shall include, but not be limited to, content of testing and commissioning plants, coordination needed between various parties in attendance, and potential problems associated with startup.
- C. Attendees will include:
 - 1. Contractor.
 - 2. Contractor's designated quality control representative.
 - 3. Subcontractors and equipment manufacturer's representatives whom Contractor deems to be directly involved in facility startup.
 - 4. Engineer's representatives.
 - 5. Owner's operations personnel.
 - 6. Others as required by Contract Documents or as deemed necessary by Contractor.

1.08 SITE COORDINATION MEETING

- A. The CM will schedule regular site-wide coordination meetings at the Site, conducted to review site-wide and project specific coordination of schedules, hoisting, road closures, lockout/tagout, testing, issues and concerns.
- B. Attendees will include:
 - 1. Owner's representative(s), as appropriate.
 - 2. Operations and Maintenance representative(s), as appropriate
 - 3. Contractor Project Manager, including Subcontractors, as appropriate.
 - 4. Owner's Resident Engineer
 - 5. Others as appropriate.

1.09 SITE SAFETY MEETING

- A. The CM Safety Manager will schedule regular safety meetings at the Site, conducted to review site-wide and project specific safety observations, trends, successes, issues and concerns.

B. Attendees will include:

1. Owner's representative(s), as appropriate.
2. Contractor Project Manager and Site Safety Officer, including Subcontractors, as appropriate.
3. Others as appropriate.

1.10 OTHER MEETINGS

- A. Coordination meetings with Other Onsite Contractors: Engineer will schedule regular coordination meetings to coordinate Work among the various onsite contractors. Meetings will be bi-weekly or as determined by the Engineer.
- B. In accordance with Contract Documents and as may be required by Owner and Engineer.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall prepare and maintain a detailed progress schedule, herein referred to as the "Preliminary Schedule" and the "Contractor's Construction Schedule," as described below. This schedule shall be the Contractor's working schedule and used to plan, organize, and execute the work, record and report actual performances and progress, and show how the Contractor plans to complete all remaining work as of the end of each progress report period, and to enable the Owner to monitor, compute the value of progress payments and evaluate work progress.

1.02 DEFINITIONS AND ABBREVIATIONS

- A. **TIMELY AND ACCEPTABLE** shall mean any construction schedule or schedule update required under the contract which is submitted in accordance with all the requirements set forth in the contract. The determination whether a schedule is timely and acceptable shall be the sole judgment of the Owner.
- B. The schedule shall be in the form of an activity-oriented network diagram (Critical Path Method) and the principles and definitions of the terms used herein shall be as set forth in the Associated General Contractors of America (AGC) publication *The Use of CPM in Construction*. In the event of discrepancies, this section shall govern the development and utilization of the progress schedule;
- C. The Primavera P6 Scheduling System version 16.0, or higher, shall be used for all scheduling requirements defined in this specification. Schedule updates and revisions shall be submitted on magnetic disc and on four printed copies as specified hereunder. CONTRACTOR may use Microsoft ® Project to complete the schedule for this Project.
- D. **Qualifications:**
 - 1. At the Preconstruction Meeting, the Contractor shall provide a statement to the Owner describing its computerized scheduling capability for review and approval. This statement shall include the following as a minimum:
 - a. Identification, qualifications, and experience of the members of the Contractor's scheduling staff or any consultant's staff. The

- designated scheduling the Owner shall have at least 3 years' experience in the computerized scheduling of public or industrial construction work.
- b. Reference of not less than two previous projects on which the Contractor or consultant has satisfactorily utilized computerized CPM scheduling, preferably of not less than one-half of the value of the present Contract. The Owner reference shall be included.
2. The Owner may reject any member of the Contractor's scheduling staff or any of its consultant's staff for lack of competence. The Contractor shall promptly replace rejected personnel with acceptable personnel at no additional cost to the Owner. The new personnel shall comply with the qualifications listed above.

E. Failure to Perform:

1. For the purpose of this Contract, the terms "timely" and "acceptable schedule" shall mean any Preliminary and/or Construction schedules or schedule updates thereafter required under the Contract which are submitted in accordance with all requirements set forth in the Contract. The determination whether a schedule is timely and acceptable shall be within the sole judgment of the Owner.
2. The Owner will use the Contractor's Preliminary Schedule and subsequently, the Contractor's Construction Schedule to monitor the value of work performed the value of work remaining, and the Contractor's compliance with the Contract Completion Date and any Milestones. In the event the Contractor fails to submit a timely and acceptable construction schedule, any work performed thereafter shall be undertaken at the Contractor's own risk. A failure to provide a timely and acceptable schedule constitutes a material breach of this Contract. The Owner therefore reserves all rights and remedies available to it upon the Contractor's failure to submit a timely and acceptable schedule including, but not limited to, default termination, a stop work order (at no cost to the Owner) and/or a withholding of partial progress payments. A decision by the Owner to permit work to proceed shall not be construed as a waiver by the Owner of any or all of its rights and remedies.
3. In the absence of a timely and acceptable schedule: (1) the Owner is not obligated to determine the impact of delays to the project, (2) the Contractor is not entitled to an equitable adjustment pursuant to Article 3 "Changes" of the General Provisions of the Standard Contract Provisions based upon delays and (3) the Owner is not obligated to abide by the requirements of the fifth full Paragraph of Article 5 "Termination-Delays" of the General Provisions of the Standard Contract Provisions, beginning with the words "The Owner shall

ascertain", but may presume, notwithstanding the provisions of Article 5, that the Contract is responsible for any anticipated or actual failure to complete the work within the time specified in the Contract, or any previously granted extensions thereof. A schedule, which has not been accepted in accordance with all requirements set forth in the Contract, may not be used by the Contractor as a basis for requesting equitable adjustments or partial progress payments.

- F. **EXCUSABLE DELAY:** Any delay of the completion of the work beyond the expiration of the Contract Time caused by conditions beyond the control and without the fault or negligence of the Contractor such as strikes, embargoes, fire, unavoidable casualties, unusual delays in transportation, national emergency, and abnormally inclement weather conditions. An Excusable Delay may entitle the Contractor to an extension of the Contract Time, but shall not entitle the Contractor to any adjustment to Contract Price.
- G. **COMPENSABLE DELAY:** Any delay of the completion of the work beyond the expiration date of the Contract Time caused by gross negligence or willful acts of the Owner or Owner's Representative, or by the Owner's consultants or Separate Contractor (if any), and which delay is unreasonable under the circumstances involved and not within the contemplation of the parties. A Compensable Delay may entitle the Contractor to an extension of the Contract Time, and/or an adjustment of the Contract Sum. Except as provided herein, the Contractor shall have no claim for damage or compensation for any delay, interruption, hindrance or disruption.
- H. **INEXCUSABLE DELAY:** Any delay of the completion of the work beyond the expiration of the Contract Time resulting from causes other than those listed in the above paragraphs.

1.03 SCHEDULE COORDINATION

- A. Project is divided into multiple prime contracts with each contract awarded separately. Construction Coordinator, as designated in the Supplementary Conditions, will be responsible for developing and maintaining a master Progress Schedule using individual Progress Schedules prepared by each Contractor as submitted to Engineer under this section.
- B. Upon review and acceptance, Engineer will transmit one hard copy and one electronic copy of all Contractors' schedules to Construction Coordinator. Within 5 days of receipt, Construction Coordinator shall prepare and transmit to Engineer one hard copy of master Progress Schedule for each designated Contractor and one hard copy for Engineer.

- C. Where Contractor is referred to in the singular, it shall refer to each of separate Contractors as applicable.

1.04 PRELIMINARY PROGRESS SCHEDULE

- A. At the Preconstruction Conference, the Contractor shall submit for approval a preliminary schedule, a supporting narrative and a separate tabulation of cumulative payments. The preliminary schedule shall include all activities the Contractor intends to undertake within the first 120 calendar days after the Notice to Proceed. The Contractor's general approach for the balance of the Project shall be indicated. Cost of activities expected to be completed within the first 120 calendar days of Notice to Proceed shall be included and will be used as a basis for payment. The submittal will not be approved unless it is complete as specified and represents a realistic approach to the work.
- B. The Owner will review and comment on the Preliminary Schedule submittal within 10 days. Upon receipt of the Owner's comments, the Contractor shall make necessary changes and deliver the corrected Preliminary Schedule submittal within 10 calendar days.
- C. The Preliminary Schedule shall be in the form of an activity-oriented network diagram and shall meet all contractual requirements, such as Contract duration, phases, and phasing restraints.
 - 1. The Preliminary Schedule shall cover the following:
 - a. Procurement - Submittals, approvals, fabrication, and delivery of all key and long lead time procurement activities;
 - b. The activities to be accomplished during the first 120 calendar days of the Project, including any phases or sub phases.
 - c. Activity descriptions shall be brief but shall clearly convey the scope of work described. Activities shall be discrete items of work that must be accomplished under the contract and which, when complete, produce definable, recognizable entities or stages within the project. All activities, including work associated with Contract deliverables, shall be shown. Generally, for activities requiring the Owner's approval, durations shall not be less than 30 calendar days for a single review. Unless otherwise approved by the Owner, construction activities shall have durations of 20 working days or less. Non-construction activities such as procurement and fabrication may have longer durations.
 - d. All durations shall be the result of Contractor's definitive labor and resource planning under contractually defined on-site work conditions by the Contractor to perform its responsibilities and contracted work.

2. The Narrative Report shall describe the Contractor's general approach for meeting the interim and final completion dates.
 3. A Separate Tabulation of Estimated Cumulative Payments will serve as the basis for progress payments up to the first 120 calendar days following the Notice to Proceed on the Contract and shall include the following information for each 30-day period covered by the Preliminary Schedule:
 - a. For each activity to be completed in each 30-day period the activity number, description, scheduled start date, scheduled completion date and the monetary value shall be provided;
 - b. The total of the monetary values of all activities scheduled to be completed during each 30-day period;
 - c. The cumulative total of the monetary values of all activities scheduled to be completed from the Notice to Proceed to the end of each 30-day period;
- D. Summary activities which are necessary (not included under the paragraph (1.b), above) to properly show:
1. The approach to scheduling the remaining work areas or phases of the Project. The work for each phase or area must be represented by at least one summary activity so that the work cumulatively shows the entire Project schedule including, but not limited to the following:
 - a. Notice to Proceed.
 - b. Permits.
 - c. Submittals, with review time. Contractor may use Schedule of Submittals specified in Section 01 33 00, Submittal Procedures.
 - d. Early procurement activities for long lead equipment and materials.
 - e. Initial Site work.
 - f. Earthwork.
 - g. Specified Work sequences and construction constraints.
 - h. Contract Milestone and Completion Dates.
 - i. Owner-furnished products delivery dates or ranges of dates.
 - j. Major structural, mechanical, equipment, electrical, architectural, and instrumentation and control Work.
 - k. System startup summary.
 - l. Project closeout summary.
 - m. Demobilization summary.
 2. Approximate cost and duration for each summary activity, which is the Contractor's best estimate for all the work represented;
 3. Realistic delivery dates for all procurement activities required and specified.

- E. Approval of Contractor's Preliminary Schedule is a prerequisite to receipt of the initial progress payment.
- F. Computer outputs as described in Sections titled "Submittals of Schedules" and "Schedule Updates" shall be required as part of the Preliminary Schedule submittal and each update thereafter.
- G. Specification Sections titled Revisions to Approved Schedule," Change Orders and Time Extensions," and Delays and Time Extension "shall be applicable to the Preliminary Schedule and its updates thereafter.

1.05 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. The Contract Time includes the time needed by the Contractor for preparation and approval of shop and working drawings, obtaining licenses, certificates, approvals and permits, procurement and assembly of equipment and materials needed for satisfactory completion of all work.
- B. The Contractor shall prepare and submit for approval the Contractor's Construction Schedule, a schedule of anticipated payments based upon both early finish and late finish of all activities and a narrative describing the Contractor's approach for meeting the interim and final completion dates to the Owner within 20 calendar days after the Notice to Proceed. The Contractor's Construction Schedule shall be composed of the Detailed Network Diagram, as described in Subsection titled "Detailed Network Diagrams;" the reports described in Subsection titled "Submittals of Schedules;" and all other reports described in subsequent Subsections, and shall be cost loaded in accordance with Subsection titled "Cost Loading and Cash Flow."
- C. The Construction Schedule shall include time for the activities in the Detailed Network Diagram.
- D. The Construction Schedule shall include time for Owner's review of submittals with durations of these review periods included herein.
- E. The Contractor's Construction Schedule shall account for the schedule and site constraints in Section 01 10 00, General Requirements, Section 01 11 00, Summary of Work, and Section 01 31 13, Project Coordination.
- F. The Contractor's Construction Schedule shall show the sequence and interdependence of activities required for complete performance of all the work. The Contractor's Construction Schedule shall begin with the date the Owner issues the Notice to Proceed, include an activity representing attainment of Beneficial Occupancy in accordance with Section 01 71 16,

Beneficial Occupancy, and conclude with an activity representing Final Completion of the Contract.

- G. The Contractor will be allowed to submit for approval a shortened schedule showing Contract completion earlier than the date of Final Completion of the Contract. If the shortened schedule is approved by the Owner, the date of Final Completion of the Contract will be revised to the completion date of the approved schedule by the Owner and all Contract provisions such as liquidated damages, etc. will be applicable as of the revised Contract completion date.
- H. Float or slack time is not for the exclusive use or benefit of either the Owner or the Contractor, but is a resource available to both parties, as needed, to meet Contract milestones and the Contract completion date. The Contractor's Construction Schedule shall reflect the sequencing and staging requirements stated in the Contract Documents.
- I. Seasonal weather conditions shall be considered and included in the planning and scheduling of all work influenced by high or low ambient temperatures and/or precipitation to ensure completion of all Work with the Contract Time.
 - 1. Seasonal weather conditions shall be determined by an assessment of average historical climatic conditions based upon the preceding 5 year records published for the locality by the National Ocean and Atmospheric Administration (NOAA) and entitled, "Local Climatological Data – City of Alexandria".
- J. Comments made by the Owner on the Contractor's Construction Schedule during review will not relieve the Contractor of compliance with requirements of the Contract Documents. Review of the Contractor's Construction Schedule, by the Owner, is for general conformance with the schedule concept of the Project and to determine that the Contractor is in compliance with the information given elsewhere in the Contract Documents. The Owner's initial review will require 30 calendar days. Subsequent reviews will require 15 calendar days. Upon the Owner's request, the Contractor shall participate in the review of the Contractor's Construction Schedule submissions. All revisions shall be submitted within 15 calendar days after the Owner's review.
- K. The approved schedule, unless subsequently changed with the approval or at the direction of the Owner, is the schedule to be used by the Contractor for planning, scheduling, managing and executing the work to be accomplished.
- L. The Owner may elect to stop the Contractor from proceeding with Contract work after the first 120 calendar days of the Contract until the Contractor's Construction Schedule submittal is approved. Prior to 120 calendar days after

the Notice to Proceed, and until approval of the Contractor's Construction Schedule submittal, progress payments will be based on the Preliminary Schedule submittal.

- M. If, through no fault of the Owner or its representatives, the Contractor's Construction Schedule is not approved within the first 120 calendar days of the Contract and the Contract work is suspended in accordance with Paragraph F above, the Owner will hold the Contractor liable for any fines imposed by the USEPA against the Owner for permit violations that occur as a result of the suspension of the work.
- N. The Contractor's Construction Schedule shall begin with the anticipated date of the Notice to Proceed, which will be revised to reflect the actual date of the Notice to Proceed and conclude with an activity representing Final Completion of the Contract.

1.06 SUBMITTAL OF SCHEDULES

- A. Following completion of each monthly progress review meeting or in no case later than the 25th of each month, four (4) copies and one (1) original of the Network Diagram of the Contractor's Construction Schedule shall be submitted to the Owner. The submittal shall include electronic copies and tabular reports.
- B. The following computer outputs shall be required as part of the initial schedule submission and each update thereafter:
 - 1. All activities sorted by activity number and also including precedent and successor relationships, lag, and lead-time. Each listing shall show activity number description, location, responsibility, total duration in working days, early-start date, late-start date, early-finish date, late-finish date, total float, free float, and status (whether critical or completed) for each activity in the Network Diagram;
 - 2. Activity sort by the amount of slack or float, then in order of preceding event number;
 - 3. Activity sort by early start for next 60 working days, then in order of preceding event number;
 - 4. Activity sort by late finish for next 60 working days, then in order off preceding event number.
 - 5. Milestones status report to include current status of each milestone events.
 - 6. Activity Responsibility sorted by early-start and float. The Activity Responsibility listing shall segregate into separate sub listings:
 - a. Work activities for the Contractor;
 - b. Work activities of each subcontractor;

- c. Submittals to the Owner for all major items of material and equipment.
 - d. Each activity shall list the number of shifts, crew size of each craft, and construction equipment to accomplish the activity;
 - 7. A sub listing of materials and equipment sorted by Specification number. The sub listing of materials and equipment shall include the following activities:
 - a. Preparation of shop drawings and submittal to the Owner;
 - b. Review by the Owner;
 - c. Fabrication and/or delivery of material and/or equipment.
- C. Outputs (A) and (B) above shall show all activities and restraints for the duration of the Project.
- D. All updated or revised schedules submitted after the original schedule shall be in the same submittal format unless modified in writing by the Owner.

1.07 PROGRESS REPORTS

- A. Update pertains to past activities. Logic calculation configurations should be consistent throughout the project.
 - 1. Use retained logic option.
 - 2. Calculate start to start lag by using Early Start option.
 - 3. Calculate Early Start using Contiguous activity duration option.
 - 4. Calculate total float using most critical option.
- B. Once each week, on a date established by the Owner, the Contractor shall submit a computerized labor/construction equipment report and progress schedule listing the activities completed and in progress for the previous week and activities scheduled for the succeeding two weeks. This report and schedule shall include concrete placements, major equipment installation, testing, and like detail. A simple histogram and bar chart shall be used to display the information in pictorial form. In addition, a detailed list of all proposed schedule changes (logic revisions, remaining duration status, actual starts, actual finish, and activity additions and deletions).
 - 1. The weekly report shall be complete and accurate, revealing the Contractor's plan of prosecuting the work to meet all Contract stipulated milestones. Upon the Owner's request, the Contractor shall participate in the review of the weekly report submission.
- C. Once each month, on a date established by the Owner, a meeting to review the monthly schedule status will be held. The purpose of this meeting is to review the current status of activities to determine completion status and to determine

progress payments. The meeting shall be attended by a duly authorized representative of the Contractor and those subcontractors determined to be necessary by the Owner and/or Contractor.

- D. Prior to the monthly review meeting, the Contractor shall obtain from his subcontractor's, consultants, and suppliers the necessary information required to reflect progress to date. An updated schedule shall be available for review at the meeting including all information available as of the cut-off date established by the Owner. A detailed list of all schedule changes (logic duration status, additions, and deletions) shall be submitted with the update.
- E. The Contractor shall come to the monthly updating meetings with the above data prepared in advance to provide, as of the end of the updating period, a complete and accurate report of current procurement and construction progress, showing how the Contractor plans to continue the work of this Project to meet all Contract completion dates.
- F. The monthly Progress reports shall be submitted in the format described herein shall include, at a minimum:
 - 1. For activities started and/or completed during the previous period: actual start and actual completion dates, number of work days, number of shifts, crew sizes by craft, and construction equipment used to accomplish the activity;
 - 2. For activities begun but not yet completed: the actual start date, physical percentage complete to date, number of shifts, crew sizes by craft, construction equipment required, the remaining duration of the work, and the estimated completion date;
 - 3. For activities not yet started: estimated start dates, number of shifts, crew sizes by craft, construction equipment required, revised duration, and estimated completion dates, as necessary; if estimated start dates for activities vary from current schedule, explain variance and effects;
 - 4. For authorized Contract changes: revised activities, number of shifts, crew sizes by craft, construction equipment required, and durations where required;
 - 5. The monthly update of the Contractor's Construction Schedule shall be for the month preceding the meeting and for one month following the meeting. The previous month's activities shall be reported as they actually took place;
 - 6. Portions of the Detailed Network Diagrams on which all activities are complete need not be reprinted and submitted in subsequent updates. However, the file of submitted Detailed Network Diagrams and the related reports shall constitute a clear record of progress of the work from Notice to Proceed to final completion;

7. The monthly submittal to the Owner shall be accompanied by four (4) individually bound copies of a report. The report shall include the information described in the Contractor's Schedule Narrative Report in detail, and shall follow the outline below:
 - a. Contractor's Schedule Narrative:
 - 1) Contractor's transmittal letter;
 - 2) Description of problem areas;
 - 3) Current and anticipated Contractor caused delays:
 - a) Cause of delay;
 - b) Corrective action and schedule adjustments to correct the delay so as to maintain affected original milestone completion dates;
 - c) Impact of the delay on other activities, on milestones, and on completion dates;
 - 4) Current and anticipated non-Contractor caused delays:
 - a) Cause of delay;
 - b) Proposed plan of corrective action and schedule adjustments necessary to correct the delay and maintain affected milestone completion dates, to include anticipated costs and time for which the Contractor considers the Owner liable;
 - c) Impact of the delay on other activities, on milestones, and on completion dates;
 - 5) Approved changes in construction sequence;
 - 6) Pending items and status thereof:
 - a) Permits;
 - b) Potential Revisions;
 - c) Change Orders;
 - d) Time extensions;
 - e) Process interfaces and shutdowns;
 - f) Other;
 - 7) Contract completion date(s) status:
 - a) Ahead of schedule, and number of working days;
 - b) Behind schedule, and number of working days;
 - 8) Other project or scheduling concerns;
 - 9) Reviewed and updated Detail Network Diagram and Reports;
 - 10) Revised cost lading and cash flow information;
 - 11) Revised labor information;
 - 12) Revised labor and equipment information;
 8. No revisions or additions to the weekly/monthly Progress Reports shall be made other than those reflecting the Owner's prior written approval (i.e., change orders, potential revisions, stop work orders, etc.);

9. The Contractor agrees that, whenever it becomes apparent from the current weekly and/or monthly computer-produced calendar-dated schedule that any Contract completion date will not be met, at no fault of the Owner, he will take any or all of the following actions with prior approval of the Owner and at no additional cost to the Owner:
 - a. re-sequencing construction activities,
 - b. providing additional labor,
 - c. working additional shifts, or otherwise accelerating the work to maintain the Contract stipulated completion dates.
 10. Whenever it becomes apparent from the current weekly and/or monthly progress evaluation and updated schedule data that any milestone date(s) and/or contract completion dates will not be met due to the Contractor's slow progress on critical activities, items a, b and c above shall be incorporated in the CPM all in accordance with section titled "Revisions to Approved Schedule." The revised schedule shall be submitted to the Owner for review and acceptance.
 11. A schedule, which has not been accepted in accordance with all requirements set forth in the Contract, may not be used by the Contractor as a basis for requesting equitable adjustments or partial progress payments.
- G. Upon final completion of the project, the Contractor shall submit for approval the final complete as-built Contractor's Construction Schedule. The as-built Contractor's Construction Schedule shall identify all project as-built critical paths and shall include the following:
1. All Contract activities identified in the approved Contractor's Construction Schedule, including all added activities and Change Orders, shall be shown;
 2. Activity durations shall be the actual number of separate workdays during which work was performed on the activity;
 3. Total person-days for an activity shall be the actual number of person-days that were required to complete the activity;
 4. The Detailed Network Diagram shall indicate the actual start date and finish date of each activity;
 5. Contract milestone completion dates shall reflect the actual date each milestone was completed, as indicated in the Owner issued acceptance letter or Certificate of Beneficial Occupancy.

1.08 REVISIONS TO APPROVED SCHEDULE

- A. The Contractor shall prosecute the work in accordance with the Contractor's Construction Schedule. Changes made to the Contractor's Construction

Schedule for accomplishing the work shall require prior acceptance of the Owner.

1. No revisions or additions to the Contractor's Construction Schedule shall be made without the Owner's prior written approval (i.e., change orders, potential revisions, stop work orders, etc.). Failure to comply with this requirement may result in rejecting the schedule.
 2. If in the event the Contractor is in disagreement with schedule updates or changes ordered by the Owner, then upon written request by the Contractor, the Owner will render a decision. Notwithstanding the Owner's decision, the Contractor is to incorporate schedule updates or changes as requested by the Owner.
- B. Network changes noted by the Contractor and/or the Owner to compensate for corrections, inadequacies, incompatibilities, and inadequate activity breakdown along with the status data agreed to during each update shall be considered acceptable by both parties unless written notice of any exceptions is given by an objecting party within 15 calendar days after receipt of the Contractor's update submission. For major network logic changes that cannot be agreed to during an updating meeting, the Contractor shall submit such revisions in writing, to the Owner for approval prior to inserting such changes into the network. Submissions may be in the form of marked-up networks or "fragnet" illustrations provided they are submitted with a letter of transmittal. The submission and approved procedures will follow the timetable described for Subsection titled "Change Orders and Time Extensions" and "Delays and Time Extensions," below. Changes to activities having adequate float shall be considered minor changes, except that an accumulation of minor changes may be considered a major change when such change affects the Contract Completion Date.
- C. In the event the Contractor is in disagreement with schedule updates or logic revisions ordered by the Owner, then upon written request by the Contractor, the Owner will render a decision. Notwithstanding the Owner's decision, the Contractor is to incorporate schedule updates or revisions as requested by the Owner.
- D. Construction Schedule updating and/or revisions to compensate for corrections, inadequacies, incompatibilities, and inadequate activity breakdown, including any items and/or logic revisions noted by the Owner, shall be rectified by the Contractor at no additional Owner cost.

1.09 SCHEDULE UPDATES

- A. Once each month, on a date established by the Owner, a meeting to review the monthly schedule status will be held. The purpose of this meeting is to review

and update the current status of activities to determine completion status for progress payments. The meeting shall be attended by a duly authorized representative of the Contractor and those subcontractors determined to be necessary by the Owner and/or Contractor.

- B. Prior to the monthly review meeting, the Contractor shall obtain from his subcontractor's, consultants and suppliers the necessary information required reflecting progress to date. An updated schedule shall be available for review at the meeting, including all information available as of the cut-off date established by the Owner. A detailed list of all schedule changes shall be submitted with the update.
- C. The Contractor shall come to the updating meetings with the above data prepared in advance to provide, as of the end of the updating period, a complete and accurate report of current procurement and construction progress, showing how the Contractor plans to continue the work of this Project to meet all Contract completion dates.
- D. Following completion of each monthly progress review meeting, or in no case later than the 25th of each month, four (4) copies of the Contractor's Updated Construction Schedule shall be submitted to the Owner. The updated schedule must include the original (scheduled) duration, remaining duration, percentage of completion (i.e., work completed, not time), scheduled and actual start dates, and scheduled and actual finish dates.
- E. Upon final completion of the project, the Contractor shall submit for approval the final complete as-built Contractor's Construction Schedule. The as-built Contractor's Construction Schedule shall include the following:
 - 1. All Contract activities identified in the approved Contractor's Construction Schedule, including all added activities and Change Orders, shall be shown;
 - 2. Activity durations shall be the actual number of separate workdays during which work was performed on the activity;

1.10 CHANGE ORDERS AND TIME EXTENSIONS

- A. Reference General Conditions and Section 01 26 00, Contract Modification Procedures.
- B. Whenever the Contractor receives a request for proposal for a potential revision from the Owner, it shall submit, within 20 calendar days of said request, a Time Impact Analysis as described hereunder.

- C. The Contractor shall submit a written Time Impact Analysis to the Owner, illustrating the influence of each change on the current Contractor's Construction Schedule completion date. Each Time Impact Analysis shall include a fragment network analysis (fragnet), demonstrating the following:
1. How the Contractor proposes to perform the changed work.
 2. A listing of activities required to execute the changed work. These activities shall be cost and resource loaded, all in accordance with Sections titled "Cost Loading and Cash Flow" and "Labor," respectively.
 - a. The estimated cost to perform each work activity shall be noted for each activity included in the fragnet submitted with the Time Impact Analysis. The cumulative total of the monetary values of all "change" activities shall be equal to the monetary value of the Contractor's cost proposal for said change.
 - b. The resources, both labor and equipment, for the "change" activities shall be in substantive agreement with the resources presented in the Contractor's cost proposal for said change.
 - c. All durations for activities shall be the result of definitive labor and resource planning under contractually defined on-site work conditions by the Contractor to perform the changed work.
- D. How the Contractor proposes to incorporate the change into the Detailed Network Diagram. Additionally, the analysis shall demonstrate the time impact based on the following:
1. The date that the Contractor was authorized to proceed with the change or anticipates the issuance of authorization;
 2. The status of construction at that point in time as reported in D.1 above; and
 3. The event time computation of all affected activities. The event items used in the analysis shall be those included in the latest updated copy of the detailed progress schedule or as adjusted by mutual agreement.
 4. Contract time extensions will be granted only to the extent that equitable time adjustments for the activity or activities affected exceed the total or remaining float along the path of activities at the time of actual delay or at the time the Contractor was notified that the change was authorized.
- E. Time Impact Analysis shall be submitted in triplicate. In cases in which the Contractor does not submit a Time Impact Analysis for a specific change within the specified period of time, then it is mutually agreed that that particular potential revision has no time impact on the Contract completion date and the Project's critical path and no time extension will be granted. Approval or rejection of each Time Impact Analysis by the Owner or his

authorized representative shall be made within 15 calendar days after receipt of each Time Impact Analysis, unless subsequent meetings and negotiations are necessary. Upon approval, a copy of the Time Impact Analysis signed by the Owner or his authorized representative shall be returned to the Contractor. Upon mutual agreement by both parties, fragnets illustrating the influence of Change Order will be incorporated into the Detailed Network Diagram during the first update after agreement is reached.

1.11 DELAYS AND TIME EXTENSIONS

- A. The Owner is not bound by any Contractor's Construction Schedule until approved in writing by the Owner. In the event the Contractor proceeds with a schedule that is not approved by the Owner, and in the event of a delay claim, the Contractor shall have the burden of proving that the schedule used is reasonable, and based on its actions, throughout the project, the schedule would have been met.
- B. Whenever delays are experienced, the Contractor shall submit a written Time Impact Analysis to the Owner, illustrating the influence of each delay on the current Contractor's Construction Schedule completion date. Each Time Impact Analysis shall include a fragment network analysis (fragnet), demonstrating how the Contractor proposes to incorporate the delay into the Detailed Network Diagram. Additionally, the analysis shall demonstrate the time impact based on the date that the delay began, the status of construction at that point in time, and the event time computation of all affected activities. The event items used in the analysis shall be those included in the latest updated copy of the detailed progress schedule or as adjusted by mutual agreement. Contract time extensions will be granted only to the extent that equitable time adjustments for the activity or activities affected exceed the total or remaining float along the path of activities at the time of actual delay or at the time the Contractor was notified that the change was authorized.
- C. Each Time Impact Analysis shall be submitted in triplicate and within 15 calendar days after a delay occurs or is recognized. In cases in which the Contractor does not submit a Time Impact Analysis for delay within the specified period of time, then it is mutually agreed that that particular delay has no time impact on the Contract completion date and the Project's critical path and no time extension will be granted. Approval or rejection of each Time Impact Analysis by the Owner or his authorized representative shall be made within 10 calendar days after receipt of each Time Impact Analysis, unless subsequent meetings and negotiations are necessary. Upon approval, a copy of the Time Impact Analysis signed by the Owner or his authorized representative shall be returned to the Contractor. Upon mutual agreement by both parties, fragnets illustrating the influence of Change Order and delays

will be incorporated into the Detailed Network Diagram during the first update after agreement is reached.

D. Adjustments to Contract Time for Concurrent Delay:

1. The Contractor may make a claim for an extension of the Contract Time, subject to the following:
 - a. If an Excusable Delay and Compensable Delay occur concurrently, the maximum extension of the Contract Time shall be the number of days from the commencement of the first delay to the cessation of the delay which ends last.
 - b. If an Inexcusable Delay occurs concurrently with either an Excusable Delay and/or a Compensable Delay, the extension of the Contract Time shall be the number of days, if any, for which the Excusable Delay or the Compensable Delay was concurrent with the Inexcusable Delay.

E. Adjustment to Contract Price:

1. If an Excusable Delay and Compensable Delay occur concurrently, the maximum extension of the Contract Time shall be the number of days from the commencement of the first delay to the cessation of the delay which ends last.
2. If an Inexcusable Delay occurs concurrently with Compensable Delay, the maximum number of compensable days shall be the number of days, if any, by which the Compensable Delay exceeds the Inexcusable Delay.
3. The net approved number of compensable days will be determined by adding the approved number of compensable calendar days for each compensable delay, adjusting for any concurrent compensable delay, and subtracting any Owner caused reductions in Contract Time (such as reductions in Contract Scope).

F. In the event that the Contractor fails to submit a timely and acceptable construction schedule, any work performed thereafter shall be undertaken at the Contractor's own risk. A failure to provide a timely and acceptable schedule constitutes a material breach of this contract. The Owner therefore reserves all rights and remedies available to it upon the contractor's failure to submit a timely and acceptable schedule including, but not limited to, default termination, a stop work order (at no cost to the Owner) and/or the withholding of partial progress payments.

G. A decision by the Owner to permit work to proceed in the absence of a timely and acceptable schedule is not to be construed as a waiver by the Owner of any or all of its rights and remedies. In the event that the Contractor proceeds

with a schedule not accepted by the Owner, and in the event of a delay claim, the Contractor will have the burden of proving that the schedule is reasonable, and based on its actions throughout the project, the schedule would have been met.

- H. In the absence of a timely and acceptable schedule:
1. The Owner is not obligated to determine impact of delays to the project,
 2. The Contractor is not entitled to an equitable adjustment,
 3. The Owner is may presume that the contractor is responsible for any anticipated or actual failure to complete the work within the time specified in the contract, or any previously granted extension thereof.
 4. The Contractor as a basis for requesting equitable adjustments or partial progress payments may not use a schedule, which has been accepted but has not been updated in accordance with all requirements set forth in the contract.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Work under pay items, with the exception of mobilization, shall not commence until the Owner accepts a schedule conforming to all contract requirements.
- B. Contractor's failure to comply with these requirements will result in delay in progress payments, other than mobilization, until such procedural requirements are satisfactorily met.

3.02 PRECONSTRUCTION CONFERENCE

- A. A preconstruction conference will be arranged by the Owner that will include representatives of the Owner, the Contractor and other agencies, both governmental and private, affected by the work to discuss and clarify points of issue involving the construction schedule, restriction, and the general conduct of the work under the Contract.
- B. The Construction Schedule will not be approved and no work shall be started until after this conference.

END OF SECTION

**SECTION 01 32 33
CONSTRUCTION PHOTOGRAPHS**

PART 1 GENERAL

1.01 SUMMARY

- A. Contractor shall be responsible for the production of pre-construction and construction photographs as provided herein.

1.02 SUBMITTALS

- A. Informational Submittals:
 - 1. Monthly submittal of photographs with the monthly application for payment.

1.03 DESCRIPTION

- A. Provide a minimum of ten (10) photographs of each element and existing project conditions in the vicinity of, and abutting, proposed construction taken prior to any activity at his site(s) and submitted to the Owner before any activity takes place. The same views shall be re-photographed upon completion of all construction activities.
- B. Provide construction photographs taken no less frequently than biweekly throughout the progress of the work until final completion of project.
- C. Contractor shall have suitable photographs taken before, during and after construction of the project.
- D. Contractor shall indicate construction limits by painting or otherwise conspicuously marking construction boundaries to show on preconstruction photos. Preconstruction photos shall be marked as such in the title block.
- E. Contractor shall have suitable photographs to show the level of work that has been completed during the progress period each month.
- F. The photos shall produce a visual step-by-step record of the progress of construction on the project.

1.04 QUALITY ASSURANCE

- A. Visibility: All photographs shall be performed during times of good visibility
- B. All digital image files shall be previewed for color accuracy on a calibrated computer monitor
- C. Digital file images are not be computer manipulated in any manner which alters the visual information in the original photograph, except for fundamental color and/or density (brightness) corrections required for proper printing or saving.

1.05 DESCRIPTION OF WORK:

- A. Take a minimum of 30 preconstruction photographs.
- B. Take a minimum of 20 progress photographs on a monthly basis during performance of the Work.

PART 2 PRODUCTS

2.01 CAMERA

- A. Digital images may be created using original digital photographic equipment. Digital camera capabilities must have a sensor capacity of at least six (6) megapixels and should be capable of utilizing a moderate wide-angle lens system, a moderate telephoto lens and an electronic flash capable of properly illuminating large interior spaces. Camera must produce original uncompressed JPEG format images files that open to display at dimensions which exceed 20x30 inches, at a minimum of 72 dpi resolution, or raw format images which can be computer-processed to these specification in either JPEG or TIF or format approved by Owner.

2.02 CONTACT SHEETS

- A. Thumbnail.
- B. Color.
- C. Finish: Smooth surface, glossy.
- D. Data: digital file name and number of each image.
- E. Mounting: In archival-quality protective pages.
- F. Format: JPEG, or format approved by Owner.

2.03 E-BUILDER

- A. All photographs shall be posted in e-Builder ® on the Owner's hosted site.
- B. Maintain folder structure on e-Builder to group photographs by date taken.

2.04 IDENTIFICATION

- A. Contractor shall maintain a log sheet listing the views photographed which shall include direction of view, station number or street address. The log shall include the name of the photographer and a unique individual sequential photo number Identify the specifications for all products to be incorporated into the Work as addressed in this Section.

PART 3 EXECUTION

3.01 GENERAL

- A. Consult with the Owner for instructions concerning views required at each specified visit to site.
- B. Contractor shall give the Owner the opportunity to accompany the photographer during the photo session(s).
- C. The Owner will request certain views to be taken in select instances.
- D. Photographs shall generally be taken on a random basis throughout each session to document various phases of the construction activities, with particular emphasis on the past month's construction progress.
- E. Contractor shall maintain a log sheet listing the views photographed which shall include direction of view, station number or street address. The log shall include the name of the photographer and a unique individual sequential photo number.
- F. Submit photographic records with the monthly pay request.

END OF SECTION

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SECTION 01 33 00 SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including but not limited to:
 - 1. Contractor's Progress Schedule.
 - 2. Schedule of Values.
 - 3. Schedule of Payments.
 - 4. Survey and Layout Data.
 - 5. Submittal Schedule Daily Construction Reports.
 - 6. Shop Drawings.
 - 7. Working Drawings.
 - 8. Product Data.
 - 9. Samples.
- B. Inspection and test reports are included in Section 01 45 16, Contractor Quality Control.

1.02 DEFINITIONS

- A. Action Submittal: Written and graphic information submitted by Contractor that requires Owner's approval.
- B. Deferred Submittal: Information, in accordance with IBC Section 106.3.4.2 submitted by Contractor for portions of design that are to be submitted to permitting agency for approval prior to installation of that portion of the Work, along with the Owner's review documentation that submittal has been found to be in general conformance with Project's design.
- C. Elevation: The figures given on the Drawings or in the other Contract Documents after the work "elevation" or abbreviation of it shall mean the distance in feet above the standard datum used by the Owner.
- D. Informational Submittal: Written information that does not required the Owner's responsive action. Information submitted by Contractor that requires the Owner's review and determination that submitted information is in accordance with the Conditions of the Contract.
- E. Shop Drawings: drawings, diagrams, illustrations, schedules, catalog cuts, performance charts, brochures, and other data prepared by the Contractor or

any subcontractor, manufacturer, supplier, or distributor, which illustrates how specific portions of the work shall be fabricated and/or installed. Drawings prepared by the fabricator or supplier showing the layout and details of components fabricated in a shop for inclusion in the permanent facility (e.g., structural steel, reinforcing steel, railings, etc.).

- F. Working Drawings: Drawings furnished by the Contractor showing the layout and details of temporary construction, procedures and methods of construction, and data for construction equipment which are to be employed in the construction of the permanent facility (e.g., form drawings, erection drawings, load test pile procedures, pile hammer data, etc.).

1.03 PROCEDURES

- A. Direct submittals to Resident Engineer unless specified otherwise.
- B. Electronic Submittals: Submittals shall, unless specifically accepted, be made in electronic format and processed manually until such time that the Owner-Selected Electronic System (OSSES) is implemented on the project.
 - 1. Submit to the Owner's hosted site and maintain on e-Builder®.
 - a. Annotate submittals using conventions to track submittal number, name and version.
 - 2. Each submittal shall be an electronic file in Adobe Acrobat Portable Document Format (PDF). Use the latest version available at time of execution of the Agreement.
 - 3. Electronic files that contain more than 10 pages in PDF format shall contain internal bookmarking from an index page to major sections of the document.
 - 4. PDF files shall be set to open "Bookmarks and Page" view.
 - 5. Add general information to each PDF file, including title, subject, author, and keywords.
 - 6. PDF files shall be set up to print legibly at 8.5-inch by 11-inch, 11-inch by 17-inch, or 22-inch by 34-inch. No other paper sizes will be accepted.
 - 7. Submit new electronic files for each resubmittal.
 - 8. Include a copy of the Transmittal of Contractor's Submittal form, located at end of section, with each electronic file.
 - 9. Provide Engineer with authorization to reproduce and distribute each file as many times as necessary for Project documentation.
 - 10. Detailed procedures for handling electronic submittals will be discussed at the preconstruction conference.
 - 11. The Contractor shall assign at least one employee to become the OSSES manager and be certified in the OSSES platform as a "train the trainer" at

which time that employee will train the remaining Contractors OSES users.

C. Transmittal of Submittal:

1. Contractor shall:

- a. Review each submittal and check for compliance with Contract Documents.
- b. Stamp each submittal with uniform approval stamp before submitting to the Resident Engineer.
 - 1) Stamp to include Project name, submittal number, Specification number, Contractor's reviewer name, date of Contractor's approval, and statement certifying submittal has been reviewed, checked, and approved for compliance with Contract Documents.
 - 2) Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- c. Fill out and affix the Transmittal of Contractor's Submittal form to each submittal package (see Attachment 1).
 - 1) Transmittal Number.
 - a) Transmittal numbers shall begin with a specification section pre-fix followed by "01" and run consecutively.
 - b) In cases where resubmittals are necessary, subsequent submissions shall carry suffixes "A", "B", etc.
 - c) Example: For the 2nd resubmittal of the eighth submittal under specification section 26 05 70 the entire transmittal number would be: 260570-08-B
 - 2) Specification section and paragraph to which submittal applies.
 - 3) Project title and the Owner's project number.
 - 4) Date of transmittal.
 - 5) Names of Contractor, Subcontractor or Supplier, and manufacturer as appropriate.
 - 6) Identify and describe each deviation or variation from Contract Documents.
 - 7) Complete, sign, and transmit via e-mail to the Resident Engineer, until such time that the Owner-Selected Electronic System comes on-line, with each submittal package, one Transmittal of Contractor's Submittal form attached at end of this section.

D. Format:

1. Do not base Shop Drawings on reproductions of Contract Documents.

2. Package submittal information by individual specification section. Do not combine different specification sections together in submittal package, unless otherwise directed in specification.
 3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.
 4. Index with labeled tab dividers in orderly manner.
- E. Timeliness: Schedule and submit in accordance Schedule of Submittals and requirements of individual specification sections.
1. Review time commences on the date the submittal is logged in by the Resident Engineer.
 2. Unless specific submittal review periods are indicated in the technical specifications, the Owner's submittal review period shall be 60 consecutive calendar days in length for electrical and instrumentation submittals, complex process system submittals and slurry wall and tie-back anchor submittals and 30 consecutive calendar days in length for all other submittals, and shall commence on the first calendar day immediately following the date of arrival of the submittal or resubmittal in the Owner's office. The time required to mail the submittal or resubmittal back to Contractor shall not be considered a part of the submittal review period.
 3. Resubmittals will be subject to same review time.
 4. No adjustment of Contract Times or Price will be allowed as a result of delays in progress of Work caused by rejection and subsequent resubmittals.
- F. Resubmittals: Clearly identify each correction or change made.
- G. Incomplete Submittals:
1. Engineer will return entire submittal for Contractor's revision if preliminary review deems it incomplete.
 2. When any of the following are missing, submittal will be deemed incomplete:
 - a. Contractor's review stamp; completed and signed.
 - b. Transmittal of Contractor's Submittal; completed and signed.
 - c. Insufficient number of copies.
- H. Submittals not required by Contract Documents:
1. Will not be reviewed and will be returned stamped "Not Subject to Review."
 2. Engineer will keep one copy and return submittal to Contractor.

1.04 ACTION SUBMITTALS

- A. Prepare and submit Action Submittals required by individual specification sections.
- B. Shop Drawings:
 - 1. Electronically, in the format outlined above.
 - 2. If hard copy submittal is required, eight copies and one reproducible of any documents larger than 11 inches by 17 inches, except copyrighted documents.
 - 3. Identify and indicate:
 - a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.
 - b. Equipment and Component Title: Identical to title shown on Drawings.
 - c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.
 - d. Project-specific information drawn accurately to scale.
 - 4. Manufacturer's standard schematic drawings and diagrams as follows:
 - a. Modify to delete information that is not applicable to the Work.
 - b. Supplement standard information to provide information specifically applicable to the Work.
 - 5. Product Data: Provide as specified in individual specifications.
 - 6. Foreign Manufacturers: When proposed, include the following additional information:
 - a. Names and addresses of at least two companies that maintain technical service representatives close to Project.
 - b. Complete list of spare parts and accessories for each piece of equipment.
- C. Samples:
 - 1. Copies: Two, unless otherwise specified in individual specifications.
 - 2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:
 - a. Manufacturer name.
 - b. Model number.
 - c. Material.
 - d. Sample source.
 - 3. Manufacturer's Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.

4. Full-size Samples:
 - a. Size as indicated in individual specification section.
 - b. Prepared from same materials to be used for the Work.
 - c. Cured and finished in manner specified.
 - d. Physically identical with product proposed for use.
- D. Action Submittal Dispositions: Engineer will review, comment, stamp, and distribute as noted:
1. Approved as Submitted (for incorporation in Work):
 - a. Contractor may begin to implement activities to incorporate specific product(s) or Work covered by Submittal.
 - b. If hard copy submittals are required, the following shall apply:
 - 1) One copy furnished Owner.
 - 2) Two copies furnished Resident Project Representative.
 - 3) One copy retained in Engineer's project office file.
 - 4) One copy retained in Engineer's design office file.
 - 5) Two copies sent to the Building Department, Special Inspections Submittals only.
 - 6) Two copies sent to the permitting agency, Deferred Submittals only.
 - 7) Remaining copies returned to Contractor appropriately annotated.
 2. Approved as Noted (for incorporation in Work):
 - a. Contractor may begin to implement activities to incorporate product(s) or Work covered by Submittal, in accordance with Engineer's notations. Contractor shall acknowledge noted comments on Contractor letterhead.
 - b. If hard copy submittals are required, the following shall apply:
 - 1) One copy furnished Owner.
 - 2) One copy furnished Resident Project Representative.
 - 3) One copy retained in Engineer's project office file.
 - 4) One copy retained in Engineer's design office file.
 - 5) Two copies sent to the Building Department, Special Inspections Submittals only.
 - 6) Two copies sent to the permitting agency, Deferred Submittals only.
 - 7) Remaining copies returned to Contractor appropriately annotated.
 3. Rejected:
 - a. Submittal is not approved.
 - b. If hard copy submittals are required, the following shall apply:
 - 1) One copy retained in Engineer's project office file.
 - 2) Remaining copies returned to Contractor appropriately annotated.

4. Revise and Resubmit:
 - a. Submittal is not approved; resubmittal is required.
 - b. If hard copy submittals are required, the following shall apply:
 - 1) One copy furnished Resident Project Representative.
 - 2) One copy retained in Engineer's file.
 - 3) Remaining copies returned to Contractor with one copy appropriately annotated.
 - 4) Contractor shall complete and resubmit or submit missing portions.
5. Partially Approved (PA), Approved as Noted:
 - a. Submittal is Partially Approved. Contractor shall resubmit items not approved. Contractor shall acknowledge noted comments on Contractor letterhead for items Approved as noted.
 - b. If hard copy submittals are required, the following shall apply:
 - 1) One copy furnished Owner.
 - 2) One copy furnished Resident Project Representative.
 - 3) One copy retained in Engineer's project office file.
 - 4) One copy retained in Engineer's design office file.
 - 5) Two copies sent to the Building Department, Special Inspections Submittals only.
 - 6) Two copies sent to the permitting agency, Deferred Submittals only.
 - 7) Remaining copies returned to Contractor appropriately annotated.

1.05 INFORMATIONAL SUBMITTALS

A. General:

1. Submit electronically, in the format outlined above.
2. If hardcopy submittals are required, submit six copies, unless otherwise indicated in individual specification section.
3. Refer to individual specification sections for specific submittal requirements.
4. Engineer will review each submittal. If submittal meets conditions of the Contract, Engineer will forward copy to appropriate parties. If Engineer determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, Engineer will return submittal electronically with review comments to Contractor, and require that submittal be corrected and resubmitted.

B. Certificates:

1. General:

- a. Provide notarized statement that includes signature of entity responsible for preparing certification.
 - b. Signed by officer or other individual authorized to sign documents on behalf of that entity.
 2. Welding: In accordance with individual specification sections.
 3. Installer: Prepare written statements on manufacturer's letterhead certifying installer complies with requirements as specified in individual specification section.
 4. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
 5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual specification sections.
 6. Manufacturer's Certificate of Compliance: In accordance with Section 01 61 00, Common Product Requirements.
 7. Manufacturer's Certificate of Proper Installation: In accordance with Section 01 43 33, Manufacturers' Field Services.
- C. Construction photographs and video in accordance with Section 01 32 33, Construction Photographs, and as may otherwise be required in Contract Documents.
- D. Closeout Submittals: In accordance with Section 01 77 00, Closeout Procedures.
- E. Contractor-design Data (related to temporary construction):
1. Written and graphic information.
 2. List of assumptions.
 3. List of performance and design criteria.
 4. Summary of loads or load diagram, if applicable.
 5. Calculations.
 6. List of applicable codes and regulations.
 7. Name and version of software.
 8. Information requested in individual specification section.
- F. Deferred Submittals: See Drawings for list of deferred submittals.
1. Contractor-design data related to permanent construction:
 - a. List of assumptions.
 - b. List of performance and design criteria.
 - c. Summary of loads or load diagram, if applicable.
 - d. Calculations.
 - e. List of applicable codes and regulations.

- f. Name and version of design software.
 - g. Factory test results.
 - h. Informational submittals requested in individual specification section.
 2. Prior to installation of indicated structural or nonstructural element, equipment, distribution system, or component or its anchorage, submit calculations and test results of Contractor-designed components for review by Engineer. Documentation of review and indication of compliance with general design intent and project criteria provided on Engineer's comment form as meets conditions of the Contract, along with completed submittal, shall be filed with permitting agency by Contractor and approved by permitting agency prior to installation.
- G. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual specification section.
- H. Operation and Maintenance Data: As required in Section 01 78 23, Operation and Maintenance Data.
- I. Payment:
 1. Application for Payment: In accordance with Section 01 29 00, Payment Procedures.
 2. Schedule of Values: In accordance with Section 01 29 00, Payment Procedures.
 3. Schedule of Estimated Progress Payments: In accordance with Section 01 29 00, Payment Procedures.
- J. Quality Control Documentation: As required in Section 01 45 16, Contractor Quality Control.
- K. Schedules:
 1. Schedule of Submittals: Prepare separately or in combination with Progress Schedule as specified in Section 01 32 00, Construction Progress Documentation.
 - a. Show for each, at a minimum, the following:
 - 1) Specification section number.
 - 2) Identification by numbering and tracking system as specified under Paragraph Transmittal of Submittal.
 - 3) Estimated date of submission to Engineer, including reviewing and processing time.
 - 4) On a monthly basis, submit updated Schedule of Submittals to Engineer if changes have occurred or resubmittals are required.

- b. Schedule of Values: In accordance with Section 01 29 00, Payment Procedures.
 - c. Schedule of Estimated Progress Payments: In accordance with Section 01 29 00, Payment Procedures.
 - d. Progress Schedules: In accordance with Section 01 32 00, Construction Progress Documentation.
- L. Special Guarantee: Supplier's written guarantee as required in individual specification sections.
- M. Statement of Qualification: Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty Subcontractor, trade, Specialist, consultant, installer, and other professionals.
- N. Submittals Required by Laws, Regulations, and Governing Agencies:
1. Promptly submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
 2. Transmit to Engineer for Owner's records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.
- O. Test, Evaluation, and Inspection Reports:
1. General: Shall contain signature of person responsible for test or report.
 2. Factory:
 - a. Identification of product and specification section, type of inspection or test with referenced standard or code.
 - b. Date of test, Project title and number, and name and signature of authorized person.
 - c. Test results.
 - d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
 - e. Provide interpretation of test results, when requested by Engineer.
 - f. Other items as identified in individual specification sections.
 3. Field:
 - a. as a minimum, include the following:
 - 1) Project title and number.
 - 2) Date and time.
 - 3) Record of temperature and weather conditions.
 - 4) Identification of product and specification section.

- 5) Type and location of test, Sample, or inspection, including referenced standard or code.
- 6) Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
- 7) If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
- 8) Provide interpretation of test results, when requested by Engineer.
- 9) Other items as identified in individual specification sections.

P. Testing and Startup Data: In accordance with equipment specification sections.

Q. Training Data: In accordance with Section 01 43 33, Manufacturers' Field Services.

1.06 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. The Owner reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. All shop drawings submitted by subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SAMPLES, SHOP AND WORKING DRAWINGS

- A. When requested, the Contractor should submit sufficient data relating to proposed materials and equipment to enable the Owner to identify and evaluate the particular product. Manufacturers test reports and certifications shall be submitted as requested. Such data shall be submitted in a manner similar to that specified for submission of shop and working drawings.
- B. When requested, the Contractor should submit samples of material for tests, as the Owner deems necessary to demonstrate conformity with specifications. Such samples shall be furnished, taken, stored, packed, and shipped by the Contractor so as to reach their destination in good condition, and shall be labeled to indicate material represented, name of project, intended location of the material and the a name of the Contractor submitting the sample. To ensure consideration of samples, the Contractor shall notify the Owner by letter that samples have been shipped and shall properly describe the samples in the letter. Then notification letter shall be sent separately from, and should not be enclosed, with, the samples.
- C. Contractor shall submit data and samples sufficiently early to permit consideration, inspection, testing, and approval before the materials and equipment are needed for the work. Failure to do so shall be the Contractor's sole responsibility.
- D. To demonstrate the proficiency of workmen or to facilitate the choice among several textures, types, finishes, surfaces, etc., the Contractor shall provide such samples of workmanship of wall and floor finish, etc. as may be requested.
- E. No material or equipment shall be purchased or fabricated for the Contract until the shop drawings have been approved. Materials and equipment used in the work shall in all respects conform to approved data and samples.
- F. The Contractor shall give written notice to the Owner of the place and time where fabrication, manufacture, testing, and shipping will take place for all materials and products for which off-site testing is specified in the Contract or as specifically requested by the Owner. Such notice shall be in writing and delivered to the Owner no less than ten (10) days before the event so that arrangements for inspection may be made.
- G. The Contractor shall not use any shop drawing which does not bear the Owner's authorized approval stamp.

- H. No changes shall be made to approved shop drawings and submitted working drawings without resubmission and approval.
- I. Shop and working drawings shall be prepared by the Contractor and submitted to the Owner sufficiently ahead of proposed work so that review, correction and approval actions as described herein will not delay construction operations.
- J. At the time of each submission, the Contractor shall give specific written notice of each variation that the shop and working drawings or samples may have deviated from the requirements of the Contract Documents, and in addition, shall cause a specific notation to be made on each shop and working drawing submitted for review of each variation. The review of shop drawings or samples shall not relieve the Contractor from the responsibility for any variation from the requirements of the Contract Documents unless the Contractor has in writing called attention to each such variation at the time of submission and the Owner has given written acceptance of each such deviation by a specific written notation incorporated in or accompanying the shop or working drawing or sample review; nor will any review relieve the Contractor from responsibility for errors or omissions in the shop or working drawings.
- K. Each submittal shall list the codes and standards governing the materials, design, and manufacture of the items covered by the submittal, with particular attention to the codes and standards set forth in the Specifications. The list shall indicate the year or date of issue of each code or standard utilized by the manufacturer or Supplier in the production of the items in question.
- L. Identify field dimensions; show relation to adjacent or critical features or work or products.
- M. The data shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangements, and operation of component materials and devices; the external connections, anchorages, and supports required; performance characteristics; and dimensions needed for installation and correlation with other materials and equipment.
- N. When catalog pages are submitted, applicable items shall be clearly identified and inapplicable data crossed out. The current revision, issue number, and date shall be indicated on all drawings and other descriptive data.
- O. Contractor's stamp of approval is a representation to the Owner that Contractor accepts full responsibility for determining and verifying all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data, and that he has reviewed and coordinated each submittal with the requirements of the Work and the Contract Documents. Contractor

shall correct all field dimensions and criteria and shall be responsible for the coordination of work by all Subcontractors.

- P. Contractor shall accept full responsibility for the completeness of each submission. When an item consists of components from several sources, Contractor shall submit a complete initial submittal including all components.
- Q. All variations from the Contract Documents shall be identified on each submittal and shall be tabulated in Contractor's letter of transmittal. Such submittals shall, as pertinent to the variation, indicate essential details of all changes proposed by Contractor (including modifications to other facilities that may be a result of the variation) and all required piping and wiring diagrams.
- R. Assemble complete submittal into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation of each item.
- S. The Owner will not accept submittals from anyone but the Contractor. Facsimile (fax) copies will not be acceptable.
- T. Additional Requirements for Electronic Submittals:
 - 1. All Electronic submittals shall adhere to the following.
 - a. All submissions shall be complete; partial submissions will not be acceptable.
 - b. Contractor shall QA/QC all electronic documents and files prior to submission. All documents must be legible, have clarity, be positioned upright, and have page/document copied in full.
 - c. The transmittal sheet for each submittal shall be scanned as one searchable pdf document and included with the electronic submittal.
 - d. When submitting multiple required copies of a document, multiple copies in one pdf document will not be acceptable.
 - e. All digital or electronic drawing submittals shall be prepared using the following naming convention:
 - 1) PROJECT ACRONYM – DISCIPLINE CODE – DRAWING NUMBER.FILE EXTENSION (dwg or pdf)
- U. Specific Shop Drawing Requirements: All shop drawing submittals shall conform to the following specific requirements for all Mechanical, Electrical, Instrumentation, Special Construction, Facility, Furniture, Plumbing, etc. submittals, where applicable:
 - 1. Technical bulletins, technical data sheets from “soft-cover” catalogs, standard equipment operations and maintenance (O&M) manuals, and

- descriptive literature or catalog information which is “highlighted” or somehow identifies the specific equipment items the Contractor intends to provide are acceptable for each individual equipment component. Manuals shall contain all illustrations, detailed drawings, wiring diagrams and instructions necessary for installing, operating and maintaining the equipment. The illustrated parts shall be numbered for identification. All information shall apply specifically to the equipment furnished and shall only include instructions that are applicable.
2. **System Description:** Describes the equipment and how it functions, identifies the installation location, number of units furnished; the equipment tag number or unit ID, and a list of principal components that includes the equipment name, model number, manufacturer, size, performance data, operating conditions and design requirements.
 3. **Equipment Operation:** Provide written pre-startup, startup, normal operation and shutdown instructions for the equipment provided. Also include emergency shutdown procedures. The written descriptions are specially prepared to describe the operation of the equipment and control system. Include contract document control diagrams and process and instrumentation diagrams relating to the equipment operation.
 4. **Safety:** Address all safety and tag-out procedures necessary to safely operate and maintain the equipment.
 5. **Dimensional Drawings:** General dimensions to confirm the size of pumps, motors, drives and specified appurtenances; piping connections; construction details and layout diagram of equipment; wiring details and weight of equipment.
 6. **Installation:** Method recommended for installation of all component assemblies, operating characteristics, and application data for the equipment. Include layout drawings showing fabrication, assembly and typical installation details.
 7. **Equipment Lubrication:** Provide the required lubricant recommended by the manufacturer for the equipment. Furnish a list of recommended lubricants from four different manufacturers and their model and part number. Include an estimated quantity of lubricant required for a full year’s operation and lubrication frequency.
 8. **Statistical Information:** Equipment performance such as pump curves, flow charts, total dynamic head, rpm, horsepower or size. Instrument data obtained such as range, set points, input/output characteristics, calibration, configuration parameters, size and graduations in the Owner units. Insulation resistance, calibration, or test data sheets to use as documentation for acceptance testing.
 9. **Preventative Maintenance:** Identify tasks and frequency for performing equipment inspections. Address tasking for equipment inspection, testing and routine adjustments. Include all applicable visual examinations and the adjustments necessary for periodic preventive

maintenance of the system. Maintenance tasking includes procedures covering checkout, troubleshooting and equipment testing. Checkout procedures provide the ability to verify the satisfactory operation of equipment. Troubleshooting procedures serve as a guide in determining faulty components. Equipment testing procedures cover requirements and recommended intervals for calibration, configuration and incorporate inspection reports, test results and all measurements and data.

10. **Materials List:** A complete list of all component assemblies, materials and equipment proposed to be furnished and installed under this portion of the work, giving manufacturer's name, catalog number, Original Equipment Manufacturers (OEM) parts number, and catalog cut for each item. Identify all parts with manufacturer's catalog number and other pertinent information. Include equipment drawing or catalog cut for each part listed in parts list. All parts on a parts list shall be properly identified, including manufacturer's catalog number and other pertinent information.
11. **Recommended Spare Parts:** A list of the manufacturer's recommended spare parts and the suggested replacement frequency of wear parts for equipment components with the manufacturer's current price for each item.
12. **Troubleshooting Procedures:** Corrective action proposed for any mechanical or electrical problems related to the equipment operation. Include guides for locating malfunctions. These guides shall include adequate details for quickly and efficiently locating the cause of an equipment malfunction and shall state the probable source(s) of trouble, the symptoms, probable cause and instructions for remedying the malfunction.
13. **Assembly/Disassembly:** Equipment shall be detailed for complete disassembly and assembly with procedures to remove & install, to assist with servicing the equipment and to facilitate repairs. The equipment shall be covered by cross-sectional drawings or exploded views with all parts numbered to correspond with the numbers in the parts list to permit identification of the various parts.
14. **Diagrams and Schematics:** Provide complete wiring diagrams, control circuits and field interconnection diagrams for all electrical and control equipment including panel drawings, fabrication drawings, loop diagrams, and point-to-point wiring diagrams. Drawings shall depict all components, piping and electrical connections of the systems supplied under this Section.
15. **Electrical As-Built Drawings:** "As Built" wiring and interconnection drawings shall be provided for all field installed and applied wiring as part of the Contract for all electrically powered devices. The drawings shall be supplied in addition to the wiring and interconnection diagrams specified and required in the individual sections of the technical

- specifications. The drawings shall illustrate electrical control devices, instruments and systems, and all instrumentation and/or control devices, instruments and systems, and all instrumentation and/or control systems.
16. Warranty/Guarantee: Provide manufacturer's guarantee of equipment operation and warranties of individual components.
 17. Field Test Records: Equipment performance data at the specified operating conditions is used as a bench mark for future routine maintenance and trouble shooting.
 18. Equipment Data for Mechanical, Special Construction and Facilities: Required for all equipment furnished under the Contract involving motors over 1/3 horsepower. Equipment data sheet forms are supplied by the Owner.
 19. Equipment Data for Instrumentation: Required for all instrumentation equipment furnished under the Contract:
 - a. A complete system block diagram(s) showing in schematic form, the interconnections between major hardware components such as; control centers, panels, power supplies, consoles, computer and peripheral devices, telemetry equipment, local digital processors and like equipment. The block diagram shall reflect the total integration of all digital devices in the system. All components shall be clearly identified with appropriate cross references to the location of each.
 - b. Data sheet for each hardware component listing all model numbers, optional, auxiliary and ancillary devices that are being provided.
 - c. Equipment specification sheets which shall fully describe the device, the intended function, how it operates and its physical environmental and performance characteristics. Each data sheet shall have appropriate cross references to loop or equipment identification tags.
 - d. Detailed drawings covering control consoles and/or enclosures.
 - e. The System Hardware submittal shall also contain all planning information, site preparation instructions, grounding and bonding procedures, cabling diagrams, plug identifications, safety precautions or guards and equipment layouts in order to proceed with the detailed site preparation for all equipment.
 - 1) A comprehensive index.
 - 2) A complete "As Constructed" set of approved shop drawings.
 - 3) A complete list of the equipment supplied, including serial numbers, ranges and pertinent data.
 - 4) Full specifications on each item.
 - 5) System schematic drawings "As Constructed", illustrating all components, piping and electrical connections of the systems supplied under this Section.

- 6) Detailed service, maintenance and operation instructions for each item supplied.
 - 7) Special maintenance requirements particular to this system shall be clearly defined, along with special calibration and test procedures.
 - 8) The operating instructions shall also incorporate a functional description of the entire system, with references to the systems schematic drawings and instructions.
 - 9) Complete parts lists with stock numbers and name, address and telephone number of the local supplier/manufacturer.
- f. The Hardware Maintenance Documentation shall describe the detailed preventive and corrective procedures required to keep the system in good operating condition. Within the complete Hardware Maintenance Documentation, all hardware maintenance manuals shall make reference to appropriate diagnostics, where applicable, and all necessary timing diagrams shall be included. A maintenance manual or a set of manuals shall be furnished for all delivered hardware, including peripherals. The Hardware Maintenance Documentation shall include, as a minimum, the following information:
- 1) Operation Information: This information shall include a detailed description of how the equipment operates and a block diagram illustrating each major assembly in the equipment.
 - 2) Preventative-Maintenance Instructions: These instructions shall include all applicable visual examinations, hardware testing and diagnostic routines and the adjustments necessary for periodic preventive maintenance of the System.
 - 3) Corrective Maintenance Instructions: These instructions shall include guides for locating malfunctions down to the card-replacement level. These guides shall include adequate details for quickly and efficiently locating the cause of an equipment malfunction and shall state the probable source(s) of trouble, the symptoms, probable cause and instructions for remedying the malfunction.
 - 4) Parts Information: This information shall include the identification of each replaceable or field repairable module. All parts shall be identified on a list in a drawing; the identification shall be of a level of detail sufficient for procuring any repairable or replaceable part.
- g. The Software Maintenance documentation shall provide a detailed description of the entire software system. This documentation shall be sufficient for software maintenance and modification of

the entire software system. The following items shall be included with the software maintenance documentation.

- 1) Manufacturer's User Manuals: All Manufacturer's manuals applicable to the system being provided.
 - 2) Software User Manuals: All applicable software manuals developed for the application software shall be provided.
 - 3) Application/Custom Software Manuals: These manual(s) shall include all software maintenance information not included in the manufacturer's standard manuals. Each custom program developed specifically for the system shall include the following information as a minimum:
 - a) Table of contents.
 - b) Overview of the program.
 - c) Narrative describing exactly how the program works. All calculations, references to process I/O points and operator inputs should be mentioned.
 - d) A flowchart shall be provided to clarify the narrative description.
 - e) A List of Variables used by the program including the function of each. A cross reference to the Software Functional Design Documentation shall be provided where appropriate.
 - 4) Software Listings: Two sets of well-annotated program listings of all software provided shall be furnished for all software items. These shall include, but not be limited to, the following:
 - a) All listings associated with the system generation and software configuration of the specific system (i.e., system parameterization tables, build maps, disk maps, etc.).
 - b) Listings of all data bases configured for and associated with the system.
 - c) Listing of all custom or modified software developed specifically for the system.
 - d) These listings shall reflect any changes made after the factory acceptance test.
20. Equipment Data for Electrical: Catalog cuts of equipment components by any other manufacturer must be included with any submittal.
21. Electric Motor Data: Product data for electric motors shall include motor data sheets, dimensional drawings, wiring diagrams identifying electric characteristics and design, mechanical construction, manufacturer's name, type and pertinent specifications for the use intended, along with the name off the equipment to be driven. A complete tabulation shall include:

22. Design data and computations shall be included in drawing submissions for sewer and water main pipe work.
23. For pressure conduits and rubber gasket jointed pipe, a checklist shall be submitted showing sequence of submission of anticipated drawings, geometry sheets, bills of material, and laying schedules.
24. Contractor shall submit for approval shop drawings for concrete reinforcement, structural details, railing, wiring, piping layouts, pipe joints and pipe harnessing, pipe thrust block layout, valves, material fabricated especially for the Contract, and materials and equipment for which such drawings are specifically requested.
25. Shop drawings shall show the principal dimensions, weight, structural features, clearances, types and/or brand of finish or shop coat, grease fittings, etc. to establish the intent of drawings and specifications. Grade, class or strength of materials shall be included. When it is customary to do so, when dimensions are of particular importance, or when so specified, shop drawings shall be certified by the manufacturer or fabricator as correct for the Contract.
26. Any proposed option shall be clearly marked, with a reference indicated on the detail the option is intended to replace.
27. Working drawings for sheeting, shoring, concrete forms for structures, staging, cofferdams, underpinning and temporary structures shall be submitted, accompanied by a description of the design basis, applicable codes and loads, and calculations for all stress carrying members.
28. Working Drawings shall be prepared under the direction and bear the seal of a registered professional engineer with a valid Commonwealth of Virginia P.E. license.
29. Any changes to working drawings will require resubmission and resealing. Whenever working drawings are submitted for structural supports and systems, the P.E. certifying said drawings shall have a valid civil/structural license.

V. The Owner's Review:

1. The Owner's review of shop drawings and data submitted by Contractor will cover only general conformity to the Drawings and Specifications, external connections and dimensions which affect the layout. The Owner's review does not indicate a thorough review of all dimensions, quantities, and details of the material, equipment, device, or item shown. The Owner's review shall not relieve Contractor of Contractor's responsibility for errors, omissions, or deviations in the drawings and data, nor of sole responsibility for compliance with the Contract Documents.
2. The Owner reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

3. Approval will be general and will not relieve the Contractor of the responsibility for accuracy, proper fit, and construction of work per the Contract nor for furnishing of material or work required but not indicated.

W. Resubmittal of Drawings and Data:

1. Contractor shall accept full responsibility for the completeness of each resubmittal. Contractor shall verify that all corrected data and additional information previously requested by the Owner are provided on the resubmittal.
2. When corrected copies are resubmitted, Contractor shall in writing direct specific attention to all revisions and shall list separately any revisions made other than those called for by the Owner on previous submissions.
3. If more than one resubmission is required because of failure of Contractor to provide all previously requested corrected data or additional information, Contractor shall reimburse the Authority for the charges of the Owner for review of the additional resubmissions. This does not include initial submittal data such as shop tests and field tests which are submitted after initial submittal.
4. Upon the 2nd return of a submittal requiring a resubmission or any resubmittal thereafter, a meeting will be held at the site with the CM, Design Engineer, Contractor project manager and vendor representatives of the submitted item to review and reconcile, to the extent possible, outstanding review comments.
5. Any need for more than one resubmission, or any other delay in obtaining the Owner's review of submittals, will not entitle Contractor to extension of the Contract Times unless delay of the Work is directly caused by a change in the Work authorized by a Change Order or other reason beyond the control of the Contractor.
6. Resubmittals shall be made within 14 days of the date of the letter returning the material to be modified or corrected, unless within 7 days Contractor submits an acceptable request for an extension of the stipulated time period, listing the reasons the submittal cannot be completed within that time.

3.02 REQUESTS FOR INFORMATION (RFI)

- A. Questions during construction shall be submitted to the Construction Manager in a form that is approved prior to the start of construction (see Attachment 2).
- B. RFI's shall be submitted as a Word Document with discrete cells for data entered and in pdf form to the Owner. All attachments to RFIs shall be submitted in pdf form.

C. Minimum information that must be included within the RFI form shall include, but not necessarily be limited to:

1. Contractor's contact name.
2. Project Number and name.
3. Date.
4. Sequential number of RFI.
5. RFI subject.
6. Contract Document References.
7. Detailed description of issue/request.
8. Recommended disposition.

3.03 SUBCONTRACT

A. Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, email address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
4. Submit the Owner Subcontractor Form.
5. Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architect, engineers and the Owner.
6. Submit six (6) copies, the Owner will return two (2) copies. Markup and retain one (1) returned copy as a Project Record Document.

3.04 CERTIFICATES

- A. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements
- B. Buy American Compliance Documentation: Submit certificates of compliance, exceptions clause citation, de minimus exception documentation, or executed EPA waiver.
- C. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedures Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

- D. Installation Certificates: Prepared written statements on manufacturer's letterhead certifying that Installer complied with manufacturer's installation requirements.
- E. Material & Product Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard forms, indicating and interpreting test results of material for compliance with Contract Documents.
- F. Field Test Reports: Prepared reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with Contract Documents.

3.05 OTHER SUBMITTALS

- A. Contractor shall submit reports, plans, permits, working drawings and other submittals as specified elsewhere or shown on the Drawings.
- B. Material Safety Data Sheets (MSDSs): Submit four (4) copies to the Owner.

3.06 SUPPLEMENTS

- A. The supplement listed below, following "End of Section," is part of this Specification.
 - 1. Transmittal of Contractor's Submittal.
 - 2. Request for Information Form.
 - 3. Contractor Submittal Routing Form

END OF SECTION

TRANSMITTAL OF CONTRACTOR'S SUBMITTAL					[INSERT GC LOGO]
Alexandria Renew Enterprises					
Contract Name:	TBD	Submittal No.			
Contractor: TBD		Contract No.	Spec. Section	Seq. No.	Rev.
TO:		<input type="checkbox"/> New Submittal <input type="checkbox"/> Resubmittal <p style="text-align: center;">(Cover only one section with each transmittal)</p> Referred Drawings: 			
FROM:		Scheduled Date of Submittal: Actual Date of Submission: Submittal Type <input type="checkbox"/> Shop Drawing <input type="checkbox"/> Sample <input type="checkbox"/> Informational <input type="checkbox"/> Deferred			
The following items are hereby submitted:					
Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. and Paragraph No.	Drawing or Brochure Number (including Brochure page nos.)	Contains Variation to Contract	
				No	Yes
Contractor hereby certifies that (i) submittal has been reviewed, checked, and approved for compliance with Contract Documents and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.					
		By:			Date:
		Contractor (Authorized Signature)			

REQUEST FOR INFORMATION/CLARIFICATION FORM											
[Project Name]											
										Page	of
DATE:			CONTRACT NO.			RFI NO.					
TO: Resident Engineer			FROM:			REFERENCED OR AFFECTED DESIGN DOCUMENTS:					
						SPEC. SECTION:					
						DWG:		REV:			
			ORIGINATOR:								
SUBJECT (for tracking purposes):											
DESCRIPTION OF REQUEST:											
Additional Info. Attached:			y	n	Response Need By:			Signed:		Date:	
										Contractor	
Disposition Assigned to:						Signed:				Date:	
						Resident Engineer					
RESPONSE TO REQUEST:											
						Signed:				Date:	
						Concur with DE:				Date:	
1. Does the DE propose to change Contract Documents?				y	n					Distribution: RE Document Control DE RFI file/Original CM AlexRenew PM	
2. Additional information attached by responder?				y	n						
3. Are other contracts affected?				y	n						
4. Are site or Plant-wide issues involved?				y	n						
Answered by FTM No.								Date:			

Contractor Submittal Routing Form Alexandria Renew Enterprises									
Contract Name: <i>108 to 116 MGD Expansion</i>					Submittal No.				
Contract No. <i>TBD</i>					Contract No.	Spec. Section		Seq. No.	Rev.
Contractor: <i>TBD</i>									
Received by RE					Title:				
Date: <i>Rec'd from GC</i>									
Distribution by RE:									
Date: <i>To Reviewers</i>					Keys:				
Responsible Resident Engineer(RE):					A - ACTION: Complete Review , combine review comments by others and send to RE . RE then sends to contractor . C - COMMENTS: Provide comments to RE. I - INFORMATION: Transmittal Cover Sheet only.				
<i>name</i>									
<i>firm</i>									
Responsible Design Engineer (DE):									
<i>name</i>									
<i>firm</i>									
Copies Distributed as shown below:									
No. of Copies	Office	Key	Date Distributed by RE	Date Received	Date Completed & Returned to RE			Reviewer Signature	
	Resident Engineer		To Reviewers						
	J. Ohnigian, CM								
	Design Engineer (DE)								
	Design Engineer Review Code:		A ____	AN ____	PA ____	RR ____	R ____	IR ____	See 0133 00.103.D for Definitions
			Approved As Submitted	Approved As Noted	Partially Approved	Revise & Resubmit	Rejected	Reviewed for Info. Only	
	DE Routing Tree:		Date Distributed by DE	Date Received	Date Completed & Returned to DE			Reviewer Signature	
Response to Contractor FTM:			Date:						

SECTION 01 33 10 DOCUMENT MANAGEMENT

PART 1 GENERAL

1.01 SUMMARY

- A. The Owner uses an eCMIS platform (e-Builder) to manage the life-cycle of project generated documents.
- B. The Owner and the Contractor shall use e-Builder for electronic submittal of all data and documents required by the Contract Documents as the platforms' workflow functions become operational. The CMIS platform site is owned and operated by the Owner. The joint use of this application is to:
 - 1. Facilitate electronic exchange of information
 - 2. Expedite the review process for submitted documents
 - 3. Centralize project information
- C. Project communications shall be submitted and processed using e-Builder. This CMIS platform shall be the primary communication tool for all contact between the Owner and the Contractor.
- D. Hard copies of all documents shall be provided in accordance with the Contract Documents.
 - 1. CMIS platform shall be used to track and expedite processing of these items.
 - 2. The Owner's acceptance of documents submitted via CMIS platform shall not relieve the Contractor from responsibility for any variation from the requirements of the Contract Documents.
 - 3. In the event of a discrepancy between the electronic version and paper documents, the paper documents will govern.
- E. If the Contractor is not familiar with eCMIS platforms they are highly encouraged to search on-line.

1.02 USER ACCESS LIMITATIONS

- A. The Owner shall provide the Contractor with a minimum of two (2) licenses of CMIS platform for participants designated by the Contractor to process submittals.
- B. The Contractor shall assign at least one employee to become the CMIS Administrator who will participate in an on-site two-day training to become

an e-Builder “train the trainer” at which time that employee will train the remaining Contractors CMIS users.

- C. User access and access rights to the CMIS platform site will be established, assigned and managed, by the Owner for the Contractor.
- D. The Owner will provide the Contractor access to CMIS platform to allow submittal of documents including, but not limited to: letters, shop drawings, submittals, meeting minutes, daily reports, drawings, specifications, memorandums, payment requisitions, change order requests, testing reports, warranties, guarantees and correspondence. Requests for Information will be directly entered into CMIS platform and generated by the application unless specified otherwise.
- E. Sub-Contractors and suppliers will not have direct access to CMIS platform unless specified or approved otherwise by the Owner. Entry of information exchanged and transferred between the Contractor and sub-contractors and suppliers shall be the responsibility of the Contractor.
- F. Access to modules is managed by permission levels configured by the Owner. Request to change permission levels must be submitted to the Owner through the Owner’s Construction Manager.

1.03 OWNERSHIP OF DATA

- A. All Data entered into CMIS platform shall be the sole property of the Owner.

1.04 COMPUTER REQUIREMENTS

- A. CMIS platform is accessed via the internet through a web browser using Java run-time plug-in technologies. The Contractor shall use computer hardware and software that meets the requirements of the Owner and the CMIS platform system. The Owner staff will not operate, install, or troubleshoot any of the Contractor’s hardware or software. The Contractor is solely responsible for the functionality of their systems.
- B. Should the version of CMIS platform be upgraded during the Contract Time the Contractor will not upgrade their system(s) to meet the requirements of the upgraded application unless directed by the Owner. Upgrading of the Contractor’s computer systems will not be justification for a time modification to the Contract.
- C. The Owner will accept no liabilities arising from the Contractor’s use of CMIS Platform.

1.05 CONTRACTOR RESPONSIBILITY

- A. The Contractor shall be responsible for the validity of the information placed in CMIS platform as well as the abilities of their personnel to use the application.
- B. An overview of the setup and submittal processes associated with CMIS platform will be presented to the Contractor. The Contractor is responsible for training their personnel in the use of CMIS platform, except as noted above in paragraph 1.1.A. All costs associated with the use of this system will be evenly distributed in the project overheads and spread across the duration of the contract; a separate added cost will not be allowed.
- C. The Contractor shall meet with the Owner authorized representative within fifteen (15) days after the Notice of Selection to discuss the Contractor's use of CMIS Platform. An Owner CMIS platform "User Account Request Form" shall be filled out, signed by each user and submitted to the Owner to receive access to CMIS platform is required. The Contractor must also submit their Company data.
- D. Notify the Owner immediately of any users who no longer require CMIS platform access. Their user account will be de-activated by the Owner and the license will again be available to the Contractor.
- E. User access changes will take effect within 3 working days of receipt of the request from the Contractor, but no earlier than NTP.
- F. The Contractor shall maintain a list of authorized the Owner network and CMIS platform accounts to reflect current authorized users. This list must be submitted to the Owner monthly.
- G. The Contractor shall protect the security of the CMIS platform system by limiting access to authorized users only and not allow 'sharing' of usernames.
- H. The Contractor shall comply with applicable laws and regulations regarding electronic transmission of documents requiring professional architects', engineers', geologists', and surveyors' stamps or signatures, including provision of hard copies of such documents as appropriate.
- I. The Contractor nor his representatives, users, sub-consultants and subcontractors shall not enter, attach or store sensitive personal information such as Social Security numbers in CMIS Platform.
- J. The Contractor will be allocated a minimum of two (2) user accounts and a maximum of five (5) user accounts based on the size of the contract.

- K. Project Communications that require the signature of authorized persons will use either:
 - 1. An approved “image” of the official signature affixed to the document. Also provide the Owner with the original signed hard copy/paper document.
 - 2. An electronic Copy or electronic image of a fully executed document containing the required signatures. Also provide the Owner with the original signed hard copy/paper document.

1.06 INTERNET CONNECTIVITY

- A. CMIS platform is a web-based environment and therefore subject to the inherent speed and connectivity issues of the internet service provider. The Contractor is responsible for his own connectivity to the internet outside of the Owner provided network. CMIS Platform’s response time is dependent on user’s equipment, including processor speed, network interface equipment, internet service provider access speed, etc. and current traffic on the internet.
- B. The Owner will not be liable for any delays associated from the usage of CMIS platform or Owner furnished internet service including, but not limited to: slow response time, down time periods, connectivity problems, or loss of information on the Contractor’s equipment.
- C. Under no circumstances shall the usage of the CMIS platform be grounds for a time extension or cost adjustment to the contract.
- D. Access to the internet for CMIS platform shall be operational upon receipt of the Notice to Proceed.

1.07 CMIS PLATFORM DOWNTIME

- A. In the event that the CMIS Platform system is temporarily unavailable, the Contractor shall continue with Project Communications utilizing alternate secure means (e-mail) or hard copies to transmit and receive Project Communications.
- B. Maintain records of all Project Communications during the CMIS Platform downtime and upload the records to CMIS Platform when it is operational.
- C. Notify the Owner by telephone and/or email when CMIS Platform is not functional.

PART 2 PRODUCTS

2.01 CMIS PLATFORM NAME

- A. The Owner has selected e-Builder to develop and implement an AlexRenew CMIS Platform.
- B. Web-based electronic information management application owned and operated by the Owner.

PART 3 EXECUTION

3.01 CMIS PLATFORM UTILIZATION AND ROLLOUT EXAMINATION

- A. Prior to providing access to CMIS platform an overview for the Contractor will be held at the site. The overview will include:
 - 1. CMIS platform site location (URL) and log on process.
 - 2. Navigation through CMIS Platform.
 - 3. Uploading documents.
 - 4. The Owner Submittal Review process.
 - 5. The Owner RFI Review process.
 - 6. The Owner Correspondence requirements.
 - 7. Submittal of Payment Requisitions.
 - 8. User Access Requirements.
- B. The Contractor shall provide the Owner with completed account forms for all its intended CMIS Platform users and information on contacts such as key personnel, sub-consultants, sub-contractors, vendors, etc. as required by the Owner.

3.02 COMMUNICATIONS

- A. All official documents attached to CMIS Platform shall be in one complete Portable Document Format (PDF) electronic file. These official PDF document files shall include duly executed signatures as required by the Contract. Supporting source document files may also be attached when so required.
- B. Date that the Contractor enters a document into CMIS platform will be recorded as the date received by the Owner with the following exceptions:
 - 1. All Project Communications submitted to the Owner through CMIS platform after 3:00 p.m., Eastern Time, Monday through Friday, will be acknowledged no earlier than the following regular business day.

2. For Project Communication purposes, business days and hours are defined as Monday through Friday, 8:00 a.m. to 3:00 p.m., Eastern Time, excluding Owner holidays.

END OF SECTION

SECTION 01 33 29
SUSTAINABLE CONSTRUCTION AND REPORTING

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor is responsible to track and log their efforts in achieving sustainable construction.

1.02 SUBMITTALS

- A. Informational Submittals:
 - 1. Sustainable construction log.

1.03 SUSTAINABLE CONSTRUCTION LOG

- A. Format: Electronic format using the Attachment 1 log template included at the end of this Section. Identify reporting period, date of submittal and author.

- B. Contents: Utilize the log to document all sustainable construction activities employed, reporting of quantitative metrics, lessons learned, innovative measures, recommended refinements, etc. to the requirements of the contract documents and other means utilized by the Contractor. Items for the log shall include the following, as applicable.
 - 1. Reductions in paper use via electronic media for project and workforce meetings. Document recycled content in copy paper.
 - 2. Use of City Water in lieu of bottled water for potable consumption.
 - 3. Use of teleconferencing and videoconferencing for project meetings where attendees are not typically on site.
 - 4. Use of any high efficiency equipment or lighting including electric or solar-powered equipment.
 - 5. Compliance with controls specified in Section 01 10 00, General Requirements.
 - 6. Compliance with operation of temporary facilities including field offices as described in Section 01 50 00, Contractor Facilities.
 - 7. Percent of monthly construction and demolition debris that is recycled compared to debris disposed in landfill in accordance with Section 01 74 19, Waste Management.
 - 8. Reductions in packaging from equipment and material suppliers or reuse and recycling of such packaging.
 - 9. Employment of any carpooling, shuttling programs, Metro, or DASH use by field staff.

10. Percentage of Regional Materials:
 - a. At the commencement of the Project, include a bill of materials list by Specification section in Divisions 3 through 44 that identifies the location of origin or manufacture of materials, products, and equipment to be provided in the Project. For minor items such as anchor bolts and small accessory items whereby the origin may fluctuate, denote the origin as “variable.”
 - b. The location of origin of equipment shall be defined as the point of final assembly of components into a product to be furnished.
 - c. Based on material costs of all items, provide a calculation showing percent of materials that are anticipated to come from within 500 miles of the Project Site versus the total material cost of the Project. A detailed listing of material costs by item is not required.
 - d. If procurement of major equipment or mechanical/electrical items that deviate from the original list is realized during the construction period, submit updated calculation to document the impact on the regional materials metric.
11. Total duration in number of weeks of active pile-driving activity.
12. Quantity of biodiesel fuel ordered for construction equipment versus regular diesel.
13. Use of any Tier 4 compliant construction equipment.
14. Report number of workdays lost in work schedule due to traffic congestion within plant Site resulting from Contractor's vehicles, other contractor vehicle, or Owner's fleet, if such incidents occur.
15. Running total of recordable and reportable safety incidents.
16. Other successes, etc.

1.04 REQUIREMENTS

A. Contractor Field Offices:

1. All lighting shall be compact fluorescent or LED lights.
2. Contractor shall enable sleep mode on computers, printers, copiers and fax machines.
3. Contractor shall turn down hot water heaters when trailer is to be unoccupied for an extended period of time.
4. Contractor shall provide and post information regarding Metro, DASH and VRE schedules and routes to promote use of mass transit for construction workers.

B. Lighting: Install and use lights only where needed to reduce light pollution.

C. Water Use: Minimize water use and utilize AlexRenew reclaimed water whenever possible. Coordinate reclaimed water usage and source locations with the Owner.

- D. Cleaning Products: All cleaning products utilized in the Contractor's field office and at the construction site must be certified by Green Seal.
- E. Fuel:
 - 1. A minimum of 50 percent of fuel consumed on the Project for operation of heavy construction equipment shall be a blend of 20 percent biodiesel and 80 percent diesel (B20 blend). Blends of greater than 20 percent biodiesel are permitted. Biodiesel shall meet the requirements of ASTM D6751.
 - 2. Biodiesel shall be delivered pre-blended from suppliers accredited by the BQ 9000 Quality Management Program of the National Biodiesel Board.
 - 3. The Contractor shall follow the equipment manufacturer's guidelines for blend type, length of storage, and maintenance requirements.
 - 4. Report all biodiesel use in the Contractor's and Subcontractors' equipment as instructed in Section 01 32 00, Construction Progress Documentation.

1.05 PUBLIC TRANSIT

- A. Per Section 01 29 00, Payment Procedures, The Owner will subsidize 50 percent of costs associated with mass transit use by the Contractor's workers for those workers who elect to use Metro, DASH, VRE or other forms of public transit to commute to the Project Site.

1.06 WASTE MANAGEMENT

- A. Report type and quantity of materials, by weight tickets, sent to salvage yards, recycling centers, and landfills, as specified in Section 01 74 19, Waste Management.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOTE USED)

3.01 SUPPLEMENTS

- A. Sustainable Construction Log.

END OF SECTION

Sustainable Construction Log			
Issued by: _____			
Issue Date: _____			
Project Number: _____		Construction Manager: _____	
Report Period: _____		Project Start (month/year): _____	
Waste Management: Weight Recycled/Salvaged: _____ tons Weight Landfilled: _____ tons Total: _____ Tons Percent Recycled/Salvaged: _____ %		Heavy Equipment Fuel Received: Biodiesel: _____ gallons Regular Diesel: _____ gallons Percent Biodiesel: ___ %	
Safety: Number of Recordable Incidents: _____ Number of Reportable Incidents: _____		Traffic: Number of Days Lost to Site Traffic Congestion: _____	
Documentation of Other Practices and Specified Metrics			
Entry No.	Date	Item Description	Follow-up Actions/Recommendations
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

**SECTION 01 43 33
MANUFACTURERS' FIELD SERVICES**

PART 1 GENERAL

1.01 DEFINITIONS

- A. Person-Day: One person for 8 hours within regular Contractor working hours.

1.02 SUBMITTALS

- A. Informational Submittals:
 - 1. Qualifications of Manufacturer's representatives.
 - 2. Training Schedule: Submit, in accordance with requirements of this Specification, not less than 45 days prior to start of equipment installation and revise as necessary for acceptance.
 - 3. Lesson Plan: Submit, in accordance with requirements of this Specification, proposed lesson plan not less than 60 days prior to scheduled training and revise as necessary for acceptance.

1.03 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

- A. Authorized representative of the manufacturer, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system, with full authority by the equipment manufacturer to issue the certifications required of the manufacturer. Additional qualifications may be specified in the individual specification section.
- B. Representative subject to acceptance by Owner and Engineer. No substitute representatives will be allowed unless prior written approval by such has been given.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

- A. Furnish certified welding inspector(s) when these services are required by individual Specification sections.
- B. Furnish manufacturers' services, when required by an individual specification section, to meet the requirements of this section.

- C. Where time is necessary in excess of that stated in the Specifications for manufacturers' services, or when a minimum time is not specified, time required to perform specified services shall be considered incidental.
- D. Schedule manufacturer' services to avoid conflict with other onsite testing or other manufacturers' onsite services.
- E. Determine, before scheduling services, that conditions necessary to allow successful testing have been met.
- F. Only those days of service approved by Engineer will be credited to fulfill specified minimum services.
- G. When specified in individual specification sections, manufacturer's onsite services shall include:
 - 1. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of Contractor's assembly, erection, installation or application procedures.
 - 2. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by manufacturer and necessary to furnish Manufacturer's Certificate of Proper Installation.
 - 3. Providing, on a daily basis, copies of manufacturers' representatives' field notes and data to Resident Engineer.
 - 4. Revisiting the Site as required to correct problems and until installation and operation are acceptable to Engineer.
 - 5. Resolution of assembly or installation problems attributable to or associated with respective manufacturer's products and systems.
 - 6. Assistance during functional and performance testing, and facility startup and evaluation.
 - 7. Training of Owner's personnel in the operation and maintenance of respective product as required.
 - 8. Additional requirements may be specified elsewhere.

3.02 MANUFACTURER'S CERTIFICATE OF COMPLIANCE

- A. When so specified, a Manufacturer's Certificate of Compliance, a copy of which is attached to this section, shall be completed in full, signed by the entity supplying the product, material, or service, and submitted prior to shipment of product or material or the execution of the services.
- B. Engineer may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.
- C. Such form shall certify that the proposed product, material, or service complies with that specified. Attach supporting reference data, affidavits, and certifications as appropriate.

- D. May reflect recent or previous test results on material or product, if acceptable to Engineer.

3.03 MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

- A. When so specified, a Manufacturer's Certificate of Proper Installation form, a copy of which is attached to this section, shall be completed and signed by equipment manufacturer's representative.
- B. Such form shall certify signing party is a duly authorized representative of manufacturer, is empowered by manufacturer to inspect, approve, and operate their equipment and is authorized to make recommendations required to ensure equipment is complete and operational.

3.04 TRAINING

A. General:

1. Furnish manufacturers' representatives for detailed classroom and hands-on training to Owner's personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.
2. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with Owner, and familiar with operation and maintenance manual information specified in Section 01 78 23, Operation and Maintenance Data.
3. Manufacturer's representative shall be familiar with facility operation and maintenance requirements as well as with specified equipment.
4. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.

B. Training Schedule:

1. List specified equipment and systems that require training services and show:
 - a. Respective manufacturer.
 - b. Estimated dates for installation completion.
 - c. Estimated training dates.
2. Multiple training sessions will be required. Provided for a minimum of five training sessions over a period of four separate weeks. Sessions may only be scheduled between the hours of 6:00 a.m. and 2:00 p.m.
3. Adjust schedule to ensure training of appropriate personnel as deemed necessary by Owner, and to allow full participation by manufacturers' representatives. Adjust schedule for interruptions in operability of equipment.
4. Coordinate with Section 01 32 00, Construction Progress Documentation, and Section 01 91 00, Commissioning System Plan.

- C. Lesson Plan: When manufacturer or vendor training of Owner personnel is specified, prepare a lesson plan for each required course containing the following minimum information:
1. Title and objectives.
 2. Recommended attendees (such as, managers, engineers, operators, maintenance).
 3. Course description, outline of course content, and estimated class duration.
 4. Format (such as, lecture, self-study, demonstration, hands-on).
 5. Instruction materials and equipment requirements.
 6. Methods used to validate training effectiveness (such as teach back, testing, etc.).
 7. Resumes of instructors providing training.
- D. Pre-Startup Training:
1. Coordinate training sessions with Owner's operating personnel and manufacturers' representatives, and with submission of operation and maintenance manuals in accordance with Section 01 78 23, Operation and Maintenance Data, and any other handouts, if applicable,.
 2. Complete at least 14 days prior to beginning of facility startup.
- E. Post-startup Training: If required in Specifications, furnish and coordinate training of Owner's operating personnel by respective manufacturer's representatives.
- F. Recording of Training Sessions:
1. Furnish audio and color recording of pre-startup and post-startup instruction sessions, including manufacturers' representatives' hands-on equipment instruction and classroom sessions.
 2. Video training materials shall be produced by a qualified, professional video production company.
 3. Use MP4 format, or other media approved by Owner, suitable for playback on YouTube.
 4. Include one training session per individual record.
 5. Submit a multiple-choice quiz with no more than ten (10) questions and include answers.

3.05 SUPPLEMENTS

- A. The supplement listed below, following “End of Section,” is part of this specification.
1. Manufacturer’s Certificate of Compliance.
 2. Manufacturer’s Certificate of Proper Installation

END OF SECTION

MANUFACTURER'S CERTIFICATE OF COMPLIANCE

OWNER: Alexandria Renew Enterprises

PRODUCT, MATERIAL, OR SERVICE
SUBMITTED:

PROJECT NAME:

PROJECT NO:

Comments: _____

I hereby certify that the above-referenced product, material, or service called for by the contract for the named project will be furnished in accordance with all applicable requirements. I further certify that the product, material, or service are of the quality specified and conform in all respects with the contract requirements, and are in the quantity shown.

Date of Execution: _____, 20__

Manufacturer: _____

Manufacturer's Authorized Representative (*print*): _____

(Authorized Signature)

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

OWNER Alexandria Renew Enterprises EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- Installed in accordance with Manufacturer's recommendations.
- Inspected, checked, and adjusted.
- Serviced with proper initial lubricants.
- Electrical and mechanical connections meet quality and safety standards.
- All applicable safety equipment has been properly installed.
- Functional tests.
- System has been performance tested and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer's Authorized Representative: _____

(Authorized Signature)

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SECTION 01 45 16 CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the responsibilities pertaining to quality assurance (QA) and quality control (QC) of the Work and applies to construction work including identification, stocking and issue of materials and supplies; the entire process of construction; and the installation and testing of equipment.
- B. Contractor is responsible for both the QA and QC of the Work, including that performed by Subcontractors and Suppliers in order to ensure all Work meets the requirements in the Contract Documents.
- C. The Owner shall hold the final authority for determining acceptance of materials incorporated into this project.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. ASTM International (ASTM):
 - a. D3740, Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
 - b. E329, Use in the Evaluation of Testing and Inspection Agencies as Used in Construction.

1.03 DEFINITIONS

- A. Contractor Quality Control (CQC): The means by which Contractor ensures that the construction, to include that performed by subcontractors and suppliers, complies with the requirements of the Contract.
- B. Quality Control (QC): The successful execution of a realistic plan which ensures that the required standards of quality construction are met and which will preclude problems resulting from poor quality or lack of quality. QC includes tests, inspections, procedures and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Contract enforcement services performed by Owner are not included.
- C. Quality Assurance (QA): The performance of tasks that ensure that construction is performed according to Contract requirements. QA includes

activities, actions and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

- D. Corrective Action Report (CAR): A written notice given by the Contractor to the Owner that defective or non-conforming work has been corrected or will be corrected within a mutually acceptable time frame.
- E. Non-Conformance Notice (NCN): A written notice to the Contractor from either the Owner or the Contractor's QC staff to the effect that a deficiency has been found in the work such that that portion of the work is considered to be defective as failing to conform to the Contract Documents, .
- F. Nonconformance: A condition which deviates from Contract Document requirements and cannot be corrected to meet such requirements or otherwise requires an engineering determination.
- G. CQC Manager: Member of Contractor's organization designated to manage and administer the Contractor's Construction CQC Program.
- H. Audit: A planned and documented activity performed by qualified personnel to determine the adequacy and compliance of the QA/QC work done in the field with established procedures in the Quality Assurance and Quality Control Program, or applicable documents, and the effectiveness of their implementation.
- I. Project Sponsor: Person responsible for assuring delivery of the project on schedule, on budget and meeting quality expectations. The Project Sponsor serves as a key link between the day-to-day project management team and the organization's executive management. The Project Sponsor is not responsible for day-to-day running of the project but helps the project manager facilitate the necessary organizational support needed to make strategic decisions and create a successful project.
- J. Mockups: Full-size, physical examples assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution and to review construction, coordination, testing or operation. They are not Samples. Mockups establish the standard by which the Work will be judged.
- K. Pre-construction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

- L. Product Testing: Tests and inspections that are performed by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- M. Source Quality Control Testing: Tests and inspections that are performed at the source (i.e., plant, mill, factory or shop).
- N. Field Quality Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- O. Testing Agency: An entity engaged to perform specific tests, inspections or both. Testing laboratory shall mean the same as testing agency.
- P. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor to perform a particular construction operation, including installation, erection, application and similar operations.

1.04 SUBMITTALS

- A. Informational Submittals:
 - 1. CQC Plan: Submit, not later than 30 days after receipt of Notice to Proceed.
 - 2. CQC Reports: an original and one copy in report form
 - a. Submit daily the report referenced in 3.08.C
 - b. Submit, weekly CQC Report, an original and one copy in report form.
 - c. Issue monthly CQC report to the Owner within 7 calendar days of the end of the month being reported. Address the status of the CQC Program including procedure development, status of Subcontractor/Supplier CQC Programs and procedures, number of inspections and tests performed during the month, unsatisfactory and nonconforming items identified as well as those that remain open or were closed during the month, and any other quality problems experienced.

1.05 OWNER'S QUALITY ASSURANCE

- A. All Work is subject to Owner's quality assurance inspection and testing at all locations and at all reasonable times before acceptance to ensure strict compliance with the terms of the Contract Documents.
- B. Owner has the right but not the responsibility to perform inspections, witness tests, or otherwise monitor or assess the Work and activities. All products,

materials, and equipment are subject to inspection by the Owner at the place of manufacture. Work to be done away from the Construction Staging Area may be subject to inspection by the Owner during its fabrication, manufacture, testing, or before shipment. Give notice to the Owner of the place and time where such fabrication, manufacture, testing, or shipping is to be done. Provide such notice in writing and deliver in ample time so that the necessary arrangements for inspections and witnessing of shop tests can be made.

- C. Owner will, throughout the duration of construction, inspect construction materials, test materials, collect measurements and survey data, and monitor settlements to assure conformance with the Contract Documents and as a basis of acceptance. The Owner may conduct testing to verify earthwork compaction, verify concrete compressive strength, monitor dewatering water quality, monitor noise levels at nearby receptors, and perform independent settlement monitoring during construction activities.
- D. The Contractor shall assist the Owner with the implementation of the Independent Assurance Sampling and Testing Program as required. Findings of all Independent Assurance observations and test results will be provided to the Contractor's CQC Manager by the Owner. Failing test results will be communicated immediately to the CQC Manager by the Owner or designated authorized representative. The Contractor shall immediately take corrective action to resolve any noted deficiencies.
- E. Owner's quality assurance inspections and tests are for the sole benefit of Owner and do not:
 - 1. Relieve Contractor of responsibility for providing adequate quality control measures;
 - 2. Relieve Contractor of responsibility for damage to or loss of the material before acceptance;
 - 3. Constitute or imply acceptance; or
 - 4. Affect the continuing rights of Owner after acceptance of the completed Work.
- F. The presence or absence of a quality assurance inspector does not relieve Contractor from any Contract requirement.
- G. Promptly furnish all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by Engineer.
- H. Owner may charge Contractor for any additional cost of inspection or test when Work is not ready at the time specified by Contractor for inspection or test, or when prior rejection makes re-inspection or retest necessary. Quality

assurance inspections and tests will be performed in a manner that will not unnecessarily delay the Work.

1.06 SPECIAL TESTS AND INSPECTIONS

- A. Owner will engage a qualified testing agency and/or qualified personnel to conduct special tests and inspections required by authorities having jurisdiction and delegated to Owner to perform.
- B. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
- C. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to the Contractor, and the Contract Sum will be adjusted by Change Order.
- D. These tests and inspections include:
 - 1. Verifying that manufacturer maintains detailed fabrication and quality control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 - 2. Submitting a certified written report of each test, inspection and similar quality control service to Owner with copy to Contractor and to authorities having jurisdiction.
 - 3. Submitting a final report of special tests and inspections at Substantial Completion (including a list of unresolved deficiencies).
 - 4. Interpreting tests and inspections and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
 - 5. Retesting and re-inspecting corrected Work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Maintain an adequate inspection system and perform such inspections as will ensure that the Work conforms to the Contract Documents.
- B. Maintain complete inspection records and make them available at all times to Owner and Engineer.

- C. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product that complies with the Contract Documents. The system shall cover all construction and demolition operations, both onsite and offsite, including Work by subcontractors, fabricators, suppliers and purchasing agents, and shall be keyed to the proposed construction sequence.

3.02 COORDINATION MEETING

- A. After the Preconstruction Conference, but before start of construction, and prior to acceptance of the CQC Plan, schedule a meeting with Engineer and Owner to discuss the quality control system.
- B. Develop a mutual understanding of the system details, including the forms for recording the CQC operations, control activities, testing, sampling, inspection administration of the system for both onsite and offsite Work, and the interrelationship of Contractor's management and control with the Owner's Quality Assurance.
- C. There may be occasions when subsequent conferences may be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures that may require corrective action by Contractor.

3.03 QUALITY CONTROL ORGANIZATION

- A. CQC System Manager:
 - 1. Designate an individual within Contractor's organization who will be responsible for overall management of CQC and have the authority to act in CQC matters for the Contractor.
 - 2. CQC System Manager may perform other duties on the Project.
 - 3. CQC System Manager shall be an experienced construction person, with a minimum of 5 years of experience in a similar position on projects with scope.
 - 4. CQC System Manager shall report to the Contractor's project sponsor or someone higher in the organization.
 - 5. CQC System Manager shall be onsite during construction, including overtime or shiftwork. Periods of absence may not exceed 2 weeks at any one time.
 - 6. Identify an alternate for CQC System Manager to serve with full authority during the System Manager's absence. The requirements for the alternate will be the same as for designated CQC System Manager.
- B. CQC Staff:

1. Designate a CQC staff, available at the Site at all times during progress, with complete authority to take any action necessary to ensure compliance with the Contract. CQC staff members shall be subject to acceptance by Engineer.
 2. CQC staff shall take direction from CQC System Manager in matters pertaining to QC.
 3. CQC staff must be of sufficient size to ensure adequate QC coverage of Work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned QC responsibilities and must be allowed sufficient time to carry out these responsibilities.
 4. The actual strength of the CQC staff may vary during any specific Work period to cover the needs of the Project. Add additional staff when necessary for a proper CQC organization.
- C. Staff the QC Organization with technically competent personnel with freedom to make decisions without pressure or bias. Provide sufficient authority to ensure that quality requirements are consistently maintained and are independent from that portion responsible for production.
1. The Owner reserves its right to remove from the project either:
 - a. QC staff that demonstrate a lack of ability to make decisions without pressure or bias, or
 - b. Any Contractor personnel who are preventing or influencing the QC staffs freedom to make decisions without pressure or bias.
 2. Any time lost or added expense to the project while staff are removed and replaced under this clause shall be non-compensable.
- D. Organizational Changes: Obtain Engineer's acceptance before replacing any member of the CQC staff. Requests for changes shall include name, qualifications, duties, and responsibilities of the proposed replacement.

3.04 QUALITY CONTROL PHASING

- A. CQC shall include at least three phases of control to be conducted by CQC System Manager for all definable features of Work, as follows:
1. Preparatory Phase:
 - a. Notify Owner at least 48 hours in advance of beginning any of the required action of the preparatory phase.
 - b. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The CQC System Manager shall instruct

- applicable CQC staff as to the acceptable level of workmanship required in order to meet Contract requirements.
- c. Document the results of the preparatory phase meeting by separate minutes prepared by the CQC System Manager and attached to the QC report.
 - d. Perform prior to beginning Work on each definable feature of Work:
 - 1) Review applicable Contract Specifications.
 - 2) Review applicable Contract Drawings.
 - 3) Verify that all materials and/or equipment have been tested, submitted, and approved.
 - 4) Verify that provisions have been made to provide required control inspection and testing.
 - 5) Review Witness and Hold points identified by the Engineer of Record in the Contract Documents or in the CQC plan.
 - 6) Examine the Work area to verify that all required preliminary Work has been completed and is in compliance with the Contract.
 - 7) Perform a physical examination of required materials, equipment, and sample Work to verify that they are on hand, conform to approved Shop Drawing or submitted data, and are properly stored.
 - 8) Review the appropriate activity hazard analysis to verify safety requirements are met.
 - 9) Review procedures for constructing the Work, including repetitive deficiencies.
 - 10) Document construction tolerances and workmanship standards for that phase of the Work.
 - 11) Check to verify that the plan for the Work to be performed, if so required, has been accepted by Engineer.
2. Initial Phase:
- a. Accomplish at the beginning of a definable feature of Work:
 - 1) Notify Owner at least 48 hours in advance of beginning the initial phase.
 - 2) Perform prior to beginning Work on each definable feature of Work:
 - a) Review minutes of the preparatory meeting.
 - b) Check preliminary Work to verify compliance with Contract requirements.
 - c) Verify required control inspection and testing.
 - d) Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Comparison with sample panels is appropriate.
 - e) Resolve all differences.

- f) Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
 - 3) Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the QC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
 - 4) The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.
3. Follow-up Phase:
- a. Perform daily checks to verify continuing compliance with Contract requirements, including control testing, until completion of the particular feature of Work.
 - b. Daily checks shall be made a matter of record in the CQC documentation and shall document specific results of inspections for all features of Work for the day or shift.
 - c. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of Work that will be affected by the deficient Work. Constructing upon or concealing nonconforming Work will not be allowed.
4. Additional Preparatory and Initial Phases: Additional preparatory and initial phases may be conducted on the same definable features of Work as determined by Owner if the quality of ongoing Work is unacceptable; or if there are changes in the applicable QC staff or in the onsite production supervision or work crew; or if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.05 CONTRACTOR QUALITY CONTROL PLAN

A. General:

1. Plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used.
2. An interim plan for the first 30 days of operation will be considered.
3. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of Work to be started.
4. Work outside of the features of Work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of Work to be started.

5. Plan shall use written QA/QC inspection and test procedures for all operations. Include instructions for performing the required inspection or test, which contain the accept/reject criteria for each inspection or test activity (i.e., applicable drawing, specification section, industry code or standard), establish the frequency for performing the inspection or test, and provide for recording the results of inspections and tests on checklists acceptable to the Owner. Keep these procedures current and available at all locations where inspections and tests are to be performed. Ensure that both QC and QA activities are addressed in the inspection and testing procedures.
6. The CQC Plan shall incorporate all Witness and Hold points identified by the Engineer of Record in the Contract Documents. Witness and Hold points shall be identified in the construction process and the schedule where critical characteristics are to be measured and maintained and at points where it is nearly impossible to determine adequacy of either materials or workmanship once work proceeds past this point. Develop procedures for notification of the Owner for Witness and Hold points.
7. Subcontractors and Suppliers may implement their own SQC program if the program is approved by the Contractor and the Owner. Otherwise the Subcontractor or Supplier will be instructed to implement the Contractor's QC Program on all Work performed and will perform the QC inspections of their Work and activities at their facilities.
8. The plan must maintain control over procurement sources to ensure that materials, equipment and services conform to specified requirements. Procurement documents must require Subcontractors and Suppliers to implement their own SQC Program or require them to implement the CQC Program. Comply fully with manufacturers' instructions, including completing each step in sequence. If the manufacturers' instructions conflict with Contract Documents, then the Contractor shall request clarification from the Owner before proceeding.
9. Establish means and methods for controlling the identification, inspection status, handling, and storage of raw and fabricated material. Maintain these controls from the time of receipt of the material until delivery to the Owner, in order to protect the material from damage, deterioration, loss or substitution.
10. Maintain control over construction and installation processes to assure compliance with specified requirements. Perform in-process and final inspection and testing of construction in accordance with written QA/QC inspection and test procedures to ensure that requirements in the Contract Documents have been met. The Contractor shall utilize the CMIS Platform once it is implemented, including the development of QC inspection and testing forms and reports, such that the program can be implemented, reviewed, monitored real-time, including statistical

- reporting. Record the results of in-process and final inspections on inspection checklists approved by the Owner.
11. Establish and maintain a Quality Assurance Auditing and Nonconformance Recovery Plan for uniform reporting, controlling, correction, disposition and resolution of nonconformance issues (including disputed nonconforming items) that may arise on the project and as required in this Section. The Plan will establish a process for review and disposition of nonconforming material, equipment or other elements of the Work as well as corrective action reporting. The Plan will specifically address recovery measures, such as increased QA and QC testing frequency, the Contractor will undertake to achieve the desired quality Work product.
 12. The CQC and SQC Programs are subject to periodic audit by the Owner to assure compliance with the Contract Documents.

B. Content:

1. Plan shall cover the intended CQC organization for the entire Contract and shall include the following, as a minimum:
 - a. Organization: Description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff will implement the three-phase control system (see Paragraph QC Phasing) for all aspects of the Work specified.
 - b. CQC Staff: The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a QC function.
 - c. Letters of Authority: A copy of a letter to the CQC System Manager signed by an authorized official of the firm, describing the responsibilities and delegating sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop Work which is not in compliance with the Contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities and responsibilities. Copies of these letters will also be furnished to Owner.
 - d. Record Document: Procedures to track revisions to the Contract Documents made via design change notice, RFI, Work Change, Directive, Field Order or Change Order to the Contract Drawings or Specifications. Procedure shall address version control and distribution, including the removal of outdated documents from circulation.
 - e. Submittals: Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers and purchasing agents.

- f. Document Control: Procedures for managing, tracking, organizing, distributing, and retaining QC documentation
 - g. Testing: Control, verification and acceptance testing procedures for each specific test to include the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required.
 - h. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests, including documentation.
 - i. Procedures for tracking deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.
 - j. Reporting procedures, including proposed reporting formats; include a copy of the CQC report form.
- C. Acceptance of Plans: Acceptance of the Contractor's basic and addendum CQC plans is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. Owner reserves the right to require Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.
- D. Notification of Changes: After acceptance of the CQC plan, Contractor shall notify Engineer, in writing, a minimum of 7 calendar days prior to any proposed change. Proposed changes are subject to acceptance by Engineer.

3.06 CONTRACTOR QUALITY CONTROL REPORT

- A. As a minimum, prepare a weekly CQC report for every 7 calendar days. Account for all days throughout the life of the Contract. Reports shall be signed and dated by CQC System Manager. Include copies of test reports and copies of reports prepared by QC staff.
- B. Maintain current records of quality control operations, activities, and tests performed, including the Work of subcontractors and suppliers.
- C. Records shall be on an acceptable form and shall be a complete description of inspections, the results of inspections, daily activities, tests, and other items, including but not limited to the following:
 - 1. Contractor/subcontractor and their areas of responsibility.
 - 2. Operating plant/equipment with hours worked, idle, or down for repair.
 - 3. Work performed today, giving location, description, and by whom. When a network schedule is used, identify each phase of Work performed each day by activity number.

4. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, and Follow-up). List deficiencies noted along with corrective action.
5. Material received with statement as to its acceptability and storage.
6. Identify submittals reviewed, with Contract reference, by whom, and action taken.
7. Offsite surveillance activities, including actions taken.
8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
9. List instructions given/received and conflicts in Drawings and/or Specifications.
10. Contractor's verification statement.
11. Indicate a description of trades working on the Project; the number of personnel working; weather conditions encountered; and any delays encountered.
12. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in file work and workmanship comply with the Contract.

3.07 SUBMITTAL QUALITY CONTROL

- A. Submittals shall be as specified in Section 01 33 00, Submittal Procedures. The CQC organization shall be responsible for certifying that all submittals are in compliance with the Contract requirements. Owner will furnish copies of test report forms upon request by Contractor. Contractor may use other forms as approved.

3.08 TESTING QUALITY CONTROL

- A. Provide all labor, equipment, and apparatus necessary for QC inspection and testing of the civil, structural, architectural, mechanical and electrical features/equipment/systems, and all other elements of Work as required by the Contract Documents and any applicable permits and codes.
- B. Conduct testing, monitoring or inspection necessary for the progress and control of Work. Do not rely upon conformance inspection, testing or monitoring conducted by the Owner for progress and control of Work. Replace nonconforming Work.
- C. Daily Reports. The Contractor shall make a daily written and verbal report to the Owner's designated representative advising of the status of the Work, the prior day's accomplishments, activity planned for the current day and for at least two subsequent days, and any problems or delays that may be anticipated.

D. Testing Procedure:

1. Perform tests specified or required to verify that control measures are adequate to provide a product which conforms to Contract requirements. Perform the following activities and record the following data:
 - a. Verify testing procedures comply with contract requirements.
 - b. Verify facilities and testing equipment are available and comply with testing standards.
 - c. Check test instrument calibration data against certified standards.
 - d. Verify recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
 - e. Documentation:
 - 1) Record results of all tests taken, both passing and failing, on the CQC report for the date taken.
 - 2) Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test.
 - 3) Actual test reports may be submitted later, if approved by Engineer, with a reference to the test number and date taken.
 - 4) Provide directly to Engineer an information copy of tests performed by an offsite or commercial test facility. Test results shall be signed by an engineer registered in the state where the tests are performed.
 - 5) Failure to submit timely test reports, as stated, may result in nonpayment for related Work performed and disapproval of the test facility for this Contract.

- E. Testing Laboratories: Laboratory facilities, including personnel and equipment, utilized for testing soils, concrete, asphalt and steel shall meet criteria detailed in ASTM D3740 and ASTM E329, and be accredited by the American Association of Laboratory Accreditation (AALA), National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP), the American Association of State Highway and Transportation Officials (AASHTO), or other approved national accreditation authority. Personnel performing concrete testing shall be certified by the American Concrete Institute (ACI).

3.09 COMPLETION INSPECTION

- A. CQC System Manager shall conduct an inspection of the Work at the completion of all Work or any milestone established by a completion time stated in the Contract.
- B. Punchlist:

1. CQC System Manager shall develop a punchlist of items which do not conform to the Contract requirements.
2. Include punchlist in the CQC report, indicating the estimated date by which the deficiencies will be corrected.
3. CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Owner.
4. These inspections and any deficiency corrections required will be accomplished within the time stated for completion of the entire Work or any particular increment thereof if the Project is divided into increments by separate completion dates.

END OF SECTION

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SECTION 01 52 00 CONTRACTOR FACILITIES

PART 1 GENERAL

1.01 SUMMARY

- A. Work specified in this section includes temporary field offices, temporary storage units, power, water, heating, cooling, ventilation, sanitary facilities, fire protection, barriers and enclosures, and easements and rights of way.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. National Fire Prevention Association (NFPA): 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.
 - 2. VOSH, Virginia Occupational Safety and Health Program.

1.03 SUBMITTALS

- A. Informational Submittals:
 - 1. Copies of the Contract Limits and Construction Access Plan that shall be posted in the construction trailer and given to each subcontractor before they commence work.
 - 2. Temporary Construction Submittals, as applicable:
 - a. Contractor's field offices, storage yard, and storage building plans, including gravel surfaced area.
 - b. Electric power supply and distribution plans.
 - c. Water supply and distribution plans.
 - d. Sanitary facilities.
 - e. Fencing and protective barrier locations and details.
 - f. Staging area location plan.

1.04 GENERAL

- A. Contractor shall maintain temporary field offices near the work for his own use during the period of construction at which readily accessible copies of all Contract documents, including approved transmittals, shall be kept.
- B. Field office shall be located within the property lines of the pump station and out of the way of flow into and out of the site for routine operation and maintenance of the pump station. Coordinate location with Owner.

1. The Contractor is responsible to furnish and install any other storage units or field offices that they may require for their workers, materials or equipment. The location of any added offices/storage units shall be located within the Contractor's assigned staging areas where it will neither interfere with the progress of the work nor with plant operations and shall be subject to AlexRenew's approval. Furthermore, use in the vicinity of the Dominion Energy transmission lines shall be subject to the permit restrictions specified in the Contract Documents. Field office shall include the amenities, filing systems, computers, storage, restroom facilities, and meeting area as required by Contractor to effectively manage and execute the Work without impeding the Owner's operation and maintenance of the pump station.

C. NOT USED

D. Furnish, install and maintain all temporary utilities required for the Work, except as allowed herein, and remove upon completion of Work.

E. Furnish, install and maintain all construction aids required for the Work, except as allowed herein, and remove upon completion of Work.

F. Furnish, install and maintain fences and barriers as required for protection of the public, property and Work.

G. Provide storage sheds as required for storage of materials and equipment.

H. Provide site security plan per Section 01 15 20, Construction Security.

I. Contractor shall obtain and pay all costs, fees, etc. for the hauling, building, setting, maintaining, permitting, connecting and removal of the any added temporary field trailer/storage/shed unit.

1.05 MOBILIZATION

A. Mobilization includes, but is not limited to, these principal items:

1. Obtaining required permits.
2. Moving Contractor's field office and equipment required for first month operations onto Site.
3. Installing temporary construction power, wiring, and lighting facilities.
4. Providing onsite Internet service and telephones.
5. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
6. Arranging for and erection of Contractor's work and storage yard.

7. Posting VOSH required notices and establishing safety programs and procedures.
8. Having Contractor's superintendent at Site full time.

B. Use area designated for Contractor's temporary facilities as shown on Drawings.

1.06 NOT USED

1.07 TEMPORARY POWER

- A. Contractor shall arrange for and pay all costs associated with temporary power service either from the local utility and/or portable engine-generator for any of their other trailers/storage units/staging areas.
- B. Contractor shall pay all costs for installation and removal of service and power used which is not incorporated into permanent power system.
- C. Temporary electrical work shall meet the requirements of the National Electric Code and utility's requirements.
- D. Connection to existing infrastructure:
 1. Convenience outlets are located throughout existing buildings and existing processing facilities and may be utilized by the Contractor for incidental small 120-volt appliances and hand tools.
 2. Additional power may be obtained from motor control centers and power distribution panel boards located within some buildings and facilities with the approval of the Owner.
 3. The Contractor shall furnish and install a KWH meter acceptable to the Owner for all temporary electrical service. Where no spare circuit breakers are available or the Contractor can add none, the Contractor may be allowed to tap the bus with the Owner's approval. The Contractor shall furnish and install all equipment including disconnects, circuit breakers, overload devices, ground fault protection, transformers and panel boards necessary to install and utilize the source in accordance with the NEC and City of Alexandria Electrical Code.
 4. All requests to utilize the Owner's electrical distribution system shall be in writing and shall include detailed plans for approval by the Owner. The Owner at no expense to the Contractor will furnish the electrical energy from the power sources described herein. However, at no time shall the total load from all sources exceed 100 kVA or 120 amp at 480V, 3-phase.

5. The Owner does not guarantee that the power from such sources will be continuous nor does the Owner warrant the condition of the power equipment or the power characteristics.
6. Power sources of sufficient characteristics and capacity may not be available at all work areas. The Contractor shall be responsible for the transmission of power to all work areas from approved sources.
7. The Contractor shall furnish and install all cables, wiring, extensions cords, connections, outlets, switches, lamps, fuses, controls, accessories and incidentals necessary to utilize and distribute power as required.
8. Cable shall be mounted on poles that do not interfere with any construction or the Owner operations. Before installing such equipment, the Contractor shall submit detailed plans for approval by the Owner.
9. The Contractor shall provide sufficient temporary electrical lighting at all work areas where there is not sufficient light from any permanent lighting system.
10. The Contractor shall exercise care in his operations to prevent damage to the Owner's electrical equipment. All such damage shall be repaired, or the equipment replaced, at the sole expense of the Contractor.
11. The Contractor shall stop using a power hookup if his activities cause an overload or impact operation of online facilities.
12. All costs for temporary construction power and lighting shall be at the sole expense of the Contractor including all power sources and requirements above those described herein.
13. The Contractor shall remove all temporary power connections at the conclusion of the project and existing equipment shall be restored to the condition prior to construction at no additional cost to the Owner.

1.08 TEMPORARY LIGHTING

- A. Provide lighting that meets or exceeds VOSH requirements.
- B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails and lamps as required.
- C. Maintain lighting and provide routine repairs.
- D. Permanent building lighting may be utilized during construction.

1.09 TEMPORARY HEAT, COOLING AND VENTILATION

- A. Contractor shall provide temporary heat, cooling and ventilation as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation of materials, and to protect materials and finishes from damage due to temperature or humidity.

- B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
 - 1. Provide temporary ventilation to maintain 12 air changes per hour in the pump station screen room and compactor room during construction.
 - C. Provide and pay for devices and operate them as required to maintain specified conditions for construction operations.
 - D. Contractor shall pay all costs of installation, maintenance, operation, removal and for fuel and power consumed.
- 1.10 TEMPORARY TELEPHONE AND HIGH-SPEED INTERNET SERVICE
- A. NOT USED
- 1.11 TEMPORARY WATER SUPPLY
- A. Provide service required for construction operations. Extend branch piping with outlets located so that water is available by use of hoses.
 - B. Contractor shall provide all drinking water required by construction personnel.
 - C. All items installed in the project that are indirectly or directly in contact with potable water are to comply with National Sanitation Foundation (NSF) Standards.
 - D. Contractor shall pay all costs for the installation, maintaining, and removal of service at the completion of construction.
 - E. Contractor shall pay utility company directly for all charges, unless waived by AlexRenew.
 - F. Work in Owner Remote Facilities:
 - 1. The Contractor shall obtain a permit from a City of Alexandria Code permit (Monday through Friday, 8:00 a.m. to 5:00 p.m.) and coordinate with the Virginia-American Water Company (VAWC) Operations Department, telephone number 703-706-3870 between the hours of 7 a.m. and 3:30 p.m. to use potable water for construction purposes from public hydrants or to connect to the water system with a temporary tap.
 - 2. If the Owner determines that fire hydrant water may be used, the Contractor will be charged the current fire hydrant use charge per working day.

3. If the Owner determines a temporary water main tap is required, the Contractor shall excavate a pit for a tap as directed, excavate the trench and install water service piping.
4. A temporary water tap requires the payment of the current water tap fee plus the additional fee for the water tap removal, the Owner will make the tap and will furnish and install a meter at no additional cost to the Contractor.
5. At completion of the Contract, the Contractor shall excavate and remove Contractor water service piping and provide excavation necessary for the meter and tap removal by the Owner. After the Owner has completed the removals the Contractor shall backfill and restore the area.
6. The Owner will keep an account for direct payment by the Contractor of water and sewer charges.
7. The Owner will provide a meter on water services to the Contractor's Field Office and the Engineer's Facilities (field office). The Contractor will not be charged for this water usage.

1.12 TEMPORARY SANITARY FACILITIES

- A. Contractor shall provide sanitary facilities:
 1. As required by laws and regulations.
 2. Not less than one facility.
 3. Not less than one facility for every 25 employees of Contractor and subcontractor at the site.
- B. Contractor shall service, clean and maintain facilities and enclosures.
- C. Contractor shall pay all costs associated with the installation, maintenance of, and removal of facilities and enclosures.
- D. Use of Owner's existing sanitary facilities by construction personnel will not be allowed.

1.13 TEMPORARY FIRE PROTECTION

- A. Observe and enforce throughout the work all requirements of the City of Alexandria, Local, State and Insurance authorities to minimize fire hazards.
- B. Remove combustible refuse from within each building daily.
- C. Provide fire extinguishers as required by the local fire department and city ordinances.

1.14 BARRIERS

- A. Provide as required to control access to active construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide 6-foot high commercial grade chain link fence around storage areas; equip with vehicular and pedestrian on outside gates with locks.
- C. Provide barricades and covered walkways as required by governing authorities for public rights of way and for public access to existing building.
- D. Provide barriers around trees and plants designated to remain. Protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and ponding or continuous running water. Protect from staining on trunk and branches. Do not disturb existing soil at base or within drip line in any manner.

1.15 ENCLOSURES

- A. Provide temporary weather tight closures of openings in exterior surfaces to provide acceptable working conditions and protection for materials, to allow for temporary heating, and to prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.
- B. Provide temporary partitions and ceilings as required to separate work areas from AlexRenew occupied areas, to prevent penetration of dust and moisture into AlexRenew occupied areas, to prevent damage to existing areas and equipment. Construction: Framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces; Flame Spread Rating of 25 in accordance with ASTM E84; paint surfaces exposed to view in AlexRenew occupied areas.

1.16 PROTECTION OF INSTALLED WORK

- A. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
- B. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects, and storage.
- C. Prohibit traffic and storage on waterproofed and roofed surfaces, on lawn and landscaped areas.

1.17 SECURITY

- A. Per Section 01 15 20, Construction Security.

1.18 PARKING

- A. Per Section 01 55 00, Vehicular Access and Parking.
- B. Provide temporary surface parking areas to accommodate construction personnel.
- C. When site space is not adequate, provide additional off-site parking and shuttle transportation.

1.19 PROGRESS CLEANING

- A. Per Section 01 74 00, Construction Cleaning.
- B. Maintain areas free of waste materials, debris and rubbish. Maintain site in a clean and orderly condition.
- C. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- D. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate dust.
- E. Remove waste materials, debris and rubbish from site weekly and dispose off-site.
- F. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. At least weekly, sweep all floors (basins, tunnels, platforms, walkways, roof surfaces), and pick up all debris and dispose.
- G. At least weekly, brush sweep entry drive, roadways, and all other streets and walkways affected by the Work and where adjacent to the Work.

1.20 ADDED FIELD OFFICES AND SHEDS

- A. Additional Field Trailers for Workers, if needed:
 - 1. All trailers shall be anchored by a tie down system that meets or exceeds building codes.
 - 2. Fire Extinguishers, Smoke and Fire alarms shall be properly installed and maintained.

3. Contractor shall provide documentation of a benefit of occupancy inspection of all trailers to AlexRenew Department of Occupational Safety and Health.
 4. Contractor shall post emergency evacuation map, primary and secondary assembly locations.
 5. Provide signage of the location of all utilities into the trailer.
 6. A sign shall be mounted on the trailer or building that shows:
 - a. Company Name.
 - b. Emergency Point of Contact.
 - c. 24-hour Emergency Telephone Number.
- B. Storage Sheds for Tools, Materials, and Equipment: Weather tight, with heat and ventilation for Products requiring controlled conditions, with adequate space for organized storage and access, and lighting for inspection of stored materials.

1.21 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations to a depth of 2 feet; grade site as indicated. Restore existing facilities used during construction as specified, or to original, condition.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Maintain and operate systems to assure continuous service.
- B. Modify and extend systems as work progress requires.
- C. Keep all construction vehicles, equipment, trailers and machinery clear of the fire lanes and fire hydrants. Ensure that deliveries of equipment or supplies in the fire lanes are quickly unloaded and the vehicles moved as soon as possible.

3.02 CONTRACTOR FIELD OFFICES

- A. Contractor shall provide weekly janitorial service, removal of waste (daily), and security until the field office is reassigned to the Owner.

- B. Contractor shall provide weekly janitorial service, removal of waste (daily), and security until the field office is reassigned to the Owner, or demobilized.
- C. Regular operation and maintenance of the HVAC system must be performed as suggested by the manufacturer.
- D. Meet requirements specified in Section 01 33 29, Sustainable Construction and Reporting.

3.03 STORAGE YARDS AND BUILDINGS

- A. Coordinate storage requirements with Section 01 61 00, Common Product Requirements.
- B. Temporary Storage Yards: Construct temporary storage yards for storage of products that are not subject to damage by weather conditions within the Contractor's storage and administration area, as shown on the Drawings.
- C. Temporary Storage Buildings:
 - 1. Provide environmental control systems that meet recommendations of manufacturers of equipment and materials stored.
 - 2. Arrange or partition to provide security of contents and ready access for inspection and inventory.
 - 3. Store combustible materials (paints, solvents, fuels) in a well-ventilated and remote building meeting safety standards.

3.04 STAGING AREAS

- A. The staging area for the Contractor is shown on the Drawings.

3.05 TEMPORARY UTILITIES

- A. Power: Electric power will be available as shown. Determine type and amount available and make arrangements for obtaining temporary electric power service, metering equipment, and pay costs for electric power used during Contract period, except for portions of the Work designated in writing by Engineer as substantially complete.
- B. Lighting: Provide temporary lighting to meet applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work, and all normal routine plant and operations maintenance.

1. Follow manufacturer's guidelines for positioning of floodlights.
2. Install and use lights only where needed to reduce light pollution. All lighting requirements established by VOSH and needed for health and safety must be followed.
3. Utilize motion sensors for security lighting outside of construction zones.

C. Heating, Cooling, and Ventilating:

1. Sequence construction such that new heating, cooling, and ventilating equipment is installed and functional prior to installation of sensitive electrical, instrumentation, and other equipment.
2. Provide as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for installation of materials, and to protect materials, equipment, and finishes from damage because of temperature or humidity. Costs for temporary heat shall be borne by Contractor responsible for constructing structure or building as specified in Section 01 11 00, Summary of Work.
3. Provide adequate forced air ventilation of enclosed areas to cure installed materials, to dispense humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases. Provide additional ventilation as specified.
4. Pay costs of installation, maintenance, operation, removal, and fuel consumed.
5. Provide portable unit heaters, complete with controls, electric-, oil-, or gas-fired, and suitably vented to outside as required for protection of health and property. Use of electric-fired units is encouraged.
6. If permanent natural gas piping is used for temporary heating units, do not modify or reroute gas piping without approval of utility company. Provide separate gas metering as required by utility.

D. Water:

1. Hydrant Water:
 - a. Is available from nearby hydrants. Secure written permission for connection and use from water department and meet requirements for use. Install an acceptable metering device and pay Virginia American Water for water used at the prevailing rates of the utility provider. Notify fire department before obtaining water from fire hydrants.
 - b. Use only special hydrant-operating wrenches to open hydrants. Make certain hydrant valve is open full, since cracking valve causes damage to hydrant. Repair damaged hydrants and notify

appropriate agency as quickly as possible. Hydrants shall be completely accessible to fire department at all times.

2. Contractor will provide a place of temporary connection for drinking water at Site. Provide temporary facilities and piping required to bring water to point(s) of use and remove when no longer needed. Install an acceptable metering device and pay for water used at the prevailing rates of the utility provider.
3. Provide a means to prevent water used for testing from flowing back into source pipeline.

E. Sanitary and Personnel Facilities:

1. Provide and maintain facilities for Contractor's employees, Subcontractors, and other onsite employers' employees. Service, clean, and maintain facilities and enclosures.
2. Use of Owner's existing sanitary facilities by construction personnel will not be allowed.

F. Fire Protection: Furnish and maintain on Site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of NFPA 241.

3.06 CONSTRUCTION AIDS

- A. Contractor shall relocate construction aids as required by progress of construction, by storage or work requirements, and to accommodate legitimate requirements of AlexRenew.
- B. Contractor shall completely remove temporary materials, equipment and services at completion of the project.
- C. Contractor shall clean and repair damages caused by installation or by use of temporary facilities.
 1. Remove foundations and underground installations for construction aids.
 2. Grade the areas of the site affected by temporary installations to required elevations and slopes and clean the area.

3.07 BARRIERS

- A. Contractor shall install facilities with a neat and uniform appearance, structurally adequate for the required purposes.

- B. Contractor shall completely remove barriers, including foundations, when construction has progressed to the point that they are no longer needed or required.
- C. Contractor shall clean and repair damage caused by installation, fill and grade the areas of the site to required elevations and slopes and clean the area.

3.08 FIELD SANITARY FACILITIES

- A. The Contractor, from the commencement of the job, shall provide sufficient sanitary toilet room facilities for the use of all personnel on the job.
- B. The facilities shall be kept in sanitary condition, and at the completion of the job shall be cleaned out and removed.
- C. The sanitary facilities shall conform to AlexRenew requirements. The Contractor shall prohibit and prevent the committing of nuisances by his employees on the work site.
- D. The Contractor and Subcontractor personnel shall not use AlexRenew toilet facilities

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SECTION 01 54 50
CONSTRUCTION SAFETY

PART 1 GENERAL

1.1 SUMMARY

- A. Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. The specified safety provisions are the minimum requirements. Take all additional necessary precautions for the safety of, and provide the necessary protection to prevent damage, injury or loss to:
1. All employees on the Work and other persons who may be affected thereby;
 2. All the Work and all materials or equipment to be incorporated therein, whether in storage on or off the sites; and
 3. Other property at the sites or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
- B. Comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for its safety and protection. Notify owners of adjacent utilities when prosecution of the Work may affect them. All damage, injury or loss to any property caused directly or indirectly, in whole or part, by Contractor, any Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by Contractor, except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of the Owner or Design Professional Engineer or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attribute, directly or indirectly, in whole or in part, to the fault or negligence of Contractor. Contractor's duties and responsibilities for the safety and protection of the Work shall continue until Substantial Completion.
- C. Comply with Contractor's and Subcontractor's Insurance Requirements.
- D. All work shall conform to the requirements of the Occupational Safety and Health Act (OSHA) and the requirements under the Virginia Occupational Safety and Health (VOSH) program. Any reference to OSHA 1910 or 1926 requirements shall also be considered a reference to VOSH 1910 or 1926.
- E. No section or description in these documents shall be construed to replace, modify or supersede requirements of other codes, specifications and/or ordinances referenced

throughout the document. If a conflict occurs between the referenced regulations and these documents, the more stringent shall govern.

- F. Address the AlexRenew Safety & Health Standard Operating Procedures (see Attachment 1) in your safety program as it relates to interfacing with the Plant.

1.2 SPECIFIC REQUIREMENTS

A. Contractor's Site Safety Officer:

The Contractor shall be responsible for the safety of the Contractor's employees, Owner's personnel, and all other personnel at the sites of the Work. The Contractor shall designate a competent Site Safety Officer(s) who shall be responsible for the supervision of the project safety requirements. The Site Safety Officer(s) shall be on the job at all times while work is in progress.

The Contractor Site Safety Officer(s), in addition to meeting the requirements of "Qualified Person" as defined by OSHA, must also meet the requirements specified in the Construction Safety & Health Manual for Contractors (see Attachment 1). A resume must be provided and accepted by the Owner prior to the start of work. The Backup Safety Person should be equally credentialed, depending on job complexity, size and any other pertinent factors.

The Site Safety Officer sole responsibility and duties shall be project safety, unless the total bid price is less than \$25M, in which case, the Site Safety Officer(s) may be assigned to other duties, provided these duties do not impact his ability to perform the requirements of the Site Safety Officer, unless otherwise specified.

The Site Safety Officer(s) shall be provided with an appropriate office at the Contractor's office facility at the Plant site to maintain and keep available safety records and up-to-date copies of all pertinent safety rules and regulations; and to maintain adequate supplies of safety equipment.

1. As a minimum, the Contractor shall provide a Site Safety Officer who is trained in accident prevention and first aid and certified in cardiopulmonary resuscitation (CPR).
2. The Contractor's Site Safety Officer shall:
 - a. Be completely familiar with all applicable health and safety requirements of all governing legislation, and ensure compliance with same.
 - b. Be experienced in heavy construction safety programs and processes.
 - c. Schedule and conduct safety meetings and safety training programs as required by law for all personnel engaged in the Work.
 - d. Post all appropriate notices regarding safety and health regulations at locations which afford maximum exposure to all personnel at the job site.

- e. Post the name, address, and hours of the nearest medical doctor; name and address of nearby clinics and hospitals; and the telephone numbers of the fire and police departments.
- f. Post appropriate instructions and warning signs with regard to all hazardous areas or conditions.
- g. Have proper safety and rescue equipment adequately maintained at the Plant site and readily available for any contingency.
 - 1) This equipment shall include such applicable items as: proper fire extinguishers, first aid kits, eyewash stations, safety lanyards and harnesses, stretchers, life savers (when working over water), oxygen breathing apparatus, resuscitators, gas detectors, oxygen deficiency indicators, explosion meters, and any other equipment mandated by law.
 - 2) This equipment shall be maintained at the Contractor Site Safety Officer's office at the Plant site, or at the actual Work areas, or at both locations as determined most appropriate in the judgement of the Site Safety Officer.
- h. Make inspections at least once daily to ensure that all machines, tools and equipment are in safe operating condition; and that all work methods are free of hazards.
- i. Submit copies of all safety records along with all safety inspection reports and certifications from regulating agencies and insurance companies.
- j. Notify Construction Manager (CM) of accidents immediately, followed by a detailed written report.
- k. Notify CM of any accident claim against the Contractor or any Subcontractor immediately, followed up by a detailed written Review safety aspects of the Contractor's submittals as applicable.
- l. Be responsible for coordinating and executing site Emergency Action procedures per client and applicable regulatory body requirements.

B. Site Safety and Health Plan (SSHP)

1. The Contractor shall provide and maintain an SSHP at all times at the project site.
2. The Contractor shall develop the SSHP to specifically address the scope of work to be performed by the Contractor.
3. The Plan shall be task-specific/activity-specific for the proposed work and be developed in compliance with requirements defined in 29 CFR 1910 and 1926 and other supporting and applicable OSHA standards as well as those standards of the Environmental Protection Agency.
4. The Contractor shall have the responsibility for defining protective measures in the SSHP that protects the environment, site personnel and the general public. The plan shall provide requirements for protecting all onsite participants, including the Contractor, lower-tier-subcontractors, and Owner's personnel.

5. The SSHP shall address requirements for the protection and orientation of vendors and other visitors who may enter the site.
6. The SSHP shall include requirements for protecting the general public and the environment from offsite emissions or physical hazards originating onsite.
7. The SSHP shall address site hazards related to environmental requirements, construction safety and occupational health.
 - a. The Plan shall identify each risk, assess the hazard and specify actions and controls.
 - b. The Plan shall define organization, responsibilities, policies, and ownership criteria. Specifically the Plan shall include but not limited to general safety; environmental, health and safety training for employees and subcontractors; task-specific hazard analysis; task-specific personnel protective equipment (e.g., respirators, clothing, fall protection, etc.); traffic control; electrical safety including grounding and lockout/tagout; equipment safety, trenching and excavation requirements; chemical safety including air monitoring, action levels for PPE and specific corrective measures such as specific engineering controls; noise monitoring and control; confined space entry protocol; hazardous work permits; establishment of controlled areas; safe work practices, equipment and personnel decontamination; hoisting and rigging specifications; hazard communication; spill prevention and control; emergency response; hazardous weather requirements; incident investigation procedures; and medical surveillance and training protocol.
- C. All personnel employed by the Contractor or his Subcontractors, whenever entering the job site, shall be required to wear approved safety hats. The Contractor shall maintain, on site, a sufficient number of safety hats for use by visitors.
- D. No employee will be allowed to work in areas where concentrations of airborne contaminants exceed federal threshold limits. Respirators shall not be substituted for environmental control measures and shall be used only as prescribed by OSHA.
- E. All internal combustion equipment shall be operated in such a manner as to prevent health hazards to personnel from exhaust fumes.
- F. Lighting of Work Areas: Provide adequate light in all areas where work is in progress to permit proper inspection of all operations at all times.
- G. First Aid and Emergency Service:
 1. General: Provide emergency first aid service.
 2. Facilities: House in the Contractor's office area at each Plant and include the following minimum facilities:
 - a. First aid supplies as recommended by the Contractor's Site Safety Officer.

- b. Telephone with emergency telephone numbers posted in a conspicuous place. Include the numbers of police, fire, doctor, hospital, and ambulance service.
- c. Potable Water
- 3. Staff and Supplies
 - a. As recommended by the Contractor's Site Safety Officer.

H. Confined Space Entry - Confined space entry procedures must be followed. A Contractor issued confined space entry checklist and completed permit must be submitted to the Owner within 48 hours of completion of the entry.

I. Hazard Communications - Contractor shall be responsible for coordinating any exchange of material safety data sheets (SDS) 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. All SDS sheets shall be submitted to the Owner's Director of Health and Safety for review.

1.3 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General, Supplementary and Special Conditions and other Division 00 and 01 Specification Sections, apply to this Section.

1.4 RELATED SECTIONS: SPECIFIED ELSEWHERE MAY INCLUDE BUT IS NOT LIMITED TO:

- A. Section 01 15 21 Confined Space Entry
- B. Section 01 33 00 Submittals
- C. Section 01 41 26 Permits

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 INDEMNIFICATION

A. The Contractor shall indemnify and hold harmless the Design Professional Engineer, the Construction Manager, the RE&I, and the Owner against fines, reasonable attorneys' fees, and defense costs resulting from citations issued to the Owner, and the Construction Manager by either federal, state, or local safety enforcement agencies due to the Contractor's failure to abide by applicable safety enforcement agencies due to the Contractor's failure to abide by applicable safety and health standards.

3.2 SUBMITTALS

- A. Comply with Section 01 33 00.
- B. The Contractor shall submit the SSHP to the Owner for review before any work is started. Work shall not occur without resolution of the Owner's comments. the Owner's review of the Contractor's SSHP shall not relieve the Contractor of the obligations under this contract or as imposed by law. The Contractor shall be solely responsible for the adequacy of its safety and health program.

3.3 INFECTIOUS AND HAZARDOUS MATERIALS

- A. Contractor is to be aware that since the project is located within a wastewater treatment facility, many forms of toxic chemicals and infectious materials (bacteria and/or virus) may be present in tanks, piping, channels, and in the atmosphere immediately surrounding such areas.
- B. The Owner cannot and will not make any provisions to clean, flush, or disinfect these areas prior to or during the work.
- C. Contractor shall take all precautions prior to beginning, or continuing work in any area where wastewater, sludge, grit, organic material, chemicals, chemical by-product, or any other sewage by-product may be present.
- D. It shall be the Contractor's responsibility to conduct monitoring for methane, hydrogen sulfide, chlorine, oxygen deficiency/enrichment and any noxious and dangerous gases prior to and during all work whenever required for reason of safety or as directed by the Owner.
- E. Whenever harmful levels of these gases are present, it will be the Contractor's responsibility to provide proper ventilation and/or special breathing apparatus, as required.
- F. Contractor shall test, remove and dispose of all infectious and hazardous material in accordance with all federal, Owner, state, and local laws and regulations as required by the Contract Documents.

3.4 HEALTH AND SAFETY STANDARDS

- A. The Contractor and any subcontractor shall not require anyone in their employment to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous to human health or safety per the Occupation Safety and Health Administration's Occupation Safety and Health Standards (29 CFR 1910), published in the Federal Register on October 18, 1972 and Safety and Health Regulations for Construction (29 CFR 1926) published in the Federal Register on December 16, 1972

- and any amendments and supplements thereto which are in effect at the time bids are opened.
- B. The above referenced regulations cover minimum requirements for, but not limited to, the following:
1. Safety and accident prevention
 2. Watchman
 3. Sanitary facilities
 4. Demolition
 5. Signing and barricading
 6. Site Safety
- C. Failure to comply with these regulations may necessitate remedial action by the Owner to meet compliance, which shall be at the Contractor's expense.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Work will not be measured separately for payment.

4.2 PAYMENT

- A. Payment will be made at the Contract lump-sum price, which price and payment include all labor, materials, tools, fees, equipment and incidentals needed to complete work specified.

4.3 AVAILABLE DOCUMENTS

SECURE THE FOLLOWING PRIOR TO, AND ADHERE TO, DURING CONSTRUCTION:

AlexRenew Safety and Health Standard Operating Procedures

- | | |
|----------|-------------------------------------|
| 01 54 50 | Construction Safety Manual |
| 01 54 50 | Plant Safety Orientation |
| 01 54 50 | Confined Space Program AlexRenew |
| 01 54 50 | Control of Hazardous Energy Program |
| 01 54 50 | Electrical/Arc Flash Safety |
| 01 54 50 | Hot Work Permitting program |
| 01 54 50 | Emergency Response Plan |

01 54 50 Mosquito Control Program

END OF SECTION 01 54 50

SECTION 01 55 00
VEHICULAR ACCESS AND PARKING

PART 1 GENERAL

1.01 SUMMARY

- A. Work specified in this Section includes but is not limited to requirements for vehicular access and parking.

1.02 SUBMITTALS

- A. Informational Submittals:
 - 1. Temporary Construction Submittals:
 - a. Contractor's parking area plans at the AlexRenew property.
 - b. Traffic and Pedestrian Control and Routing Plans: As specified herein, and proposed revisions thereto.

1.03 VEHICLE ACCESS AND PARKING

- A. Construction workers are prohibited from on-street parking within the City of Alexandria.
- B. The Contractor may utilize portions of the assigned laydown/staging area for privately owned vehicle parking (POV) and marked company vehicles. All Contractor POV shall comply with requirements of this section including the Dominion Consent Agreement for Right of Way Easement.
- C. The Contractor must control vehicle parking within the limits of the Work as shown on the Drawings to preclude interference with traffic or parking, access by emergency vehicles, Owner's operations, or other construction operations.
- D. The Contractor must confine construction traffic to designated haul routes as shown on the Drawings.
- E. AlexRenew Department of Occupational Safety and Health reserves the right to declare parking conditions unsafe or unacceptable and to require the contractor to make necessary on-the-spot changes at no cost to the Owner.
- F. If Contractor's, subcontractors,' or vendors'/suppliers' employees, or any other Contractor invitee violates these Contract requirements, the Contractor must immediately remedy the violation upon Owner notification to the Contractor.

- G. The Contractor shall be responsible for providing transportation to and from the job site for project personnel parking in an offsite area.
- H. Vehicle speed on AlexRenew property shall not exceed 15 mph. Violators may be prohibited from the site at the discretion of the Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

3.01 PARKING AREAS

- A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.

3.02 VEHICULAR TRAFFIC

- A. No public or private road shall be closed. Ensure the least possible obstruction to traffic.
- B. Conduct the Work to interfere as little as possible with public travel, whether vehicular or pedestrian.
- C. All posted speed limits on Site must be obeyed.
- D. Construction traffic on pump station roads will be limited to stabilized road surfaces to the greatest extent practical, as shown on the Drawings.
- E. Whenever it is necessary to cross or obstruct onsite roads, driveways, and walks, provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel.
- F. Maintain top of backfilled trenches before they are paved, to allow normal vehicular traffic to pass over. Provide temporary access driveways where required. Cleanup operations shall follow immediately behind backfilling.
- G. Provide snow removal to facilitate normal vehicular traffic on private travelways and walkways within construction zone. Snow removed from roadways and walkways shall not block walkways or sidewalks. Perform snow removal promptly and efficiently by means of suitable equipment whenever necessary for safety, and as may be directed by proper authority.
- H. Coordinate traffic routing with that of others working in same or adjacent areas. Other contracts will be under construction during portions of the duration of this project.

3.03 PUMP STATION ROADS

- A. Unless otherwise approved by the Owner, pump station roads shall remain open at all times with at least one 12-foot traffic lane, unless specifically indicated otherwise on the Drawings.

END OF SECTION

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SECTION 01 61 00 COMMON PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 DEFINITIONS

A. Products:

1. New items for incorporation in the Work, whether purchased by Contractor or Owner for the Project, or taken from previously purchased stock, and may also include existing materials or components required for reuse.
2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in construction industry.
3. Items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.02 CODES

A. Provide systems, equipment, and components that comply with the following codes as adopted by the City of Alexandria.

1. 2012 Virginia Construction Code (IBC).
2. [2012 Virginia Energy Conservation Code](#) (with ASHRAE 90.1-2010).
3. [2012 Virginia Mechanical Code](#) (International Mechanical Code).
4. [2012 Virginia Plumbing Code](#) (International Plumbing Code).
5. [2012 Virginia Fuel Gas Code](#) (International Fuel Gas Code).
6. 2005 National Electrical Code.
7. [2012 Virginia Existing Building Code](#) (International Existing Building Code).
8. [2012 Virginia Fire Code](#) (International Fire Code).

1.03 DESIGN REQUIREMENTS

- A. Where Contractor design is specified, design of installation, systems, equipment, and components, including supports and anchorage, shall be in accordance with provisions of 2012 Virginia Construction Code (VCC) and 2012 International Building Code (IBC) by International Code Council as modified by VCC.

1. See Structural Notes on Drawings for project-specific structural design criteria.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of 0 degrees F to 100 degrees F.

1.05 PREPARATION FOR SHIPMENT

- A. When practical, factory assemble products. Mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.
- B. Whenever possible, order equipment and materials in bulk quantities to minimize excess packaging. Avoid over-ordering of material quantities.
- C. The Contractor is encouraged to request that equipment and material suppliers ship items with minimal and/or recyclable packaging products without sacrificing adequate protection for all items. Submit documentation to the Engineer that such requests have been made.
- D. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.
- E. Recycle, reuse, or return packaging items to the greatest extent practical.
- F. Extra Materials, Special Tools, Test Equipment, and Expendables:
 1. Furnish as required by individual Specifications.
 2. Schedule:
 - a. Ensure that shipment and delivery occurs concurrent with shipment of associated equipment.
 - b. Transfer to Owner shall occur immediately subsequent to Contractor's acceptance of equipment from Supplier.
 3. Packaging and Shipment:
 - a. Package and ship extra materials and special tools to avoid damage during long term storage in original cartons insofar as possible, or in appropriately sized, hinged-cover, wood, plastic, or metal box.

- b. Prominently displayed on each package, the following:
 - 1) Manufacturer's part nomenclature and number, consistent with Operation and Maintenance Manual identification system.
 - 2) Applicable equipment description.
 - 3) Quantity of parts in package.
 - 4) Equipment manufacturer.
 4. Deliver materials to Site. Notify Construction Manager upon arrival for transfer of materials.
 5. Replace extra materials and special tools found to be damaged or otherwise inoperable at time of transfer to Owner.
- G. Request a minimum 7-day advance notice of shipment from manufacturer. Upon receipt of manufacturer's advance notice of shipment, promptly notify Engineer of anticipated date and place of equipment arrival.
- H. Factory Test Results: Reviewed and accepted by Engineer before product shipment as required in individual Specification sections.

1.06 DELIVERY AND INSPECTION

- A. Deliver products in accordance with accepted current Progress Schedule and coordinate to avoid conflict with the Work and conditions at Site. Schedule deliveries in succession to avoid vehicle idling on site.
- B. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.
- C. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable.
- D. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at Site. Promptly inspect for completeness and evidence of damage during shipment.
- E. Remove damaged products from Site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work.

1.07 HANDLING, STORAGE, AND PROTECTION

- A. Handle and store products in accordance with manufacturer's written instructions and in a manner to prevent damage. Store in approved storage yards or sheds provided in accordance with Section 01 50 00, Temporary

Facilities and Controls. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by Owner.

- B. Manufacturer's instructions for material requiring special handling, storage, or protection shall be provided prior to delivery of material.
- C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to ensure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.
- D. 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.
- E. Store fabricated products above ground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
- F. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.
- G. After installation, provide coverings to protect products from damage due to traffic and construction operations. Remove coverings when no longer needed.
- H. Hazardous Materials: Prevent contamination of personnel, storage area, and Site. Meet requirements of product specification, codes, and manufacturer's instructions.

1.08 SUBSTITUTE AND "OR-EQUAL" PRODUCTS

- A. Any substitute and "or-equal" products must meet the requirements of the General Conditions, the Specification sections, and as set forth herein.
- B. Submit each proposed substitute or "or-equal" item/method. Include all supporting data to allow Engineer's review in accordance with Section 01 33 00, Submittal Procedures, and as follows:

1. With consideration of the additional evaluation time necessary for Engineer's review of such items, indicate for each item the review status; either substitute or "or-equal."
 2. Contractor, in indicating the review status of the proposed item, acknowledges that the time shown for Engineer's review on the current accepted schedule is sufficient only to allow Engineer to accomplish review for the status indicated and not sufficient to perform both a review for "or-equal" status and a subsequent review for substitute status on the same product.
 3. Engineer shall require the Contractor to provide the specified product and may return unreviewed those submissions which fall into one or more of the following categories:
 - a. Not shown on the current accepted schedule.
 - b. Review status differs from that indicated on the accepted list unless previously approved in writing by Engineer.
 - c. Not in accordance with paragraph 7.05 of the General Conditions and as specified herein.
 - d. Incomplete.
 - e. Uncertified.
- C. Disposition of Substitute Item/Method:
1. Accepted: Engineer will evidence such acceptance by recommendation of a Change Order for Contractor and Owner execution. Such Change Order will accompany Engineer's evaluation and acceptance of Contractor's proposed substitute.
 2. Rejected:
 - a. If a hard copy submittal was provided:
 - 1) One copy retained by Engineer.
 - 2) Remaining copies returned to Contractor with a commentary by Engineer.
 - b. Contractor shall provide item specified in Contract Documents.

PART 2 PRODUCTS

2.01 GENERAL

- A. Provide manufacturer's standard materials suitable for service conditions, unless otherwise specified in the individual Specifications.
- B. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer's products must meet the performance specifications.

- C. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.
- D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- E. Provide interchangeable components of the same manufacturer, for similar components, unless otherwise specified.
- F. Equipment, Components, Systems, and Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.
- G. Regulatory Requirement: Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.
- H. Safety Guards: Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Cover rotating part on all sides. Design for easy installation and removal. Use 16-gauge or heavier; galvanized steel, aluminum coated steel, or galvanized or aluminum coated 1/2-inch mesh expanded steel. Provide galvanized steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water.
- I. Authority Having Jurisdiction (AHJ):
 - 1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
 - 2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.
- J. Equipment Finish:
 - 1. Provide manufacturer's standard finish and color, except where specific color is indicated.

2. If manufacturer has no standard color, provide equipment with gray finish as approved by Owner and Engineer.
- K. Special Tools and Accessories: Furnish to Owner, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other spare parts as required for maintenance.
- L. Lubricant: Provide initial lubricant recommended by equipment manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by Owner.
- M. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 FABRICATION AND MANUFACTURE

A. General:

1. Manufacture parts to U.S.A. standard sizes and gauges.
2. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.
3. Design structural members for anticipated shock and vibratory loads.
4. Use 1/4-inch minimum thickness for steel that will be submerged, wholly or partially, during normal operation.
5. Modify standard products as necessary to meet performance Specifications.

B. Lubrication System:

1. Require no more than weekly attention during continuous operation.
2. Convenient and accessible; oil drains with bronze or stainless steel valves and fill-plugs easily accessible from the normal operating area or platform. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.

3. Provide constant-level oilers or oil level indicators for oil lubrication systems.
4. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

2.03 SOURCE QUALITY CONTROL

- A. Where Specifications call for factory testing to be witnessed by Engineer, notify Engineer not less than 14 days prior to scheduled test date, unless otherwise specified.
- B. Calibration Instruments: Bear the seal of a reputable laboratory certifying instrument has been calibrated within the previous 12 months to a standard endorsed by the National Institute of Standards and Technology (NIST).
- C. Factory Tests: Perform in accordance with accepted test procedures and document successful completion.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing such effects. Remove damaged material or equipment from the Site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor's control.

3.02 INSTALLATION

- A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.
- B. No shimming between machined surfaces is allowed.
- C. Install the Work in accordance with NECA Standard of Installation, unless otherwise specified.
- D. Repaint painted surfaces that are damaged prior to equipment acceptance.
- E. Do not cut or notch any structural member or building surface without specific approval of Engineer.

- F. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's instructions, and as may be specified. Retain a copy of manufacturers' instruction at Site, available for review at all times.
- G. For material and equipment specifically indicated or specified to be reused in the Work:
 - 1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.
 - 2. Arrange for transportation, storage, and handling of products that require offsite storage, restoration, or renovation. Include costs for such Work in the Contract Price.
 - 3. Reused or relocated shall mean reused or relocated in-kind. The Contractor shall be responsible for all mechanical, electrical, instrumentation and any other Work required to make the relocated or reused material or equipment completely functional in all respects to the original installation.

3.03 FIELD FINISHING

- A. In accordance with Section 09 90 00, Painting and Coating, and individual Specification sections.

3.04 ADJUSTMENT AND CLEANING

- A. Perform required adjustments, tests, operation checks, and other startup activities.

3.05 LUBRICANTS

- A. Fill lubricant reservoirs and replace consumption during testing, startup, and operation prior to acceptance of equipment by Owner.

END OF SECTION

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**SECTION 01 74 00
CLEANING**

PART 1 GENERAL

1.01 SUMMARY

- A. Work specified in this Section includes but is not limited to the following:
 - 1. Furnish all labor, materials, equipment and appurtenances required to provide cleaning as shown and specified.
 - 2. Cleaning includes:
 - a. Cleaning during construction
 - b. Final cleaning of project and related site work

1.02 CLEANING DURING CONSTRUCTION

- A. In accordance with General Conditions, as may be specified in other Specification sections, and as required herein.
- B. Control accumulation of waste materials and rubbish; periodically dispose of offsite.
- C. Keep site and construction areas clean on a weekly basis.
- D. Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

1.03 FINAL CLEANING

- A. Execute cleaning prior to inspection for Substantial Completion of the Work.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Use materials which will not create hazards to health or property, and which will not damage surfaces.
- B. Use only materials and methods recommended by manufacturer of material being cleaned.
- C. All cleaning products utilized in the Contractor's field office and at the construction site must be certified by Green Seal.

PART 3 EXECUTION

3.01 CLEANING

- A. In addition to removal of debris and cleaning specified in other sections, clean interior and exterior exposed to view surfaces.
- B. Remove waste, foreign matter, and debris from roofs, gutters, areaways, and drainage systems.
- C. Cleaning During Construction:
 - 1. Execute periodic cleaning to keep building, site, and adjacent properties free of accumulations of waste materials, debris, rubbish, and windblown debris resulting from construction operations.
 - 2. Prior to Substantial Completion remove construction tools, scaffolding, equipment, machinery, and surplus materials.
 - 3. Broom clean and vacuum interior areas prior to start of surface finishing, and continue cleaning to eliminate dust. Protect existing and new equipment from construction dust and dust cleaning operations and per manufacturer's recommendations.
 - 4. Schedule cleaning operations such that dust and other contaminants will not fall on, or adhere to, wet or newly coated surfaces.
 - 5. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing space.
 - 6. Store volatile wastes in covered metal containers and remove from premises daily. Prevent accumulation of waste which creates hazardous conditions. Provide adequate ventilation during use of volatile or noxious substances.
 - 7. Do not throw materials from heights.
 - 8. Open free-fall chutes not permitted. Terminate closed chutes into appropriate containers with lids.
 - 9. Collect and remove waste materials, debris, and rubbish from site weekly until execution of final cleaning and dispose off-site in lawful manner.
 - 10. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 11. Do not burn or bury rubbish and waste materials on Project site. Do not dispose of volatile wastes or hazardous materials such as mineral spirits, oil, or paint thinner in storm or sanitary drains. Do not dispose of wastes into streams or waterways.
 - 12. Maintain cleaning until Final Completion.

- D. Final Cleaning: In addition to cleaning during construction, prior to Substantial Completion provide the following:
1. Remove temporary protection and labels not required to remain.
 2. Clean finishes free of dust, stains, films and other foreign substances.
 3. Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.
 4. Vacuum clean carpeted and/or similar soft surfaces.
 5. Clean, damp mop, wax, and polish resilient and hard surface floor as specified.
 6. Clean surfaces of equipment; remove excess lubrication.
 7. Clean plumbing fixtures, and food service equipment, to a sanitary condition.
 8. Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers, and coils when units have been operated without filters during construction.
 9. Clean light fixtures and lamps.
 10. Clean all roadways, parking areas and sidewalks within the project site and offsite, if applicable.
 11. Remove waste, debris, and surplus materials from site. Clean grounds; remove stains, spills, and foreign substances from paved areas and sweep clean. Rake clean other exterior surfaces.
- E. Site Maintenance: Should the Contractor fail to clean up the construction area each day to the satisfaction of the Owner, this may be done by others and the cost thereof plus ten percent (10%) deducted from the final payment.

END OF SECTION

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**SECTION 01 74 19
WASTE MANAGEMENT**

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes administrative requirements for the following:
1. Salvaging nonhazardous demolition waste.
 2. Recycling nonhazardous demolition waste.
 3. Disposing of nonhazardous demolition waste

1.02 DEFINITIONS

- A. Contaminated Material: In accordance with definition in Section 01 10 00, General Requirements.
- B. Construction Waste; Building and site improvement materials and other solid waste resulting from construction, remodeling, renovations or repair operations. Construction waste includes packaging.
- C. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations. Any demolition waste from subsurface structures in contaminated zones must be handled as Contaminated Material.
- D. Disposal: Removal off-site of demolition waste and subsequent sale, recycling, reuse, or deposit in landfills acceptable to authorities having jurisdiction.
- E. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.
- F. Salvage: Recovery of demolition waste and subsequent sale or reuse in another facility.

1.03 SUBMITTALS

- A. Informational Submittals:
1. Waste Management Plan: Submit five (5) copies of plan within ten (10) days following the Notice to Proceed.
 2. Waste Accountability Report: Concurrent with request for substantial completion, submit three (3) copies of report. Include the following information:
 - a. Total quantity of waste generated in tons

- b. Quantity of waste recycled in tons
 - c. Quantity of waste salvaged in tons
 - d. Quantity of waste landfilled in tons
 - e. Waste Diversion Rate - Total quantity of waste recovered (sum of salvaged and recycled) as a percentage of total waste generated.
3. Records of Donations/Sales: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations.
 4. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
 5. Landfill Disposal Records: Indicate receipt and acceptance of waste by landfill facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

1.05 PERFORMANCE REQUIREMENT

- A. General: The Owner's end-of-Project goal for salvage/recycling of material is 50 percent with a stretch goal of 75 percent by weight of total nonhazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators.
- B. Waste Management Summary: It is the Contractor's responsibility to keep track of the type and quantity of materials, by weight tickets, sent to salvage yards, recycling centers, and landfills. The following types of materials shall be salvaged or recycled at a minimum:
 1. Asphaltic concrete paving.
 2. Concrete.
 3. Concrete reinforcing steel.
 4. Concrete masonry units and brick.
 5. Piping and electrical conduit.
 6. Copper wiring.
 7. Scrap steel piling.

1.06 WASTE MANAGEMENT PLAN

- A. Develop a waste management plan that consists of a waste identification and a waste reduction work plan. The waste management program shall control wastes such as discarded building materials, concrete truck washout, chemicals, litter, or trash generated by construction workers or mobile food

vendor businesses serving them, and all sanitary waste at the construction site and prevent offsite migration that may cause adverse impacts to neighboring properties or to the environment.

- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing, and construction waste generated by the Work.
- C. Waste Reduction Work Plan: List each type of waste and how it will be salvaged, recycled, or disposed.
 - 1. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 - 2. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Use materials which will not create hazards to health or property, and which will not damage surfaces.
- B. Use only materials and methods recommended by manufacturer of material being cleaned.
- C. Cleaning products shall meet specifications in Section 01 74 00, Cleaning.

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PLAN

- A. Implement approved Project Waste Management Plan. Provide handling, containers, transportation, and other items as required to implement waste management plan during the entire duration of the Contract. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. Dispose of such waste materials, debris, and rubbish offsite. Provide separate containers for recyclable materials in addition to non-recyclable waste containers. Remove and properly recycle collected items as material volumes accumulate.
- B. Salvage and refurbish any non-toxic demolition or construction waste items that can be utilized for temporary construction means.

- C. The Contractor shall be responsible for implementing, monitoring, and reporting status of waste management plan.

END OF SECTION

**SECTION 01 77 00
CONTRACT CLOSEOUT**

PART 1 GENERAL

1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for a Project Closeout.

1.02 PREREQUISITES TO SUBSTANTIAL COMPLETION

- A. Definition: The functional and aesthetic qualities of the work have been completed to the point in which the Owner can utilize the project for the purpose for which it was intended as determined by the Owner.
- B. Complete items in following paragraphs before requesting Certification of Substantial Completion either for entire Work or for portions of Work.
- C. Submit maintenance manuals, project record documents, O & M Manuals, damage or settlement surveys, property surveys, photographs and other similar final record data
- D. Complete facility startup, testing, adjusting and balancing of systems and equipment
- E. Deliver tools, spare parts, extra stock, etc. to the Owner
- F. Perform final cleaning
- G. Complete equipment and process systems operational training.
- H. Submit an Application for Payment that coincides with, or first follows, date Substantial Completion is claimed, show 100 percent completion for portion of Work claimed as substantially completed.
 - 1. Include supporting documentation for completion as indicated in Contract Documents and a statement showing an accounting of changes to Contract Sum.
 - 2. If 100 percent completion cannot be shown, include a list of incomplete items, value of incomplete construction, and reason Work is not completed.
- I. Advise the Owner of pending insurance changeover requirements.
- J. Submit specific warranties, workmanship bonds, maintenance agreements, final certification and similar documents

- K. Obtain and submit releases enabling the Owner unrestricted use of Work and access to services and utilities. Including occupancy permits, operating certificates, and similar releases.

1.03 SUBSTANTIAL COMPLETION INSPECTION

- A. When Contractor considers Work to be substantially complete, submit to the Owner:
 - 1. Written certificate that Work, or designated portion, is substantially complete.
 - 2. List of items to be completed or corrected.
 - 3. Certify that the work has been completed in accordance with the Contract Documents.
 - 4. Certify that the equipment and systems have been tested and are operational.
- B. Within 10 days after receipt of request for Substantial Completion. The Owner will make inspection to determine whether Work or designated portion is substantially completed.
- C. After the inspection, the Owner shall:
 - 1. Prepare and submit to the Contractor, a list of items to be completed or corrected, as determined by the inspection.
 - 2. Prepare and issue a Certificate of Substantial Completion, containing:
 - a. The date of substantial completion
 - b. The list of items to be completed or corrected by the Contractor
 - c. The timeframe within which the Contractor shall complete or correct the work of the above listed items.
 - d. The associated cost of to complete or correct the work of the above listed items.
 - e. The Owner shall pay the Contractor in full within forty-five days following the date of Substantial Completion less only one and one-half times such amount as determined above.
 - f. The time and date that the Owner will assume complete ownership and control of the work or designated portion thereof.
 - g. The responsibilities of the Contractor for:
 - 1) Insurance.
 - 2) Utilities.
 - 3) Maintenance.
 - 4) Security.
 - 5) Operations.
 - 6) Safety.
 - 7) Heat.

- h. Certificate shall contain the signature of the:
 - 1) Owner.
 - 2) Contractor.
 - 3) Resident Engineer, if applicable.
 - 4) Construction Manager, if applicable.
 - 5) Design Engineer, if applicable.
 3. The Owner shall have the right to exclude the Contractor from the Work after the date of Substantial Completion, but the Owner shall allow the Contractor reasonable access to complete or correct items on the list.
- D. The Substantial Completion Inspection shall include, but not be limited to:
1. The project contracted work and any additional change orders.
 2. All equipment and systems tested and shown operational in the presence of the Owner.
- E. Should the Owner determine that Work is not substantially complete:
1. The Owner shall immediately notify the Contractor, in writing, stating the reasons.
 2. Contractor shall complete the work, and then send a second written notice to the Owner certifying that the Project, or designated portion of the Project, is substantially complete.
 3. The Owner shall then re-inspect the work upon the Contractors request at a scheduled re-inspection time.

1.04 PREREQUISITES FOR FINAL COMPLETION/FINAL ACCEPTANCE

- A. Definition: Final Completion shall not occur until installation required by the contract documents is one hundred percent (100%) complete as determined by the Owner.
- B. Complete items in following paragraphs before requesting final payment. List known exceptions, if any, in request.
- C. When Contractor considers Work to be complete, submit written verification that:
 1. Contract Documents have been reviewed.
 2. Work has been examined for compliance with Contract Documents.
 3. Work has been completed in accordance with Contract Documents.
 4. Work is completed and ready for final inspection.
- D. Submit following:

1. Submit a certified copy of the Final Inspection Punch List. This certified copy shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Owner.
2. Final payment request with final release and supporting documentation not previously submitted and accepted. Include certification of installation for products and completed operations where required.
3. Submit specific warranties, workmanship and maintenance bonds, maintenance agreements, final certifications and other similar documents.
4. Submit all required certified weekly payroll records (contractor and sub-contractors) and reports required by the Virginia Clean Water Revolving Loan Fund, including a narrative explaining if MBE/WBE and other goals were not achieved, and what good faith efforts were exerted to increase participation.
5. Submit Consent of Surety to Final Payment.
6. Certificates of inspection and acceptance by local governing agencies having jurisdiction.
7. Releases from all parties who are entitled to claims against the subject Project, property, or improvement pursuant to the provisions of law.
8. Certify that the work has been completed in accordance with the Contract Documents.
9. Certify that the equipment and systems have been tested and are operational.
10. Submit a final liquidated damages settlement statement.
11. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
12. Submit an updated final statement, accounting for final additional changes to Contract Sum.
13. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of Work.
14. Evidence of release of all liens and stop notices.
15. Provide copies of hazardous waste manifests and hazardous materials spill records.
16. Certify that the Project is completed and is ready for final inspection.

1.05 FINAL COMPLETION INSPECTION

- A. Within ten (10) days after receipt of request for final inspection, the Owner will make inspection to determine whether Work or designated portion is complete following procedures indicated in the Conditions of the Contract. In the event the Owner considers Work to be incomplete or defective:

1. The Owner will promptly notify Contractor, in writing, listing incomplete or defective work.
 2. Contractor shall take immediate steps to remedy stated deficiencies and give a written request to the Owner that Work is complete.
 3. The Owner will re-inspect Work.
- B. When the Owner consider the work is finally complete and in accordance with the requirements of the Contract Documents, the Owner shall request the Contractor to make Project Closeout submittals.
- C. At completion of the Contract and before final payment is made, the Contractor shall furnish the Owner two (2) full size set of clearly readable, documents and four (4) compact disks (or sets of disks), each containing a complete electronic set of Record Documents (including reference documents, shop drawings, technical submittals, O&M Manuals, training Manuals, cut sheets, etc.)

1.06 REINSPECTION PROCEDURES

- A. The Owner will re-inspect the Work to verify that the items identified on the Incomplete Work List and Punch List has been completed.
- B. Re-inspections will be scheduled upon receipt of notice that Work from the respective inspection lists has been completed.
- C. At the Owner's discretion, Contractor shall pay all costs associated with repetitive re-inspections (more than two re-inspections) of the same inspection list items.

1.07 BENEFICIAL OCCUPANCY

- A. Beneficial Occupancy of process equipment and or systems may be required when incremental acceptance of portions of the Work is required due to construction sequencing issues.
- B. Beneficial Occupancy shall include all aspects of that portion of the Work as defined by the Owner.
- C. Proposed Beneficial Occupancy shall be addressed in the Progress Schedule as described in the Contract Documents.
- D. Beneficial Occupancy shall be as approved by the Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Detailed information for the preparation, submission, and Engineer's review of Operations and Maintenance (O&M) Data, as required by individual Specification sections. O&M manuals must be submitted in hard copy format.

1.02 DEFINITIONS

- A. Preliminary Data: Initial and subsequent submissions for Engineer's review.
- B. Final Data: Engineer-accepted data, submitted as specified herein.
- C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

1.03 SEQUENCING AND SCHEDULING

- A. Equipment and System Data:
 - 1. Preliminary Data:
 - a. Do not submit until Shop Drawing for equipment or system has been reviewed and approved by Engineer.
 - b. Submit prior to shipment date.
 - c. Submit three hard copies.
 - 2. Final Data: Submit six hard copies and one in electronic format. Submit Instructional Manual Formatted data not less than 30 days prior to equipment or system field functional testing.
- B. Materials and Finishes Data:
 - 1. Preliminary Data: Submit at least 15 days prior to request for final inspection.
 - 2. Final Data: Submit within 10 days after final inspection.

1.04 DATA FORMAT

- A. Prepare preliminary and final data in the form of an instructional manual.
- B. Instructional Manual Format:
 - 1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
 - 2. Size: 8-1/2 inches by 11 inches, minimum.
 - 3. Cover: Identify manual with typed or printed title “OPERATION AND MAINTENANCE DATA” and list:
 - a. Project title.
 - b. Designate applicable system, equipment, material, or finish.
 - c. Identity of separate structure as applicable.
 - d. Identify volume number if more than one volume.
 - e. Identity of general subject matter covered in manual. Identity of equipment number and Specification section.
 - f. Identify location at the plant
 - 4. Spine:
 - a. Project title.
 - b. Applicable system, equipment, material, or finish
 - c. Identify volume number if more than one volume
 - d. Location.
 - 5. Title Page:
 - a. Contractor name, address, and telephone number.
 - b. Subcontractor, Supplier, installer, or maintenance contractor’s name, address, and telephone number, as appropriate.
 - 1) Identify area of responsibility of each.
 - 2) Provide name and telephone number of local source of supply for parts and replacement.
 - 6. Table of Contents:
 - a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
 - b. Identify each product, by product name and other identifying numbers or symbols as set forth in Contract Documents.
 - 7. Paper: 20-pound minimum, white for typed pages.
 - 8. Text: Manufacturer’s printed data, or neatly typewritten.
 - 9. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
 - 10. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.
- C. Data Compilation Format:

1. Compile all Engineer-accepted preliminary O&M data into a hard-copy, hard-bound set.
2. Each set shall consist of the following:
 - a. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
 - b. Cover: Identify each volume with typed or printed title “OPERATION AND MAINTENANCE DATA, VOLUME NO. ___ OF ___”, and list:
 - 1) Project title.
 - 2) Contractor’s name, address, and telephone number.
 - 3) If entire volume covers equipment or system provided by one Supplier include the following:
 - a) Identity of general subject matter covered in manual.
 - b) Identity of equipment number and Specification section.
 - c) Identity of location
 - c. Provide each volume with title page and typed table of contents with consecutive page numbers. Place contents of entire set, identified by volume number, in each binder.
 - d. Table of contents neatly typewritten, arranged in a systematic order:
 - 1) Include list of each product, indexed to content of each volume.
 - 2) Designate system or equipment for which it is intended.
 - 3) Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
 - e. Section Dividers:
 - 1) Heavy, 80-pound cover weight, tabbed with numbered plastic index tabs.
 - 2) Fly-Leaf:
 - a) For each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment.
 - b) List with Each Product:
 - (1) Name, address, and telephone number of Subcontractor, Supplier, installer, and maintenance contractor, as appropriate.
 - (2) Identify area of responsibility of each.
 - (3) Provide local source of supply for parts and replacement.
 - c) Identity of separate structure as applicable.
 - f. Assemble and bind material, as much as possible, in same order as specified in the Contract Documents.

D. Electronic Media Format:

1. Portable Document Format (PDF):
 - a. After all preliminary data has been found to be acceptable to Engineer, submit Operation and Maintenance data in PDF format on e-Builder®.
 - b. Files to be exact duplicates of Engineer-accepted preliminary data. Arrange by specification number and name.
 - c. Files to be fully functional and viewable in most recent version of Adobe Acrobat.

1.05 EQUIPMENT DATA SHEETS

- A. In addition to the requirements of 1.04 above, the Contractor shall fill out an Owner furnished Excel based Equipment Data Sheet for installed equipment.

1.06 SUBMITTALS

A. Informational:

1. Preliminary Data:
 - a. Submit three copies for Engineer's review.
 - b. If data meets conditions of the Contract:
 - 1) One copy will be returned to Contractor.
 - 2) One copy will be forwarded to Resident Project Representative.
 - 3) One copy will be retained in Engineer's file.
 - c. If data does not meet conditions of the Contract:
 - 1) All copies will be returned to Contractor with Engineer's comments (on separate document) for revision.
 - 2) Engineer's comments will be retained in Engineer's file.
 - 3) Resubmit three copies revised in accordance with Engineer's comments.
2. Final Data: Submit four copies in format specified herein.

1.07 DATA FOR EQUIPMENT AND SYSTEMS

A. Content For Each Unit (or Common Units) and System:

1. Product Data:
 - a. Include only those sheets that are pertinent to specific product.
 - b. Clearly annotate each sheet to:
 - 1) Identify specific product or part installed.
 - 2) Identify data applicable to installation.

- 3) Delete references to inapplicable information.
 - c. Function, normal operating characteristics, and limiting conditions.
 - d. Performance curves, engineering data, nameplate data, and tests.
 - e. Complete nomenclature and commercial number of replaceable parts.
 - f. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
 - g. Spare parts ordering instructions.
 - h. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, terminals).
 2. As-installed, color-coded piping diagrams.
 3. Charts of valve tag numbers, with the location and function of each valve.
 4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
 - a. Format:
 - 1) Provide reinforced, punched, binder tab; bind in with text.
 - 2) Reduced to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.
 - 3) Where reduction is impractical, fold and place in 8-1/2-inch by 11-inch envelopes bound in text.
 - 4) Identify Specification section and product on Drawings and envelopes.
 - b. Relations of component parts of equipment and systems.
 - c. Control and flow diagrams.
 - d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.
 5. Instructions and Procedures: Within text, as required to supplement product data.
 - a. Format:
 - 1) Organize in consistent format under separate heading for each different procedure.
 - 2) Provide logical sequence of instructions for each procedure.
 - 3) Provide information sheet for Owner's personnel, including:
 - a) Proper procedures in event of failure.
 - b) Instances that might affect validity of guarantee or Bond.
 - b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
 - c. Operating Procedures:
 - 1) Startup, break-in, routine, and normal operating instructions.

- 2) Test procedures and results of factory tests where required.
 - 3) Regulation, control, stopping, and emergency instructions.
 - 4) Description of operation sequence by control manufacturer.
 - 5) Shutdown instructions for both short and extended duration.
 - 6) Summer and winter operating instructions, as applicable.
 - 7) Safety precautions.
 - 8) Special operating instructions.
 - d. Maintenance and Overhaul Procedures:
 - 1) Routine maintenance.
 - 2) Guide to troubleshooting.
 - 3) Disassembly, removal, repair, reinstallation, and re-assembly.
 6. Guarantee, Bond, and Service Agreement: In accordance with Section 01 77 00, Closeout Procedures.
- B. Content for Each Electric or Electronic Item or System:
1. Description of Unit and Component Parts:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data, nameplate data, and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 - d. Interconnection wiring diagrams, including control and lighting systems.
 2. Circuit Directories of Panelboards:
 - a. Electrical service.
 - b. Control requirements and interfaces.
 - c. Communication requirements and interfaces.
 - d. List of electrical relay settings, and control and alarm contact settings.
 3. Electrical interconnection wiring diagram, including as applicable, single-line, three-line, schematic and internal wiring, and external interconnection wiring.
 4. As-installed control diagrams by control manufacturer.
 5. Operating Procedures:
 - a. Routine and normal operating instructions.
 - b. Startup and shutdown sequences, normal and emergency.
 - c. Safety precautions.
 - d. Special operating instructions.
 6. Maintenance Procedures:
 - a. Routine maintenance.
 - b. Guide to troubleshooting.
 - c. Adjustment and checking.

- d. List of relay settings, control and alarm contact settings.
7. Manufacturer's printed operating and maintenance instructions.
8. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

C. Maintenance Summary:

1. Compile individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or sub-units.
2. Format:
 - a. Use Maintenance Summary Form bound with this section or electronic facsimile of such.
 - b. Each Maintenance Summary may take as many pages as required.
 - c. Use only 8-1/2-inch by 11-inch size paper.
 - d. Complete using typewriter or electronic printing.
3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.
4. Recommended Spare Parts:
 - a. Data to be consistent with manufacturer's Bill of Materials/Parts List furnished in O&M manuals.
 - b. "Unit" is the unit of measure for ordering the part.
 - c. "Quantity" is the number of units recommended.
 - d. "Unit Cost" is the current purchase price.

1.08 DATA FOR MATERIALS AND FINISHES

A. Content for Architectural Products, Applied Materials, and Finishes:

1. Manufacturer's data, giving full information on products:
 - a. Catalog number, size, and composition.
 - b. Color and texture designations.
 - c. Information required for reordering special-manufactured products.
2. Instructions for Care and Maintenance:
 - a. Manufacturer's recommendation for types of cleaning agents and methods.
 - b. Cautions against cleaning agents and methods that are detrimental to product.
 - c. Recommended schedule for cleaning and maintenance.

B. Content for Moisture Protection and Weather Exposed Products:

1. Manufacturer's data, giving full information on products:

- a. Applicable standards.
 - b. Chemical composition.
 - c. Details of installation.
2. Instructions for inspection, maintenance, and repair.

1.09 SUPPLEMENTS

- A. The supplements listed below, following “End of Section,” are part of this Specification.

1. Forms: Maintenance Summary Form.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

MAINTENANCE SUMMARY FORM

PROJECT: _____ CONTRACT NO.: _____

1. EQUIPMENT ITEM: _____

2. MANUFACTURER: _____

3. EQUIPMENT/TAG NUMBER(S): _____

4. SERIAL NUMBER(S): _____

5. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS): _____

6. OPERATING PARAMETERS/NAMEPLATE DATA (hp, voltage, speed, TDH, gpm, impeller size/type, copy of pump curve, seal type and size, etc.): _____

7. EQUIPMENT MSRP: _____

8. DATE OF SERVICE: _____

9. WARRANTY INFORMATION (time period and contact information): _____

10. LUBRICANT LIST (include environmentally friendly products, if applicable): _____

11. MANUFACTURER'S LOCAL REPRESENTATIVE: _____

a. Name _____ Telephone No. _____

b. Address _____

12. ALTERNATIVE PARTS SUPPLIER (if applicable): _____

13. MAINTENANCE REQUIREMENTS:

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. (Reference to manufacturer's catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

14. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 10 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

15. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

16. EQUIPMENT SUMMARY CHART FOR OWNER'S INVENTORY.

Equipment	Tag Number	Serial Number	MSRP

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**SECTION 01 78 39
PROJECT RECORD DOCUMENTS**

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Specifications
 - 2. Record Product Data
- B. AlexRenew Standards for Record Documents will be provided to the Contractor at the pre-construction meeting.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store Contract Documents and samples in Contractor's field office apart from documents used for construction.
 - 1. Provide files and racks for storage of documents
 - 2. Provide secure storage space for storage of samples
- B. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- C. Within one day's notice, during the course of the work, current record documents shall be made available for inspection by Owner.

1.03 RECORDING "AS BUILT RECORD" MODIFICATIONS

- A. Label each document "As Built Record" in neat, large printed letters.
- B. Record information concurrently with construction progress.
 - 1. Do not conceal any work until required information is recorded.
 - 2. Accurately record information in an understandable drawing technique.
 - 3. Mark Record Prints to show the actual installation where installation varies from that shown originally.
- C. Project Manual: Legibly mark each section to record:
 - 1. Changes made by addenda.
 - 2. Changes made by written field order or by change order.

3. Products actually used where choices are indicated or where substitutions are accepted.
4. Mark Specifications to indicate the actual product installations where installation varies from that indicated in Specifications, Addenda and contract modifications.
 - a. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - b. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - c. Record the name of manufacturer, supplier, installer, and other information necessary to provide a record of selections made.
 - d. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.

1.04 RECORD PRODUCT DATA

- A. Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
- B. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
- C. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

1.05 CERTIFICATION

- A. Certify as a part of each application for payment that project record documents are current at time application is submitted.

1.06 SUBMITTAL: "AS BUILT RECORD" DOCUMENTS

- A. At completion of the project, the Contractor shall submit two (2) electronic copies via e-Builder of the Record Specifications to the Owner. Certify to their accuracy and completion. All modifications clearly marked for identification.
- B. Submit three (3) copies of each Product Data submittal. Where Record Product Data is required as part of operation and maintenance manuals; submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

1.07 QUALITY ASSURANCE:

- A. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
- B. Accuracy of Records:
 - 1. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
 - 2. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive Site measurement, investigation, and examination.
- C. Make entries within 24 hours after receipt of information that a change in the Work has occurred.
- D. Prior to submitting each request for progress payment, request Engineer's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by Engineer to recommend whole or any part of Contractor's Application for Payment, either partial or final.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 RECORDING AND MAINTENANCE

- A. General:
 - 1. Promptly following commencement of Contract Times, secure from Engineer at no cost to Contractor, one complete set of Contract Documents. Drawings will be full size.
 - 2. Delete Engineer title block and seal from all documents.
 - 3. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.
- B. Recording:
 - 1. Maintain one (1) copy of each submittal during the construction period for Project Record Document purposes.

2. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of the Project.
3. Digital Records: entries on the PDF drawings, using a program such as BlueBeam, clearly describe change by graphic line and note as required.
4. Color Coding:
 - a. Green when showing information deleted from Drawings.
 - b. Red when showing information added to Drawings.
 - c. Blue and circled in blue to show notes.
5. Date entries: call attention to entry by “cloud” drawn around area or areas affected.
6. Legibly mark to record actual changes made during construction, including, but not limited to:
 - a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
 - b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
 - c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
 - d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
 - e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, and Engineer’s written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.
7. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
 - a. Clearly identify the item by accurate note such as “cast iron drain,” “galv. water,” and the like.
 - b. Show, by symbol or note, vertical location of item (“under slab,” “in ceiling plenum,” “exposed,” and the like).
 - c. Make identification so descriptive that it may be related reliably to Specifications.

C. Maintenance:

1. Store Record Documents and Samples apart from the Contract Documents used for construction.
2. Do not use Project Record Documents for construction purposes.

3. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss.
4. Provide access to Project Record Documents for Owner's reference during normal working hours.

END OF SECTION

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SECTION 01 79 26 WARRANTIES

PART 1 GENERAL

1.01 SUMMARY

- A. Work specified in this Section includes but is not limited to the following:
 - 1. Administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties.
- B. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.

1.02 DISCLAIMERS AND LIMITATIONS

- A. Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products.
- B. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.03 DEFINITIONS

- A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.04 WARRANTY REQUIREMENTS

- A. Related Damages and Losses
 - 1. When correcting failed or damaged warranted construction, Contractor shall remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

- B. Reinstatement of Warranty:
1. When Work covered by a warranty has failed and been corrected by replacement or rebuilding, Contractor shall reinstate the warranty by written endorsement
 2. The reinstated warranty shall be equal to the original warranty.
- C. Replacement Cost:
1. Upon determination that Work covered by a warranty has failed, Contractor shall replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents.
 2. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. The Owner's Recourse:
1. Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law.
 2. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - a. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.
- F. Contractor shall guarantee all materials and workmanship for a period of 12 months from the date of final acceptance of Work.

1.05 WARRANTY PERIOD

- A. Date of beginning of time of warranty will be the date of Substantial Completion or date of Beneficial Occupancy if equipment is put to use by the Owner at date of Beneficial Occupancy.
- B. No warranty shall start prior to equipment being put into operation.

- C. Equipment warranty period: Manufacturer’s standard warranty, minimum 1 year from above date of beginning of warranty, except as stated elsewhere.

1.06 SUBMITTALS

- A. Contractor shall submit written warranties to the Owner prior to the date certified for Final Inspection.
 - 1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, Contractor shall submit properly executed warranties to the Owner within 15 days of completion of that designated portion of the Work.
- B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, Contractor shall prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Engineer, for approval prior to final execution.
 - 1. Refer to Divisions 2 through 50 for specific content requirements and particular requirements for submitting special warranties.
- C. Warranties and Bonds in Operations and Maintenance Manual:
 - 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation.
 - 2. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.
 - 3. Identify each binder on the front with the typed or printed title “WARRANTIES”.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 LIST OF WARRANTIES

- A. Refer to individual Sections for required product warranty information.

END OF SECTION

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SECTION 01 88 15 ANCHORAGE AND BRACING

PART 1 GENERAL

1.01 SUMMARY

- A. This section covers requirements for anchorage and bracing of equipment, distribution systems, and other nonstructural components required in accordance with the ICC 2012 International Building Code (IBC), for seismic, wind, gravity, soil, and operational loads.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Institute of Steel Construction (AISC) 360, Specification for Structural Steel Buildings.
 2. American Society of Civil Engineers (ASCE): ASCE 7, Minimum Design Loads for Buildings and Other Structures.
 3. International Code Council (ICC): International Building Code (IBC).
 4. National Fire Protection Association (NFPA): 13, Standard for the Installation of Sprinkler Systems.

1.03 DEFINITIONS

- A. Authority Having Jurisdiction (AHJ): Permitting building agency; may be a federal, state, local, or other regional department, or individual including building official, fire chief, fire marshal, chief of a fire prevention bureau, labor department, or health department, electrical inspector; or others having statutory authority. AHJ may be Owner when authorized to be self-permitting by governmental permitting agency or when no governmental agency has authority.
- B. Designated Seismic System: Architectural, electrical, and mechanical system or their components for which component importance factor is greater than 1.0.

1.04 DESIGN AND PERFORMANCE REQUIREMENTS

- A. General:
1. Anchorage and bracing systems shall be designed by a qualified professional engineer registered in the Commonwealth of Virginia.

2. Design anchorage into concrete including embedment in accordance with ACI 318-11, Appendix D (or other industry standard approved by Engineer), and Project Specifications.
 - a. Unless otherwise noted, design for cracked concrete condition.
3. Design anchorage and bracing of architectural, mechanical, and electrical components and systems in accordance with this section, unless a design is specifically provided within Contract Documents or where exempted hereinafter.
4. Design attachments, braces, and anchors for equipment, components, and distribution systems to structure for gravity, seismic, wind, and operational loading.
5. Anchor and brace piping and ductwork, whether exempt or not exempt for this section, so that lateral or vertical displacement does not result in damage or failure to essential architectural, mechanical, or electrical equipment.
6. Architectural Components: Includes, but are not limited to, nonstructural walls and elements, partitions, cladding and veneer, access flooring, signs, cabinets, suspended ceilings, and glass in glazed curtain walls and partitions.
7. Provide supplementary framing where required to transfer anchorage and bracing loads to structure.
8. Adjust equipment pad sizes or provide additional anchorage confinement reinforcing to provide required anchorage capacities.
9. Design anchorage and bracing for:
 - a. Equipment and components that weigh more than 400 pounds and are mounted 5 feet or less above adjacent finished floor.
 - b. Equipment weighing more than 75 pounds that is mounted more than 5 feet above adjacent finished floor.
 - c. Distribution systems that weigh more than 5 pounds per foot that are mounted more than 5 feet above adjacent finished floor.
10. For components exempted from design requirements of this section, provide bolted, welded, or otherwise positively fastened attachments to supporting structure.

B. Design Loads:

1. Gravity: Design anchorage and bracing for self-weight and superimposed loads on components and equipment.
2. Wind: Design anchorage and bracing for wind criteria provided on General Structural Notes on Drawings for exposed architectural components and exterior and wind-exposed mechanical and electrical equipment. Alternately, manufacturer certification may be provided for components such as roofing and flashing to verify attachments meet Project-specific design criteria.

3. Operational:
 - a. For loading supplied by equipment manufacturer for IBC required load cases.
 - b. Loads may include equipment vibration, torque, thermal effects, effects of internal contents (weight and sloshing), water hammer, and other load-inducing conditions.
 - c. Locate braces to minimize vibration to or movement of structure.
 - d. For vibrating loads, use anchors meeting requirements of Section 05 05 19, Post-Installed Anchors, for anchors with designated capacities for vibratory loading per manufacturer's ICC-ES report.
4. Seismic:
 - a. In accordance with 2012 IBC, Section 1613, and Chapter 13 of ASCE 7.
 - b. Design anchorage and bracing for design criteria listed on General Structural Notes on Drawings.
 - c. Design forces for anchors in concrete or masonry shall be in accordance with ASCE 7, Section 13.4.2 , or IBC Section 1905.1.9 as applicable for Project Seismic Design Category.

C. Seismic Design Requirements:

1. Analyze local region of body of nonstructural component for load transfer of anchorage attachment if component $I_p = 1.5$.
2. The following are exempt from requirements for provision of seismic anchorages and bracing, in addition to those items specifically exempted in ASCE 7, Part 13.5 for architectural components and Part 13.6 for electrical and mechanical equipment:
 - a. Furniture, except storage cabinets and bookshelves over 6 feet tall.
 - b. Temporary or movable equipment.
3. Fire protection sprinkler systems designed and constructed in accordance with NFPA 13 shall be considered to meet requirements of Chapter 13 of ASCE 7.
4. Provide support drawings and calculations for electrical distribution components if any of the following conditions apply:
 - a. Conduit diameter is greater than 2.5-inch trade size.
 - b. Total weight of bus duct, cable tray, or conduit supported by trapeze assemblies exceeds 10 pounds per foot.
5. Existing components, systems, and equipment in their final condition that are modified by Project requirements and are not exempted by above paragraph require the same anchorage and bracing drawing and calculation submittals as new equipment. Field verify existing conditions.

6. Other seismic design and detailing information identified in ASCE 7, Chapter 13, is required to be provided for new and modified or noted architectural, mechanical and electrical components, systems, or equipment.

1.05 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
 - a. List of architectural, mechanical, and electrical equipment requiring Contractor-designed anchorage and bracing, unless specifically exempted.
 - b. Manufacturers' engineered seismic and non-seismic hardware product data.
 - c. Attachment assemblies' drawings including seismic attachments; include connection hardware, braces, and anchors or anchor bolts for nonexempt components, equipment, and systems.
 - d. List of existing architectural, mechanical, and electrical equipment or components to be modified in Project requiring Contractor-designed anchorage and bracing in final retrofitted condition.
 - e. Drawings for seismic attachment assemblies include connection hardware, braces, and anchors (or anchor bolts) for modified, nonexempt existing components, equipment, and systems where a combination of new and existing systems or components' final condition would require anchorage or bracing under this specification for new equipment.
 - f. Submittal will be rejected if proposed anchorage method would create excessive stress to supporting member. Revise anchorages and strengthen structural support to eliminate overstressed condition.

B. Informational Submittals:

1. Anchorage and Bracing Calculations: For attachments, braces, and anchorages, include IBC and Project-specific criteria as noted on General Structural Notes on Drawings, in addition to manufacturer's specific criteria used for design; sealed by a civil engineer registered in the Commonwealth of Virginia.
2. Manufacturer's hardware installation requirements.

C. Deferred Submittals:

1. Submitted seismic anchorage drawings and calculations for Designated Seismic Systems are identified as IBC deferred submittals and will be

- submitted to and must be accepted by AHJ prior to installation of component, equipment, or distribution system.
2. Submit deferred Action Submittals such as Shop Drawings with supporting deferred informational submittals such as calculations no less than 4 weeks in advance of installation of component, equipment or distribution system to be anchored to structure.

1.06 SOURCE QUALITY CONTROL

- A. Contractor and supplier responsibilities to accommodate Owner-furnished shop fabrication related special inspections and testing are provided in Project's Statement of Special Inspections on Drawings, and Section 01 45 33, Special Inspection, Observation, and Testing.
- B. Provide all other specified, regulatory required, or required repair verification inspection and testing that is not listed in Statement of Special Inspections in accordance with Section 01 45 16, Contractor Quality Control.
- C. Provide Source Quality Control for welding and hot-dip galvanizing of anchors in accordance with Section 05 50 00, Metal Fabrications.

PART 2 PRODUCTS

2.01 GENERAL

- A. Design and construct attachments and supports transferring seismic and non-seismic loads to structure of materials and products suitable for application and in accordance with design criteria shown on Drawings and nationally recognized standards.
- B. Provide anchor bolts for anchorage of equipment to concrete or masonry in accordance with Section 05 50 00, Metal Fabrications. Provide anchor bolts of the size, minimum embedment, and spacing designated in calculations submitted by Contractor and accepted by Engineer.
- C. Provide post-installed concrete and masonry anchors for anchorage of equipment to concrete or masonry in accordance with Section 05 05 19, Post-Installed Anchors. Provide post-installed anchors of the size, minimum embedment, and spacing designated in calculations submitted by Contractor and accepted by Engineer.
- D. Do not use powder-actuated fasteners or sleeve anchors for seismic attachments and anchorage where resistance to tension loads is required. Do not use expansion anchors, other than undercut anchors, for nonvibration isolated mechanical equipment rated over 10 horsepower.

PART 3 EXECUTION

3.01 GENERAL

- A. Make attachments, bracing, and anchorage in such a manner that component lateral force is transferred to lateral force resisting system of structure through a complete load path.
- B. Design, provide, and install overall seismic anchorage system to provide restraint in all directions, including vertical, for each component or system so anchored.
- C. Provide snubbers in each horizontal direction and vertical restraints for components mounted on vibration isolation systems where required to resist overturning.
- D. Provide piping anchorage that maintains design flexibility and expansion capabilities at flexible connections and expansion joints.
 - 1. Piping and ductwork suspended more than 12 inches below supporting structure shall be braced for seismic effects to avoid significant bending of hangers and their attachments unless high-deformability piping is used per ASCE 7, Section 13.6.8 or HVAC ducts have a cross-sectional area of less than 6 square feet or weigh 17 pounds per foot or less.
- E. Anchor tall and narrow equipment such as motor control centers and telemetry equipment at base and within 12 inches from top of equipment, unless approved otherwise by Engineer.
- F. Do not attach architectural, mechanical, or electrical components to more than one element of a building structure at a single restraint location where such elements may respond differently during a seismic event. Do not make such attachments across building expansion and contraction joints.

3.02 INSTALLATION

- A. Do not install components or their anchorages or restraints prior to review and acceptance by Engineer and AHJ.
- B. Notify Engineer upon completion of installation of seismic restraints in accordance with Section 01 45 33, Special Inspection, Observation, and Testing.

3.03 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

- A. In accordance with Section 05 50 00, Metal Fabrications and Section 05 05 19, Post-Installed Anchors.
- B. Owner-Furnished Quality Assurance, in accordance with IBC Chapter 17 requirements, is provided in Statement of Special Inspections Plan on Drawings. Contractor responsibilities and related information are included in Section 01 45 33, Special Inspection, Observation, and Testing.
- C. Provide any other specified, regulatory required, or required repair verification inspection and testing that is not listed in Statement of Special Inspections in accordance with Section 01 45 16, Contractor Quality Control.

END OF SECTION

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SECTION 01 91 00 EQUIPMENT SYSTEMS COMMISSIONING

PART 1 GENERAL

1.01 DEFINITIONS

- A. Commissioning: The series of activities required of the Contractor necessary to bring components or systems from installation to readiness, to startup and completion of Operational Demonstration.
- B. Facility: Entire Project, or an agreed upon portion, including all of its unit processes.
- C. Operational Demonstration:
 - 1. A demonstration, conducted by Contractor, with assistance of Owner, to demonstrate and document the performance of the entire operating facility, both manually and automatically (if required), based on criteria developed in conjunction with Owner and as accepted by Engineer.
 - 2. Such demonstration is for the purposes of (i) verifying to Owner entire facility performs as a whole, and (ii) documenting performance characteristics of completed facility for Owner's records. Neither the demonstration nor the evaluation is intended in any way to make performance of a unit process or entire facility the responsibility of Contractor, unless such performance is otherwise specified.
- D. Equipment Tests: tests in presence of Engineer and Owner to demonstrate that installed equipment meets manufacturer's installation, calibration, and adjustment requirements and other requirements as specified.
- E. Performance Test: Wet-Test or tests performed after any required functional test in presence of Engineer and Owner to demonstrate and confirm individual equipment meets performance requirements specified in individual sections.
- F. Unit Process: As used in this section, a unit process is a portion of the facility that performs a specific process function, such as production of chilled water and pumping.
- G. Wet Testing: Wet Testing is testing performed by the Contractor utilizing test material in the component, system, or unit process. Process Tankage shall be filled with test material to operating level.

1.02 SUPERVISION AND MANAGEMENT OF TESTING PROGRAM

- A. Contractor shall assign a dedicated Testing and Checkout Coordinator to supervise, manage, and oversee the testing requirements of this Section.
- B. Testing and Checkout Coordinator Duties and Responsibilities:
 - 1. Develop the testing plans including the scheduling of all testing and inspection activities.
 - 2. Submit start-up requests for vendor and subcontractor checkouts of all equipment.
 - 3. Coordinate with the Owner for the testing and start-up of all equipment.
 - 4. Submission of all test reports for authority review and approval.
 - 5. Submission of the completed testing manual, including all test documentation to the Owner.
 - 6. Participate in all Operational Demonstrations required by contract and submit the final report including all documentation.

1.03 SUBMITTALS

- A. Informational Submittals:
 - 1. Qualifications:
 - a. Submit resumes, including three outside references, for each team member proposed for testing, startup, and commissioning at least 60 days before the functional testing, start-up, and commissioning operations are to begin. At a minimum, include the following staffing, as appropriate for the equipment/systems being tested and commissioned:
 - 1) Startup manager.
 - 2) Electrical Systems Start-up Engineer, Technician, or Specialist.
 - 3) Instrumentation and Control Systems Start-up Engineer, Technician, or Specialist.
 - 4) Major Mechanical Equipment and Piping Start-up Engineer, Technician, or Specialist.
 - 5) HVAC Systems and Ducting Start-up Engineer, Technician, or Specialist.
 - b. The Owner will review resumes. Based upon review of resumes, and contacts with references, the Owner will approve, request additional information, or reject proposed startup and commissioning team members.
 - c. If a proposed startup and commissioning team member is rejected, submit resume and references for a replacement team member for consideration

2. Facility Operational Demonstration Plan.
 - a. Contractor shall have an approved testing plan at least 30 days prior to beginning testing.
3. Functional and performance test results.
4. Completed Unit Process Startup Form for each unit process.
5. Completed Operational Demonstration/Certification Form.
6. Record Drawings: Test, adjustment, and balancing data shall be recorded on the Record Drawings documents as specified in the Submittals section.
7. Baseline Commissioning Report.

1.04 COMMISSIONING PLAN

- A. The Commissioning Plan consists of the equipment testing plan, training of Owner's staff, and startup and operational demonstration plan.
- B. The Commissioning Plan is prepared by the Contractor and submitted to the Engineer for approval. The plan is intended to outline the equipment and system test sequence and coordination requirements, data collection requirements during the Equipment Testing and Operational Demonstration, and test report(s) submittals.
- C. Any changes or adjustments to the Commissioning Plan by the Contractor after it has originally been submitted and approved, must be submitted and approved by the Owner or Engineer prior to the Contractor starting the Functional Testing.

1.05 EQUIPMENT TESTING PLAN

- A. The equipment testing plan shall include the sequential requirements of Installation Review, Functional and Performance Testing, and Equipment and System Check-out.
- B. Installation Review: Ready-to-test determination will be made by the Resident Engineer after verifying that the installation is in accordance with Contract requirements and manufacturer's recommendations.
- C. Functional and Performance Testing:
 1. Equipment testing shall not commence until after the installation review is complete and the Resident Engineer's Ready-to-test determination is given.
 2. Test equipment as specified, or required to prove conformance with design and manufacturer, or required to develop equipment baseline

- data shall be completed and documentation submitted prior to proceeding to Equipment and System Checkout.
3. The Contractor shall submit a schedule defining when the testing (both startup point and duration) for each piece of equipment or unit process will occur.
 4. The Contractor shall identify the need for auxiliary systems, such as ventilation, cooling, and lubricating systems, so that the equipment can be tested safely.
 5. The Engineer shall identify interfacing equipment and system that may not be part of the Work but are necessary for the design intent to be satisfied.
 6. Testing shall demonstrate that equipment is ready for equipment and unit process systems startup.
 - a. If any equipment or unit process systems does not comply with the testing requirements, make the necessary corrections or replacements and repeat the test until equipment testing requirements are met.
 - b. Do not start up or place into service equipment and unit process systems until the testing is completed.
 - c. Modify the equipment and unit process systems to meet testing requirements and retest at no additional cost to the Owner.
 - d. Submit reporting documentation prior to proceeding to Operational Demonstration.
 - e. Complete calibrations and submit calibration reports prior to proceeding to Operational Demonstration.
 7. The minimum testing period for any piece of equipment shall be 2 consecutive hours with no equipment failure. In the event that a failure occurs in the test period, remedy the cause of the failure and start a new testing period.
 8. Perform equipment related testing on power actuated (oil hydraulic, water hydraulic, pneumatic, or electric motor) valves and slide gates and their related power actuation systems before commencing the testing of the associated equipment, piping and duct systems, or unit processes or mechanical systems.
 9. Complete installation and wiring of control panels, and pre-loop I/O testing and continuity checks.
 10. Paint and label pipes, conduits, wires, equipment, and panels prior to Operational Demonstration.

D. Equipment and System Check-out:

1. Complete loop I/O points testing prior.
2. Submit Manufacturers' certifications.

3. Complete Training of Owner's staff as defined in Section 01 43 33, Manufacturer's Field Services.
4. Completed the above requirements prior to the request for Operational Demonstration.
5. The Resident Engineer will observe equipment and process treatment system or unit performance in a site walk-through and attempt to confirm that there are no issues that would carry through to an incomplete work list. Issues identified during the walk through shall be resolved prior to proceeding to Operational Demonstration.

1.06 FACILITY STARTUP AND OPERATIONAL DEMONSTRATION PLAN

- A. Develop a written plan, in conjunction with Owner's operations personnel; to include the following:
 1. Step-by-step instructions for startup of each unit process and the complete facility.
 2. Unit Process Startup Form (sample attached), to minimally include the following:
 - a. Description of the unit process, including equipment numbers/nomenclature of each item of equipment and all included devices.
 - b. Detailed procedure for startup of the unit process, including valves to be opened/closed, order of equipment startup, etc.
 - c. Startup requirements for each unit process, including water, power, chemicals, etc.
 - d. Space for evaluation comments.
 3. Operational Demonstration/Certification Form (sample attached), to minimally include the following:
 - a. Description of unit processes included in the facility startup.
 - b. Sequence of unit process startup to achieve facility startup.
 - c. Description of computerized operations, if any, included in the facility.
 - d. Contractor certification facility is capable of performing its intended function(s), including fully automatic operation.
 - e. Signature spaces for Contractor and Engineer.
- B. Submit daily results of the Operational Demonstration in the form of daily reports showing compliance, non-compliance, or partial compliance of equipment and systems with specifications and performance criteria to the Resident Engineer.
- C. Submit consolidated Operational Demonstration daily reports into a complete equipment baseline commissioning report for each equipment and system tested within 48 hours of completion of the Operational Demonstration period.

- D. Operation of the system by the Contractor shall continue past the Operational Demonstration period with the Contractor remaining responsible for the system until submission of a final report within 48 hours of successful completion of the Operational Demonstration.
- E. The successful completion of the Operational Demonstration shall be defined by the equipment or system meeting the design criteria and all unit processes being operable and under control of computer system.
- F. Contract shall certify, on the Operational Demonstration/Certification Form, that facility is capable of performing its intended function(s), including fully automatic and computerized operation.
- G. On demonstrating successful completion of Operational Demonstration of equipment or system and after submittal of the Operational Demonstration report, the Owner will issue Beneficial Occupancy of the tested equipment or system.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Contractor shall supply all materials and equipment used in testing, adjusting, and balancing.
- B. Materials and equipment used shall be of good quality and suitable for the intended service. The use of miscellaneous items found at the job site is not acceptable.
- C. Select capacity or range of test equipment to provide meaningful test results. For example, select pressure or differential pressure gauges so that test pressure is 50 percent to 75 percent of the gauge capacity.
- D. Contractor shall provide or fabricate temporary equipment required for testing.

2.02 SOURCE QUALITY CONTROL

- A. All instruments shall be calibrated to recognized standards, by the instrument manufacturer or a qualified independent calibration laboratory. Retain instrument calibration data at the Contractor's site office for the Owner's review.

PART 3 EXECUTION

3.01 GENERAL

- A. Facility Startup and Commissioning Meetings: Schedule Project Meetings to discuss test schedule, test methods, materials, chemicals and liquids required, facilities operations interface, and Owner involvement.
- B. Contractor's Testing and Startup Representative:
 - 1. Designate and furnish one or more personnel to coordinate and expedite testing and facility startup.
 - 2. Representative(s) shall be present during startup meetings and shall be available at all times during testing and startup.
- C. Provide temporary valves, gauges, piping, test equipment and other materials and equipment required for testing and startup.
- D. Provide Subcontractor and equipment manufacturers' staff adequate to prevent delays. Schedule ongoing work so as not to interfere with or delay testing and startup.
- E. Owner will:
 - 1. Provide water, power, chemicals, and other items as required for startup, unless otherwise indicated.
 - 2. Operate process units and facility with support of Contractor.
 - 3. Provide labor and materials as required for laboratory analyses.

3.02 EQUIPMENT TESTING

- A. Preparation:
 - 1. Complete installation before testing.
 - 2. Furnish qualified manufacturers' representatives, when required by individual Specification sections.
 - 3. Equipment Test Report Form: Provide written test report for each item of equipment to be tested, to include the minimum information:
 - a. Owner/Project Name.
 - b. Equipment or item tested.
 - c. Date and time of test.
 - d. Type of test performed (Functional or Performance).
 - e. Test method.
 - f. Test conditions.
 - g. Test results.

- h. Signature spaces for Contractor and Engineer as witness.
 4. Cleaning and Checking: Prior to beginning functional testing:
 - a. Calibrate testing equipment in accordance with manufacturer's instructions.
 - b. Inspect and clean equipment, devices, connected piping, and structures to ensure they are free of foreign material.
 - c. Lubricate equipment in accordance with manufacturer's instructions.
 - d. Turn rotating equipment by hand when possible to confirm that equipment is not bound.
 - e. Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.
 - f. Check power supply to electric-powered equipment for correct voltage.
 - g. Adjust clearances and torque.
 - h. Test piping for leaks.
 5. Ready-to-test determination will be by Engineer based at least on the following:
 - a. Acceptable Operation and Maintenance Data.
 - b. Notification by Contractor of equipment readiness for testing.
 - c. Receipt of Manufacturer's Certificate of Proper Installation, if so specified.
 - d. Adequate completion of work adjacent to, or interfacing with, equipment to be tested, including items to be furnished by Owner.
 - e. Availability and acceptability of manufacturer's representative, when specified, to assist in testing of respective equipment.
 - f. Satisfactory fulfillment of other specified manufacturer's responsibilities.
 - g. Equipment and electrical tagging complete.
 - h. Delivery of all spare parts and special tools.

B. Functional Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Owner and Engineer in writing at least 14 days prior to scheduled date of testing.
3. Prepare Equipment Test Report summarizing test method and results.
4. When, in Engineer's opinion, equipment meets functional requirements specified, such equipment will be accepted for purposes of advancing to performance testing phase, if so required by individual Specification sections. Such acceptance will be evidenced by Engineer/Owner's signature as witness on Equipment Test Report.

C. Performance Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Engineer and Owner in writing at least 10 days prior to scheduled date of test.
3. Performance testing shall not commence until equipment has been accepted by Engineer as having satisfied functional test requirements specified.
4. Type of fluid, gas, or solid for testing shall be as specified.
5. Unless otherwise indicated, furnish labor, materials, and supplies for conducting the test and taking samples and performance measurements.
6. Prepare Equipment Test Report summarizing test method and results.
7. When, in Engineer's opinion, equipment meets performance requirements specified, such equipment will be accepted as to conforming to Contract requirements. Such acceptance will be evidenced by Engineer's signature on Equipment Test Report.
8. For all rotating machinery/equipment with a motor horsepower of more than 40, and with a rotational speed of the driven shaft in excess of 200 rpm, wet testing shall include:
 - a. Constant speed equipment: operate equipment through a range of conditions (e.g., various suction/discharge pressures for pumps and measure volts, amps, and kilowatts consumed).
 - b. Variable speed equipment: operate equipment at a range of speeds and other conditions (varying wet well level, etc.) and measure (ahead of the VFD) volts, amps, and kilowatts consumed.
 - c. Owner vibration data templates to be completed and signed off by the engineer and forwarded to the DMS Reliability Group at least 14 calendar days prior to the beginning of Facilities Startup and Operational Demonstration.

3.03 FACILITY START UP AND OPERATIONAL DEMONSTRATION

- A. Prior to unit process startup, equipment within unit process shall be accepted by Engineer as having met functional and performance testing requirements specified.
- B. Make adjustments, repairs, and corrections necessary to complete unit process startup.
- C. Operational Demonstration shall be considered complete when, in opinion of Engineer, unit process has operated in manner intended for a minimum of 5 continuous days without significant interruption. This period is in addition to functional or performance test periods specified elsewhere.
- D. Significant Interruption: May include any of the following events:

1. Failure of Contractor to provide and maintain qualified onsite startup personnel as scheduled.
 2. Failure to meet specified functional operation for more than 2 consecutive hours.
 3. Failure of any critical equipment or unit process that is not satisfactorily corrected within 5 hours after failure.
 4. Failure of any noncritical equipment or unit process that is not satisfactorily corrected within 8 hours after failure.
 5. As determined by Engineer.
- E. A significant interruption will require startup then in progress to be stopped. After corrections are made, startup test period to start from beginning again.

3.04 OPERATIONAL DEMONSTRATION CERTIFICATION

- A. When, in the opinion of Engineer, startup of all unit processes has been achieved, sequence each unit process to the point that facility is operational.
- B. Demonstrate proper operation of required interfaces within and between individual unit processes.
- C. After facility is operating, complete performance testing of equipment and systems not previously tested.
- D. Document, as defined in Facility Startup and Performance Demonstration Plan, the performance of the facility including its computer system, until all unit processes are operable and under control of computer system.
- E. Certify, on the Operational Demonstration/Certification Form, that facility is capable of performing its intended function(s), including fully automatic and computerized operation.

3.05 BASELINE STANDARD COMMISSIONING REPORT

- A. Following the conclusion of all testing adjusting and balancing work for each equipment component, manufacturer and contractor shall prepare and submit a baseline standard commissioning report to include documentation of the following:
 1. Vibration testing.
 2. Infrared analysis.
 3. Ultrasound measurements.
 4. Power usage under different operating conditions.
 5. Flow, head and pressure.
 6. Laser alignment.

7. Dynamic field balancing.
- B. Provide separate reports for each separate equipment component.
- C. Reports for equipment components of the same type, style, purpose, etc. shall be submitted as a complete group following the testing, adjusting and balancing of the last component in each group.

3.06 SUPPLEMENTS

- A. Supplements listed below, following “End of Section,” are a part of this Specification:
 1. Unit Process Startup Form.
 2. Operational Demonstration/Certification Form.

END OF SECTION

UNIT PROCESS STARTUP FORM

OWNER: Alexandria Renew Enterprises _____ **PROJECT:** Building J Relocation & Decommissioning _____

Unit Process Description: (Include description and equipment number of all equipment and devices):

Startup Procedure (Describe procedure for sequential startup and evaluation, including valves to be opened/closed, order of equipment startup, etc.):

Startup Requirements (Water, power, chemicals, etc.): _____

Evaluation Comments: _____

OPERATIONAL DEMONSTRATION/CERTIFICATION FORM

OWNER: Alexandria Renew Enterprises

PROJECT: Building J Facilities Relocation & Decommissioning

Unit Processes Description (List unit processes involved in facility startup):

Unit Processes Startup Sequence (Describe sequence for startup, including computerized operations, if any):

Contractor Certification that Facility is capable of performing its intended function(s), including fully automatic operation:

Contractor: _____

Date: _____, 20__

Engineer: _____

Date: _____, 20__

(Authorized Signature)

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SECTION 05 05 05

MISCELLANEOUS METALWORK

PART 1--GENERAL

1.01 DESCRIPTION

This section specifies miscellaneous metalwork, which consists of custom fabricated aluminum, steel, and stainless-steel metalwork other than structural metalwork.

1.02 QUALITY ASSURANCE

A. GENERAL:

Shop and field welding shall conform to the requirements of the AISC Manual of Steel Construction.

The use of salvaged, reprocessed or scrap materials will not be permitted.

B. REFERENCES:

This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
AISC Manual of Steel Construction	American Institute of Steel Construction, Manual of Steel Construction, Allowable Stress Design-9th Edition
ASTM A36/A36M	Structural Steel
ASTM A48	Gray-Iron Castings
ASTM A283/A283M	Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes and Bars
ASTM A307	Carbon Steel Externally Threaded Standard Fasteners
ASTM A320/ A320M	Alloy-Steel Bolting Materials for Low Temperature Service
ASTM A500	Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

PART 2--PRODUCTS

2.01 MATERIALS

Materials for miscellaneous metalwork are specified in Table A.

Table A, Materials for Miscellaneous Metalwork

Material	Specification
Nonstructural steel bars, angles, clips, and similar items	ASTM A36 or ASTM A283
Iron castings	ASTM A48
Structural steel tubing	ASTM A500, Grade B
Steel bolts (except flanges and anchor bolts)	ASTM A307, Grade A
Stainless steel	ASTM A320, Type 304
Aluminum rods and shapes	ASTM B221

2.02 FABRICATION

A. GENERAL:

Holes shall be punched 1/16 inch larger than the nominal size of the bolts, unless otherwise specified. Whenever needed, because of the thickness of the metal, holes shall be subpunched and reamed or shall be drilled.

Fabrication including cutting, drilling, punching, threading and tapping required for miscellaneous metal or adjacent work shall be performed prior to hot-dip galvanizing.

B. SEAT ANGLES, DUCT SUPPORTS, HANGERS, AND BRACKETS:

Seat angles for grating, supports for floor plates, clips for precast panels and brackets for piping shall be aluminum or type 316 stainless steel unless otherwise specified. Hangers shall be type 316 stainless steel, threaded, and furnished and installed with flat washers, lock washers and nylon lock nuts. Size per exhaust fan manufacturer's recommendations.

C. MECHANICAL BAR SCREEN COVER:

Coordinate covering of the existing mechanical bar screen with the mechanical bar screen manufacturer and manufacturer's vendor. The existing screen is a Climber model by Suez. The local sales representative firm is Sherwood Logan. In general, cover the open side of the bar screen with like material as to the construction of the bar screen frame and cover. Seal the cover with neoprene gaskets, fasten the cover with mechanical nuts, bolts, and washers, and include a pipe stub on the top of the covered screen. Connect this stub to the FRP ductwork shown on the drawings for odor control.

D. OTHER MISCELLANEOUS STEEL METALWORK:

Other miscellaneous steel metalwork including embedded and nonembedded steel metalwork, hangers and inserts shall be as specified on the drawings and shall be hot-dip galvanized after fabrication unless the metals are stainless steel or aluminum.

PART 3--EXECUTION

3.01 INSTALLATION

A. GENERAL:

Fieldwork shall not be permitted on galvanized items. Drilling of bolts or enlargement of holes to correct misalignment will not be allowed.

Dissimilar metals shall be protected from galvanic corrosion by means of pressure tapes, coatings or isolators.

Metalwork to be embedded in concrete shall be placed accurately and held in correct position while the concrete is placed or, if specified, recesses or blockouts shall be formed in the concrete. The surfaces of metalwork in contact with or embedded in concrete shall be thoroughly cleaned. If accepted, recesses may be neatly cored in the concrete after it has attained its design strength and the metalwork grouted in place.

B. SEAT ANGLES, SUPPORTS AND GUIDES:

Seat angles for grating and supports for floor plates shall be set so that they are flush with the floor and also maintain the grating and floor plates flush with the floor.

3.02 CLEANING

After installation, damaged surfaces of shop primed metals shall be cleaned and touched up with the same material used for the shop coat.

****END OF SECTION****

SECTION 06 70 13

FIBERGLASS REINFORCED PLASTIC (FRP) FABRICATIONS IN ODOR TREATMENT EQUIPMENT

PART 1 GENERAL

1.01 DESCRIPTION

- A. This section specifies general requirements for fiberglass reinforced plastic (FRP) fabrications. Equipment-specific requirements are detailed in other sections of the contract documents pertaining to specific equipment. This section is intended to be used in conjunction with the other related equipment specification sections and design drawings. It is intended to specify materials, describe methods of work, and provide for documentation of quality and acceptance.

1.02 QUALITY ASSURANCE

- A. Quality, as represented by raw materials used, manufacturing practices employed, and condition of the finished product, is of prime importance. Knowledge of new technology in the interest of improved quality and/or lower cost is welcomed. However, any change of raw materials, alteration of construction, or other deviations from the requirements of the Specification sections or design drawings must be submitted in detail and approved in writing by the Engineer.

1.03 REFERENCES

- A. This section contains references to the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.
- B. Unless otherwise specified, references to the documents in this section shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
AISC and Research Council for Riveted and Bolted Structural Joints (RCRBSJ)	Specification for Structural Joints Using ASTM A325 or A490 Bolts
American Institute of Steel Construction (AISC)	Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings
AMCA 500 D	Laboratory Methods of Testing Dampers for Rating
ASME/ANSI RTP-1	Reinforced Thermoset Plastic Corrosion Resistant Equipment
ASTM C582	Standard Specification for Contact Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion-Resistant Equipment
ASTM D883	Definitions of Terms Relating to Plastics
ASTM D2471	Gel Time and Peak Exothermic Temperature of Reacting Thermoset Resins
ASTM D2563	Recommended Practice for Classifying Visual Defects in Glass-Reinforced Plastic Laminate Parts
ASTM D2583	Test for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
ASTM D2584	Ignition Loss of Cured Reinforced Resins
ASTM D3567	Determining Dimensions of Reinforced Thermosetting Resin Pipe and Fittings
ASTM D3982	Standard Specification for Contact Molded "Fiberglass" (Glass Fiber Reinforced Thermosetting Resin) Duct and Hood
ASTM E84	Standard Method of Test for Surface Burning Characteristics of Building Materials
AWS D1.1, American Welding Society (AWS)	Structural Welding Code

Reference	Title
Iron and Steel Society	Pocketbook of Standard Steels
IBC	International Building Code
IMC	International Mechanical Code

1.04 DEFINITIONS

- A. The terminology of this specification is consistent with ASTM D883. Fabricators are responsible for correct interpretation. Further definitions are as follows:
1. Equipment: The FRP equipment, as listed in the pertinent equipment section, including all ancillary equipment, work, and materials as described in this section and related sections specification.
 2. Fabricator: The primary party responsible for fabrication of the FRP equipment.
 3. Field Joining Contractor: The party responsible for the field joining of the equipment. This may be the same party as the Fabricator and/or the Contractor.
 4. Mat: A fibrous material consisting of randomly oriented chopped or swirled glass filaments loosely held together with a binder.
 5. Chopped Glass: A fibrous material consisting of randomly oriented chopped filaments applied directly to a mold surface or laminate under construction by a chopper gun.
 6. Fiber Prominence (Jackstraw): The distinct visibility of individual glass strands causing a loss of translucency of the laminate.

1.05 SUBMITTALS

- A. Submittals shall be provided in accordance with Specification Section 01 33 00. Submittal requirements for FRP fabrications are detailed in those specification sections pertaining to specific equipment.

PART 2 PRODUCTS

2.01 GENERAL

- A. All products shall be new, of current design, and produced by approved manufacturers who specialized in the fabrication of such products.
- B. Stainless steel hardware and fabricated parts (including anchor bolts, anchor lugs, lifting lugs, hangers, etc.) shall be AISI Type 316.

- C. Gaskets for use with FRP flanges shall be flat, full-faced, and drilled to match the drilling of the mating flange(s). Gasket material shall be as specified in the pertinent equipment section.

2.02 MATERIALS

A. Resin:

1. The equipment shall be fabricated using the corrosion-resistant resin(s) specified in the pertinent equipment section, or equal as approved by the Construction Manager. The resin shall be used throughout all laminates.
2. Catalysts and promoters shall be of the type and amount recommended by the resin manufacturer for use with their resin in the required service. The Construction Manager will review the Fabricator's choice of resin/catalyst before fabrication begins to verify compliance to the resin manufacturer's recommended procedures. Positive measurement control of catalysts, promoters, and resins shall be maintained at all times.
3. No fillers, additives, or pigments shall be employed in the resin except as specified below, and in the pertinent equipment section. A thixotropic agent for viscosity control may be used in the proportion and type recommended by the resin manufacturer as approved by the Construction Manager. No thixotropic agent is to be used in the corrosion liner or on surfaces to be in contact with the corrosive environment.
4. Resin putty shall be made using the same resin as was used in the original fabrication of the parts to be joined. Resin putty shall contain a minimum 15 percent by weight of milled glass fibers. A fumed-silica additive such as Aerosil 200 or Cab-O-Sil TS-720 shall be added to increase the viscosity of the putty. The use of silica flour, grinding dust, or other fillers is not allowed.
5. When specified in the pertinent equipment section, antimony trioxide or antimony pentoxide shall be added to the resin in the amount necessary to achieve the required fire retardancy rating in the structural wall only. Resin manufacturer's recommendations shall be followed. The corrosion liner shall not contain this additive.

B. Reinforcement:

1. Type and sequence of reinforcement to be used shall be as designated in the pertinent equipment section, the construction details, or on the design drawings.
2. Glass fiber reinforcement used shall be a commercial grade corrosion-resistant borosilicate glass, except as otherwise noted.
3. All glass fiber reinforcing shall have an epoxy compatible silane type surface finish and binder that is specifically recommended by the glass manufacturer for the particular resin system to be used. This surface finish should allow the maximum possible chemical bonding between the resin and glass.

4. Surfacing veils shall be Type C (chemical grade) glass, 10 mil thickness, unless otherwise specified. An apertured polyester surfacing veil, such as Nexus or approved equal, shall be used only when indicated in the pertinent equipment section.
5. Mat shall be Type E (electrical grade) glass, 1-1/2 oz. or 3/4 oz. per sq. ft., with nominal fiber length of 1.25 ±0.75 inches.
6. Continuous glass roving used in chopper guns for spray-up shall be Type E chopper roving.
7. Woven roving shall be 24 oz. per sq. yd. Type E glass and have a 5 x 4 plain weave.
8. Continuous roving used in filament wound construction shall be Type E glass winder roving with a yield of 200 yards or more per pound.
9. Unidirectional fabric shall be a weft style made with glass strand of a yield equal to or greater than, (more yds./lb) that of the adjacent filament winding strand, stitched in a manner that provides uniform strand density without bunching or gapping.

2.03 FABRICATION

A. Molds:

1. Molds constructed of Masonite, wood, or other porous material must be completely covered with Mylar or other suitable material to produce a smooth and glossy inner surface on the FRP equipment.
2. Molds and mandrels shall be hard-surfaced such that working the wet laminate will not cause local displacement of the material or air entrapment. Covering of mandrels with cardboard is not acceptable. If submitted, Contractor shall demonstrate that it produces an RTP-1 Level 2 liner quality before being approved by the Construction Manager prior to start of fabrication.
3. Certain components shown on the design drawings assume the availability of specific tooling and/or molds. Alternate mold configurations may be considered by the Construction Manager in the interest of cost savings or betterment. Any deviations from the dimensions shown on the design drawings must be approved by the Construction Manager prior to the start of fabrication.

B. Vessel Assembly:

1. All cutouts from the equipment are to be marked, indicating their original location, and retained. All cutouts become the property of the Construction Manager.

2. Centerlines marked on the equipment for use in assembly shall not be removed until after inspection by the Construction Manager.
3. Flanged nozzles shall be installed with boltholes straddling principle centerlines of the vessel. For tank tops, nozzle boltholes straddle radial centerlines. Other layouts take precedence when detailed on the design drawings.
4. When requested, Fabricator shall supply to the Contractor, at the earliest possible time, a template which locates anchor bolt holes within $\pm 1/8$ -inch for each vessel.
5. When specified, or indicated on the design drawings or construction details of the pertinent equipment section, a non-skid surface shall be provided on the exterior surface of domed covers. Silica grit may be applied in conjunction with the final resin coat, or other methods employed if approved by the Construction Manager.
6. The Fabricator shall furnish and overlay on the outside of the equipment a plastic nameplate showing the following information:
 - a. Name of manufacturer
 - b. Date of manufacture
 - c. Construction Manager's purchase order number
 - d. Equipment name/number
 - e. Resin number and manufacturer
 - f. Design pressure and temperature
 - g. Vessel diameter, height, and weight
7. Butt joints or shell joints are to be in the number and location(s) as shown on the design drawings. Additional joints are not allowed except as approved by the Construction Manager. Slip joints, "mod joints," or other methods not conforming to the design drawings are not allowed. If joint locations are not indicated on the design drawings, Fabricator shall propose number and location for approval by Construction Manager.
8. Allowable tolerances shall be as listed in RTP-1, Fig. 4-1 and NM 7-1, except as modified herein or on the design drawings. Laminate thicknesses designated on the design drawings or in the approved Design Submittal are construction minimums.
9. When joining components, gaps at mating edges shall be limited to 1/4-inch maximum, and misalignment of inside surfaces shall not exceed 1/3 of the lesser wall thickness.
10. The outside surface of vessel flat bottoms after assembly shall be flat within $\pm 1/2$ -inch. In addition, localized indentations or protrusions shall not exceed $\pm 1/4$ -inch within two feet.
11. Nozzle cutout reinforcement shall be applied as required by the approved Design Submittal.

12. When reinforcing materials are cut to facilitate placement around an installed nozzle or opening, joints in successive reinforcing layers shall be staggered to avoid overlapping and shall not be placed so that the joints are parallel to the axis of the tank. The principal fiber direction of the woven roving reinforcement shall be parallel to the tank axis.

C. Ductwork Assembly:

1. Centerlines marked on the equipment for use in assembly shall not be removed until after inspection by the Construction Manager's representative.
2. Fabricator shall apply and overlay an identification tag on each duct spool, straight duct length or other equipment, showing the following information:
 - a. Name of manufacturer
 - b. Date of manufacture
 - c. Contractor's purchase order number
 - d. Resin identification
 - e. Duct diameter
 - f. Laminate thickness
 - g. Unique spool identification number
3. Tolerances on spool assembly shall be as follows, except as otherwise noted on the drawings:
 - a. Diametral, including out of roundness, shall be $\pm 1/8$ -inch or ± 1 percent, whichever is greater.
 - b. Tolerance on overall length and location of tees and laterals shall be $\pm 1/4$ -inch.
 - c. Plain ends shall be cut square with the duct axis $\pm 1/8$ -inch.
 - d. Flanges shall be perpendicular to the axis of the duct within $1/2$ degree, and shall be flat to $\pm 1/32$ -inch up to and including 16-inch diameter and $\pm 1/16$ -inch for larger diameters.
 - e. Tolerance on the specified angle for tees, laterals, and miters shall be $\pm 1/2$ degree.
4. All cutouts from the equipment are to be marked, indicating their original location, and retained. All cutouts become the property of the Construction Manager.
5. Cut Lengths: Construction Manager prefers straight duct to be supplied to required lengths with a minimum of shop butt joining of shorter lengths. Recognizing that waste can be minimized by joining shorter sections, or that mandrels may be limited to 20 ft., shop butt joints will be allowed within reason.
6. Duct Marking: All lengths of duct shall be identified in accordance with the requirements of paragraph 2.03 Ductwork Assembly. If required by the

Construction Manager, Fabricator shall return a marked-up copy of the layout drawings, with Mark numbers referenced.

D. Piping Assembly:

1. Fabricator is responsible for field verification of required piping spool dimensions to assure proper fit-up. Provide field trim as required to allow adjustment during installation.
2. Centerlines marked on the piping for use in assembly shall not be removed until after inspection by the Construction Manager's representative.
3. Fabricator shall apply and overlay an identification tag on each piping spool, straight length or component, showing the following information:
 - a. Name of manufacturer
 - b. Date of manufacture
 - c. Contractor's purchase order number
 - d. Resin identification
 - e. Pipe diameter
 - f. Laminate thickness
 - g. Unique spool identification number
4. Tolerances on piping spool assembly shall be as follows, except as otherwise noted on the drawings:
 - a. Diametral, including out of roundness, shall be $\pm 1/8$ -inch or ± 1 percent, whichever is greater.
 - b. Tolerance on overall length and location of tees and laterals shall be $\pm 1/8$ -inch.
 - c. Tolerance on lengths including field trim shall be ± 1 inch.
 - d. Plain ends shall be cut square with the pipe axis $\pm 1/8$ -inch.
 - e. Flanges shall be perpendicular to the axis of the duct within $1/2$ degree, and shall be flat to $\pm 1/32$ -inch up to and including 16-inch diameter and $\pm 1/16$ -inch for larger diameters.
 - f. Tolerance on the specified angle for tees, laterals, and miters shall be $+1/2$ degree.
5. All cutouts from the equipment are to be marked, indicating their original location, and retained. All cutouts become the property of the Construction Manager.

E. All Laminates:

1. Refer to the approved Design Submittal for reinforcement sequences. No deviations in number or sequence of plies will be allowed without approval by the Construction Manager.

2. Positive methods shall be used to assure uniform total thickness of the laminate and uniform glass-to-resin ratio without surplus resin or unsaturated glass.
3. All laminate thicknesses shown on the approved Design Submittal are construction minimums. It is the responsibility of the Fabricator to verify that minimum thicknesses are obtained using the laminate sequences specified.
4. The minimum allowable structural laminate thickness shall be the total laminate thickness less the specified sacrificial corrosion liner thickness.
5. Delays in hand lay-up laminating sequences for purposes of exotherm shall follow application of a mat ply. When lamination is resumed, it shall begin with a mat ply. Additional mat layers applied due to exotherm stops shall not be considered as part of the required wall thickness.
6. Laminating sequence interruptions shall not exceed 24 hours, and the in-process surface must retain acetone sensitivity until laminating is resumed. Lack of compliance with these procedures, or any indication that contamination of the surface has occurred, shall require that surface preparation be accomplished before resuming. Before resuming lamination, any rough areas or projections shall be touch-ground to allow full contact of the succeeding wet laminate.
7. An exotherm interruption is specifically prohibited within the corrosion liner. An exotherm interruption between the corrosion liner and the structural layers is limited to a maximum of twelve hours.
8. Chopped strand glass applied by chopper gun is allowed in lieu of mat layers if the application is mechanically controlled in a manner that ensures uniform thickness and glass-to-resin ratio. The specific methodology must be approved by the Owner's Representative prior to fabrication.
9. All non-mold surfaces shall be coated with resin containing wax additive in the amount necessary to allow full cure of the surface. In the case of interior primary corrosion surfaces, such as interior overlays, this wax coat shall be applied within 24 hours of original lamination. In the case of exterior surfaces, this wax coat shall also contain a UV stabilizer in the type and amount recommended by the resin manufacturer.
10. The exterior surface of all equipment shall be resin rich and reinforced with one layer C-glass surfacing veil, except as otherwise specified.
11. When specified in the pertinent equipment section or on design drawings, the exterior coat shall be an opaque pigmented surface coat, applied only after Construction Manager's inspection. Color to be selected by the Construction Manager.
12. Saturation of reinforcement prior to application to equipment shall not be performed on waxed paper or other contaminated material. Saturation of reinforcement on clean paper or cardboard is allowed.

13. All cut edges shall be thoroughly coated with resin so that no glass fibers are exposed. Cut edges exposed to the corrosive service shall be sealed with a corrosion liner laminate. All voids shall be filled with resin putty.

F. Corrosion Liner Laminates (inner surface and interior layers):

1. The inner (corrosion service) surface of all laminates shall be resin-rich and reinforced with surfacing veil of the type and number of layers as described in the pertinent equipment section or on design drawings.
2. The interior layer of the corrosion liner shall consist of 1-1/2 oz. per sq. ft. mat in the number of layers specified in the pertinent equipment section or on design drawings. Each ply shall be rolled separately to remove entrapped air.
3. All plies of the inner surface and interior layer are to gel completely before proceeding with the structural laminates, but in no case shall the interruption exceed twelve hours. The surface must retain acetone sensitivity until the structural laminate is applied. Lack of compliance to either of these aspects shall be cause for rejection of the corrosion liner.
4. Completed corrosion liner, as described above, shall contain not less than 20 percent nor more than 30 percent glass (by weight). No thixotropic material shall be used in the liner resin or in the fabrication of any FRP components intended for direct contact with the process stream. Completed liner shall be the minimum thickness specified in the pertinent equipment section or on design drawings. Completed liner shall meet visual defects requirements of RTP-1, Table 6-1, Level 2.
5. All edges of surfacing veils in wet lay-up shall be lapped a minimum of one inch.
6. A separately cured unreinforced gel coat shall not be used.
7. Antimony shall not be used in the corrosion liner.

G. Hand-Layup Structural Laminates:

1. The corrosion liner laminate shall be followed by structural laminates of varying construction types, as specified in the pertinent equipment sections, or on the design drawings.
2. For hand-layup structural laminates, reinforcement shall consist of mat and woven roving in the sequence specified in the pertinent equipment section or on design drawings.
3. All woven roving shall have a ply of mat on each side. Two adjacent plies of woven roving are not permitted.
4. All edges of woven roving material in wet lay-up shall be lapped a minimum of two inches. Lapped edges of adjacent layers shall be staggered to obtain the maximum possible strength.
5. Laminates containing primarily 1-1/2 oz. per sq. ft. mat layers in conjunction with woven roving shall contain not less than 35 percent or more than 45 percent glass (by weight).

6. Laminates containing primarily 3/4 oz. per sq. ft. mat layers in conjunction with woven roving are considered to be high strength laminates and shall contain not less than 45 percent or more than 55 percent glass (by weight).

H. Filament Wound Structural Laminates:

1. The corrosion liner laminate shall be followed by structural laminates of varying construction types, as specified in the pertinent equipment section, or on the design drawings.
2. For filament wound structural laminates, reinforcement shall consist of continuous strand fiberglass roving applied with a minimum of interruptions until the specified minimum thickness is attained. This laminate shall contain the percentage of glass (by weight) specified in the Design Submittal.
3. Each complete cycle of filament winding shall form a closed pattern of winding bands which completely covers the surface with two bi-directional layers. Each layer shall be a maximum of one roving in thickness. Singular cycles shall not exceed a thickness of 0.06 inches. In laminates with helix angles greater than 75 degrees, a minimum of 10% of the structural wall thickness shall be oriented at 0 degrees (longitudinal direction), plus or minus 5 degrees. Unidirectional roving shall be a minimum of 15 oz./sq.yd. and applied in a minimum of two layers. Unidirectional layers shall be evenly distributed through the thickness, with the first layer applied immediately after the first cycle of winding and the last layer located immediately prior to the last cycle of winding.
4. Upon request, Fabricator shall submit the following information:
 - a. Specific glass strand to be used and yield
 - b. Net thickness per cycle
 - c. Number of strands per inch in the winding band
 - d. Typical glass-to-resin ratio
5. Spacing of filaments within the winding band shall be sufficiently close that bridging is avoided and glass content is maintained within the specified limits. Spacing of the filaments shall be uniform across the winding band without bunching or gapping.
6. The helix angle of winding shall be as specified in the approved Design Submittal, as measured from the centerline of revolution of the equipment shell.
7. Tolerance on helix angle is +2 degrees, -2 degrees, unless otherwise noted in the pertinent equipment sections.
8. If layers of mat or chopped glass are needed to ensure proper bonding between the corrosion liner and filament winding, or within the filament winding to accommodate the fabricator's manufacturing methods, or to provide for laminates of acceptable quality, they may be added at the

Fabricator's option. These layers are considered to be extra material and will result in a thickness greater than specified. The amount of filament winding and unidirectional roving specified required by the approved Design Submittal must still be applied.

9. If for any reason, winding is interrupted to the point where the outer surface is gelled or exotherm temperatures are excessive, production shall stop and the laminate shall be allowed to cure. Any prominent ridges left on the cured surface shall be ground to smooth the projections and prevent bridging. Following the grinding, a bedding layer of 3/4 oz. per sq. ft. mat or chopped glass shall be applied and thoroughly rolled to remove air. Winding with continuous strand may be resumed before this layer gels. The additional mat layer is extra material and will result in a wall thickness greater than that specified.
- I. Surface Preparation:
1. Surface Abrasion:
 - a. Prior to starting secondary overlays, adequate surface abrasion with no surface contamination is required. Every precaution shall be taken to assure adequate surface preparation and a good bond of the secondary overlays.
 - b. Prior to making all overlays, the cured or wax coated surfaces of the area to be overlaid must be roughened thoroughly by grinding. The roughened area shall extend 1-inch minimum beyond the proposed overlay edge. The roughened area must be completely coated with wax coat at the completion of the joint.
 - c. Grinding shall be sufficiently deep that all traces of glossy resin coat are removed and that glass fiber is exposed over the entire abraded surface.
 - d. The edges of the abraded surface shall be "feathered" out such that no sharp discontinuities exist.
 - e. For surface abrasion by grinding, grinding disks shall be new and not contaminated, with a grit size of 16 to 24.
 - f. FRP joint application must begin within four hours of surface abrasion, or else abrasion must be repeated.
 2. Final Surface Preparation:
 - a. Within 15 minutes prior to beginning FRP joint application, dust shall be removed from the abraded area by vacuuming or brushing with clean non-metallic brushes, or wiping with clean dry rags.
 - b. Solvent wiping the abraded area is not allowed.
 - c. Air blowing the abraded area is not allowed.
 - d. If any indication of contamination is present after this final surface preparation, the abraded area shall be scrubbed with solvent and allowed to evaporate to verify removal of the contaminant. Repeat this solvent

wash if necessary. Surface abrasion must be repeated after solvent washing.

J. Joining Laminates:

1. FRP joining laminates are subject to all applicable requirements specified in other sections for laminates.
2. FRP joints shall be reinforced with an overlay of glass reinforcement and resin which extends equally within $\pm 1/2$ -inch on each side of the joint. A smooth contour is required. Minimum thickness, ply sequence, and ply widths of FRP joints shall be as specified in the approved Design Submittal.
3. Tolerance on width of joint reinforcement plies is +1 inch, -0 inch. Woven roving plies shall not exceed the width of the mat ply below them.
4. Parts to be joined shall be restrained to prevent movement until completion and cure of the joint overlay.
5. Parts shall be fit-up, and it shall be verified that all tolerances and assembly requirements of sections are satisfied. All cut edges shall be resin coated. The void between component parts shall be completely filled with resin putty, taking care not to extrude an excessive amount of putty into the interior.
6. The puttied area shall be ground to a smooth contour and final surface preparation repeated.
7. The abraded area to be overlaid shall be resin coated immediately prior to applying glass reinforcement, using a stiff brush to work resin into the rough surface. The resin coat shall be applied only to an area as wide (+1 inch, -0 inch) as the next exotherm stage of the joint sequence and shall be repeated prior to each exotherm stage. No thixotropic material shall be used in this resin.

K. Environment:

1. It is the Fabricator's responsibility to maintain conditions in the FRP laminate work area during all times when the final surface preparation and FRP laminate application are in process in order to not jeopardize the reliability of the laminate or secondary bond. As a minimum, controls shall include the following.
 - a. All surfaces to be overlaid and all materials are to be maintained within a range of 60 to 95 degrees F. This temperature must also be at least 5 degrees F greater than the dew point. During the exotherm stage(s) of each laminate sequence, and during any unplanned exotherms, the temperature of the curing laminate will likely exceed 95 degrees F. No further lamination may proceed until the exotherm has completed and the laminate has cooled to 95 degrees F or less. No attempt shall be made to cool the curing laminate prematurely.

- b. Prepared surfaces and materials shall be protected from blowing dust, moisture, and other contaminants.
- c. If any of the above conditions are violated while the final surface preparation or FRP laminate application are in-process, work shall stop immediately and the process must begin again with surface abrasion.
- d. Materials shall be stored in a dry area and within the temperature and humidity limits recommended by the manufacturers.

L. Flanges:

1. Except as otherwise specified on the design drawings, flanges shall be made by hand-layup construction with nozzle neck and flange made integrally in one piece and fabricated in accordance with the dimensions shown on the design drawings. All layers of reinforcement in the nozzle neck and hub shall extend uninterrupted into the flange.
2. Unless otherwise noted on the design drawings, additional hub thickness shall be built-up using alternating layers of 1-1/2 oz. per sq. ft. mat and 24 oz. per sq. yd. woven roving.
3. Additional thickness in the flange shall be built-up using "ring" cutouts of mat, evenly distributed throughout the flange thickness.
4. Press molded or filament wound flanges are not allowed. Filament winding of the nozzle neck is not allowed, and the "flange on pipe" method of nozzle fabrication (Ref. RTP-1, Fig. 4-11) is not allowed.
5. To obtain proper seating, bolt holes shall be spotfaced for SAE size washers. Overall machine facing of the back of flanges is not permitted if the fillet radius is maintained and the hub thickness is not undercut. Bolt holes and all other cut surfaces shall be resin coated. Spotfacing shall not produce a flange thickness less than that specified in the pertinent equipment section or on the design drawings.
6. Bolt holes in flanges are to straddle principal centerlines of the equipment. Tolerance in bolt hole locations and in diameter of bolt circle shall be $\pm 1/16$ -inch.
7. Flange faces shall be flat to $\pm 1/32$ -inch up to and including 16-inch diameter and $\pm 1/16$ -inch for larger diameters.
8. Resin coat all flange bolt holes so that no fibers are exposed.

2.04 FABRICATION QUALITY CONTROL

A. Allowable Visual Defects:

1. Fabricator shall take care to minimize the amount of defects in all laminates. In no case shall visual defects in any area of the equipment exceed the maximum allowable levels of visual defects set forth in RTP-1, Table 6-1, Level 2.

2. Air entrapment limits, (gaseous bubbles or blisters), that are required to supplement RTP-1 Table 6-1, shall be as follows. Dimensions refer to the largest measured dimension for any specific defect. Defects at the interfaces between layers are subject to the most stringent requirement.
 - a. Inner Surface: 2 per sq. in. up to max. size of 1/16", except < 1/64" is unlimited.
 - b. Interior Layer: 2 per sq. in. up to max. size of 1/8", except < 1/32" is unlimited.
 - c. Structural Layer: 2 per sq. in. up to max. size of 1/4", except < 1/8" is unlimited.
3. Presence of visual defects in excess of the allowable levels shall be grounds for rejection of the equipment.

B. FRP Fabrication:

1. Fabricator shall be responsible for implementation of a comprehensive quality assurance procedure. The minimum requirements are described below.
 - a. Fabricator shall designate personnel to inspect equipment while in-process and after completion to assure compliance to all aspects of the specification and design drawings. Inspection shall include, as a minimum, checks for visual defects, laminate thickness and sequence, glass content, Barcol hardness, acetone sensitivity, dimensional tolerances, adherence to construction details, surface preparation, and environmental conditions. Fabricator's inspector shall complete a report of the findings including method of measurement for each separate assembly.
 - b. Prior to use of any resin, Fabricator shall test resin to establish cure characteristics and verify that it meets the resin manufacturer's acceptance standards.
 - c. Resin testing shall be performed in accordance with ASTM D2471. Gel time to peak exotherm and peak exotherm temperature shall be recorded.
 - d. If the Fabricator in any way alters the resin after receipt, such as through the addition of styrene, promoters, or other additives, one test shall be performed for each drum or portion thereof mixed with additives.
 - e. Fabricator shall provide documentation for each test, including resin type, manufacturer, batch and lot number, drum number, complete listing of all additives with amounts added, and description and manufacturer of each additive.
 - f. Fabricator shall inspect all glass reinforcement prior to use in fabrication and shall not use any glass that does not meet the manufacturer's acceptance standards. Glass material that is wet or has been wet shall not be used. For each type of glass and lot number used, Fabricator shall record the manufacturer, product description, binder type, product code, production date, and lot number. For mat, woven roving, unidirectional

roving, and cloth, records shall also include actual measured weight per square yard of material.

- g. Fabricator shall retain all nozzle cutouts and other excess laminate, clearly marking each piece to identify its original location. These laminate samples become the property of the Construction Manager. For areas where valid laminate samples are not available, sample plugs shall be taken at the Construction Manager's request. Repair of subsequent holes will be performed in a manner approved by the Construction Manager.
 - h. Fabricator shall verify glass content of corrosion liner and structural laminate on samples from at least two representative areas of each major component in accordance with ASTM D2584. This test shall be completed, and the results reported as follows:
 - 1) Measure and record total thickness, corrosion liner thickness and structural laminate thickness.
 - 2) Separate the corrosion liner from the structural laminate and determine glass content for each per ASTM D2584.
 - 3) Record the sequence of individual reinforcement plies from the remains of the ignition test.
 - i. Glass content of corrosion liner portion of laminates shall be within the range specified in paragraph 2.03 Corrosion Liner Laminates. Minimum glass content of structural layers shall satisfy the minimum glass content used as a basis for the physical properties used in the approved Design Submittal.
2. Prior to final shipment of the equipment, Fabricator shall provide the Construction Manager with a complete quality control report, consisting of copies of all records maintained for compliance with this section.

C. Construction Manager's Inspection:

1. The Construction Manager shall be permitted access to the equipment during fabrication and upon completion for the purpose of verifying compliance to the contract documents. The Construction Manager's inspection is not intended to replace the Fabricator's own quality control procedures.
2. In no respect does inspection of any equipment by the Construction Manager relieve the Fabricator of compliance with the contract documents. A final inspection shall be performed by the Construction Manager when the Fabricator certifies that all the terms and requirements of the contract documents have been satisfied. At least five days notice shall be given the Construction Manager prior to this inspection.
3. The Fabricator is required to notify the Construction Manager at the completion of particular milestones during fabrication. The Fabricator shall give at least 48 hours notice prior to occurrence of these milestones, as follows:
 - a. View tooling prior to fabrication

- b. Beginning application of corrosion liner for each part
 - c. Extraction of each part prior to beginning assembly
 - d. Upon completion of each separate assembly
4. Construction Manager reserves the right to include additional milestones.
 5. In the event the equipment is not to the stage of completion designated for a milestone inspection or is not complete as required for a final inspection at the time specified by the Fabricator, the Fabricator agrees to assume the cost of the inspector's time and expenses and further agrees that such charges be deducted from the cost of the equipment.
 6. Construction Manager shall be allowed to photograph the equipment while in-process and/or upon completion.
 7. Construction Manager retains the right to employ the use of magnification or other special viewing or measurement devices during inspection.
 8. At the time of final inspection, the Fabricator shall assure that the equipment is cleaned of all foreign material and workings which might block the view of the Construction Manager. The equipment shall be in a position that allows for easy access and viewing and, at the request of the Construction Manager, shall be moved to allow viewing of all parts of the equipment.
 9. Evidence of poor workmanship or lack of compliance with any aspect of the contract documents will be grounds for rejection of the equipment.
 10. Subsequent repair of rejected equipment may, at the Construction Manager's option, be undertaken in an attempt to bring the equipment to an acceptable state. Repair procedures must be approved by the Construction Manager prior to implementation.

D. Construction Manager's Acceptance:

1. The Construction Manager may employ destructive testing, such as ultimate tensile or flexural strength tests or glass content ignition tests, on available samples or use other non-destructive test methods, such as acoustic emission or ultrasonic magnetic thickness measurement, on the completed equipment for verification of compliance to the contract documents.
2. Testing performed by the Construction Manager shall be accomplished through use of applicable ASTM test methods when appropriate.
3. Hardness tests shall be made for acceptance by the Construction Manager on the liner surface using the Barcol impressor, Model GYZJ 934-1, calibrated at two points in accordance with ASTM D2583. Ten readings will be taken in a localized area, deleting the two highest and two lowest, and averaging the remaining six. Minimum acceptable Barcol hardness will be a reading of 30, unless otherwise specified in the pertinent equipment section.
4. An acetone sensitivity test shall also be performed by the Construction Manager as an acceptance criterion. Evidence of a sticky or tacky surface

following rubbing with an acetone-saturated cloth shall be grounds for rejection of the equipment.

2.05 SHIPPING

A. Vessels:

1. The Fabricator shall be responsible for proper packaging, loading, and protection of all materials to prevent transit and handling damage.
2. All equipment which is shipped in a horizontal position shall be mounted on padded cradles contacting at least 120 degrees of the vessel circumference. All end blocking used to prevent shifting of equipment must be padded.
3. Equipment shall be loaded with a minimum clearance of two inches between pieces (including external fittings, nozzles, or other projections) and the bed of the car or truck. When two or more units are shipped together, sufficient clearance shall be provided between units to prevent contact in transit.
4. Flange faces shall be protected by coverings of suitable plywood or hardboard, securely fastened.
5. Loose parts such as fasteners, gaskets, and accessory fittings shall be packaged securely to allow storage under field conditions.
6. All dry FRP field joining materials shall be precut in the shop and layered in order of laminate sequence, then labeled and packaged in sealed, moisture-proof containers for shipment.
7. When a number of loose items or field joining materials are packed in larger shipping crates, each crate will be individually marked or tagged as to its contents, clearly listing number and type of each item contained therein.

B. Ductwork and Piping:

1. The Fabricator shall be responsible for proper packaging, loading, and protection of all materials to prevent transit and handling damage.
2. All ducts and pipes shall be supported for shipment on cradles spaced no greater than 20 feet. Lengths shall also be supported by cradles within two feet of the end.
3. Cradles used to support duct, pipe, or other equipment during shall contact at least 120 degrees of the circumference, be padded and match the outside diameter within +1/8-inch, -0 inch.
4. If duct or pipe is stacked in layers, cradles shall be used which support each independently from the overlying and underlying equipment, such that no duct or pipe in a cradle carries more than its own weight.
5. Duct or pipe ends and flange faces shall be protected by covering with suitable material which is securely fastened.

6. Equipment shall be loaded with a minimum clearance of two inches between pieces (including external fittings, nozzles, or other projections) and the bed of the car or truck.
7. Loose parts such as fasteners, gaskets, and accessory fittings shall be packaged securely to allow storage under field conditions.
8. When a number of loose items are packed in larger shipping containers, each container will be individually marked or tagged as to its contents, clearly listing number and type of each item contained therein.

2.06 HANDLING FRP EQUIPMENT

- A. The equipment shall not be rolled, slid, dropped, allowed to swing into other objects, or forced out of shape. Resulting impact and excessive distortions may cause cracking or crazing.
- B. When working in or around FRP equipment, care should be exercised to prevent tools, scaffolding, or other objects from striking or being dropped on or inside the equipment. Soft-soled shoes should be worn by workers entering the equipment.
- C. Proper rigging and hoisting practices shall be observed at all times.
- D. The use of a crane is recommended both in lifting and positioning the equipment. Ideally, the slings or cables attached to the equipment should lift as nearly vertical as possible, and shall under no circumstances shall slings or cables lift more than 45 degrees from vertical. A spreader bar (lifting fixture) may be necessary to keep the lifting angle within this range.
- E. Lifting lugs in most cases are not designed to accommodate lifting vessels in or from the horizontal position. Nylon slings encircling the tank should be used for this purpose and for righting the vessel to the vertical position.
- F. Unless otherwise specified, use all lifting lugs, loaded uniformly for lifting vessels in the vertical position. The use of spreader bars is recommended to keep loads on lugs as nearly vertical and uniform as possible.
- G. When lifting lugs are not provided, and it is necessary to use lifting slings in direct contact with the FRP equipment, the slings shall be woven nylon or canvas at least 3 inches wide. Care must be taken to assure that shackles, eyes, hooks, or other objects do not come into contact with the FRP equipment.
- H. Do not attach lifting slings or cables to (nor allow them to come in contact with) any nozzles, flanges, gussets, or fittings other than lifting and/or anchor lugs.

PART 3 EXECUTION

3.01 GENERAL

- A. FRP specialties shall be shipped, installed, joined and erected under the direction of factory-trained specialists. Where jointing is required, workers employed for these efforts shall have been trained in proper jointing techniques by the Fabricator. Fabricated equipment shall have the warning, "Plastic Equipment Handle with Care" stenciled on two sides in letters a minimum of 2 inches high.

3.02 ASSEMBLY AND ERECTION PLANS

- A. Prior to assembly and erection of FRP towers, tanks, stacks and similar structures, the Contractor shall provide assembly and erection plans prepared by the Fabricator. The plans shall provide details on handling, field connections and final installation.

3.03 PIPING INSTALLATION

A. Flanged Connections:

1. Flanged connections shall be aligned with the mating flange prior to tightening bolts. Do not use bolts to correct angularity or to close gaps.
2. FRP full face flanges shall be bolted only to full-faced mating flanges; mating to raised face or Vanstone flanges is not allowed.
3. Bolt threads shall be clean and lubricated to attain proper torque.
4. Use lubricated washers at both nut and bolt heads to protect back flange facing.
5. All flange bolts shall be final tightened with a torque wrench.
6. Tighten bolts alternately on opposite sides of the bolting pattern. Torque all bolts to 50% of intended torque and then repeat pattern to 100% of intended torque values.
7. After all bolts have been tightened to the intended torque, recheck the torque on each bolt in the same sequence, since previously tightened bolts may have relaxed.
8. Recommended maximum bolt torques are as follows. These values may be exceeded only with Fabricator's approval.

Bolt Diameter	Torque (ft-lb)
5/8"	25
3/4"	45

7/8"	75
1"	115
1-1/8"	160
1-1/4"	220

B. Field Joining:

1. Field joining shall be performed in accordance with this Section and the design drawings. Use of other joint designs is prohibited.
2. The Field Joining Contractor shall have experience in the joining of FRP piping using the methods described in this Section and shall be able to demonstrate ability to perform the required work to the satisfaction of the Construction Manager.
3. Field Joining Contractor shall be responsible for the disposal of waste material resulting from field joining and associated work. Disposal of waste material shall conform to all applicable local regulations, as well as disposal and safety practices of the installation site.

END OF SECTION

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SECTION 13 12 00

FLAT ALUMINUM COVERS

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope

1. Provide design, labor, materials, equipment, and incidentals required to provide support framing and removable aluminum covers for the influent channels and wet wells in the Screen Room as shown on the drawings.
2. The Work also includes duct supports and attachments to covers to allow for conveyance of treated air into outlet ducting as shown on drawings.
3. Verify dimensions and other site conditions prior to submittal of shop drawings.
4. Covers specified will enclose raw wastewater. Foul air within the enclosed tanks/channels will be up to 100 percent humidity with concentrations up to 20 ppm of hydrogen sulfide.

1.02 QUALITY ASSURANCE

A. Qualifications:

1. Supplier and installer shall be experienced in production of similar Work and shall show evidence of satisfactory operation of at least five similar installations
2. Items provided under this Section shall be designed by a Georgia registered professional engineer who shall be hired and paid by Supplier/Subcontractor.

B. Field Measurements

1. Obtain prior to preparation of shop drawings and fabrication to confirm dimensions shown on Drawings and to ensure proper fitting of Work.

C. References:

1. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those standards are included as if referenced directly. In event of conflict between requirements of this section and those of listed documents, requirements of this section prevail.
2. References to documents shall mean documents in effect at time of Advertisement for Bids or Invitation to Bid. If referenced documents have

been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization, or, the last version of the document before it was discontinued.

Reference	Title
ASCE 7-16	Minimum Design Loads for Buildings and Other Structures
ASTM B 209	Aluminum-Alloy Sheet and Plate
ASTM B 210	Aluminum-Alloy Drawn Seamless Tubes
ASTM B 221	Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes
ASTM C509	Cellular Elastomeric Preformed Gasket and Sealing
AWS D1.2	Structural Welding Code - Aluminum
Fedspec TT-S-00230C	Sealants
IBC	2018 International Building Code w/ Georgia Amendments
Aluminum Association	Specifications for Aluminum Structures as published by Aluminum Association and Regional and State Building Codes

D. Product Storage and Handling Requirements

1. Protect materials during shipment, storage, and installation per Supplier's recommendations.

1.03 SUBMITTALS

A. Provide in accordance with Section 01 33 00:

1. A copy of this specification section, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by Supplier/Subcontractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of reasons for requesting the deviation. Engineer shall be the final authority for determining acceptability of requested deviations. Remaining portions of the paragraph not underlined will signify compliance. Failure to include a copy of the marked-up specification sections, along with justification(s) for requested deviations with submittal shall be

sufficient cause for rejection of the entire submittal with no further consideration.

2. Framing, support, bracing, and anchoring design calculations per requirements of Section 01 73 24.
3. Representative samples of covers, appurtenances and other finished products. Review will be for type and finish only. Compliance with other requirements shall be responsibility of Supplier/Subcontractor.
4. Complete shop drawings for fabrication and erection of Work. Include plans and details of sections and connections. Show anchorage, rainwater drains, penetrations, and accessory items as applicable. Provide setting drawings and templates for location and installation of anchorage devices.
5. Provide certification, on shop drawings, stating that all items and fabrications are of sufficient strength to serve their intended function without undue stress, distortion, or deflection.
6. Calculations shall be submitted for each cover system providing a summary of loads used and member designs.
7. Shop drawings and calculations shall be signed and sealed by the Georgia registered professional engineer who is in responsible charge for these designs.
8. Provide catalog information showing material properties, structural properties, and dimensional characteristics of structural shapes and manufactured products to be used.
9. Provide load tables showing that pre-engineered manufactured products will meet load and deflection provisions of the specifications for each size and span of aluminum panel or component.
10. Supplier's Installation Certification (Form 43 05 11-A) as specified in paragraph 3.01.D of this Specification.
11. Test procedure describing testing to be performed under paragraph 3.02 of this Specification.
12. Written report of testing performed under paragraph 3.02 of this Specification.
13. Provide a preliminary copy of Supplier's written warranty specified in paragraph 3.03 of this Specification during initial shop drawing process. Provide a final signed copy of Supplier's warranty at completion of installation.

1.04 BRACING AND ANCHORING

- A. Mechanical, instrumentation and control, electrical, nonstructural systems, components, and elements permanently attached to the structure shall be anchored and braced to resist seismic forces. Design structural components, seismic

attachment, braces, and anchors to the structure for all parts or elements of mechanical and electrical systems in accordance with Section 01 73 24.

PART 2 PRODUCTS

2.01 SUPPLIERS

- A. It shall not be interpreted that named Supplier's standard equipment or products will comply with requirements of this Section. Candidate Suppliers include:
1. Hallsten Corporation,
 2. CST
 3. RPS Engineering
 4. Approved Equal.

2.02 DESIGN AND PERFORMANCE CRITERIA

- A. Provide removable covers and accessories to conform to the following criteria:
1. Minimum live load: 100 pounds per square foot or as shown on drawings.
 2. Concentrated live load: 1000 pounds on two square feet at any point on each panel or as shown on drawings.
 3. Maximum deflection: $\frac{1}{4}$ inch or $L/240$ of span of any panel and its supports in both directions, whichever is less.
 4. Maximum panel weight: Non-hatched panels = 100 pounds. Panels with hatches = 60 pounds.
 5. Thermal expansion for a temperature differential of 100 degrees F.
 6. Design and fabricate welded aluminum parts in accordance with Section 7 of the Aluminum Association's Specifications for Aluminum Structures, and the American Welding Society D1.2 Structural Welding Code for Aluminum.
 7. Stainless steel fasteners shall be designed with a 3.0 safety factor on shear stress and bolt tension.
 8. Each panel shall be easy to remove with a lifting force not to exceed the dead weight of panel. Access to any given covered area shall not require removal of other panels. Provide two recessed or integral handles at each end of each panel.
 9. Each panel of the covered surface shall be airtight under the specified load conditions. Airtightness is defined in paragraph 3.02 below.
 10. Seismic loads per Section 01 73 24.
 11. Wind uplift load per Section 01 73 24.
 12. Snow Load per Section 01 73 24.

13. Internal negative pressure: 0.2-inch water column. Air intake rate shall not exceed 0.3 cfm/square foot of cover area.
14. Forces imparted on the covers by duct supports (as shown on Drawings) shall be included as part of the cover system design.

2.03 MATERIALS

Component	Material
Cover Plates and Access Hatches	6061-T6 extruded aluminum with thickness sufficient to meet or exceed the loading requirements set forth in this specification
Extrusions	6061-T6 or 6063-T6 aluminum
Fasteners	Type 316 stainless steel
Sealant	Silicone; fully resistant to ozone and ultraviolet as manufactured by Dow Corning, General Electric, or equal
Gaskets	ASTM C 509, resistant to ozone, ultraviolet light, and water
Anchor Bolts	Type 316 stainless steel. Cast-in-place or drilled-in adhesive anchors per Section 05 05 20.

- A. Required structural supports shall be aluminum.
- B. Materials specified are considered the minimum acceptable for purposes of durability, strength, and resistance to erosion and corrosion. Supplier/Subcontractor may propose alternative materials for the purpose of providing greater strength or to meet required stress limitations. However, alternative materials must provide at least the same qualities as those specified.

2.04 EQUIPMENT FEATURES

- A. New cover system shall be flat type projecting no more than 2 inches above top of supporting concrete. Exposed bolts shall be button type.
- B. Provide allowance for duct penetrations into cover for air exhaust and openings for instruments in locations shown on Drawings.
- C. Provide aluminum handles for hatches, if provided. Handles for inspection hatches, 12"x12" or less, are not required.
- D. Provide permanently installed operable grating below access hatches. Use aluminum grating with stainless steel or aluminum hardware components. Grating shall be operable with hold open brackets; either to facilitate access to space area below cover. System shall meet or exceed applicable OSHA and ANSI standards.

- E. Include two pressure gauges penetrating the head space of each covered area such that internal negative pressure can be observed. Range shall be negative 0 – 2 inches w.c.

2.05 FABRICATION

- A. Use materials of minimum size and thickness as specified above. Work to dimensions shown on accepted shop drawings.
- B. Type of Finish: Non-anodized, integral non-skid surface. This surface shall not be achieved by use of paint or sand-blasting.
- C. Design cover panel penetrations as shown or as required to maintain air tightness. Design layout of removable panels to allow for removal without disturbing items penetrating covers. Provide reinforcing around openings as required.
- D. Provide aluminum or stainless steel bearing/support members where needed by Supplier's design. Provide stainless steel fasteners and adhesive anchors per Supplier's design.
- E. Covers shall be connected and attached to concrete and structural members in a manner to ensure water and air tightness. Cover panels shall be removable to the greatest extent possible.
- F. Provide access hatches, lifting inserts, and connections to odor control ducts, piping, and instruments as shown on Drawings. Odor control ducts, piping penetrations and instrument connections shall be connected to cover by means of an aluminum penetration kit with raised aluminum flanges to allow movement while providing an airtight seal.
- G. Structural welds and weld-affected structural components shall be inspected by the Dye Penetrant method of examination in accordance with AWS D1.2. The inspector and personnel performing non-destructive testing shall be qualified as required by AWS.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Fastening to In-Place Construction: Use anchorage devices and fasteners to secure covers to supporting members of prepared openings, as recommended by Supplier and accepted by Engineer.

- B. Cutting, Fitting and Placement:
1. Perform cutting, drilling and fitting required for installation. Set Work accurately in location, alignment and elevation, plumb, level, true and free of rack. Wedges or skimming devices shall not be used.
 2. Wherever covers are pierced by pipes, ducts, and structural members, Cut openings neatly and accurately to size and provide structural members and closure panels to maintain support and air tightness.
 3. Divide panels into sections as shown on Drawings and to facilitate easy removal during operation.
 4. Structural welding of aluminum shall be performed prior to field erection.
- C. Provide services of cover Supplier's experienced representative to supervise installation of covers. Covers shall be installed by factory-trained installers. The installation shall be certified by Supplier.
- D. Installation and initial operation of components shall be certified on Form 43 05 11-A as specified in Section 01 99 90.

3.02 TESTING

- A. Three representative areas of the cover systems at each process system shall be tested for air tightness. The tests shall be performed after the air exhaust system has been balanced. Provide 24 hours' notice of air tightness test to Design-Builder's Representative Team and include test procedure.
- B. The first test shall be a qualitative test carried out by smoke testing under actual operating conditions and confirm no visible escape of smoke during test duration. Smoke testing duration shall be a minimum of 5 minutes. If smoke is observed to be emitted through covers during the test, Supplier/Subcontractor shall remedy cover installation and retest using the same procedure.
- C. The second test shall be a quantitative test carried out by pressure testing the cover under operating conditions. The negative pressure under the cover shall be measured with a pressure gauge for a period of 30 minutes. The negative pressure shall meet the design criteria listed in section 2.02. If the design pressure is not achieved during the test, Supplier/Subcontractor shall remedy cover installation and retest using the same procedure.

3.03 WARRANTY

- A. Cover Supplier shall warrant Work described herein to be free from defects in workmanship and material. Cover Supplier shall replace or repair faulty workmanship or defective material provided within two years from date of Substantial Completion.

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR ODOR CONTROL SYSTEMS

PART 1--GENERAL

1.01 DESCRIPTION

- A. This section specifies the labor and services necessary to test, adjust, and balance under actual operating conditions air design flow rates. Nothing herein shall be construed as relieving the contractor of his overall responsibility of this portion of the work.

1.02 QUALITY ASSURANCE

A. References:

1. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.
2. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
NEBB	Procedural Standards for Testing Adjusting and Balancing of Environmental Systems
AABC	National Standards for Total System Balance

Reference	Title
ASHRAE 70	Standards--Methods of Testing for Rating the Air Flow Performance of Outlets and Inlets

B. Testing Agency:

1. The Contractor shall procure the services of an independent air and hydronic balancing and testing agency, belonging to the Associated Air Balance Council (AABC) or the National Environmental Balancing Bureau (NEBB), to perform air and hydronic balancing, testing and adjustment of systems. The Contractor shall submit a copy of the National Project Certification Performance Guaranty, issued to the testing agency by the AABC, as a part of the balancing report specified in paragraph 2.01 Report Requirements.

C. Codes And Standards:

1. The Contractor shall comply with applicable procedures and standards of the certification sponsoring association:
 - a. "National Standards for Field Measurements and Instrumentation, Total Systems Balance, Air Distribution-Hydraulics Systems," AABC.
 - b. "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", NEBB.
 - c. "Method of Testing for Rating the Air Flow Performance of Outlets and Inlets," ASHRAE.
2. Calibration and maintenance of instruments and accuracy of measurements shall comply with the requirements of the standards.

1.03 SPECIAL REQUIREMENTS

- A. Tests and adjustments shall include the complete testing and balancing of all foul air systems and necessary adjustments to the damper and equipment to accomplish the specified design flow rates.
- B. Should any apparatus, material or work fail to meet the specified requirements in these tests, the Contractor shall make the necessary corrections and retest the apparatus, material, or work at no additional cost to the Owner.

1.04 BALANCING

A. General:

1. The Contractor shall review plans and specifications prior to testing and balancing the foul air system. The contractor shall submit a proposed approach and schedule for approval prior to the start of testing and balancing

work. Characteristics to be tested and adjusted to conform to the values specified include the following:

- a. Total airflow rates delivered by fans.
- b. Flow rates at all foul air takeoffs and exhaust ducts.

B. Airflow Rate Measurements:

1. Airflow rates shall be obtained by adjustment of the fan speeds and/or dampers. All flow rates shall be measured with the odor control system in full operation.

Flow rates at branch ductwork and air distribution patterns shall be tested in strict accordance with ASHRAE Standard-70.

1.05 SUBMITTALS

A. The following information shall be provided in accordance with Section 01 33 00:

1. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Construction Manager shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.
2. Sample copy of each of the NEBB or AABC report forms.
3. Proposed approach and schedule of testing and balancing work as specified in paragraph 1.04 General.
4. A description of the foul air system including equipment to be balanced.

PART 2 **PRODUCTS**

2.01 **BALANCING REPORT**

A. Report Data:

1. The final certified balancing report shall include the following actual field-verified data:
 - a. Equipment data
 - 1) Manufacturer and model, size, arrangement, class, location, and equipment number.
 - 2) Motor horsepower, voltage, phase, and full load amperage.
 - 3) Fan cfm, static pressure, rpm, operating motor BHP and operating fan noise level.
 - b. Duct size, supply or exhaust recorded cfm, velocity, pressure measurements, location of all measurements.
 - c. Balancing duct size and model, location of all measurements.

B. Report Requirements:

1. Each individual final reporting form must bear the signature of the person who recorded the data and that of the supervisor of the reporting organization.
2. One certified organization shall perform the testing and balancing services.
3. All instruments which were used shall be listed and identified including the last date each was calibrated.

C. Final Report:

1. Final report shall be submitted prior to Contractor's request for final inspection. In addition to providing all specified data and information on applicable reporting forms, report shall include the following:
 - a. A schedule for testing and balancing parts of the systems which must be delayed due to seasonal, climatic, occupancy, or other conditions beyond control of the Contractor. Delayed work shall be completed as early as the proper conditions will allow, after consultation with the Construction Manager.
 - b. Due to delayed testing, reports shall be submitted after execution of those services.
 - c. A total balance report shall include the following components:
 - 1) General Information and Summary
 - 2) Instrument Calibration
 - 3) Foul Air Systems
 - 4) Record drawings with specified and measured flow rates

2.02 CERTIFICATE OF COMPLETION

- A. At completion of testing and balancing, Contractor shall submit a Certificate of Compliance stating that each apparatus, device, outlet, and system has been tested, adjusted, and balanced so that it is operating in conformance with manufacturer's recommendations and with the specified conditions.

2.03 PRODUCT DATA

- A. The following information shall be provided in accordance with Section 01 33 00:
 - 1. The balancing report specified in paragraph 2.01.
 - 2. Documentation to confirm compliance with codes and standards.
 - 3. NEBB or AABC certification

PART 3 EXECUTION

3.01 GENERAL

- A. The balancing agency shall conduct the above field tests in the presence of the Construction Manager.
- B. Following completion of testing and balancing the system shall be left in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.02 PERFORMANCE OF WORK

- A. Air Systems:
 - 1. General: Testing, adjusting, and balancing shall be performed after the system installation is complete but prior to acceptance of the project.
 - 2. Measurements: The Contractor shall perform the following:
 - a. Measure and adjust air supply and exhaust units to deliver at least 100 percent of the design air volume.
 - b. Measure static air pressure conditions on fans, including total pressure across the fan.
 - c. Adjust fan speeds and motor drives within drive limitations, for required air volume. Set a speed to provide air volume farthest distance from the fan without excess static pressure. Check draw amps of fans on initial start-up. If running amps exceed nameplate, shut off motor immediately,

notify Construction Manager, and make necessary drive changes as directed.

- d. Airflow rates shall be measured and exhaust systems operating. The deflection pattern of supply outlets shall be adjusted to ensure uniform air distribution throughout the space served.
 - e. Airflow rates supplied shall be within plus or minus 5 percent of the design values specified.
3. Systems to Be Balanced:
 - a. Pump Station Odor Control System and associated ductwork.

3.03 FINAL INSPECTION

- A. Following completion of testing and balancing, but prior to submitting the balancing report, the Contractor shall recheck, in the presence of the Construction Manager, random selections of air quantities, air motion, and sound levels recorded in the report. Points and areas for recheck shall be as selected by the Construction Manager. Measurement and test procedures shall be as approved for work forming basis of the report.
- B. Selections for recheck will not exceed 25 percent of the total tabulated in the report.
- C. In the event the report is rejected, all systems shall be readjusted and tested, new data recorded, new reports submitted, and new inspection test made.
- D. Following acceptance of the reports by the Construction Manager, the Contractor shall permanently mark all damper positions so that they can be restored to their correct position if disturbed at any time. If a balancing device is provided with a memory stop, it shall be set and locked. Devices shall not be marked until after final inspection.

END OF SECTION

SECTION 23 31 16.16

THERMOSET FIBERGLASS REINFORCED PLASTIC (FRP) DUCTS

PART 1 GENERAL

1.01 SUMMARY

A. Scope:

1. This section specifies fiberglass reinforced plastic (FRP) ductwork. Unless specified otherwise, all ductwork shall be filament wound construction.

B. Standards:

1. The requirements of Section 06 70 13 shall apply to all aspects of this specification section. In cases of conflict, this section shall take precedence over Section 06 70 13.

1.02 SERVICE REQUIREMENTS

A. Air Stream Contents:

1. Saturated air streams at 40-120° F containing hydrogen sulfide in concentrations up to 50 ppm and droplets of sulfuric acid.

B. Pressure and Vacuum:

1. Design conditions are 20 inches water column pressure and 12 inches water column vacuum. A minimum structural safety factor of 10:1 shall be used in the design of ductwork for tensile or flexural stress conditions. A minimum safety factor of 5:1 shall be used for conditions of elastic stability, such as buckling under vacuum loads.

1.03 REFERENCES

- A. References are described in Section 06 70 13.

1.04 ENVIRONMENTAL CONDITIONS

- A. Environmental conditions are as described in Section 01 11 00.

1.05 SUBMITTALS

- A. The following submittal information shall be provided in accordance with Section 01 33 00:
1. A copy of this specification section, with addendum updates included, and all referenced and applicable 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. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Construction Manager shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. *Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.*
 2. Complete damper shop drawings illustrating component configuration, dimensions, and materials list.
 3. Certified damper leakage test results in accordance with AMCA 500 standards, pressure drop characteristics, and actuator torque requirements.
 4. Proposed FRP ductwork plan, including hanger and support types and locations, field joint locations, inspection plates, drains, blast gates, dampers, expansion boots, etc.
 5. Certification from the resin manufacturer that the selected resin and catalyst systems are appropriate for the service conditions of the duct systems, as specified in Sections 01 11 80 and 23 31 16.16.
 6. Calculations and complete fabrication details of special system components specified in paragraph 2.02 Special System Components. Approval of design is required prior to the start of fabrication.
 7. Qualifications of the Fabricator and Field Joining Contractor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. The Owner and Construction Manager believe the following candidate manufacturers are capable of producing equipment and/or products that will

satisfy the requirements of this Section. This statement, however, shall not be construed as an endorsement of a particular manufacturer's products, nor shall it be construed that named manufacturers' standard equipment or products will comply with the requirements of this Section. Candidate manufacturers include Daniel Mechanical, ECS Environmental, or Spunstrand.

2.02 FRP DUCTWORK

A. Design Criteria:

1. Equipment: FRP Ductwork.
2. Resin: Premium grade vinylester resin such as AOC Vipel KO22, Derakane 510C-350, Hetrion 992FR, or Reichhold Dion VER9300FR, or equal, if approved in writing by the Construction Manager.
3. Antimony trioxide or pentoxide shall be added to the resin of the structural laminates only to achieve Class-I fire retardance in accordance with ASTM E-84. Antimony shall not be used in the corrosion liner.
4. Special Catalyst: In accordance with the recommendations of the resin manufacturer for the intended service.
5. Minimum Barcol Hardness: 30
6. Surfacing Veil (Inner Surface): One (1) layer of 10 mil C-glass surfacing veil.
7. Interior Layer: Two (2) layers of 1-1/2 oz./sq. ft. mat.
8. Corrosion Liner Thickness, minimum: 100 mils.
9. Filament Winding Helix Angle: 55° to 65°; Tolerance: $\pm 2^\circ$
10. Filament Winding Cycle Thickness, Maximum: 0.06"
11. Filament Wound Structural Wall Glass Content: 55 percent to 65 percent.
12. Structural layers: Natural color, no pigments allowed.
13. Exterior surface coat and 10 mil C-glass surfacing veil required; color to be determined by the Construction Manager.
14. Postcure: Equipment to be postcured in accordance with the recommendations of the resin manufacturer for the intended service.
15. Marking: In addition to the requirements of Section 06 70 13-2.03 Ductwork Assembly, all spool assemblies and pieces shall be identified with piece mark numbers using non-water-soluble paint, easily removable with agents that will not attack the finish of the FRP Ductwork.
16. The exterior of all FRP duct to be located inside of any buildings shall be coated with two (2) coats of PPG Speedhide Flat Latex paint No. 42-7, or equal, in accordance with the manufacturer's recommendations, for smoke rating and additional fire retardancy.

17. Any damage to this paint coat occurring during installation shall be repaired promptly, restoring the paint coat to the original condition.

B. Details:

1. As a minimum, FRP ductwork shall be constructed in accordance with the thicknesses, laminate sequences and detail drawings that follow at the end of this section. If the design requirements dictate that increased thickness or other changes are required, they shall be submitted for approval of the Construction Manager. Details shall be used in conjunction with contract drawings and Section 06 70 13. Details are as follows:
 - a. Detail-1, FRP Duct and Fitting Thickness
 - b. Detail-2, FRP Flanges
 - c. Detail-3, Expansion Boot
 - d. Detail-4, 1-1/2" Dia. Drain Nozzle Installation
 - e. Detail-5, FRP Butt and Miter Joints
 - f. Detail-6, FRP Tee and Lateral Joints
 - g. Detail 7, Typical Round Blast Gate, All FRP Construction
 - h. Detail 8, FRP Zero Leak Damper

C. Elbows:

1. Elbows 30 inch diameter and smaller shall be one piece molded, smooth turn, hand lay-up construction. Larger elbows may be fabricated from straight duct sections, using miter joints per the drawing details in this section. Mitered elbows 45 degrees and less shall be two piece, one miter joint. Mitered elbows 46 to 90 degrees shall be three piece with two miter joints. All elbows shall be large radius (1.5 times the diameter) except as otherwise required.

D. Laminate Sequence Tables for FRP Ductwork:

1. Key for Tables 1 and 2:
 - C = 10 mil C-glass surfacing veil
 - M = 1-1/2 oz./sq. ft. Mat
 - E = Exotherm ply, 1-1/2 oz./sq. ft. Mat
 - R = 24 oz./sq. yd., 5x4 plain weave, woven roving
 - FW = Filament winding to the thickness specified.

Table 1. Helix Wound Laminate Composition

Thk.	C	M	E	R	Sequence of plies
0.21"	2	1	1		CME ⇒ 0.11" F.W. ⇒C
0.24"	2	1	1		CME ⇒ 0.14" F.W. ⇒C
0.27"	2	1	1		CME ⇒ 0.17" F.W. ⇒C

0.32"	2	1	1		CME ⇒ 0.22" F.W. ⇒C
0.35"	2	1	1		CME ⇒ 0.25" F.W. ⇒C
0.38"	2	1	1		CME ⇒ 0.28" F.W. ⇒C
0.41"	2	1	1		CME ⇒ 0.31" F.W. ⇒C

Table 2. Hand Lay-Up Laminate Composition

Thk.	C	M	E	R	Sequence of plies
0.24"	2	4	1	1	CME MRMMC
0.33"	2	5	1	2	CME MRMRMMC
0.39"	2	6	1	3	CME MRMRMRMMC
0.46"	2	6	2	4	CME MRMRE MRMRMC
0.50"	2	7	2	4	CME MRMRMRE MRMMC
0.54"	2	7	2	5	CME MRMRMRE MRMRMC
0.57"	2	8	2	5	CME MRMRMRE MRMRMMC
0.64"	2	9	2	6	CME MRMRMRE MRMRMRMMC

E. Special System Components:

1. Fabricator shall be responsible for the design of rectangular duct, transitions, or any special system components not specifically detailed in this section. Deflection of flat panels shall be limited to 1 percent of the panel width at the system operating pressure. Rectangular duct and flanges shall be fabricated in one piece with a minimum radius of 1/2" in all corners. Rectangular duct shall not be assembled from multiple flat panels.

F. Turning Vanes:

1. Turning vanes shall be provided where indicated on the drawings and in accordance with ASHRAE recommendations. All vanes shall have sufficient section and stiffness to operate without flutter or vibration under the airflow conditions indicated. Turning vanes shall be airfoil section with internal metal reinforcement and FRP laminate overlay or airfoil section, all Type 316 stainless steel. Duct fabricator shall propose and submit construction, location, and installation details of vanes and splitters.

2.03 FASTENERS

- A. Bolts, nuts, and washers shall be stainless steel, AISI Type 316. Type 316 stainless steel backing strips, drilled for the above bolting requirements, shall be employed for all connections at fans, demisting sections, and wherever shear or moment loads may be encountered on duct connections.

2.04 GASKETS

- A. Gaskets shall be EPDM, Viton, or Buna-N.

2.05 EXPANSION BOOTS

- A. Expansion boots shall be as shown on the detail drawings in this section, flanged one-piece molded reinforced EPDM, a minimum thickness of 1/8-inch with stainless steel split retaining rings. Expansion boots shall be Mercer Rubber Company, Duct Connector Model MI-9, or equal. Provide a 1/2-inch diameter galvanized U-bolt to function as a guide at the closest pipe support on each side of each expansion boot. Install U-bolt with approximately 1/8-inch clearance between duct and U-bolt to allow axial movement of duct. For expansion/ flexible connections at fans or blowers, refer to those equipment specifications.
- B. For exterior ducts, Contractor shall size the expansion boots based on a minimum temperature of -30°F and a maximum temperature of 105°F, using the coefficient of thermal expansion for the particular duct work being provided by the Contractor.

2.06 SUPPORTS AND HANGERS

- A. FRP ductwork shall be supported in accordance with Section 40 05 01, and at intervals no greater than those indicated in the table below. Supports and hangers shall transmit all ductwork loads into the building structural frame through a system of intermediate beams and struts as necessary to accommodate requirements of these specifications. The Contractor shall submit construction details for supports and hangers and its proposed plan for location and type of supports, including location of any required expansion joints. Acceptance of the proposed locations and construction details by the Construction Manager is required prior to the start of fabrication. Where supports and hangers are detailed on the Drawings, they shall be provided as shown.

FRP Ductwork Allowable Spans:

Inside Diameter - inches	Maximum span, feet
<20	12
24-36	15
42	17
48-54	20
60	22
72	24

- B. Hangers and supports shall be lined with 1/8-inch thick neoprene, bonded to the metal hanger or support, to cushion the duct.
- C. Hangers and supports shall fit the exterior of the duct closely and extend completely around the duct. Minimum width shall be the larger of 4 inches or 1/8 of the duct diameter.

2.07 DAMPERS

A. General:

1. Dampers shall have FRP or Type 316 stainless steel blades, Type 316 stainless steel shafts and hardware, and permanently lubricated bearings of material impervious to attack by acids and caustics. Damper frames shall be fabricated to match connecting ductwork. Flanges shall be pre-punched and shall match duct flanges and bolt patterns as specified in this section. No shop fabricated or spooled in duct dampers will be allowed.
 - a. Stuffing boxes shall be provided for gas-tight seals to prevent leakage at all shaft ductwork penetrations. Stuffing boxes shall be adjustable and shall contain a minimum of two sets of packing glands. Bearings shall be flange mounted, located outside the air stream. Bearings may be oil impregnated sintered bronze or relubricable rolling element.
 - b. Damper linkage shall be capable of transmitting twice the maximum torque required by the damper at 20 inches differential pressure. Linkage lever arms shall be a minimum of 3 inches, and the lever arms shall be welded to the axles. All linkage connections shall be supplied with oil impregnated bronze bearings.
 - c. Actuators for dampers having torque requirements of 500 inch-pounds or less shall have heavy-duty manual locking quadrants. Actuators for dampers having torque requirements in excess of 500 inch-pounds shall

have manual worm gear actuators with hand wheel. Damper actuators not readily accessible shall be provided with chain wheel actuators.

- d. Damper supplier shall provide certified leakage, pressure drop, and torque data for each damper type and size. Data shall result from prototype testing conducted in accordance with AMCA 500 test standards, in an AMCA certified test facility.

B. Standard Round Dampers:

1. Round dampers shall be butterfly dampers suitable for balancing and shut-off. Dampers shall be constructed between two flanges unless shown otherwise. Minimum damper blade thickness shall be equal to flange thickness specified in this section. Shaft seal shall be Viton O-ring. Leakage through the closed damper at 70° F and 10 inches water column differential pressure shall not exceed 30 cfm per square foot of conduit cross-sectional area. Standard round dampers shall be Spundstrand, Swartwout Model 914, ECS Model X01, or approved equal.

C. Zero Leak Round Dampers:

1. Zero leak dampers shall be suitable for air tight sealing, and leak free at 28 inches w.c. pressure for one hour. Dampers shall be constructed between two flanges. Minimum damper blade thickness shall be equal to flange thickness specified in this section. Shaft seal shall be Viton O-ring. Zero leak dampers shall be provided similar to the detail drawing in this specification section and installed at the locations shown on the contract drawings. Zero leak dampers shall be Spundstrand ZL Series, Ershigs Type B, Daniel Mechanical DanElast Series, or ECS Model X02. Unless shown otherwise on drawings, all round dampers shall be zero leak.

D. Actuators:

1. All actuators for all dampers shall be independently supported.

2.08 INSPECTION PLATES

- A. Removable inspection plates, covering 8 inch round access holes, shall be provided at all fan inlet and discharge connections and upstream and downstream from all operable fittings such as dampers, , screens, filters, and at all primary instrument locations. Inspection plates shall be gasketed and shall make an airtight seal with the parent duct. Inspection plates shall be fabricated of the same material as the parent duct.
- B. Fabricator shall propose and submit construction, location, and installation details of inspection plates.

2.09 BLAST GATES

- A. Blast gates shall be provided in accordance with this specification section and installed at the locations shown on the contract drawings.

2.10 DRAINS

- A. Drains sumps shall be 1 1/2-inch flanged outlets fabricated and installed in accordance with the detail drawings in this section. Each drain shall be fitted with a 316 stainless steel blind flange with a 1 inch NPT PVC half-coupling mounted at its center.
- B. In addition to drains shown on the drawings, drain sumps with 1 1/2-inch minimum flanged outlets shall be provided at all low points. All drain sumps shall be fitted with a 1 1/2-inch PVC ball valve. Drains shall be FRP or Schedule 80 PVC.
- C. Fabricator shall propose and submit construction, location, and installation details of drain sumps.

2.11 PRODUCT DATA

- A. The following information shall be provided in accordance with Section 01 33 00:
 - 1. Installation certification Section 43 05 11-Form A as specified in paragraph 3.02.

PART 3 EXECUTION

3.01 GENERAL

- A. Refer to Section 06 70 13. Unless otherwise specified, all ductwork shall be filament wound construction.

3.02 INSTALLATION

- A. General:
 - 1. All material and equipment shall be installed as specified and as required by the applicable state and local codes. All ductwork indicated on the drawings is schematic. Therefore, changes in duct size, duct configuration, and location may be necessary to conform to field conditions. All such changes shall be

submitted to the Construction Manager for approval prior to fabrication or construction.

B. Field Joining Materials:

1. FRP duct manufacturer shall supply all materials needed for any required FRP duct field joining. Supply of these materials shall be in accordance with the requirements of this Section and Section 06 70 13.

C. Field Joining:

1. Any required field joining shall be accomplished by the Field Joining Contractor in accordance with the requirements of this section and Section 06 70 13. The Field Joining Contractor shall have a minimum five years experience in FRP ductwork.

D. Installation and Support:

1. FRP ductwork shall be installed and supported in accordance with Chapter 11 of the Uniform Mechanical Code. Ductwork shall be supported as described in paragraph 2.06. Large elbows and terminal ends of ducts shall be supported independently. Flexible connections as described in paragraph 2.05 shall be provided between fans and ductwork, and elsewhere as indicated on the layout drawings.

E. Certification:

1. The installation shall be certified on Section 01 99 90-Form 43 05 11-A.

3.03 FIELD QUALITY CONTROL

A. Testing:

1. All ductwork shall be leak-tested as described in Section 40 05 01. All audible leaks shall be sealed. All tests shall be scheduled with the Construction Manager by giving 24 hours notice. The Contractor shall provide necessary fittings, blind flanges, etc. to isolate sections of duct and to enable all sections of ductwork to be tested.

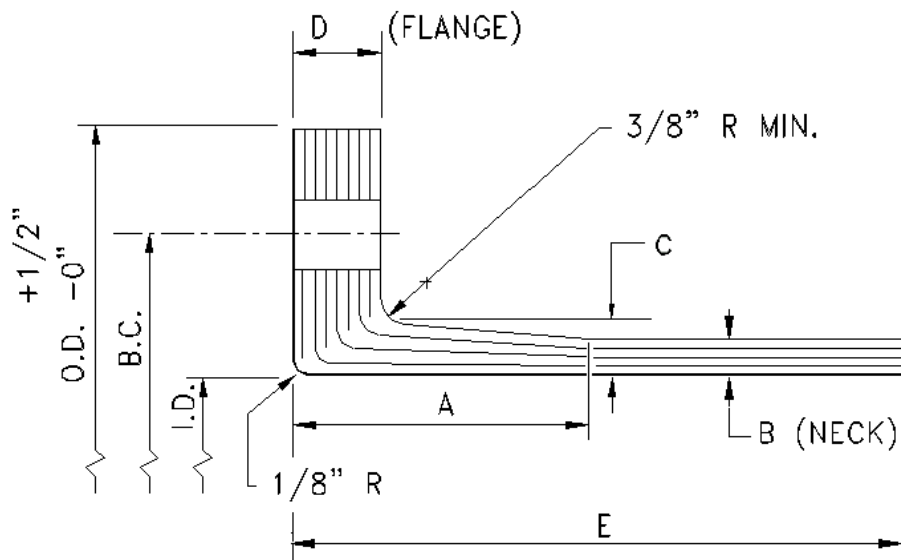
B. Manufacturer's Services:

1. The Fabricator shall provide a representative on-site at the start of the installation of the ductwork to supervise installation of the FRP duct system. To ensure the Contractor is employing the proper procedures, the Fabricator shall remain on-site to witness installation of all ductwork. The Fabricator shall be on-site no less than two 8-hour days during the start of installation.

The Fabricator shall instruct the Contractor on the proper installation procedures at any time the Fabricator and/or the Construction Manager witnesses improper installation practices.

Duct I.D.	F.W. Wall THK. (TABLE 1)	H.L.U. Wall THK. (Table 2)
Up to 12"	0.21"	0.24"
14"	0.21"	0.24"
16"	0.21"	0.24"
18"	0.24"	0.33"
20"	0.24"	0.33"
24"	0.27"	0.33"
30"	0.32"	0.39"
36"	0.35"	0.46"
42"	0.38"	0.50"
48"	0.41"	0.54"
54"	0.41"	0.64"
60"	0.41"	0.64"

**FRP Duct and Fitting Thickness
Detail-1**



FRP Drilled Flange - Duct Drilling

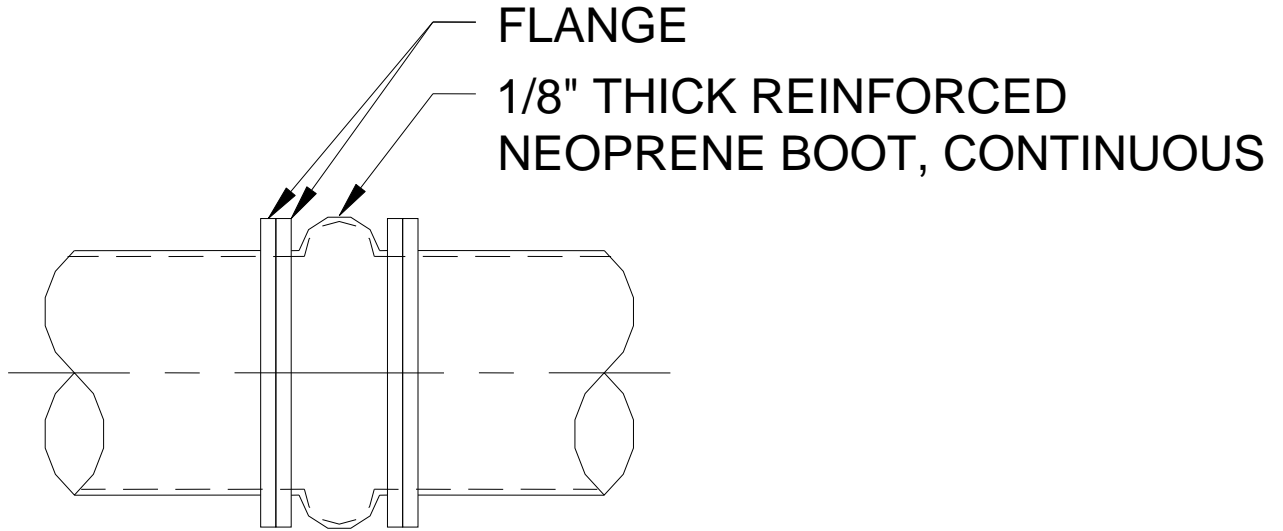
Nozzle I.D.	Nozzle O.D	Bolt circle	No. of Bolt Holes	Dia. of Bolt Holes	A	B (Table 2)	C	D
Up to 12"	16 3/8"	15"	12	1/2"	2"	0.24"	0.37"	0.50"
14"	18 3/8"	17"	12	1/2"	2"	0.24"	0.37"	0.50"
16"	20 3/8"	19"	16	1/2"	2 1/2"	0.24"	0.44"	0.63"
18"	22 3/8"	21"	16	1/2"	2 1/2"	0.33"	0.48"	0.63"
20"	24 3/8"	23"	20	1/2"	2 1/2"	0.33"	0.48"	0.63"
24"	28 3/8"	27"	20	1/2"	2 1/2"	0.33"	0.48"	0.63"
30"	34 3/8"	33"	28	1/2"	2 1/2"	0.39"	0.51"	0.63"
36"	40 3/8"	39"	32	1/2"	2 1/2"	0.46"	0.55"	0.63"
42"	46 3/8"	45"	36	1/2"	3"	0.50"	0.63"	0.75"
48"	54 3/8"	52"	44	5/8"	4"	0.54"	0.77"	1.00"
54"	66 3/8"	58"	44	5/8"	4"	0.64"	1.00"	1.00"
60"	66 3/8"	64"	52	5/8"	4"	0.64"	1.00"	1.00"

FRP Drilled Flange – 125/150 Pattern

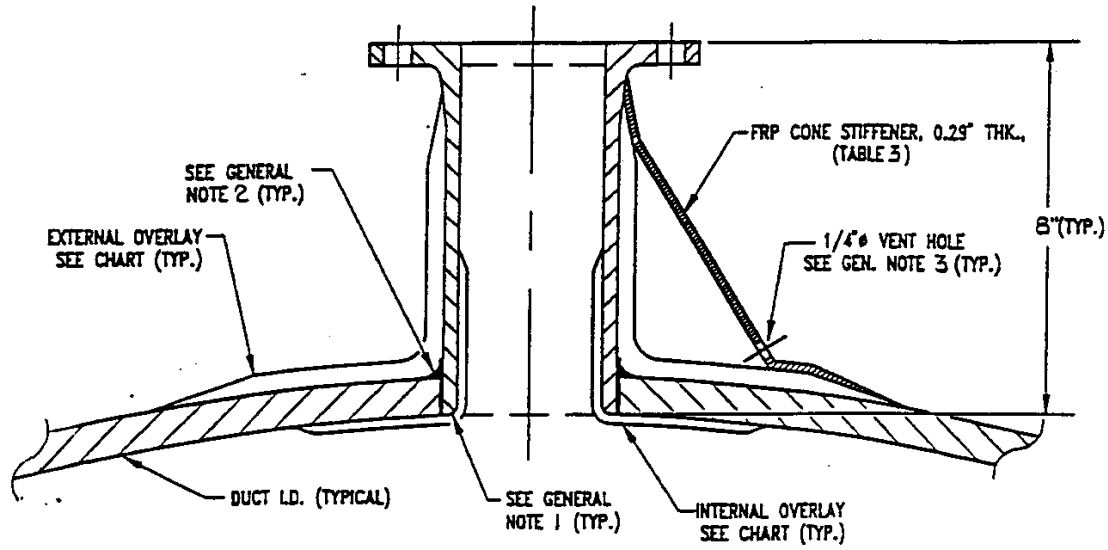
NOZZLE I.D.	NOZZLE O.D	BOLT CIRCLE	NO. OF BOLT HOLES	DIA. OF BOLT HOLES	A	B (Table 2)	C	D	E

1-1/2"	5"	3-7/8"	4	5/8"	2"	0.24"	0.50"	0.50"	8"
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**FRP Flanges
Detail-2**



**Expansion Boot
Detail-3**

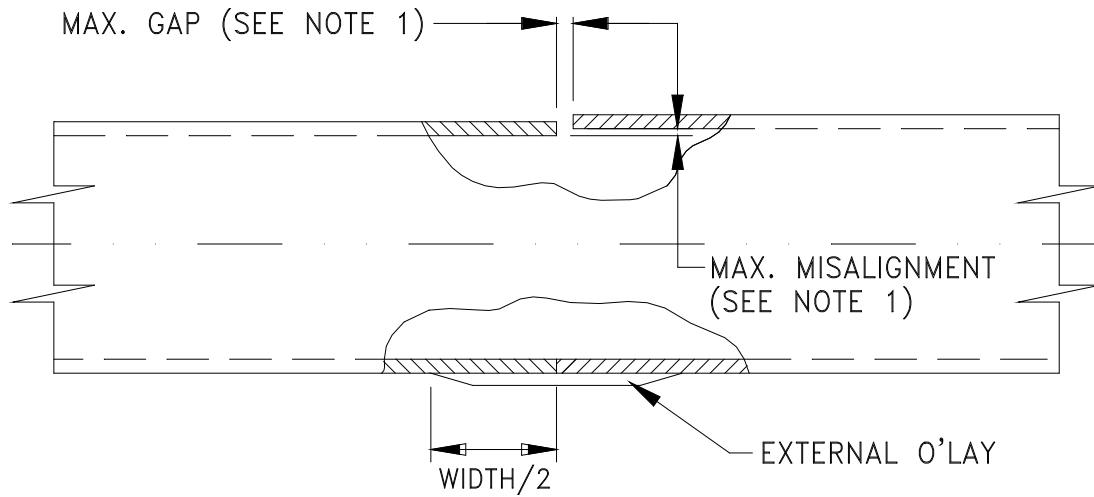


Nozzle I.D.	External Overlay		Internal Overlay	
	THK. (Table 2)	Width	THK.	Width.
1 1/2"	0.29"	10"	(MMCC)"	4"

Notes:

1. Radius inside edge of nozzle, 1/8" min. to 1/4" max.
2. Fill voids with resin putty. Flare putty into a radius 1/4" min. to 3/8" max.
3. Locate vent hole as low as possible, resin coat edge of hole.

1 1/2" DIA. Drain and Nozzle Installation
Detail-4



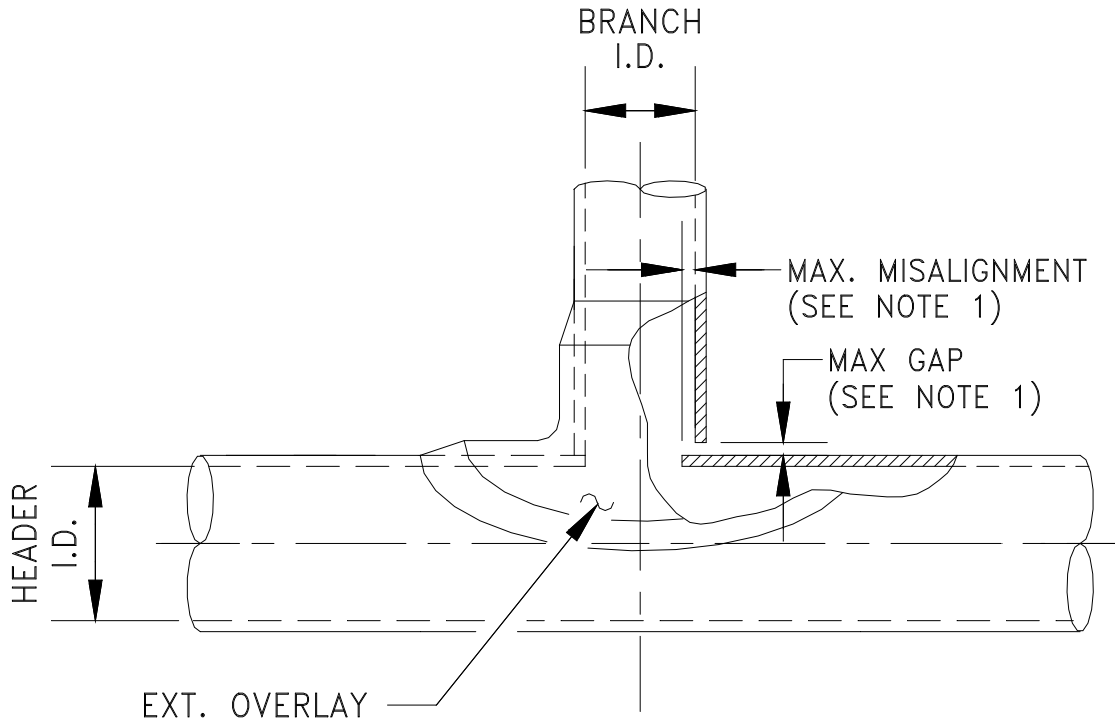
FRP Duct Butt and Miter Joint Overlay

Duct I.D.	External Overlay (Table 2)	
	Thickness	Width
Up to 12"	0.24"	8"
14"	0.24"	8"
16"	0.24"	8"
18"	0.33"	10"
20"	0.33"	10"
24"	0.33"	10"
30"	0.42"	12"
36"	0.46"	12"
42"	0.54"	12"
48"	0.54"	12"
54"	0.64"	14"
60"	0.64"	16"

Notes:

1. See Section 06 70 13 for assembly tolerances.
2. For 24" diameter and larger, and where accessible, apply an internal overlay (MMC) 6" wide.

FRP Butt and Miter Joints
Detail-5



FRP Duct Tee and Lateral Joint Overlay

Duct I.D.	External Overlay (Table 2)	
	Thickness	Width
12"	0.33"	10"
14"	0.33"	10"
16"	0.33"	10"
18"	0.39"	12"
20"	0.39"	12"
24"	0.39"	12"
30"	0.46"	14"
36"	0.54"	14"
42"	0.57"	16"

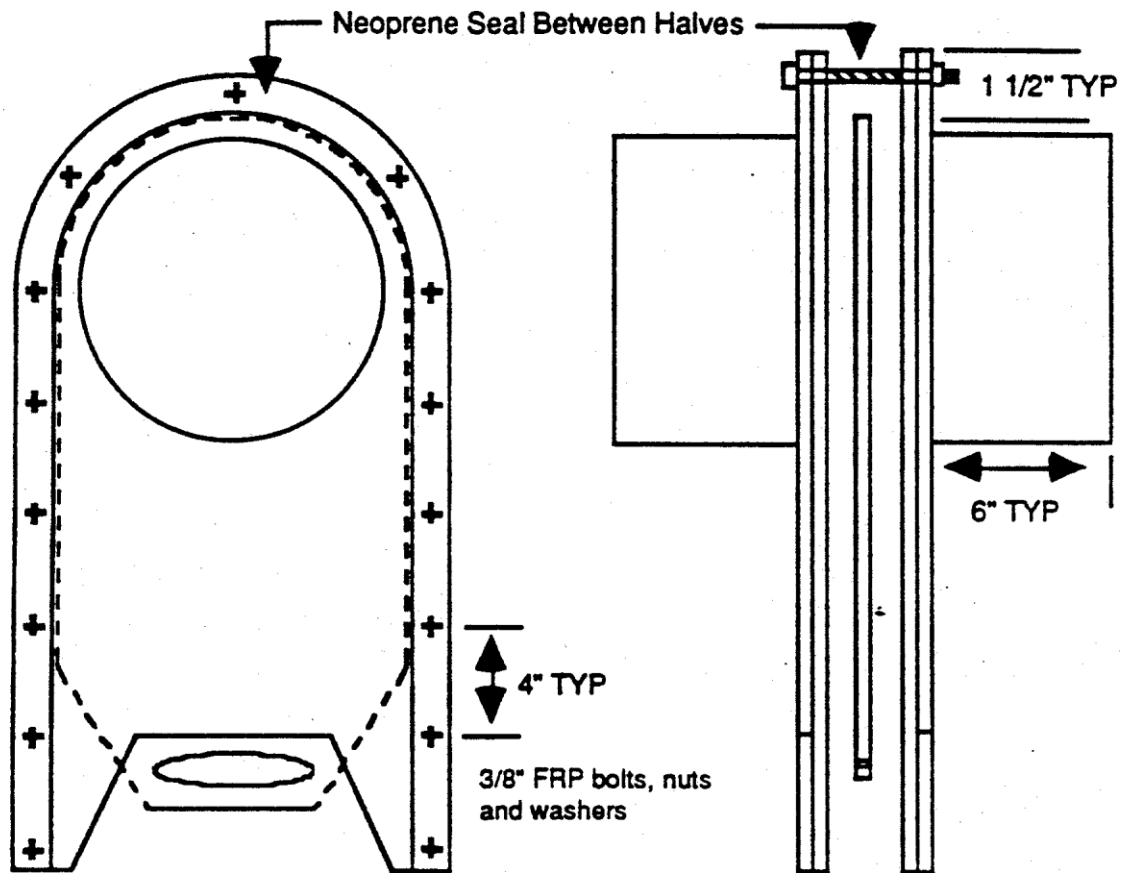
FRP Duct Tee and Lateral Joint Overlay

Duct I.D.	External Overlay (Table 2)	
	Thickness	Width
48"	0.64"	16"
54"	0.64"	16"
60"	0.64"	16"

Notes:

1. See Section 06 70 13 for assembly tolerances.
2. Fill voids with resin putty as shown. Flare putty into a radius 1/4" min. to 3/8" max.
3. For header diameter 24" and larger, and where accessible, apply an internal overlay (MMC) 6" wide.

**FRP Tee and Lateral Joints
Detail-6**

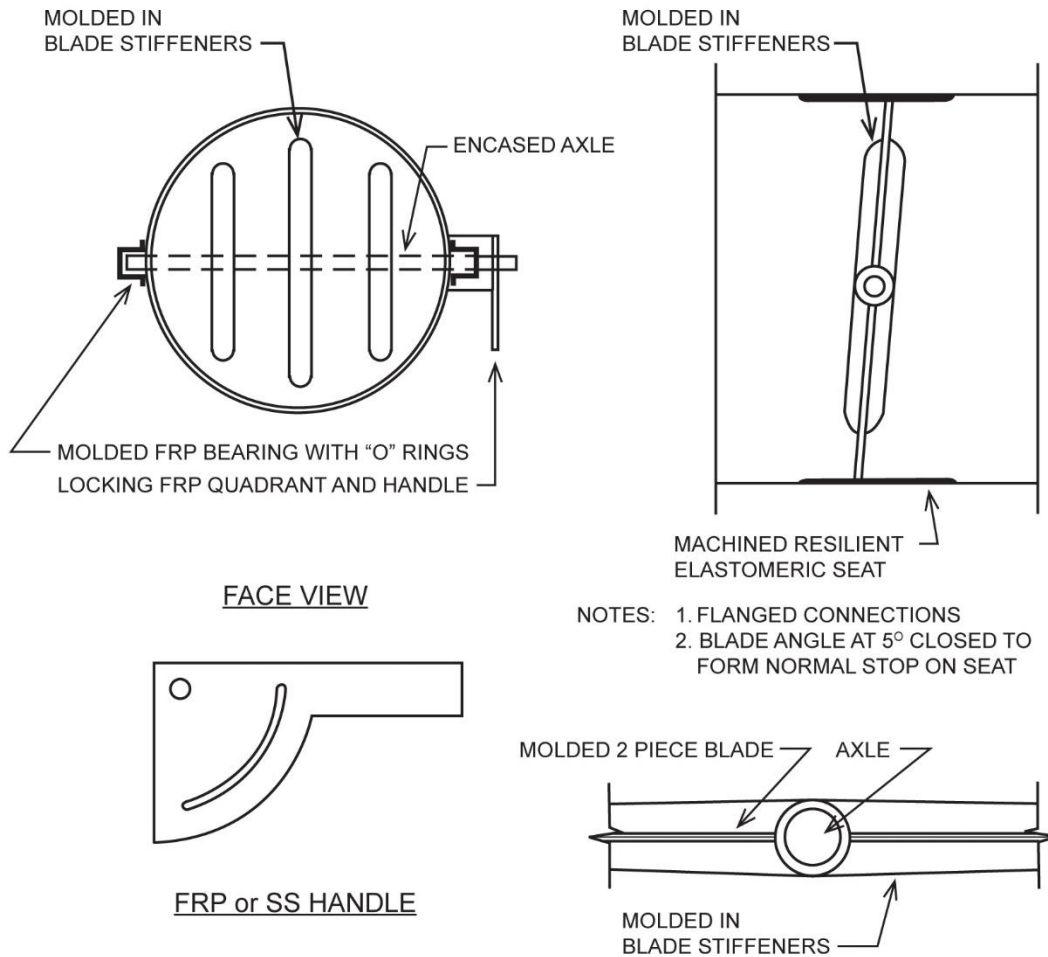


Vinylester Resin

Neoprene Seals

Construction	Blade Thkness	Hole Size	Bolt Size
4" THRU 16"	.187	7/16"	3/8"
18" THRU 24"	.250	7/16"	3/8"
26" THRU 36"	.320	7/16"	3/8"
42" THRU 72"	.375	9/16"	1/2"

Typical Round Blast Gate
All FRP Construction
Detail-7



VITON OR EPDM SEAT

Construction	Blade Thkness	Axle DIM	Blade Stiffeners
4" THRU 10"	.125	0.75	--
12" THRU 16"	.125	1.0	1
16" THRU 22"	.187	1.0	2
24" THRU 28"	.25	1.5	2

Construction	Blade Thkness	Axle DIM	Blade Stiffeners
30" THRU 36"	.375	1.5	3

**Zero Leak Round Damper
Detail-8**

END OF SECTION

SECTION 23 34 13 AXIAL HVAC FANS

1.1 SUMMARY

- A. Section Includes:
1. Tubeaxial fans.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Include rated capacities, furnished specialties, and accessories for each fan.
 2. Certified fan performance curves with system operating conditions indicated.
 3. Certified fan sound-power ratings.
 4. Motor ratings and electrical characteristics, plus motor and electrical accessories.
 5. Material thickness and finishes, including color charts.
 6. Dampers, including housings, linkages, and operators.
 7. Fan speed controllers.
- B. Shop Drawings:
1. Include plans, elevations, sections, and attachment details.
 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 3. Include diagrams for power, signal, and control wiring.
 4. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
 5. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, and base weights.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show fan room layout and relationships between components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate and certify field measurements.
- B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For axial fans to include in emergency, operation, and maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Belts: One set(s) for each belt-driven unit.

PART 2 - PRODUCTS

2.1 TUBEAXIAL FANS

- 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. Loren Cook (basis of design)
 - 2. Greenheck
 - 3. Carnes
 - 4. Penn
- B. Description: Fan wheel and housing, factory-mounted motor with belt drive, an inlet cone section, and accessories.
- C. EF-7: Cook AFBS, 5,575 CFM, 2 HP, 0.75 s.p. EF-8: Cook AFBS, 2,525 CFM, 0.75-HP, 0.5 s.p.
- D. Housings: Stainless Steel with flanged inlet and outlet connections.
- E. Wheel Assemblies: Cast or extruded aluminum with airfoil-shaped blades mounted on cast-iron wheel plate keyed to shaft with solid-steel key.
- F. Belt Drives:
 - 1. Factory mounted, with adjustable alignment and belt tensioning.
 - 2. Service Factor Based on Fan Motor Size: 1.2.
 - 3. Fan Shaft: Turned, ground, and polished steel designed to operate at no more than 70 percent of first critical speed at top of fan's speed range.
 - 4. Fan Pulleys: Cast iron with split, tapered bushing; dynamically balanced at factory.
 - 5. Motor Pulleys: Adjustable pitch for use with motors through 5 hp; fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
 - 6. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
 - 7. Belt Guards: Fabricate of steel for motors mounted on outside of fan cabinet.
 - 8. Motor Mount: Adjustable base.
 - 9. Shaft Bearings: Radial, self-aligning bearings.
- G. Accessories:
 - 1. Companion Flanges: Rolled flanges of same material as housing.
 - 2. Inspection Door: Bolted door allowing limited access to internal parts of fan, of same material as housing.

3. Propeller Access Section Door: Short duct section bolted to fan allowing access to internal parts of fan for inspection and cleaning, of same material as housing.
4. Swingout Construction: Assembly allowing entire fan section to swing out from duct for cleaning and servicing, of same material as housing.
5. Mounting Clips: Horizontal ceiling clips welded to fan housing, of same material as housing.
6. Horizontal Support: Pair of supports bolted to fan housing, of same material as housing.
7. Vertical Support: Short duct section with welded brackets bolted to fan housing, of same material as housing.
8. Inlet Screen: Wire-mesh screen on fans not connected to ductwork, of same material as housing.
9. Outlet Screen: Wire-mesh screen on fans not connected to ductwork, of same material as housing.
10. Backdraft Dampers: Butterfly style, for bolting to the discharge of fan or outlet cone, of same material as housing.
11. Shaft Seal: Elastomeric seal and Teflon wear plate, suitable for up to 300 deg F (149 deg C).
12. Motor Cover: Cover with side vents to dissipate motor heat, of same material as housing.
13. Inlet Vanes: Adjustable; with peripheral control linkage operated from outside of airstream, bronze sleeve bearings on each end of vane support, and provision for manual or automatic operation of same material as housing.
14. Inlet Bell: Curved inlet for when fan is not attached to duct, of same material as housing
15. Inlet Cone: Round-to-round transition of same material as housing.
16. Outlet Cone: Round-to-round transition, of same material as housing.
17. Stack Cap: Vertical discharge assembly with backdraft dampers, of same material as housing.

H. Factory Finishes:

1. Sheet Metal Parts: Prime coat before final assembly.
2. Exterior Surfaces: Baked-enamel finish coat after assembly.
3. Coatings: Anit-corrosion coating suitable for hydrogen sulfide environments.
 - a. Apply to finished housings.
 - b. Apply to fan wheels.

2.2 SOURCE QUALITY CONTROL

- A. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install axial fans level and plumb.
- B. Disassemble and reassemble units, as required for moving to the final location, according to manufacturer's written instructions.
- C. Lift and support units with manufacturer's designated lifting or supporting points.
- D. Equipment Mounting:
 - 1. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
 - 2. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."
- E. Install units with clearances for service and maintenance.
- F. Label fans according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

3.2 CONNECTIONS

- A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."
- B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Verify that shipping, blocking, and bracing are removed.
 - 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
 - 3. Verify that cleaning and adjusting are complete.
 - 4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.

5. Adjust belt tension.
 6. Adjust damper linkages for proper damper operation.
 7. Verify lubrication for bearings and other moving parts.
 8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
 9. Disable automatic temperature-control operators, energize motor and confirm proper motor rotation and unit operation, adjust fan to indicated rpm, and measure and record motor voltage and amperage.
 10. Shut unit down and reconnect automatic temperature-control operators.
 11. Remove and replace malfunctioning units and retest as specified above.
- B. Test and adjust controls and safeties. Controls and equipment will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION

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SECTION 26 05 00.01
COMMON WORK RESULT FOR ELECTRICAL

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Scope: This section specifies general requirements for electrical work. Project detailed requirements, which may be specified in other sections, are subject to the general requirements of this section.
1. Furnish labor, equipment, tools, materials, supplies, and perform operations necessary to install a complete and operable electrical system. Furnish incidental material and perform work shown on the Drawings and in the Specifications.
 2. Perform electrical work and provide material and equipment in compliance with applicable National, State, and Local codes, regulations, laws, and ordinances. Work in general consists of:
 - a. Work as shown and specified, an overview is as follows:
 - 1) Demolish the equipment, cable, and conduit as shown.
 - 2) Install new equipment as shown.
 - 3) Modify the existing MCC as shown.
 - 4) Add the new equipment in the existing Compactor Room and adjacent Electrical Room.
 3. Obtain electrical permits, arrange for required inspections, correct deficiencies resulting from inspections, and pay permit fees and inspections charges. Pay fines and the cost of extra work incurred by action or inaction of the Supplier/Subcontractor, at no additional cost to the Contractor or Contractor's Representative.
 4. Furnish properly executed certificates of final electrical inspection and approval from the Code Authority Having Jurisdiction (AHJ) at the conclusion of the work, before final acceptance.
 5. Adhere to the Area Classification shown for the product required and the installation required. Provide products in Hazardous Classified Areas in accordance with NEC Article 500 for the Class and Division specified or identified and products in corrosion areas in accordance with this specification.
 - a. Hazardous areas: Screen Room and Compactor Room.
 6. Maintain a complete set of Contract Drawings in "Record" condition, available for review by the Contractor, Engineer, or Owner. Mark, initial, and date changes, modifications, or corrections, as they occur. Refer to the Record Drawing specification section requirements.
 7. Field verify the exact locations of equipment or equipment terminations. Use accepted equipment submittals as the basis of the conduit openings and slab penetrations.
 8. Provide PLC and SCADA/HMI programming modifications to reflect the new equipment, associated controls-related functionality, and graphical representation on

the HMI. PLC and SCADA/HMI programming shall be performed following the Owner's current standard(s).

B. Drawing Definitions and Requirements:

1. **Elementary or Schematic Diagram:** Shows, by means of graphic symbols, the electrical connections and functions of a specific circuit arrangement that facilitates tracing the circuit and its functions without regard to the actual physical size, shape, or location of the component devices or parts.
2. **One-Line Diagram:** Shows by means of single lines and graphical symbols the course of an electrical circuit or system of circuits and the components, devices or parts used therein. Physical relationships are usually disregarded.
3. **Block Diagram:** Diagram of a system, instrument, computer, or program in which selected portions are represented by annotated boxes and interconnecting lines.
4. **Wiring Diagram or Connection System:** Includes all of the devices in a system and shows their physical relationship to each other including terminals and interconnecting wiring in an assembly. A panel layout diagram shows the physical location of devices and the wiring connections.
5. **Interconnection Diagram:**
 - a. Shows external connections between terminals of equipment in panels or electrical assemblies and outside points, such as motors, auxiliary devices, control devices, and instruments. Provide references to connection diagrams that interface to the interconnection diagrams of the continuous line type.
 - b. Show bundled wires as a single line with the direction of entry/exit of the individual wires clearly shown. Show each wire identification as actually installed. Wireless diagrams and wire lists are not acceptable.
 - c. Provide wire identification for each end of the same wire for devices and equipment, indicate terminal blocks identification actually installed with individual terminal identification.
 - d. Show jumpers, shielding and grounding termination details not shown on the equipment connection diagrams on the interconnection diagrams. Wires or jumpers shown on the equipment connection diagrams shall not be shown again on the interconnection diagram. Signal and DC circuit polarities and wire pairs shall be shown. Show spare wires and cables.
6. **Arrangement, Layout, or Outline Drawings:** Shows the physical space and mounting requirements of a piece of equipment and may indicate ventilation requirements, space provided for connections, or the location connections are to be made.
7. **Drawing Cross-Referencing:**
 - a. Reference each submittal drawing submitted to the associated Contract Document and indicate the one-line diagrams, schematics, control diagrams, block diagrams, and Process and Instrumentation Diagrams (P&IDs) cross-referenced on the submittal drawings.
 - b. Internally cross-reference submittal drawings related to the same subject shall be referenced to other submittal drawings. Failure to cross-reference Contract Documents with the submittal shall be cause for rejection of the entire submittal with no further consideration.

1.02 QUALITY ASSURANCE

A. References:

1. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.
2. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
ANSI A58.1 / ASCE 7	Minimum Design Load in Buildings and Other Structures, 1982
ANSI C80.1	Rigid Steel Conduit - Zinc Coated, 1994
ASTM B3	Standard Specification for Soft or Annealed Copper Wire, 2001
ASTM B8	Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft, 1999
ASTM B33	Standard Specification for Tinned Soft or Annealed Copper Wire for Electrical Purposes, 2000
ICEA S-68-516 / NEMA WC 70, 71, & 74	Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
ICEA S-95-658	Standard for Non-Shielded Power Cables Rated 2000 Volts or Less, 2000
IEEE 81	Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System, 1983
IEEE 383	Type Test of Class IE Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations, 1974 (1992)
JIC EMP-1	Electrical Standard for Mass Production Engineering, 1967
NEMA TC2	Electrical Polyvinyl Chloride (PVC) Conduit, 2003
NEMA 250	Enclosures for Electrical Equipment (1000 Volt Maximum)
NEMA WC-70	Non-Shielded Power Cable 2000V or Less (ICEA S-95-658), 1999 (2001)
NEMA WD-1	General Requirements for Wiring Devices, 1999
NFPA 70	National Electrical Code (NEC)
UBC	Uniform Building Code
UL 6	Electrical Rigid Metal Conduit - Steel, 12th Edition, 2000 (2003)
UL 44	Thermoset-Insulated Wires and Cables, 15th Edition, 1999 (2002)
UL 67	Panelboards, 11th Edition, 1993 (2003)
UL 83	Thermoplastic-Insulated Wires and Cables, 13th Edition, 2003 (2004)
UL 263	Fire Tests of Building Construction and Materials, 13th Edition, 2003

Reference	Title
UL 360	Liquid-Tight Flexible Steel Conduit, 5th Edition, 2003
UL 489	Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures, 10th Edition, 2002 (2003), Adopted: NEMA AB 1-1999
UL 1277	Electrical Power and Control Tray Cables with Optional Optical-Fiber Members, 4th Edition, 2001 (2003)

B. Listed and Labeled Products:

1. Provide electrical equipment and materials listed or labeled by an independent testing laboratory for the purpose for which they are to be used and provide associated testing laboratory label.
2. The independent testing laboratory shall be acceptable to the inspection authority having jurisdiction. Test Laboratory examples: Underwriters Laboratories (UL), Electrical Testing Laboratories (ETL), and Canadian Standards Association (CSA).
3. Include costs and expenses incurred for special inspections in the contract price for electrical products required to undergo a special inspection either at the manufacturer's place of assembly or at the installed location by the local inspection authority when a product is not available with a testing laboratory listing or labeling.

C. Factory Tests:

1. Perform factory tests at the place of fabrication and on completion of manufacture or assembly where specified in the individual product specification section.
 - a. Include the costs of factory tests in the contract price.
 - b. Include the costs of Engineer witness of factory tests in the contract price.

1.03 SUBMITTALS

A. The following information shall be provided for all electrical equipment and materials:

1. Catalog cuts of equipment, devices, and materials requested by the individual specification sections.
 - a. Catalog information with technical specifications and application information including ratings, range, weight, accuracy, and other pertinent product information.
 - b. Edit catalog cuts to show only the items, model numbers, and information that apply.
 - c. Assemble catalog cuts in a folder or three ring binders with a cover sheet, indexed by item, and cross-referenced to the appropriate specification paragraph.
2. Arrangement, layout, and outline drawings with dimensions and weight, as appropriate.
3. Control schematics and interconnection wiring diagrams depicting internal and external wire and cable terminations. Drawing cross-reference to specification and Contract Document drawings.

1.04 DRAWINGS

- A. Prepare specified drawings on 11-inch by 17-inch drafting media complete with borders and title blocks clearly identifying project name, equipment and the scope of the drawing.
- B. Prepare drawings to reflect the final constructed state of the project installation or supplied equipment. Provide drawing quality, clarity, and size of presentation to permit insertion in operation and maintenance manuals.

1.05 PROJECT/SITE CONDITIONS

- A. General:
 - 1. Unless otherwise specified, equipment and materials shall be sized and de-rated for the ambient conditions specified in Section 01 11 80, but not less than an ambient temperature of 40 degrees C at an elevation ranging from sea level to 3000 feet without exceeding the manufacturer's stated tolerances.
- B. The following areas are designated as corrosive:
 - 1. Outdoors.
 - 2. Screen Room for purposes of conduit type.
 - 3. Compactor Room for purposes of conduit type.
- C. Hazardous (Classified) Areas, Class I, Division I:
 - 1. Screen Room for purposes of connections to equipment.
 - 2. Compactor Room for purposes of connections to equipment.
- D. Seismic:
 - 1. Electrical equipment and supports shall be braced in accordance with all applicable building codes.
- E. Construction Materials:
 - 1. Refer to the individual specification section for each component for material composition and installation practices.
 - 2. Construction materials required for each area classification are listed in the following table that specifies the type of raceway required for each location and application by RACESPEC sheet. Unscheduled conduit shall be galvanized rigid steel conduit: RACESPEC type RMC-Steel.

Location	Application/Condition	RACESPEC
Indoor non-corrosive	Exposed	RMC-Steel
Indoor corrosive	Exposed	PVC-coated RMC-Steel
Outdoor	Exposed	RMC-Steel
Hazardous	Exposed	RMC-Steel
Concealed	Embedded in concrete structure or beneath slab-on-grade	RMC-Steel, RNC40, or RNC80, as shown

Location	Application/Condition	RACESPEC
Underground	Instrumentation, communications and data signals encased in concrete, ductbank	RMC-Steel, RNC40, or RNC80, as shown
Underground	Instrumentation, communications and data signals directly buried	RMC-Steel, RNC40, or RNC80, as shown
Underground	Power directly buried (Non-Power Utility)	RNC40
Nonhazardous	Final connection to equipment	RMC-Steel
Hazardous	Final connection to equipment	Fittings per NEC Article-500 for the Classified Hazardous Area identified.
Corrosive	Final connection to equipment	PVC coated RMC-Steel, NC40, RNC80, Flexible Steel Fittings, as appropriate

Notes:

1. Install conduit connections to control stations, enclosures, and device boxes through threaded hubs.
2. Install flexible conduit for final connections to devices, equipment and motors not exceeding 18 inches. Limit length to 36 inches where flexibility is required.
3. Mount enclosures, device boxes, control stations, and raceway systems with 1/4-inch (minimum) air space between the electrical system and supporting structure.

1.06 STORAGE OF MATERIALS AND EQUIPMENT

- A. Store equipment and materials in the factory-sealed container and protect with additional covering and materials to avoid physical damage or weather damage.

1.07 ELECTRICAL NUMBERING SYSTEMS

A. Raceway Numbers:

1. Tag raceways with brass tags at the access locations including manholes, pull boxes, junction boxes, and at the terminations.
2. Tag raceways with aluminum tags where subject to hydrogen sulfide atmosphere typically found at wastewater treatment facilities.
3. Raceway numbers are derived from the "Cable and Conduit Schedule" or shown on the drawings. Where raceway numbers are not provided, use the circuit number on the power and control single line diagrams.

B. Wire and Cable Circuit Numbers:

1. Identify wire and cable circuit numbers at both ends. Refer to the circuit labeling method specified and shown in the drawings to label circuits.
2. Identify lighting and receptacle branch circuits with the power source and circuit load, at source and destination locations. Identify the load, location, and circuit in typed panel schedules with corrections shown.
3. Include copies of schematic diagrams, wiring connection diagrams, and interconnection diagrams inside of the equipment enclosure, protected in a plastic container in the equipment print holder.

PART 2 – PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. General:

1. Provide new equipment and materials free from defects. Provide material and equipment of the same or a similar type of the same manufacturer throughout the work. Use standard production materials wherever possible.

B. Paint Finish and Galvanizing:

1. Paint installed and unpainted electrical construction materials as specified or shown on the drawings. Coatings shall be compatible with the base material(s) and anticipated environment(s).

2.02 RACEWAYS, BOXES, AND SUPPORTS

A. Raceways and Boxes:

1. Pullboxes, handholes, and device boxes are generally called boxes herein. Size boxes, manholes, and handholes in accordance with the National Electrical Code. Provide separate raceways for lighting, receptacles, power, control, instrumentation, and signaling systems.

B. Boxes and Wireways:

1. Provide indoor boxes, larger than FD boxes, constructed of stainless steel.
2. Provide boxes constructed of Grade 316L stainless steel rated NEMA-4X for corrosive areas and for outdoor locations.
3. Size and provide wireways at locations above and below boxes, panels and groups of devices. Comply with the NEC sizing for conductor fill requirements. Wireway NEMA type shall match the location and area classification and equipment NEMA enclosure ratings.

C. Terminal Cabinets:

1. Provide cabinets located indoors-conditioned space with NEMA-12 rating. Provide cabinets located outdoors, in process areas and in corrosive areas with NEMA-4X rating of stainless steel. Provide cabinets with hinged doors and 2 or 3-point stainless steel quick release latches with locking features via handle or latching clasps with provisions for padlocks.
2. Provide adjustable terminal strip mounting accessories and with channel mounted terminal blocks rated 30A, 600VAC. Provide No. 8 minimum strap-screw type terminal strip, suitable for ring tongue, locking spade terminals. Provide Phoenix Contact products with capture feature and terminal identification method per terminal, as specified.

D. Raceway and Box Supports:

1. Provide stainless steel framing channel with end caps to support groups of conduit. Provide individual conduit supports that have one-hole stainless steel malleable iron pipe straps used with stainless steel clamp backs and nesting backs.

2. Provide stainless steel supports, channel, fittings, all-thread, and fasteners in outdoor locations, in corrosive areas, and as shown. Provide factory end-caps for supports and channels.
 3. Independently support boxes by stainless steel brackets, expansion bolts, toggle bolts, or machine or wood screws as appropriate. Wooden or plastic plugs inserted in masonry or concrete shall not be used as a base to secure boxes, nor shall welding or brazing be used for attachment.
- E. Nameplates:
1. Provide nameplates for all boxes and enclosures with nameplate wording as shown on the drawings. Provide the tag number or box number with device functional description on device nameplate. Nameplate wording may be changed without additional cost where changes are made during the submittal process or prior to commencement of engraving.
 2. Provide machine engraved laminated white phenolic nameplates with black lettering for panel-mounted equipment with the instrument tag number/description in 3/32-inch minimum size lettering and attach to the panel or enclosure with a minimum of two self-tapping 316 stainless steel screws. Provide nameplates for power sources indicating the power loads and nameplates for power loads that indicate the power sources, in accordance with these specifications and the NEC.
- F. Raceway Markers:
1. Provide raceway markers: 0.036-inch minimum thickness, solid brass tags or aluminum tags with raceway number or the circuit number, stamped in 3/16-inch minimum height characters and attach tags to the raceway with 316 stainless steel wire. Install raceway markers inside of pull boxes, handholes, manholes, and where entering electrical equipment enclosures.
 2. Provide raceway markers indicating the power source and circuit number for lighting and receptacle raceways to the associated panelboard. Interior lighting and receptacle raceways do not require raceway markers for conduit between components.
- G. Identification Tags:
1. Provide the following:
 - a. Equipment: Typical size 1-inch x 3-inch wide, white with black engraved equipment number and equipment description.
 - b. Raceway/Conduit: Tags with raceway or conduit number or circuit shown.
 - c. Instrument: 1.5-inch wide, aluminum tag with instrument number and description.
 - d. Conductor: Power, control, or instrument cable with the circuit identified as shown; power source or power/control panel identified; power load, equipment, instrument, or device identified; purpose of the conductors identified.
 - e. Fastener: nylon-coated 48-mil stainless steel wire. Manufacturer: Brady catalog number 23310 or equal with double ferrule type brass wire clamps. Manufacturer: Brady number 23312.

H. General Raceway Requirements:

1. Provide additional pullboxes for conduit runs with greater than 360 degrees in any run between pull boxes. Limit maximum conduit runs without additional pullboxes to 400 feet, less 100 feet for every 90 degrees for the conduit run change in direction.
2. Determine conduit routing that conforms to the installation requirements set forth herein and in accordance with the NEC requirements for size and number of pullboxes. The RACESPEC sheets with specified requirements begin on the next page.

2.03 RACEWAY SPECIFICATION SHEETS (RACESPEC) - RMC-STEEL**A. Raceway Identification:**

1. RMC-Steel

B. Description:

1. Rigid Steel Conduit

C. Compliance:

1. ANSI C80.1, UL 6

D. Finish:

1. Hot-dip galvanized after fabrication, inside and outside. Smooth finished surfaces.

E. Manufacturers:

1. Allied Tube and Conduit Corp., Wheatland Tube Co., or equal.

F. Minimum size:

1. Unless otherwise shown: 3/4-inch for exposed; 1-inch for concealed or embedded; 2-inch for ductbank encased.

G. Fittings:

1. Hubs:
 - a. Insulated throat with bonding locknut, hot-dip galvanized. The hubs shall utilize a neoprene "O" ring and shall provide a watertight connection. O-Z Gedney, CHM-XXT, or equal.
2. Unions:
 - a. Electro-galvanized ferrous alloy type Appleton UNF or UNY, Crouse-Hinds UNF or UNY, or equal. Threadless fittings are not acceptable.

H. Boxes:

1. Indoor:
 - a. Type FD cast ferrous for all device boxes and for junction boxes less than 6 inches square. NEMA-12 welded steel 6 inches square and larger. Door shall have hinges with clamp locks. Boxes in process areas shall be NEMA-4 watertight. Boxes in corrosion areas shall be NEMA-4X.
 - b. Conduit bodies: ferrous alloy type with screw taps for fastening covers. Gaskets shall be made of neoprene.

2. Outdoor:
 - a. Type FD cast ferrous for all device boxes and for junction boxes less than 6 inches square. NEMA-4X stainless steel nonmetallic for 6 inches square and larger.
- I. Elbows:
 1. (3/4" thru 2.5")
 - a. Factory fabricated or field bent.
 2. (3" thru 6")
 - a. Factory fabricated.
- J. Conduit Bodies:
 1. (3/4" thru 4")
 - a. Malleable iron, hot-dip galvanized, unless otherwise noted. Neoprene gaskets for all access plates. Tapered threads for all conduit entrances.
 2. (5" and 6")
 - a. Electro-galvanized iron or cast iron box.
- K. Expansion Fittings:
 1. Expansion fittings in embedded runs shall be watertight and shall be provided with an internal bonding jumper. The expansion material shall be neoprene and shall allow for 3/4-inch movement in any direction.
- L. Manufacturers:
 1. Appleton, Crouse-Hinds, Hubbell, O. Z. Gedney, or equal.
- M. Installation:
 1. Rigid steel conduit shall be made up tight and without thread compound. Joints shall be made with standard couplings or threaded unions. Steel conduit shall be supported away from the structures using hot-dip galvanized malleable iron straps with nesting backs.
 2. Conduit entering boxes shall be terminated with a threaded hub as specified or standard fittings with grounding bushing.
 3. Exposed male threads on rigid steel conduit shall be coated with zinc-rich paint.

2.04 RACEWAY SPECIFICATION SHEETS (RACESPEC) - LFSC

- A. Raceway Identification:
 1. LFSC
- B. Description:
 1. Liquid-Tight Flexible Steel Conduit
- C. Application:
 1. Final connection to equipment subject to vibration or adjustment.

- D. Compliance:
 - 1. UL 360
- E. Construction:
 - 1. Spirally wound galvanized steel strip with successive convolutions securely interlocked and jacketed with liquid-tight plastic cover.
- F. Minimum size:
 - 1. 3/4 inch
- G. Fittings:
 - 1. Cadmium-plated malleable iron body and gland nut with cast-in lug, brass grounding ferrule threaded to engage conduit spiral and O-ring seals around the conduit and box connection and insulated throat. Forty-five and 90-degree fittings shall be used where applicable.
- H. Installation:
 - 1. Do not exceed 36-inch length.

2.05 RACEWAY SPECIFICATION SHEETS (RACESPEC) - RNC40 AND RNC80

- A. Raceway Identification:
 - 1. RNC40 and RNC80
- B. Description:
 - 1. Rigid Nonmetallic Conduit, heavy wall thickness for direct bury, concrete encasement or surface mounting where not subject to physical damage. DZYR per NEC Article 352.
- C. Compliance:
 - 1. NEMA TC2, UL 651
- D. Construction:
 - 1. Schedule 40, high-impact, polyvinyl-chloride (PVC)
 - 2. Schedule 80, high-impact, polyvinyl-chloride (PVC)
- E. Minimum size:
 - 1. 3/4 inch exposed; 2-inch embedded or encased
- F. Fittings:
 - 1. PVC solvent weld type
- G. Boxes:
 - 1. Indoor:
 - a. NEMA Class 4, nonmetallic

2. Outdoor and corrosive:
 - a. NEMA Class 4X, nonmetallic

H. Installation:

1. PVC conduit entering fiberglass boxes or cabinets shall be secured by threaded bushings on the interior of the box and shall be terminated with a threaded male terminal adapter having a neoprene O-ring. Joints shall be made with standard PVC couplings.
2. PVC conduit shall have bell ends where terminated at manholes, handholes, or building walls. Bell ends shall terminate flush at the walls and floors and not extend or protrude.

2.06 RACEWAY SPECIFICATION SHEETS (RACESPEC) – PVC-COATED RMC-STEEL

A. Raceway Identification:

1. PVC Coated RMC-Steel

B. Description:

1. Rigid Steel Conduit, Corrosion-Resistant, Polyvinyl Chloride (PVC) Coated

C. Compliance:

1. ANSI C80.1, UL 6

D. Finish:

1. Hot-dip galvanized rigid steel conduit, to which a minimum 40-mil thick PVC coating has been bonded to the outside of the conduit. A 2-mil coat of urethane coating shall be bonded to the inside. Coating shall be free of pinholes. Bond strength shall exceed the tensile strength of the PVC coat. Elbows and fittings shall be factory made and coated.

E. Fittings: (includes unions, conduit bodies and expansion fittings)

1. Refer to RACESPEC RMC-Steel for additional requirements. Similarly coated to the same thickness as the conduit and provided with type 316 stainless steel hardware. Conduit and fittings shall be manufactured by the same company.
 - a. Hubs:
 - 1) Hubs for connection of conduit to junction, device, or terminal boxes shall be threaded with the same PVC coating as the conduit and provide a watertight connection.
 - b. Boxes:
 - 1) Refer to RACESPEC RMC-Steel. FD boxes shall be PVC coated.
 - c. Elbows:
 - 1) Refer to RACESPEC RMC-Steel.

F. Manufacturers:

1. PVC coated conduit shall be by Robroy Industries, PLASTI-BOND RED; Occidental Coating Company (OCAL), or equal.

G. Installation:

1. Plastic coated conduit shall be made up tight, threaded, and installed using tools approved by the conduit manufacturer.
2. Conduit threads shall be covered by a plastic overlap which shall be coated and sealed per manufacturer's recommendations. Painted fittings are not acceptable.
3. Pipe wrenches and channel locks shall not be used for tightening plastic coated conduits. Damaged areas shall be patched, using manufacturer's recommended material.

2.07 RACEWAY SPECIFICATION SHEETS (RACESPEC) - WW**A. Raceway Identification:**

1. WW

B. Description:

1. Wireway and Auxiliary Gutter with hinged covers.
2. Match the area classification enclosure type where installed.

C. Compliance:

1. JIC EMP-1 and NEC Article 366

D. Minimum size:

1. 4-inch x 4-inch
2. Length as shown or determined by the installation requirements.

E. Maximum size:

1. Sized in accordance with NEC-366 fill rules

F. Finish:

1. Smooth finished surfaces.

G. Application:

1. As shown on the drawings and where required.

H. Hardware, Supports, Fittings, and Fasteners:

1. Stainless steel

I. Fasteners:

1. Quick release 1/4 turn type or suitable for the area classification.

2.08 RACEWAY SPECIFICATION SHEETS (RACESPEC) – XPFS**A. Raceway Identification:**

1. XPFS

B. Description:

1. Explosion-proof Flexible Steel Conduit

C. Application:

1. XPFS Conduit coupling shall be used for final connections to motors and other equipment subject to vibration or adjustment in Class I Division 1 hazardous areas and shall be watertight.

D. Size:

1. 1/2 inch – 4-inch

E. Length:

1. 4-inch – 36-inch

2.09 CONDUCTORS, WIRE, AND CABLE

A. Provide products specified.

B. Unscheduled Conductor Sizing:

1. Size conductors, wire, and cables in accordance with the National Electrical Code where not specified on the Drawings, and install in the minimum size raceway as specified in the RaceSpecs herein.

C. Control Wire Color Coding:

1. Provide control wires with the following colors for the shown voltage:

120VAC Power, line and load	Black
120VAC Control	Red
24VAC	Orange
12VAC	Brown
Foreign Voltage (AC) (Interlock)	Yellow
AC Neutrals	White
Ground	Green
24VDC (+ & -)	Violet
12VDC (+ & -)	Blue
Foreign Voltage (DC)	Violet/White or Blue/White

D. Power Conductors:

1. Provide power conductors with following colors for the shown voltage:

Wire	480Y/277V, 3Ø	208Y/120V, 3Ø	240/120V, 3Ø
Phase A	Brown	Black	Black
Phase B	Orange	Red	Orange per NEC 408.3(E) and 215.8
Phase C	Yellow	Blue	Blue
Ground	Green	Green	Green

Neutral	White or Gray per NEC 210.4(D)	White	White
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2. Provide black insulation conductors larger than #10 AWG with colored 3/4-inch vinyl plastic tape to identify the phase color at each cable termination. Tape wrap with 25 percent overlay to provide minimum of 3 inches of coverage.

E. Scheduled and Unscheduled Wire and Cable:

1. Provide the insulation and jacket material specified in the CABLESPEC sheets for scheduled and unscheduled (not shown) conductors. Provide stranded copper conductors for all wire and cable.

F. Electrical Enclosure Conductor Ratings:

1. Provide conductors with 600-volt insulation ratings in panels and other electrical enclosures. Conductors with less than 600-volt insulation ratings are prohibited, unless specifically identified.
2. Bundle and lace conductors in panels and electrical equipment at intervals not greater than 6 inches, spread into trees and connected to their respective terminals. Provide lacing using plastic cable ties that are tensioned and cut off using a tool specifically designed for the purpose such as a Panduit GS2B. Other methods of cutting cable ties are prohibited.
3. Bundle conductors crossing hinges into groups not exceeding 10 to 15 conductors and protected using nylon spiral flexible covers to protect conductors and provide oversized plastic panel wiring duct within panels.
4. Provide slack in junction boxes, pull boxes, handholes and manholes sufficient to allow cables or conductors to be routed along the walls with the amount of slack equal to largest dimension of the enclosure.
5. Provide dedicated electrical wireways and insulated cable holders mounted and secured on stainless steel unistrut in manholes and handholes.

G. Instrument Signal Cable:

1. Provide terminal blocks at instrument cable junctions within dedicated terminal boxes provided by the installer. Provide twisted shielded cable with individual shield for each pair. Provide twisted shielded cable multi-pair with overall shield and jacket. Provide triads wherever 3-wire circuits are required. Circuits shall not be made using conductors from different pairs or triads.
2. Install instrument, signal, and data communication circuits without splices between instruments, terminal boxes, or panels. Shields as a signal path, except for circuits operating at radio frequencies and utilizing coaxial cables are not acceptable. Common ground return conductors for two or more circuits are not acceptable.
3. Bond shields to the signal ground bus at the control panel. Isolate shields from ground and other shields at other locations by cutting short or taping. Provide terminal strips for signal leads and shield drain wires.
4. Terminate spare circuits and the shield drain wire on terminal blocks at both ends of the cable run. Shields or drain wires for spare circuit cables shall be bonded at control panel only with the other end insulated by tape cover.

5. Provide an instrument stand with terminal box mounted approximately 3 feet above grade to center or as shown. Provide terminal boxes for instrument cable with the cable and conductor labels specified.
 6. Install and terminate conductors for paging, security, data communication, voice communication, and telephone systems in compliance with the manufacturer and the system utility recommendations.
- H. Splicing and Terminating Materials:
1. Use an UL-listed tool for the applied compression type of connectors with the correct size and type. Provide tin-plated high conductivity copper connectors. Mechanical clamp, dimple, screw-type connectors are prohibited.
 2. Provide polymeric insulating material over motor terminations with high dielectric strength mastic or material to seal the ends against ingress of moisture and contamination.
 3. Cover splices with electrical products designed for the application, and insulate with a heat-shrinkable sleeve or boot.
- I. Fire Stop Sealant Materials:
1. Provide non-combustible silicone sealant for sealing apertures and cable through-penetrations for electrical conductors meeting UL 263 4-hour time-temperature requirements.
 2. Manufacturer: STI Inc., Pensil Silicone Sealants PEN300 SpecSeal Firestop, or equal.
- J. Circuit Numbering Marking System:
1. Identify each power, control, and signal conductor at each terminal connection. Machine print the letters and numbers with black on white alphanumeric characters representing the circuit numbering system.
 2. Identify conductors, including spares. Provide cable markers and wire markers for distribution and utilization equipment circuits identifying the power source and circuit source from which it is served.
 3. Provide the identification system of vinyl power cable strap-on cable markers, vinyl multi-conductor control cable strap-on cable markers, and vinyl or polyolefin wire slip-on sleeves and encircle the conductor.
 4. Provide conductor marker used in outdoor, damp, or wet locations on heat-shrinkable polyolefin shrinkable marking sleeves covered with clear heat-shrink sleeve or clear tape cover.
 5. Print conductor markers using the Brady Marker "XC PLUS", the Brady LS2000 printer with the Brady sleeve wire marking system, or Engineer accepted equal.
- K. Terminal Blocks:
1. Provide terminal blocks with the following features:
 - a. Voltage rated: 600 volts.
 - b. Current rated: match largest conductor connected to the assembly.
 - c. Integral marking strips.

- d. Terminal block assemblies: provide with mounting channels, barriers, and end clamps.
- e. Power and grounding terminal blocks: solderless box lug type.
- f. Control and signal terminal blocks. Manufacturer: Allen-Bradley 1492-HM1GY, NEMA type, 30-ampere.
- g. DIN-rail mount for direct wiring into terminal blocks.
- h. Pre-printed snap-in markers.

2.10 CABLE SPECIFICATION SHEETS (CABLESPEC)

A. CABLESPEC Sheets

1. The following CABLESPEC sheets are included in this section:

Type	Volt	Product	Purpose
MIC	600	SP-OS: MULT-PR#16 Shielded (TC) with Individual Pair Shields and Overall Cable Shield	Instrument
SIC	600	P-OS: 1-PR#16SH OR 1-TR#16SH (TC)	Instrument
XHHW	600	XLP Insulated Industrial Grade Conductor	Power cable
THWN-2	600	Building Wire, Control Wire	Lights, receptacles, control wire
MEPR/CPE	600	Multi-Conductor Jacketed Cable Power Cable Example: 3/C #500 KCMIL with NEC Size Ground	Power
	600	Tray Cable (TC) Rated Control Cable Example: 19/C #14	Control

2.11 CABLE SPECIFICATION SHEETS (CABLESPEC) – MIC

A. Cable System Identification:

1. MIC

B. Description:

1. Multiple twisted, shielded pairs, 16 AWG, with overall shield instrumentation cable, UL listed, with number of pairs as shown.

C. Voltage:

1. 600 volts

D. Conductor Material:

1. Bare annealed copper; stranded in accordance with ASTM B8

E. Insulation:

1. 15 mil, 90 degree C, polyvinylchloride (PVC) with 4 mil nylon conduit or jacket

F. Lay:

1. Twisted on a 2-inch lay

- G. Shield:
 - 1. 100 percent, 1.35 mil aluminum-Mylar tape with 7-strand tinned copper drain wire
- H. Overall Shield:
 - 1. 2.35 mil aluminum-Mylar tape with a 7-strand tinned copper drain wire
- I. Jacket:
 - 1. 45 mil polyvinylchloride (PVC)
- J. Flame Resistance:
 - 1. UL 1277
- K. Manufacturer(s):
 - 1. Okonite, Okoseal-N type SP-OS; or Cooper Industries-Belden equal
- L. Execution:
 - 1. Installation:
 - a. Install in accordance with this Section.
 - 2. Testing:
 - a. Megger test: use Form in Section 01 99 90

2.12 CABLE SPECIFICATION SHEETS (CABLESPEC) – SIC

- A. Cable System Identification:
 - 1. SIC
- B. Description:
 - 1. Single twisted, shielded pair or triad, 16 AWG, instrumentation and signal cable, UL listed
- C. Voltage:
 - 1. 600 volts
- D. Conductor Material:
 - 1. Bare annealed copper; stranded in accordance with ASTM B8
- E. Insulation:
 - 1. 15 mil, 90 degree C, polyvinylchloride (PVC) with 4 mil nylon conduit or jacket
- F. Lay:
 - 1. Twisted on a 2-inch lay
- G. Shield:
 - 1. 100 percent, 1.35 mil aluminum-Mylar tape with a 7-strand tinned copper drain wire

- H. Jacket:
 - 1. 45 mil polyvinylchloride (PVC)
- I. Flame Resistance:
 - 1. UL 1277
- J. Manufacturer(s):
 - 1. Okonite, Okoseal-N type P-OS; or Cooper Industries-Belden equal
- K. Execution:
 - 1. Installation:
 - a. Install in accordance with this Section.
 - 2. Testing:
 - a. Megger Test: use Form in Section 01 99 90

2.13 CABLE SPECIFICATION SHEETS (CABLESPEC) – XHHW

- A. Cable System Identification:
 - 1. XHHW
- B. Description:
 - 1. Industrial grade single conductor
 - 2. Sizes: 14 AWG through 750 kcmil as shown
- C. Voltage:
 - 1. 600 volts
- D. Conductor Material:
 - 1. Bare annealed copper; stranded per ASTM B8
- E. Insulation:
 - 1. NEC Type XHHW-2, 90 degrees C dry or wet, Cross-Linked Polyethylene (XLP) per ICEA S-66-524 and UL-44, Color in sizes 14, 12 and 10 AWG: Black, Green, Yellow, White, Orange, Brown, Red, Blue
- F. Jacket:
 - 1. None
- G. Flame Resistance:
 - 1. UL 83
- H. Manufacturer(s):
 - 1. Okonite, X-Olene; Cablec, Durasheath XLP; or equal.
- I. Uses Permitted:
 - 1. Power, control, lighting and outlet circuits.

- J. Execution:
 - 1. Installation:
 - a. Install in accordance with this Section.
 - 2. Testing:
 - a. Test in accordance with paragraph 3.02 and this Section.

2.14 CABLE SPECIFICATION SHEETS (CABLESPEC) – THWN-2

- A. Cable System Identification:
 - 1. THWN-2
- B. Description:
 - 1. Single conductor lighting and receptacle type indoor branch circuit conductor. Sizes: 12 AWG through as shown.
- C. Voltage:
 - 1. 600 volts
- D. Conductor Material:
 - 1. Bare annealed copper; stranded in accordance with ASTM B3 or B8
- E. Insulation:
 - 1. THWN/THHN, 90 degrees C dry, 75 degrees C wet, polyvinylchloride (PVC) with nylon jacket per UL 83.
 - 2. May substitute XHHW2 with XLP insulation without a jacket.
- F. Jacket:
 - 1. Nylon
- G. Flame Resistance:
 - 1. UL 83
- H. Manufacturer(s):
 - 1. Okonite, Okoseal-N, series 116-67-XXXX; or equal.
- I. Uses Permitted:
 - 1. Lighting, receptacle, appliance circuits and control, no other location permitted
- J. Execution:
 - 1. Installation:
 - a. Install in accordance with this Section.
 - 2. Testing:
 - a. Megger Test: use Form in Section 01 99 90

2.15 CABLE SPECIFICATION SHEETS (CABLESPEC) – MEPR/CPE

- A. Cable System Identification:
 - 1. MEPR/CPE
- B. Description:
 - 1. Multiconductor Power Cable with ground conductor sized for the circuit or NEC required custom larger ground conductor sized for multiple-sets of conductors in one circuit
 - 2. Multiconductor Control Cable with 14-AWG minimum conductor size
- C. Power Cable:
 - 1. Green ground conductor sized in accordance with the NEC
- D. Ground Conductor Size:
 - 1. Multiple cable runs of multiconductor power cable shall have the ground conductor sized in accordance with NEC 250-95
- E. Control Cable Type:
 - 1. ICEA Method 1, E-2:
without white neutral conductor,
without green ground conductor
- F. Control Cable Identification:
 - 1. Conductors color coded per ICEA and conductors numbered
- G. Voltage:
 - 1. 600 volts
- H. Conductor Material:
 - 1. Bare annealed copper; stranded in accordance with ASTM B8, coated in accordance with ASTM B33
- I. Insulation:
 - 1. For Power Cable: RWN/RHH, 90 degrees C dry, 75 degrees C wet, composite of ethylene propylene rubber (EPR) and chlorinated polyethylene (CPE) per ICEA S-68-516 and UL 44
 - 2. For Control Cable: FR-EP (XHHW-2), 90 degrees C dry or wet, ethylene propylene rubber based per ICEA s-68-516 and UL 44.
- J. Jacket:
 - 1. Chlorinated Polyethylene (CPE)
- K. Flame Resistance:
 - 1. IEEE 383

- L. Manufacturer(s):
 - 1. Okonite; Cablec; or equal
- M. Execution:
 - 1. Installation:
 - a. Install in accordance with this Section.
 - 2. Testing:
 - a. Megger Test: use Form in Section 01 99 90

2.16 WIRING DEVICES

- A. Unless specified otherwise, provide UL approved wiring ivory devices for the current and voltage ratings specified and comply with NEMA WD-1 with provisions for back wiring and side wiring with captive held binding screws.
- B. Heavy Duty 120VAC Receptacles:
 - 1. Single Phase: Duplex 20A, NEMA 5-20R accepting NEMA 5-15P and 5-20P plugs. Cooper 5362, Hubbell 5362, or equal.
 - 2. Ground Fault Interrupting: Ground fault interrupting (GFI) receptacles: duplex, 20 amp, NEMA 5-20R, specification grade that accepts NEMA 5-15P and 5-20P plugs. Provide GFI receptacles outdoors and as shown, UL listed with provisions for testing and resetting. Manufacturer: Hubbell GF-5352-I, or equal.
 - 3. Three-Phase Receptacles and Boxes: Cooper Series 309 watertight pin & sleeve receptacles, plugs, and back boxes, or equal.
- C. Switches:
 - 1. Indoor Switches: Quiet AC type, heavy duty, specification grade in accordance with rated capacities as required. Match the switch color and the receptacles color. Manufacturer: Cooper, Hubbell, or equal.
 - 2. Switches for Outdoor and Corrosive Areas: Provide 20-ampere, push-type switches; Cooper Tap-Action, Hubbell PressSwitch, or equal.
- D. Device Plates: Provide device plates with switches and receptacles that match the area classification location.
 - 1. Indoor, Architecturally Finished Areas: Provide switch and receptacle device plates of stainless-steel finish. Manufacturer: Crouse-Hinds, Appleton, or equal in.
 - 2. Indoor, Non-Finished, Non-Corrosive: Provide switch and receptacle device plates of stainless steel finish. Manufacturer: Appleton, Crouse-Hinds, or equal.
 - 3. Indoor, NEMA-12 Areas: In areas designated NEMA-12, or other areas specified provide hinged covers with neoprene gaskets. Manufacturer: Hubbell, Cooper, or equal.
 - 4. NEMA 4X - Corrosive: In areas designated NEMA-4X, Corrosive, or other areas specified provide corrosion-resistant/marine-duty stainless steel type covers. Manufacturer: Hubbell, or equal.
 - 5. In-Use Covers: In areas designated NEMA-4X, Corrosive, or other areas specified, and in outdoor areas, provide in-use type weatherproof lift covers that maintain

weatherproof rating with plug installed for equipment that is cord connected with plug and receptacle. Covers shall be cast aluminum. Manufacturer: Outdoor, NEMA 4X areas: In-use covers shall be Hubbell WP7, WP8, WP26, or equal. Corrosive areas; Manufacturer: TayMac Corporation 20510, Carlon E9UXXX, Hubbell WP826XXX, or equal.

6. Wet/Corrosive Switch Covers: In outdoor, areas, wet areas, areas designated NEMA-4X, Corrosive, or other areas specified, provide weatherproof, corrosion-resistant covers for switches to maintain weatherproof rating during operation of switch. Covers shall have flexible bubble of silicone or neoprene rubber for switch operation. Manufacturer: Cooper, Hubbell, or equal.
7. Hazardous Areas: Device plates in hazardous areas shall be, rated NEMA 7, suitable for use outdoors and in wet areas. Manufacturer: Appleton, Crouse-Hinds, or equal.

E. Pilot Devices:

1. Provide heavy-duty push buttons, selector switches and indicating lights: 30mm, oil-tight, NEMA 4X. Indicating lights shall be light emitting diode (LED) type lamps. Unless otherwise shown, provide push-to-test type indicating lights. Provide diode isolating type pilot indicating lights specified for remote-test. Provide red indicating lamps for "RUN" indication and green indicating lamps for "STOP".
2. Provide 120VAC control units: heavy-duty type Allen-Bradley 800H, or equal. For 24VDC: Allen-Bradley 800T, Square-D Class 9001 Type J, or equal.

F. Load-Switching Control Relays:

1. Heavy-duty, machine tool type for switching load such as solenoids, actuators, contactors, motor starter coils, and other devices used for remote interlocking.
2. Contacts: 4-pole and field interchangeable to either normally open or normally closed and capable of accepting a 4-pole contact block adder.
3. AC relays: NEMA A600 contact ratings and electrical clearances for up to 600 volts.
4. DC relays: NEMA P300 contact ratings and electrical clearances of up to 250 volts.
5. Manufacturer: Allen Bradley Bulletin-700, Square D Class 8501 Type X, or equal.

G. Logic-Level Relays

1. Logic-Level switching solid-state logic and signal circuits:
 - a. Minimum of three SPDT, silver cadmium oxide contacts rated 10A resistive at 120VAC or 28VDC.
 - b. Plug-in type with heavy-duty, barrier-protected screw terminal sockets.
 - c. Clear polycarbonate dust cover with clip fastener.
 - d. AC models: neon lamp indicator wired in parallel with coil.
 - e. Manufacturer: Idec Series RH, Square D Class 8501, or equal

H. Timing Relays:

1. Multi-function, micro-controller based, socket mounted timing relay.
2. Single functions:
 - a. Delay on Make
 - b. Delay on Break

- c. Recycle (on time first, equal recycle delays)
 - d. Single shot
 - e. Interval
 - f. Trailing edge single shot
 - g. Inverted single shot
 - h. Inverted delay on break
 - i. Accumulative delay on make
 - j. Retriggerable single shot
3. Dual functions:
- a. Delay on make/delay on break
 - b. Delay on make/recycle (on time first, equal recycle delays.)
 - c. Delay on make/interval
 - d. Delay on make/single shot
 - e. Interval/recycle (on time first, equal recycle delays)
 - f. Delay on break/recycle (on time first, equal recycle delays)
 - g. Single shot/recycle (on time first, equal recycle delays)
 - h. Recycle – both times adjustable (on time first)
 - i. Recycle – both times adjustable (off time first)
 - j. Interval/delay on make
 - k. Accumulative delay on make/interval
4. Time delay range, switch selectable:
- a. Single function 0.1 second to 1,705 hours in 8 ranges.
 - b. Dual function 0.1 second to 3,100 minutes in 8 ranges.
 - c. Setting accuracy +/- 1 percent or 50 milliseconds, whichever is greater.
 - d. Repeat accuracy +/- 0.1 percent or 16 milliseconds, whichever is greater.
5. Output: Two Form-C electromechanical isolated contacts rated 10A resistive at 240VAC and 1/3-horsepower at 120 or 240VAC; double pole double throw: DPDT. Mechanical life: 10,000,000 operations and electrical life: 1,000,000 operations at full load.
6. Mounting: Magnal Plug 11-pin socket
7. Environment: -20 degrees C to +65 degrees C.
8. ABB/SSAC multifunction type TRDU time delay relay with dip-switch function setting with 12VDC, 24VAC, 120VAC, 240VAC inputs as required; Agastat, STA series; IDEC or Engineer accepted substitute.
- I. Elapsed Time Indicators:
- 1. Elapsed time indicators shall be panel mounted, non-resettable five-digit, hour indicator, rated 120 volts, 60 Hz.

2.17 GROUNDING SYSTEM

- A. Provide electrical system equipment grounding conductors for equipment grounding and raceways, grounding electrodes, grounding electrode conductors, connections, and bonding in compliance with the National Electrical Code-Article 250 and the National Electrical Safety Code.
- B. Provide annealed bare copper, concentric stranded grounding conductors. Provide the minimum sizes per NEC Article 250 for grounding conductors or service entrance conductors, if not sized on the drawings.
- C. Make connections grounding conductor connections to equipment and ground rods by bolted clamps, compression connectors, or exothermic weld connections in accordance with manufacturer's installation and testing instructions. Make connections to buried grounding connections using compression connectors or exothermic weld connections. Make connections at the ground grid test wells using bolted clamps.
- D. Raceway Ground:
 - 1. Install metallic conduits to provide a continuous ground path. Use insulated grounding bushings and bonded to the ground grid system in compliance with Article 250 of the National Electrical Code.
 - 2. Provide an equipment-grounding conductor with green insulation in all metallic and non-metallic conduit, raceway, wireway, gutter, or ductbanks.
 - 3. Provide an equipment grounding conductor with green insulation for size up to #6 AWG and provide green color insulation tape band for conductor size #4 AWG and larger.

2.18 POWER, CONTROL, AND MISCELLANEOUS EQUIPMENT

- A. Coordinate demolition of existing equipment and installation of new equipment with electric power utility company.
- B. Comply with the power utility service entrance section standards that includes the power utility metering equipment. Coordinate the correct meter socket requirements. Submit proposed equipment to power utility for acceptance prior to submitting to the Engineer. Provide and install equipment according to power utility requirements.
- C. Combination Motor Starters:
 - 1. Provide NEMA rated for the horsepower for combination motor starters, minimum size 1, with motor circuit protector and solid-state type overload relay. Provide a reset button located on the unit door exterior.
 - 2. Provide adjustable motor circuit protector with magnetic only trip setting adjustable over a range of 600 to 1300 percent of full load current of the motor served. Field adjust motor circuit protector setting per NEC and manufacture's recommendations. Provide 22,000 symmetrical ampere interrupt rating, where not shown on the power single line diagrams.
 - 3. Provide solid-state adjustable overload relay to latch in the open position. Provide adjustable trip settings with minimum adjustable range from 85 to 115 percent of

full load current of motor served. Field adjust overload setting per NEC and manufacture's recommendations.

4. Provide control power transformers with two primary fuses rated at 100,000A at 600VAC and one secondary fuse rated at 10,000A at 250VAC and sized at 125 percent of the control circuit full load current. Ground the non-fused leg of the secondary circuit.
5. Provide switchboard type MTW or SIS control circuit conductors rated 90 degrees C above ambient temperature. Conductors shall be identified with tag numbers.
6. Provide motor contactor "Run" status contact and "Overload" alarm contact. Provide "Hand-Off-Auto" (HOA) and other shown selector switches with a "Auto Mode" status contact wired to terminal block.
7. Provide heavy-duty selector-switches and pushbutton and indicating lights with rating to match enclosure type. Provide control devices rated at 600VAC, 10-ampere continuous with
8. Provide start/stop pushbuttons with "Run" and "Stop" indicating lights including other control devices as shown. Provide push-to-test transformer type pilot lights or LED pilot lights. Lens color as shown on the drawings or specified herein.

D. Circuit Breakers:

1. Provide circuit breakers: molded-case type provided for the current ratings and pole configurations as shown or as specified on the panelboard schedule and with a minimum interrupting current rating as shown on drawings or schedules, but not less than 22,000 AIC for 240V rated devices or 42,000 AIC for 480V rated devices. Series rated branch, main, or other devices are prohibited.
2. Provide circuit breakers listed in accordance with UL 489 for the service specified and load terminals with solderless connectors. Provide bolt-on type circuit breakers. Provide circuit breakers with machine-printed, circuit number labels indicting the load served.

E. Manual Starters:

1. Provide manual starters with horsepower rated, quick-make, quick-break, toggle mechanism with overloads in each phase. Provide NEMA-12 enclosures indoor and NEMA-4X stainless steel enclosures outdoor, process areas, and corrosive areas. Provide label for power source and load as shown.

F. Safety Disconnect Switches:

1. Provide safety disconnect switches:
 - a. Motor horsepower rated, heavy-duty, non-fusible
 - b. Safety type rated 600VAC
 - c. Ratings and fuse size as shown
 - d. Rating and fuse size as required by the utilization equipment manufacturer
 - e. Disconnect "open status" switch rated 1A
 - f. Switch operator with a positive, quick-make, quick-break mechanism
 - g. NEMA-12 indoor-conditioned space, or as shown

- h. NEMA-4X stainless steel below grade, process areas, outdoors, corrosive areas, or as shown
- i. NEMA-7 aluminum hazardous classified areas.
- j. Tinplated copper products. Silver-plated products are prohibited.
- k. Manufacturer: Square-D, GE, Allen-Bradley and Cutler Hammer or approved equal.

G. Electrical Safety Matting

1. Safety matting shall be provided for added protection of operations staff and workers to cover concrete surfaces in front of electrical equipment indoors.
 - a. Matting shall meet ASTM D178 specifications for manufacture of Type II, Class 2: ¼" thickness matting.
 - b. Flame and oil resistant tested per ASTM standards.
 - c. ASTM certification engraved or stamped on the back surface of the matt.
 - d. Matting shall be tested and certified for industrial use. Matt rolls shall be proof testing over the entire surface at 20,000VAC, and a dielectric test voltage of 30,000VAC.
 - e. The Supplier/Subcontractor shall provide matting in the existing electrical rooms in front of all new electrical enclosures.
 - f. The Supplier/Subcontractor shall provide matting in the front of all interior control panels.
 - g. Single piece rolls are preferred to be used in front of long sections of electrical equipment including, but not limited to, switchboards, switchgear, motor control centers, panelboards and control panels.
 - h. Matting shall be a minimum of 48" wide corrugated black for interior areas.

2.19 PRODUCT DATA

- A. The following information shall be provided in accordance with Section 01 33 00:
 1. Operating and maintenance information as specified in Section 01 78 23.
 2. One 11" x 17" set of drawings in a protective covering and shipped with the equipment in the internal equipment pocket at the time of equipment delivery to the project site.
 3. Record documents as specified in Section 01 78 39.
 4. Certificates of final electrical inspection and approval from the Code Authority Having Jurisdiction (AHJ) as specified in paragraph 1.01 Scope.

PART 3 – EXECUTION

3.01 GENERAL

- A. Construction:
 1. Perform the work specified by Contract Documents in accordance with these specifications.

2. Coordinate the location of electrical material or equipment with the work and adjust conduit location to accommodate equipment in accordance with the accepted submittal drawings from the manufacturer.
- B. Housekeeping:
1. Protect electrical equipment from dust, water and damage. Cover the exterior to keep dry. Electrical distribution equipment such as motor control centers, switchgear, switchboards, panelboards, and other power source buses shall be clean and free of dust and dirt.
 2. Protect electrical equipment temporarily exposed to weather, debris, liquids, or damage during construction as specified in Shipment, Protection, and Storage section. Touch up scratches on equipment as specified in Coating Systems section before final acceptance.
 3. Wipe clean and vacuum equipment on the inside prior to acceptance testing and energization and again prior to detailed inspection and acceptance of the work.
- C. Installation:
1. Perform the installation work specified in accordance with these specifications.
 - a. Splices are not allowed except by permission. Submit proposed splice locations to the Engineer and Design-BUILDER's Representative for review prior to installation. Splices and terminations are subject to inspection prior to and after insulating and may require re-termination after inspection. Underground splices will not be allowed.
 - b. Lighting and receptacle circuits may be in the same conduit in accordance with derating requirements of the NEC. Lighting and receptacle circuits in conduits with power or control conductors is prohibited.
 - c. Adhere to the NEC raceway fill limitations. Provide separate conduits for signal and instrument conductors and cables.
 - d. Install power conductors derived from uninterruptible power supply systems in separate raceways.
 - e. Provide terminations at 460-volt motors by bolt-connecting the lugged connectors and insulating. Alternately, provide Tyco Electronics GelCap Motor Connection Kit by Raychem.
 - f. Install **pre-approved** in-line splices and tees with tubular compression connectors and insulate. Splices and tees in underground handholes or pull boxes shall be insulated using Scotch-cast epoxy resin splicing kits.
 - g. Provide self-insulating tubular butt-splice type of compression connectors for terminations at solenoid valves, 120-volt motors, and other devices furnished with pigtail leads.
 - h. Adjust motor circuit protectors in accordance with manufacturer's instructions and NEC requirements.
 - i. Adjust motor overload device in accordance with manufacturer's instructions and NEC requirements.

D. Conductors, Wire, and Cable Installation:

1. Identify conductors at each connection terminal and at splice points with the identification marking system specified.
2. Install wire and cable into raceways, conduit, cable trays, or wireways without damaging or putting undue stress on the insulation or jacket. Provide manufacturer's recommended and UL Listed pulling compounds lubricants for pulling wire and cable. Grease is prohibited.
3. Raceway construction shall be complete, cleaned, and protected from the weather before cable is installed. Provide wire or cable support where wire or cable exits a raceway. Provide reusable stainless steel Kellums grips or equal product where cable support is required and where loads are removable.
4. Scratch-brush the contact areas and tinfoil the connection where flat bus bar connections are made with tinfoiled or uninfoiled flat bus bar. Provide non-oxide material approved for the function. Torque bolts to the bus manufacturer's recommendations.
5. Adhere to raceway fill limitations defined by NEC and the following: Lighting and receptacle circuits may be in the same conduit in accordance with de-rating requirements of the NEC. Lighting and receptacle circuits shall not be in conduits with power or control conductors. Signal conductors shall be in separate conduits.
6. Install pre-approved in-line splices and tees made with tubular compression connectors and insulated as specified for terminations and for motor terminations. Splices and tees in underground handholes or pull boxes shall be insulated using Scotch-cast epoxy resin or equal splicing kits.
7. Conductors in all handholes and manholes shall have adequate slack to be tied up around the perimeter of the vault and will be suspended by insulators around the vault's perimeter as needed to support the cable.

E. Raceway Installation:

1. Provide additional pullboxes for conduit runs with greater than 360 degrees in any run between pull boxes. Limit maximum conduit runs without additional pullboxes to 400 feet, less 100 feet for every 90 degrees for the conduit run change in direction.
2. Determine conduit routing that conforms to the installation requirements set forth herein and in accordance with the NEC requirements for size and number of pullboxes.
 - a. Install exposed conduit either parallel or perpendicular to structural members and surfaces.
 - b. Route two or more exposed conduits in the same general routing parallel with symmetrical bends.
 - c. Install exposed conduit on supports spaced not more than 10 feet apart.
 - d. Install conduits out from the wall using framing channel where three or more conduits are located in parallel run.
 - e. Install conduits between the reinforcing steel in walls or slabs that have reinforcing in both faces. Verify installation method for conduits larger than 2-inch with Design-Builder's Representative prior to installation.
 - f. Install conduit in slabs that have only a single layer of reinforcing steel, under the reinforcement.

- g. Install conduits with large radii under the slab in a one-sack concrete slurry.
 - h. Route conduit clear of structural openings and shown future openings.
 - i. Provide conduit roofs or wall penetrations with flashing sealed watertight and fire-stop, as required to maintain the structural rating.
 - j. Grout conduit into any openings cut into concrete and masonry structures.
 - k. Cap conduits during construction to prevent entrance of dirt, trash, and water.
 - l. Terminate exposed conduit stubs for future use with pipe-caps and provide couplings and pipe-plugs where flush with the slab.
 - m. Determine concealed conduit stub-up locations from the manufacturer's shop drawings.
 - n. Terminate conduit in equipment with conduit couplings with pipe-plugs flush with structural surfaces for empty conduit.
 - o. Install conduit horizontally with at least 7-foot headroom clearance.
 - p. Terminate conduit with fittings that ensure that the NEMA rating of the enclosure and provide conduit hubs, as required heretofore.
 - q. Connect underground metallic or nonmetallic conduit that turns out of concrete, masonry, or earth to a 90-degree elbow of PVC-coated rigid steel conduit before emergence. Taped or painted RMC-Steel or RNC is prohibited.
 - r. Provide conduit crossing structural joints with structural movement with O-Z "Type DX" or Crouse-Hinds "Type XJG-SA," aluminum, bonded, weather-tight expansion fitting of the same size and type as the conduit.
 - s. Seal conduits in corrosive areas using removable mastic material.
 - t. VFD motor feeder circuits shall be routed a minimum of 12 inches from any control conduits. Should they cross they shall cross at 90 degrees.
- F. Electrical Equipment Labeling – Arc Flash
- 1. Electrical equipment shall have field marked signs and labeling to warn qualified persons of the potential electric arc flash hazards per NEC Article 110.16 Flash Protection. These labels will be provided by the Supplier/Subcontractor.

3.02 TESTING

- A. Provide electrical equipment acceptance tests in accordance with the latest version of NETA Acceptance Testing Specification for electrical distribution and utilization equipment to demonstrate that all electrical equipment is functioning as designed.
- B. Test lighting system for proper function. Test wiring devices for correct connections. Test outlet grounding and polarity using a plug-in test device. Test motor control stations and control devices for proper function.
- C. Test power, control, instrument, and signal conductors to verify free from grounds. Megger test all conductors with the test voltage appropriate to the conductor insulation voltage. Use a 600 or 1,000-volt megohmmeter for resistance measurements for 600VAC rated insulation and all motors. Test between conductors and from conductor to ground. Insulation with resistance of less than 10-megohms is not acceptable. Record the insulation

resistance measurements in a format similar to or on the Form 26 05 00.01-A in Section 01 99 90.

- D. Pre-test conductors prior to installation, as appropriate. Replace damaged conductors. Test all conductors after installation.
- E. Measure motors insulation resistance before they are connected. For 50-horsepower and larger motor, measure the motor insulation resistance at the time of delivery and after they are connected. Insulation resistance values less than 10 megohms are not acceptable. Complete the Installed Motor Test Form: 26 05 00.01-B in Section 01 99 90, for each motor after installation.

3.03 FUNCTIONAL CHECKOUT

- A. Prior to energization of equipment, perform a functional checkout of the control circuit. Prior to functional testing, adjust and make protective devices operative. Energizing each control circuit and operating each control, status, alarm, protective device, and each interlock to verify that the specified action occurs. Submit a description of his proposed functional test procedures prior to the performance of functional checkout.
- B. Verify motors are connected to rotate in the correct direction by momentarily energizing the motor. Prior to motor rotation test, confirm that the motor, the driven equipment, nor personnel will be damaged by reverse operation.

3.04 GROUNDING SYSTEM TESTS

- A. Test each grounding connection to determine the ground resistance per the IEEE Standard 81. Submit a plot of ground resistance readings for each isolated ground rod or ground mat to the Design-Builder's Representative on 8-1/2 x 11-inch size graph paper.
- B. The current reference rod shall be driven at least 100 feet from the ground rod or grid under test. Make measurements at 10-foot intervals, beginning 25 feet from the test electrode and ending 75 feet from it, in direct line between the ground rod or center of grid and the current reference electrode.
- C. A grounding system that shows greater than 2-ohm resistance, for the flat portion of the plotted data, is considered inadequately grounded. Add additional parallel connected ground rods and/or deeper driven rods until the ground resistance measurements meet the 2-ohm requirement. Additional ground rods and ground grid work will be paid for as extra work. Use of salts, water, or compounds to attain the specified ground resistance is prohibited.

3.05 PROTECTIVE DEVICE COORDINATION STUDY – NOT USED

3.06 RECORD DOCUMENTS

- A. Provide Record Drawings and documents maintained and annotated during construction. Submit drawings in accordance with Section 01 78 39 and the following.

- B. Include addendum items, requests for information, change orders, and field changes posted or drawn on the Record Drawings. Include the following drawings with the Record Drawings:
 - 1. Interconnection Diagrams specified herein.
 - 2. Original Submittal Drawings specified herein.
- C. Schedule a meeting with the Engineer in the Engineer's office to review the Record Drawings at the end of the project. Make corrections to the Record Drawings prior to re-submitting the Record Drawings to the Engineer.
- D. Submit Record Drawings and Operations and Maintenance (O&M) Manuals as specified in other Sections of the design package, to be included in the completed project Record Document Set for the Owner.

END OF SECTION

SECTION 26 05 11
ELECTRICAL DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. All electrical demolition as indicated on the drawings and as required for electrical work included herein.
- B. Related Sections include but are not necessarily limited to:
 - 1. General Clauses, Special Clauses and Division 1.
 - 2. Division 26 – Electrical.
 - 3. Division 40 – Process Integration.
- C. Disposition of Material:
 - 1. Unless indicated otherwise, all material and equipment removed shall become the property of the Supplier/Subcontractor and shall be promptly removed from the site.
 - 2. Material and equipment indicated to be reused or turned over to the Design-Builder or Design-Builder's Representative shall be protected from damage and preserved in its existing condition during demolition.

1.02 COORDINATION

- A. Supplier/Subcontractor shall coordinate all demolition work with work of other Supplier/Subcontractors and with the Construction Administrator.

1.03 SITE CONDITIONS

- A. Perform preliminary investigations as required to ascertain extent of work. Conditions which would be apparent by such investigation will not be allowed as cause for claims for extra costs.
- B. See plans for extent of remodeling and demolition in addition to this section.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Materials used to cover blank openings in NEMA 4X panels, boxes and equipment enclosures:
 - 1. Sheet stainless steel equivalent to gauge of enclosure.
 - 2. Primed and painted to match enclosure.

- a. Provide neoprene gasket or silicone-based caulk to maintain NEMA 4X construction integrity.
- B. Materials used to cover blank openings in NEMA 7 boxes and equipment enclosures:
 1. Material must match box or enclosure.
 2. Must be threaded or have labyrinth type seals to maintain NEMA 7 construction integrity.
- C. Materials used to cover blank openings in NEMA 1, 3R, 4 and 12 panels, boxes and equipment enclosures:
 1. Provide plugs or fittings that will maintain the NEMA construction integrity.
 2. Tape shall not be allowed to cover blank openings.
- D. Conduit Caps:
 1. Same material as conduit.

PART 3 EXECUTION

3.01 GENERAL

- A. Provide partitions, barricades, warning lights and other means necessary to ensure the safety of persons in the area of work.
- B. Ensure the integrity of all enclosures containing energized conductors or equipment. Provide substantial sheet metal closures over all openings during all phases of work.
- C. Protect property to prevent damage during demolition.
- D. Promptly cleanup and remove from site all material to be disposed.
- E. Dispose of all materials in accordance with federal, state and local laws.

3.02 DEMOLITION

- A. Conduit:
 1. Remove conduits as indicated in the drawings and/or specifications.
 2. Straps and supports shall be removed.
 3. Remove conduit from area indicated back to the nearest pullbox, motor control center, or equipment enclosure outside of the indicated area or as noted on the drawings.
 4. Provide blank cover over knockouts from which conduit has been removed in indoor enclosures.
 5. Install square head plug with thread sealing compound in cast enclosure hubs from which conduit has been removed.

6. Restore integrity of all floors, roofs or walls penetrated by conduit to be removed.
 7. Restore fire rating of all partitions penetrated by conduit to be removed.
 8. Where conduits pass through (perpendicular to surface) walls, roofs, or floors, remove entirely and plug holes.
 9. Where conduits are embedded in (parallel to surface) walls, floors or roofs, cut off below surface of concrete, plug conduits and patch concrete.
- B. Wire and Cable:
1. Remove conductors indicated in the drawings and/or specifications.
 2. Conductors tapped from circuits that will remain in service:
 - a. Disconnect conductors from terminals or splices at nearest pullbox or equipment enclosure outside of the indicated removal area.
 - b. Re-insulate gutter taps or terminals from which conductors have been removed to the original insulation level.
 - c. Re-insulation of conductors shall comply with requirements of Section 26 05 00.01 for new conductors.
 3. Conductors of circuits dedicated to equipment which is to be removed:
 - a. Remove power conductors back to panelboard or motor control center and relabel circuit breaker(s) "spare" on schedule.
 - b. Remove control conductors back to nearest control panel outside demolition area.
 4. Remove equipment grounding conductor(s) with phase conductors, unless indicated otherwise.
 5. All conductors designated for reuse or reconnection shall be identified as to circuit designation and phase sequence to permit maintaining existing phase relationships upon reconnection.
- C. Equipment:
1. Disconnect and remove or relocate all equipment indicated.
 2. Protect equipment to be reused from dust, dirt, impact, or other damage during demolition.
 3. Close all conduit penetration, bus penetrations, or other openings in remaining equipment caused by the removal of equipment indicated.
 4. Remove equipment anchor bolts by grinding flush with floor surface or top of concrete pad if pad is to remain.
 5. Where equipment removed leaves openings in walls or floor restore wall or floor to match adjacent construction.
 6. Where removal of concrete equipment mounting pads is indicated, remove concrete and reinforcing flush to floor and seal exposed concrete surface.

3.03 SALVAGE OF MATERIALS

- A. Salvage items designated for Contractor or Contractor's Representative's salvage, as a unit.

1. Clean, list and tag for storage.
 2. Protect from damage and deliver to locations designated.
 3. Salvage each item along with all ancillary equipment required for operation.
- B. Remove items designated for reuse and reuse as a unit.
1. Clean, condition, tag and deliver to locations designated.
 2. Clean and lubricate moving parts.
 3. Cover openings and surfaces to protect from dirt, debris and damage during construction.
- C. Contractor or Contractor's Representative has the right to first refusal on all salvage items. Supplier/Subcontractor shall remove and dispose of items refused by Contractor or Contractor's Representative. Construction Administrator shall act as an agent of the Contractor or Contractor's Representative in this regard.

END OF SECTION

SECTION 43 11 19.13
CENTRIFUGAL FRP FANS FOR ODOR CONTROL

PART 1 GENERAL

1.01 DESCRIPTION

A. This section specifies centrifugal belt-driven fiberglass reinforced plastic (FRP) fans for service of saturated foul air with high concentrations of hydrogen sulfide and organic sulfides, at times containing dilute sulfuric acid, methane, and gasoline vapors. Fans shall be backward inclined, or backward curved impeller type.

B. Equipment list:

Description	Equipment No.
Odor Control Fan	TBD

C. The requirements of Section 06 70 13 shall apply to all aspects of this specification.

D. Refer to Sections on grease filter/mist eliminators (44 31 14), and FRP tanks (43 41 45.16) for specifications related to this Section. The FRP fan shall be integral to the odor control system as part of a packaged system. The fan shall be located downstream of the carbon media and will operate in a “draw thru” configuration.

1.02 PERFORMANCE REQUIREMENTS

A. General:

1. Fans specified in this section shall be designed and selected for continuous outdoor operation with air containing corrosive and flammable vapors and gases generated from the treatment and conveyance of municipal wastewater and stabilization and processing of solids from municipal wastewater treatment processes. Vapors and gases may be expected to include methane, hydrogen sulfide, chlorine gas, sulfur dioxide, gasoline vapors, ammonia, and water saturated air. The air stream may also be expected to contain droplets of dilute sulfuric acid. Air stream temperatures are expected to vary between 20 and 100 degrees F.

B. Operating Requirements:

1. The fans shall be selected to achieve the design capacity at no greater than 90 percent of maximum recommended RPM. Fans shall be non-overloading at all

points on their curve. Capacity shall be determined in accordance with AMCA Standard 210, cataloged performance licensed to bare the AMCA Rating Seal prior to bid.

Equipment No.	Air Volume, SCFM	Total Static Pressure, in W.C.	Min. Shut off Pr. In W.C.	Max Fan Speed, RPM	Max Fan BHP ³	Motor Data			Fan Arrangement ²	NEC Classification
						Max HP	Voltage / Phase	Motor Type ¹		
TBD	4,500	8				20	460/3	XPR F	10	Class 1, Div 1

1. XPRF= Explosion proof motor.
2. Verify fan arrangement on drawings and with fan manufacturer.
3. BHP shall include belt losses.

C. Sound Power Levels:

1. Octave band sound power levels, measured in accordance with ANSI S1-21, ASHRAE 36, AMCA 300, and subsequent revisions of these standards, shall not exceed the following values:

Octave Band Total Sound Power Level, dB (re: 10-12 Watts)

Equipment No.	Octave Band Center Frequency, hertz								Overall
	63	125	250	500	1,000	2,000	4,000	8,000	
TBD									

2. Fans shall be tested and rated for sound power levels in accordance with AMCA Standards 300 and 301. Sound power rating shall be decibels (reference 10-12 watts) in eight octave bands. Sound dBA levels only are not acceptable.

Sound Pressure Level Outside the Fan

Description	Housing Radiated Noise, dBA
	TBD

3. The estimated sound pressure level outside the fan is measured at 5.0 feet when both inlet and outlet are ducted.

D. Balance and Vibration:

1. Fans specified in this section shall be balanced at the factory to operate without vibration throughout the full operating range specified. Vibration criteria shall not exceed limits specified in Section 43 05 17. The wheel and shaft shall be dynamically balanced as assembled; the fan shall be balanced in accordance with the limits set forth in AMCA 204, Section 6, Table 6-3 for Industrial and Process and Power Generation equipment level BV-3 (0.15 in/sec. filter-in at both bearing in the horizontal and vertical planes).

1.03 UNIT RESPONSIBILITY

- A. In accordance with Section 43 05 11-1.02 Unit Responsibility, the Contractor shall cause the fans and motors and adjustable frequency drives to be provided by the fan manufacturer, who shall be fully responsible for the engineering, design, selection, and operation of all systems and components furnished therewith.
- B. Provide a certification of unit responsibility, as specified in Section 01 99 90, executed by the responsible manufacturer, attesting that the engineering, design, and selection of all systems and components shall be conducted by the respective manufacturers. The Contractor is advised that the Engineer will not process or review any submittal materials unless or until an acceptable certificate of unit responsibility is provided.
- C. Additionally, the Contractor shall cause the responsible equipment manufacturer to supply qualified installation technicians to supervise unloading, erection, placement, installation, adjustment, testing, and initial start-up of the equipment specified under this section. Nothing in the provision, however, shall be construed as relieving the Contractor of responsibility for the overall quality and completeness of the work.

1.04 QUALITY ASSURANCE

- A. References:
 - 1. This section contains references to the following documents. These references are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. If requirements of this section conflict with those of the listed documents, requirements of this section prevail.
 - 2. Unless otherwise specified, reference documents refer to documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if no Bids). If referenced documents have been discontinued by the issuing organization, refer to replacement documents issued or otherwise identified by that organization. If there are no replacement documents, refer to the last version of the document before it was discontinued. Where document dates are given in the following listing, those documents refer to the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued, or replaced.

Reference	Title
AMCA Standard 210	Air Movement and Control Association Test Code and Certified Ratings Program
AMCA Standard 211	Certified Rating Program for Air Moving Devices
AMCA Standard 300	Test Code for Sound Rating
AMCA Standard 301	Methods for Calculating Fan Sound Ratings from Laboratory Test Data
ASTM C582	Standard Specification for Contact Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion Resistant Equipment
ASTM D4167	Fiber-Reinforced Plastic Fans and Blowers
ASTM E84	Standard Test Method for Surface Burning Characteristics of Building Materials.
NEC	National Electrical Code (NEC)

3. FRP fabrication shall be in accordance with the National Bureau of Standard Voluntary Product Standards PS-15-69. FRP construction quality shall be in accordance with Section 06 70 13.

B. Certification:

1. Fan shall bear the AMCA rating seal. Fan shall be from a manufacturer's catalog product that bears the AMCA seal, and is listed on AMCA's web site, prior to bid.

1.05 SUBMITTALS

A. Comply with procedures described in Section 01 33 00.

1. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with

justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

2. A copy of the contract document control diagrams and process and instrumentation diagrams relating to the submitted equipment, layout drawings
with addendum updates that apply to the equipment in this section, marked to show specific changes necessary for the equipment proposed in the submittal. If no changes are required, the drawing or drawings shall be marked "no changes required". Failure to include copies of the relevant drawings with the submittal shall be cause for rejection of the entire submittal with no further review.
3. Certificate of Unit Responsibility attesting that the Contractor has assigned, and that the manufacturer accepts, unit responsibility in accordance with the requirements of this Section and Section 43 05 11. No other submittal material will be reviewed until the certificate has been received and found to be in conformance with these requirements.
4. Performance curves for the specified operating requirements in paragraph 1.02 B.
5. Provide Motor Data Section 43 05 21-Form A.
6. Dimensioned drawings including motor V-belt drive and base.
7. Provide certification that units have been tested and rated in accordance with the applicable AMCA Standard Test Code and Certified Ratings Program and that they bear the AMCA seal.
8. Verify sound power level ratings of fan and motor in eight octave bands in accordance with AMCA Standards 300 and 301.
9. Identify octave band sound power levels generated by the fan with motor at the specified/scheduled operating point.
10. Ensure that the sound pressure level outside the fan measures 5.0 feet when both inlet and outlet are ducted.

1.06 ENVIRONMENTAL CONDITIONS

- A. See Section 01 11 80 for specified environmental conditions.

PART 2 PRODUCTS

2.01 ACCEPTABLE PRODUCTS

- A. The Owner and Engineer believe the following candidate manufacturers are capable of producing equipment and/or products satisfying the requirements of this section. This statement, however, shall not be construed as an endorsement of

a particular manufacturer's products, nor shall it be construed that a named manufacturer's standard equipment or products will comply with the requirements of this section. Candidate manufacturers include:

1. Hartzell
2. New York Blower
3. Verantis

2.02 MATERIALS

A. Materials of Construction:

Component	Material
Housing	Fiberglass reinforced plastic
Wheel	Fiberglass reinforced plastic
Door gasket and shaft seal	Neoprene or Teflon
Hub	Aluminum encapsulated in FRP
Bolts	Type 316 stainless steel
Shaft	Type 316 stainless steel

B. FRP Fabrication:

1. Housing and wheel fabrication shall conform to Section 06 70 13.
 - a. Select ultraviolet light stabilized fan housings with resin achieving ASTM Class 1 rating per ASTM E84, and a fire retardance of 25 or less without addition of additives. Resin shall be manufactured by AOC, Ashland, or Reichold.
 - b. Select housings built of laminate construction using vinyl ester or polyester resin. Resin shall be manufactured by AOC, Ashland, or Reichold. Outer layers shall be a 100 percent less carbon impregnation content resin coat. The next layer shall be a C-glass or Nexus corrosion resistant veil followed by another resin rich coat layer and another C-glass or Nexus veil.
 - c. Ensure that housing laminate construction conforms to ASTM Standard C-582.
 - d. The structural core layer shall be comprised of resin and chopped strand fiberglass. Total glass content shall be 30 to 40 percent. Wheel and housing shall have a carbon-rich resin coating on air stream contact surfaces and shall be grounded through the base to prevent static buildup.
 - e. Ensure smooth airstream surfaces to minimize resistance and prevent build-up of airborne contaminants. Furnish fans with flanged outlets.

- f. Furnish fans with a lubricated, double-lip, Teflon shaft seal. Bolt inlet assembly to permit fan removal.
2. Wheel
 - a. Fan wheel shall be built of laminate construction using vinyl ester resin. Resin shall be manufactured by AOC, Ashland, or Reichold. Ensure that resin achieves ASTM Class 1 rating per ASTM E84 with a fire retardance of 25 or less without the addition of additives.
 - b. The first layer of wheel laminate shall be 100 percent resin. The next layer shall be a C-glass or Nexus corrosion resistant veil followed by another resin rich coat and another C-glass or Nexus veil. The structural core consisting of chopped strand fiberglass and resin shall be laid next, followed by a C-glass or Nexus veil, a resin-rich coat, another C-glass or Nexus veil, and a final 100 percent less carbon impregnation content resin coat. Total glass content shall be 30 to 40 percent. Wheel shall be graphite impregnated and grounded to prevent static buildup.
 - c. Select a fan wheel of a backwardly inclined, non-overloading design. Wheel hub shall be permanently bonded to the shaft and completely encapsulated in FRP to insure corrosion-resistant integrity. Steel wheels coated with FRP, or wheels with taper-lock hubs are not acceptable.
 3. Type
 - a. Comply with construction type and material thickness requirements in accordance with ASTM D4167.
 4. Shaft
 - a. Select a Type 316 stainless steel shaft. Ensure that the shaft's first critical speed is at least 125 percent of fan's maximum operating speed, and countersunk for tachometer readings.

2.03 CONSTRUCTION

A. Fan:

1. Fan shall be designed for rated pressure, V-belt driven, of centrifugal design with backward inclined or backward curved impellers. The fan wheel shall be the overhung type with at least two pillow block bearings located away from the air stream. Configure fan and motor as indicated in paragraph 1.02. Use bearings rated for a minimum AFBMA L-10 bearing life of 50,000 hours of operation. Select a shaft hub and bushings completely encapsulated in a reinforced plastic laminate. Shaft and wheel are to be permanently affixed as one unit. Provide an FRP sleeve extending from the back plate of the wheel through the fan housing for protection of the fan shaft. The rotor shall be dynamically balanced after fabrication.
2. Provide the fan with a 1-1/2-inch FRP drain at the lowest point of the scroll housing. Fit drain with a ball valve and P-trap.

3. Unless shown otherwise on the drawings, provide plain flanged round inlets and outlets suitable for use with flexible connections. All flanges shall be factory drilled. Use stainless steel fasteners. Use a steel-fabricated, adequately braced base equipped with lifting eyes. Provide a 6-inch diameter inspection port cleanout door.

B. Accessories:

1. Flexible connections
 - a. Flexible connections shall be provided for fan to duct connections. Flexible connections shall be pre-fabricated flanged type unless specifically indicated to be plain end (slip-on) type on the drawings.
 - b. Use neoprene or Buna-N material.
 - c. Use flanged type expansion joints of W-design configuration, constructed with compound curve-molded corners with arch pre-molded. Corners on rectangular expansion joints shall be completely molded and free of splices. Backing rings shall be 3/8 inch thick, 2 inches wide, Type 316 stainless steel, ANSI/ASME B16.1, Class 25 diameter and drilling. Thickness shall be 1/4 inch, minimum; flanges shall be a minimum of 3/4 inches thick. Length shall be 12 inches flange-to-flange with the following additional dimensions:
 - 1) Extension: 1 inch
 - 2) Compression: 2 inches
 - 3) Lateral offset: 1 1/2 inches
 - d. Flexible connections shall be manufactured by Holz Rubber Company, Inc.; Style 945 (flanged style), Mercer Rubber Duct connector MI-9, or equal.
2. Mounting
 - a. Fan shall be mounted per manufacturer's recommendation.
3. Pressure gauges
 - a. One differential pressure gauge shall be provided to measure the air pressure drop across the fan.
 - b. The pressure gauge shall be provided with an accuracy of +/- 2 to 3 percent of full scale.
 - c. The gauge shall have a stainless steel or aluminum housing. The manufacturer shall be Dywider or equal.
 - d. Mount gauges 48 to 60 inches from ground level for easy viewing on wall, or provide a stainless steel stanchion.
 - e. Provide stainless steel tubing for sensing lines, and arrange drains on sensing lines to prevent condensate build up, gauge damage, and false gauge readings.

4. Provide safety equipment including belt guard, shaft guard, and coupling guard.

2.04 DRIVE UNIT

- A. The fan shall be V-belt driven by an electric motor mounted on a common base. The mounting plates shall be slotted to allow tension adjustment of the drive belts and a belt guard shall be supplied. The fan shall be provided with adjustable motor base. Fan shall be provided with variable pitch pulley for adjusting speed plus 5 percent and minus 15 percent.
- B. The electric motor shall be as specified in Section 43 05 21. Electric motors shall have low noise characteristics. Motor sound levels shall not exceed 80 dBA when measured in accordance with IEEE No. 85 "Test Procedures for Air Borne Noise Measurements on Rotating Machinery" over the specified motor speed range.

2.05 CONTROLS

- A. Fan controls are provided under Division 26.

2.06 PRODUCT DATA

- A. The following information shall be provided in accordance with Section 01 33 00.
 1. Operations and maintenance information as specified in Section 01 78 23.
 2. Manufacturer's Installation Certification Form 43 05 11-A in accordance with Section 01 99 90.
 3. Manufacturer's Instruction Certification Form 43 05 11-B in accordance with Section 01 99 90, certifying that instructions to operators have been completed.

2.07 STAND-BY COMPONENTS

- A. Provide the following standby components for each fan size:
 1. One set of matched belts per fan size and horse-power requirement
 2. One shaft seal
 3. One set of bearings.
- B. Tag and store standby components as specified in Section 43 05 11.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Connect and install fan as shown on drawings and in accordance with the manufacturer's printed instructions.
- B. Certify installation and trial operation on Form 43 05 11-A specified in Section 01 99 90.

3.02 TESTING

- A. Each fan shall be dynamically balanced in accordance with ASTM D4167 at the specified operating speed. One of each size fan shall be factory tested in an AMCA-approved laboratory for air and sound performance. Results shall be provided to Engineer.
- B. After completion of installation, subject each fan to field testing in accordance with Sections 01 45 20 and 23 05 93 to guarantee compliance with drawings and requirements of this specification.

3.03 TRAINING

- A. A minimum of 4 hours of training shall be provided by the fan manufacturer's service representative. Training shall conform to Section 01 79 00 and certified on Form 43 05 11-B as specified in Section 01 99 90.

3.04 WARRANTY

- A. Fan manufacturer shall warrant all components free from material defects for a period of one year after startup.

END OF SECTION

SECTION 43 41 45.16

FIBERGLASS REINFORCED PLASTIC (FRP) TANKS FOR ACTIVATED CARBON

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope:

1. This section specifies fiberglass reinforced plastic (FRP) tanks to serve as vapor-phase activated carbon adsorbers. Carbon media is specified in Section 44 31 16
2. The requirements of Section 06 70 13 apply to all aspects of this specification section. For purposes of this section, construe references to design drawings, construction details, laminate sequences or laminate charts herein or contained in Section 06 70 13 as references to the fabricator's approved design submittal.
3. The tanks will contain activated carbon and will handle corrosive and potentially flammable wastewater gases.
4. Install the activated carbon specified in Section 44 31 16.

B. Unit Responsibility:

1. The Contractor shall assign Unit Responsibility to the odor control vessel supplier for provision of the activated carbon media specified in Section 44 31 16, the FRP Centrifugal Fan specified in Section 23 31.16.16, the grease/mist eliminator specified in 44 31 14, and odor control ductwork connections for the skid as specified in section 43 11 19.13. The system will be supplied as a single packaged unit.

C. Type:

1. Provide tanks under this section that are horizontal, rectangular, and hand lay-up sidewall construction. Supply tanks complete with all nozzles, level fittings, hatches, and an anchoring system.

D. Equipment List:

Item	Equipment No.
Odor Control Unit	TBD

E. Design Requirements:

1. Physical characteristics: Ensure that FRP tanks provided under this section have the following characteristics:

Access hatches, Minimum	Number of carbon beds	Minimum carbon depth, feet	Mass of wet carbon bed, pounds
3	1	3	VTF

VTF: Vendor to furnish

Dimensions shall be as shown on the Contract Drawings.

- Operating conditions: Design FRP tanks for the following characteristics:

Air flow, scfm	Air flow direction	Maximum internal pressure/vacuum, inches W.C.
4,500	Horizontal	20/12

1.02 QUALITY ASSURANCE

- General: Fabricate tanks and assemble in strict compliance with the design drawings and specifications. Use weft unidirectional tape if dictated by the Engineer's stamped design calculations. Manufacture the inlet duct up to the first upstream flange and the outlet duct up to the first downstream joint as part of the tank.
- Design Requirements:
 - The fabricator shall perform all calculations necessary to ensure long-term, low-risk service of the FRP equipment with minimum reasonable maintenance requirements. Have the design ensure proper functioning of the equipment at the stated operating conditions. Include (as a minimum) engineering calculations, materials selection, and documented physical and mechanical properties, and all detailed drawings required for fabrication and assembly of the equipment.
 - The design shall satisfy all applicable national, regional, and local design and building codes. Seismic forces shall be determined in accordance with the Uniform Building Code for both the tank with carbon only, and the tank filled with carbon media.
 - The detailed design of FRP tanks shall follow the procedures and methods, use the equations and formulas, and incorporate safety factors and allowable design stresses and strains set forth in ASME/ANSI RTP-1.
 - The design shall consider the interaction of the installed system, including but not limited to: thermal expansion of duct, tanks and vessels and the effects of external loading from piping, fans, pumps, platforms, etc.
 - The design shall allow for the most severe combination of conditions that may include any or all of the following:
 - Internal or external pressure
 - Static head of contents (working and test conditions)

- c. Mass of structure and contents
- d. Design temperature including upset conditions
- e. Superimposed loads, such as seismic forces
- f. Bending moments due to eccentric loads
- g. Localized loads acting at supports, lugs, and other attachments
- h. Shock loads
- i. Loads due to heating or cooling and thermal gradients
- j. Loads applied during transport or erection
- k. Loads imposed by personnel during erection and operations
- l. Fatigue
- m. Specifically:
 - 1) Shell overturning due to wind/seismic:
 - a) Critical buckling
 - b) Design factor on tension side
 - 2) Anchoring, due to overturning or internal pressure:
 - a) Lug design
 - b) Analysis of attachment to shell
 - c) Effect on shell knuckle
 - d) Maximum pullout forces and moments reported for the foundation design
 - 3) Appendage support:
 - a) Effect of point loads on shells
 - b) Interaction between towers under any load
 - 4) Internal pressure or vacuum:
 - a) Main shells, hoop, and axial
 - b) Cutout reinforcements at nozzles
 - c) Effect on any discontinuities or special components (such as internal cone)
 - 5) Thermal:
 - a) Differential expansion at temperature extremes
 - b) Thermal gradient through laminate
 - 6) Special loads:
 - a) Effect of agitators on nozzles
 - b) Dead or live loads on domes
 - c) Platforms

- n. There will typically be other aspects that should be considered. It is the responsibility of the fabricator to identify and consider these effects, and to provide this information to the construction manager for review.
 6. The fabricator shall provide documentation for all laminate properties used in the design. Laminates must be similar in construction, layer sequence, resin type, and cure to those used to determine tested properties. Adjust all properties to reflect any reductions at operating temperatures.
 7. The corrosion liner shall be a minimum of 100 mils in thickness, and that documentation is provided by the fabricator verifying veil type, liner thickness, and resin cure. Consider 50 mils of the corrosion liner sacrificial and do not include while determining structural wall thickness. Determine structural wall thickness in accordance with ASME/ANSI RTP-1 and ensure it is no less than 0.375 inch for tanks and vessels. The requirements of ASME/ANSI RTP-1 govern the design.
 8. Laminate types for various components may include helical winding, hand lay-up, and hoop/chop construction methods. In laminates with helix angles greater than 75 degrees and in all hoop/chop laminates, orient approximately 10 percent of the structural wall thickness at zero degrees (longitudinal direction). Apply this reinforcement in two layers of weft unidirectional fabric and equally space within the structural wall.
 9. Nozzles, gussets, accessways and shell reinforcements shall be determined according to the applicable text, tables, and formulas in ASME/ANSI RTP-1.
 10. Anchoring for tanks shall be accomplished using lugs and one of the following three methods: a continuous filament wound band, an integral filament wound load ledge with external anchor clips, or an appropriate secondary bond using hand lay-up.
 11. Internal beams and support attachments shall be designed using a maximum of 25 psi shear stress for secondary bonds. This also applies to design of external lugs required for ladders, platforms, etc.
 12. The tank shall be designed to support the 3-foot carbon bed.
- C. Factory Testing:
1. Testing of samples taken from the tanks' fabrication laminates shall be in accordance with Section 06 70 13. Provide the results of all tests to the Owner.

1.03 REFERENCES

- A. References are as described in Section 06 70 13-1.03.

1.04 ENVIRONMENTAL CONDITIONS

- A. The tank shall be located indoors.

1.05 SUBMITTALS

- A. In addition to the submittals required under Section 06 70 13, the Contractor shall provide (prior to beginning fabrication) the following submittals in accordance with Division 1:
1. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.
 2. A copy of the contract document control diagrams and process and instrumentation diagrams relating to the submitted equipment, with addendum updates that apply to the equipment in this section, marked to show specific changes necessary for the equipment proposed in the submittal. If no changes are required, the drawing or drawings shall be marked "no changes required". Failure to include copies of the relevant drawings with the submittal shall be cause for rejection of the entire submittal with no further review.
 3. Completed Certificate of Unit Responsibility attesting that the Contractor has assigned, and that the manufacturer accepts, unit responsibility in accordance with the requirements of this Section and Section 43 05 11-1.02 Unit Responsibility. *No other submittal material will be reviewed until the certificate has been received and found to be in conformance with these requirements.*
 4. Complete design calculations for all tanks. Calculations shall be signed by a structural engineer registered in the State of Virginia verifying that the tanks have been designed to meet all design criteria given in these specifications.

5. Complete information developed by the fabricator that describes specifically how the equipment is to be built. This would most likely be in the form of shop drawings, standards, specifications, or other shop instructions, but may also be partially contained in quality control records. This should include but not be limited to:
 - a. Resin type
 - b. Type and amount of fillers
 - c. Nominal corrosion liner description
 - d. Reinforcement types for hand lay-up laminates
 - e. For filament wound laminates:
 - 1) Strand orientation angle
 - 2) Glass content range
 - 3) Strand yield
 - 4) Strand per inch in the winding band
 - 5) Ply thickness
 - 6) Amount of chop or unidirectional roving interspersed with winding, if any, and location within laminate
 - f. For all other components:
 - 1) Construction type
 - 2) Laminate thicknesses
 - 3) Ply sequences
 - 4) Glass content range
 - g. For all secondary overlays (both interior and exterior):
 - 1) Laminate thicknesses
 - 2) Ply sequences and widths
 - h. Construction details for all assembly and other special configurations, including:
 - 1) Bottom/top attachments with knuckle configuration and overlays and thicknesses
 - 2) Support and anchor lugs, including attachment details
 - 3) Nozzles and installation, including cutout reinforcement, gusseting, etc.
 - 4) Lateral or other support fabrication details, including ladder and platform attachment clips and/or shoulders
 - 5) Configuration and fabrication details of internal support system and other specialty items
 - i. Assembly and erection plans as described in Section 06 70 13-3.02.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Candidate manufacturers are listed below:
1. PureAir Filtration
 2. ECS Environmental Solutions
 3. Or pre-approved equal
- B. The manufacturer's standard product may require modification to conform to specified requirements.

2.02 FABRICATION

- A. Fabrication the FRP tanks in accordance with Section 06 70 13 and the following. Where there is a conflict between this section and Section 06 70 13, the requirements of Section 06 70 13 shall govern.
1. Reinforcement surfacing veil, as described in Section 06 70 13, shall be C-glass surfacing veil.
 2. The interior layers of the glass mat, as described in Section 06 70 13, shall consist of three layers of 1-1/2 ounces per square foot glass mat.
 3. All laminates, the corrosion resistant liner (as described in A and B, above) shall be followed by a filament-wound structural laminate applied in accordance with Section 06 70 13.
 4. All exterior surfaces shall be resin rich and reinforced with one layer of C-glass surfacing veil.
 5. Maintain laminate sequences and thicknesses, as specified.
 6. Shop assemble the tanks to ensure proper fit. Number subassemblies and match mark mating flanges or elements to ensure correct alignment and correct field assembly.
 7. The minimum corrosion liner thickness is 0.100 inch. Add excess liner thickness to total wall thickness, but ensure it does not conflict with tolerance requirements.
 8. The filament winding angle shall be 60 degrees \pm 5 degrees.
 9. Use a vinyl ester resin with Class 1 flame spread and approved in writing by the construction manager. Do not use pigments or additives that inhibit translucency such as Nyacol or antimony trioxide in any fiberglass components of the tank.
 10. The carbon support system shall include a polypropylene carbon support membrane, as recommended by carbon supplier, supported by fiberglass grating, supported by fiberglass beams. Use grating that is 2 inch by 2 inch

vinyl ester. The carbon bed screen and grating shall be removable through access manways. The support beams shall use same resin system specified in the tank construction. The support beams shall have a full 100-milliliter corrosion liner applied to the exterior. The carbon support system shall have a design safety factor of 300 percent.

11. Do not use pigments in the inner lamina. However, apply a pigmented surface coat to the exterior surface of the tanks in accordance with Section 06 70 13. The color shall be as directed in writing by the construction manager.

2.03 TANK FITTINGS

- A. Provide fittings as shown on drawings. All air inlet and access hatch fittings shall be per ASTM 3982 flanges.

2.04 METAL APPURTENANCES

- A. All wires, anchor lugs, bolts, and fasteners shall be AISI type 316 stainless steel.

2.05 GASKETS

- A. Unless specified otherwise, use neoprene gaskets.

2.06 AIR SAMPLE PORT

- A. Each tank shall have an air sample port for treated air. Locate the port as shown on the contract drawings.

2.07 ACCESS HATCHES

- A. The tank shall have 24-inch flanged access hatches as specified. Ensure that the location is as shown on the drawings.

2.08 GROUNDING

- A. A grounding rod shall be provided for each carbon bed and ground at the base of the tank.

2.09 SAMPLE PORTS

- A. The carbon bed shall have three 1.5-inch-diameter carbon sample ports extending 6 inches into carbon media. Ports shall be seated with a full port ball valve. The valve material shall be CPVC.

2.10 CARBON BED MONITORING

- A. Provide a media life sampling method to allow external viewing of remaining carbon life in each bed. This shall include an electronic carbon consumption monitor which will measure the actual carbon consumption in real time. The system shall provide consumption resolution of one percent. The carbon consumption shall be displayed on a local NEMA 4X panel at the odor control unit as well as a remote alarm and “days remaining” value sent to the SCADA system. Systems which rely on break-through sampling of hydrogen sulfide are not acceptable. The electronic carbon consumption monitor shall be manufactured by PureAir Filtration or pre-approved equal.

2.11 PRODUCT DATA

- A. Provide the following product data in accordance with Division 1:
 1. Signed affidavit by the tank fabricator indicating that the tank was successfully factory tested
 2. Statement by the tank fabricator that the tank material meets the test properties specified
 3. Applicable operating and maintenance information specified in Division 1
 4. Fabricator’s inspection reports as described in Section 06 70 13
 5. Fabricator's certifications (Section 01 99 90-Form 43 05 11-A) that the equipment has been properly installed, aligned, and tested and meets all requirements for satisfactory performance under the conditions specified
 6. Fabricator's certification (Section 01 99 90-Form 43 05 11-B) that instruction to operators has been completed

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspection of all tanks, including examination of laminate cutouts and specimens, shall be performed by the Construction Manager. The Contractor shall notify the

Construction Manager 72 hours in advance of the occurrence of the following tank construction milestones:

1. Extraction of each shell section, prior to beginning assembly work.
 2. Assembly completion, prior to shipment.
- B. Laminate defects and their allowable limits and tolerances shall be in accordance with Section 06 70 13. Minimum acceptable hardness of all FRP laminates shall be 36 when tested in accordance with Section 06 70 13. Surfaces shall also be tested for acetone sensitivity as an indication of air inhibition. Air-inhibited surfaces are not allowed.
- C. All welded thermoplastic seams shall be subjected to a non-destructive AC spark test in accordance with Fabricator's recommendations.

3.02 INSTALLATION

- A. The tanks shall be installed as shown and in accordance with the Fabricator's written instructions. Each tank shall rest on a level, even base of concrete so that the entire bottom of the tank is supported as shown on the Drawings. The installation shall be certified on Form 43 05 11-A specified in Section 01 99 90.

3.03 FIELD TESTING

- A. Connect the tanks to the ductwork system and air test under design system pressure. Any leaks shall be corrected prior to filling tanks with carbon media.

3.04 INSTALLATION OF CARBON

- A. Notify the construction manager 2 weeks prior to the time planned for installing the activated carbon. Provide quantities of each type of carbon, a delivery date, and an installation time.
- B. Arrange with the construction manager at least 1 week in advance for a representative of the construction manager to be on site when the carbon is installed. The representative will be familiar with carbon tank maintenance procedures and will inspect each lift of carbon as it is installed.
- C. Evenly spread and compact carbon. Take special care to ensure there are no voids or opportunities for short circuiting. Special care shall be taken to insure there are no void pockets or opportunities for short-circuiting, including bed areas around the sampling probes and near the vessel walls. Each bed shall have a smooth surface with uniform bed depth throughout.

END OF SECTION

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SECTION 44 31 14
GREASE FILTER/MIST ELIMINATOR

PART 1 GENERAL

1.01 SUMMARY

A. SCOPE:

1. This section specifies filters for removing grease and moisture from corrosive air streams.
2. The installation of the grease filter/mist eliminator shall be provided as part of the odor control unit package.

B. EQUIPMENT LIST:

Item	Equipment No.
Grease Filter/Mist Eliminator	TBD

1.02 QUALITY ASSURANCE

A. This section contains references to the following documents, included as specified and modified. A document referencing other standards is included under this Section as if referenced directly. If this Section's requirements and those of the listed documents conflict, use this Section's requirements.

1. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the Issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
SMACNA	Thermoset FRP Duct Construction Manual
National Bureau of Standards Voluntary Product Standard PS 15-69	Custom Contact-Molded Reinforced-Polyester Chemical Resistant Process Equipment

Reference	Title
ASTM C582	Standard Specification for Contact Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion-Resistant Equipment

1.03 PERFORMANCE REQUIREMENTS

A. GENERAL:

- Units specified in this section shall be designed and selected for continuous indoor operation with air containing corrosive and flammable vapors and gases generated from the treatment and conveyance of municipal wastewater and wastewater residuals. Vapors and gases may be expected to include methane, hydrogen sulfide, organic sulfides, sulfur dioxide, volatile organic compounds, ammonia, grease, and water-saturated air. The air stream may also be expected to contain droplets of dilute sulfuric acid. Air stream temperatures are expected to vary between 40 and 95 degrees F.

B. OPERATING REQUIREMENTS:

- The grease filter/mist eliminator shall remove 99.8% of all particles greater than 10 microns in diameter at 400 feet per minute face velocity.
- Face velocity through pads shall not exceed 500 feet per minute to avoid carryover.
- The units shall comply with the following operating conditions and requirements:

Equipment No.	Capacity, scfm	Max. Pressure Drop at Ultimate Capacity with Filters Clean, in., W.C.	Connection Diameter, inches
TBD	4,500	0.5	N/A

1.04 SUBMITTALS

A. Provide the following information in accordance with the Contract Documents:

- A copy of the contract drawing, this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the

marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

2. Detailed installation drawings showing equipment layout, size and location of all piping, and instrumentation and structural connections.
3. Certification from the resin manufacturer demonstrating that selected resin and catalyst systems are appropriate for service conditions. Resin shall meet requirements listed here and in Section 06 70 13.
4. Pressure drop data through filter pads showing conformance with paragraph 1.03B.
5. Fabricator qualifications.

PART 2 PRODUCTS

2.01 MANUFACTURERS

1. Manufacturers: Candidate manufacturers are listed below:
 - a. PureAir Filtration
 - b. ECS Environmental Solutions
 - c. or approved equal
2. The manufacturer's standard product may require modification to conform to requirements in this Section.

2.02 MATERIALS

Component	Material
Housing	FRP as per Section 06 70 13
First-stage pad	Type 316 stainless steel
Second-stage pad	Polypropylene or 316 stainless steel
Gaskets	EPDM
Hardware	Type 316 stainless steel

2.03 EQUIPMENT FEATURES

A. HOUSING:

1. The grease filter/mist eliminator filter shall consist of filter pads housed inside a fiberglass-reinforced plastic (FRP) enclosure suitable for indoor installation. Provide a resin system with corrosion-resistant vinyl ester meeting Class 1 flame spread rating. Provide a resin system not requiring any additives such as Nyacol or antimony to achieve the Class 1 flame spread rating. Use resin manufactured by AOC, Ashland, or Reichold. Finished laminate including liner and structure must be translucent.

2. Provide housing with doors and chambers to access to filter pads from both sides of the filter housing.
 3. The housing shall allow removal and replacement of filter pads through a hinged door fastened with stainless-steel, quick-release toggle clamps, and manual removal of the cartridges by one operator. The housing shall be integral to the overall odor control system vessel. Refer to Section 43 41 45.15 for FRP construction requirements.
 4. Provide access doors hinged with stainless-steel locking latches. The housing must withstand 20 inches of water column pressure and 12 inches of water column vacuum.
 5. A drain connection with a ball valve shall be provided.
 6. Provide housing capable of achieving required pad face velocity for initial airflow by inserts or other means. Use removable inserts.
- B. FILTER PADS:**
1. The first pad is for grease removal and must be at minimum 2 inches thick. The second pad is for mist removal and must be at minimum 4 inches thick. Assemble the pads side-by-side to cover total filter face area. Use a water-washable pad.
 2. Use pads removable by one operator for cleaning, not exceeding 20 pounds each. Provide a differential pressure to measure pressure drop across entire unit.
 3. Provide the grease filter/mist eliminator filter with a 2-inch drain connection. Field-route drain piping as shown on the Drawings. Install an external water trap to allow drain valve to remain open.
 4. Candidate pad manufacturers include ACS and York, without exception.

2.04 INSTRUMENTS

- A. Provide a differential pressure gauge to measure pressure drop across entire unit. Primary element shall be corrosion-resistant. Instrument range and display shall be 0 to 5 inches water column. Instrument shall be manufactured by Dwyer or equal.

2.05 STANDBY COMPONENTS

- A. Provide one extra set of first- and second-stage filter pads.

2.06 PRODUCT DATA

- A. Provide the following information:
1. Applicable maintenance information as specified in Section 01 78 23.
 2. Instructions for installation of equipment. At a minimum, include the following information:
 - a. Major parts list, including weights of component parts.

- b. Unpacking and unloading procedures, including directions indicating proper methods for moving equipment.
- c. Instructions for field assembly of match-marked components, as they will be shipped.
- d. Instructions for anchoring and securing equipment.
- e. Site storage and protection requirements for equipment prior to installation.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install each grease filter/mist eliminator as shown on the Drawings and recommended by the manufacturer. Install to ensure access for filter removal. Route drain pipe to a disposal point.
- B. Permanently mark the two pressure gauges as recommended by the manufacturer for filter maintenance.

END OF SECTION

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SECTION 44 31 16

ACTIVATED CARBON ADSORPTION ODOR CONTROL MEDIA

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope:

1. This section specifies activated carbon media for odor reduction. Fiberglass reinforced plastic tanks for activated carbon odor control systems are specified in Section 43 41 45.16.
2. Activated carbon adsorption odor control unit shall treat foul air from sources shown on the Drawings. Unit shall be upstream of a foul air fan (Section 23 34 16.16) and downstream of a grease/mist eliminator (Section 44 31 14). The grease filter/mist eliminator, carbon media bed, and foul air fan shall be supplied as part of a packaged system.

B. Unit Responsibility:

1. The Contractor shall assign unit responsibility as specified in Section 43 05 11-1.02 Unit Responsibility to the odor control vessel supplier for provision of new activated carbon as specified herein.

C. Type:

1. Virgin activated carbon shall be non-impregnated, high surface area, tightly packed granular or pelletized type, specifically manufactured to absorb vapor phase organic and malodorous compounds of the type typically generated from municipal wastewater.
2. Supplier of activated carbon shall be experienced in the supply and operation of activated carbon systems for vapor phase organic and hydrogen sulfide removal at wastewater treatment facilities. Supplier shall have a minimum of five installations in which the same carbon media as supplied was installed in the past five years. A list of these five installations shall be provided, complete with current contact numbers, names and catalog information for the media installed.

1.02 QUALITY ASSURANCE

A. General:

1. Activated carbon shall be specifically manufactured for continuous exposure to moisture-laden foul air containing concentrations of hydrogen sulfide up to 10 parts per million, as well as other malodorous compounds of municipal

sewage origin such as ammonia, organic sulfides, indols, skatols, aldehydes, and mercaptans. Foul air will have temperatures ranging from 40 to 95 degrees F and relative humidity up to 100 percent.

B. Operating Conditions:

Air flow, cfm	4,500
Maximum temperature in vessel, degrees F	95
Maximum face velocity in bed, fpm	50
Minimum empty bed detention time, sec	3.6
Bed thickness, ft	3.0
Maximum H ₂ S outlet at <1ppm inlet, ppm	0.05
Maximum H ₂ S outlet at 1-10 ppm inlet, ppm	0.1
Minimum H ₂ S removal at >10 ppm inlet, percent	99
Maximum outlet odor at <3,000 dilutions-to-threshold (D/T) inlet, D/T	300
Minimum odor removal at >3,000 D/T inlet, percent	90

1.03 ENVIRONMENTAL CONDITIONS

A. Environmental conditions are specified in Section 01 11 80.

1.04 SUBMITTALS

A. The following submittals shall be provided in accordance with Section 01 33 00:

1. A copy of this specification section, with addendum updates included, and all referenced and applicable 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. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in

the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Construction Manager shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. *Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.*

2. Completed Certificate of Unit Responsibility attesting that the Contractor has assigned, and that the manufacturer accepts, unit responsibility in accordance with the requirements of this Section and Section 43 05 11-1.02 Unit Responsibility. *No other submittal material will be reviewed until the certificate has been received and found to be in conformance with these requirements.*
3. Detailed product information for the activated carbon proposed for the job, including verification of all properties specified in paragraph 2.02, as well as total weight per bed.
4. Certified weights of the carbon beds.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Candidate manufacturers include:

1. Daniel Company
2. ECS Environmental Solutions
3. Evoqua Water Technologies
4. Haycarb Activated Carbon
5. Jacobi Carbons
6. Pure Air Filtration

B. The manufacturer's standard product may require modification to conform to specified requirements.

2.02 MATERIALS

Virgin Activated Carbon

Substrate

Bituminous coal or
coconut shell

Virgin Activated Carbon

Particle size (U.S. Sieve)	4 x 8
Mean particle diameter, millimeters (per ASTM D2862)	3.4 - 3.8
CCl4 number percent by weight minimum (per ASTM D3467)	60
Hardness number minimum (per ASTM D3802)	95
Maximum moisture content percent by weight (per ASTM D2867)	2
Apparent density, minimum gms/cc (per ASTM D2854)	0.46 - 0.60
Maximum head loss through bed at 50 fpm velocity inches w.c./ft bed depth (1)	1.5
H ₂ S breakthrough capacity minimum, gms H ₂ S removal/gm carbon (2)	0.04

Notes:

1. Head loss shall be determined by passing dry air at 70 degrees F and 1 atm. pressure through a 2-inch diameter by 12-inch deep bed of carbon placed in a dense packed arrangement per ASTM D2854.
2. The determination of H₂S breakthrough capacity shall be made by passing a moist (70 percent RH) air stream containing 1 percent H₂S at 1,450 cubic centimeter per minute flow through a test bed of uniformly packed activated carbon of the following dimensions: depth-9 inches, diameter-0.725 to 1.0 inch. The test shall be monitored to a 10 ppm breakthrough and the results expressed in gms H₂S removal/gm carbon which is calculated from the carbon sample weight uncorrected for moisture.

2.03 PRODUCT DATA

- A. The following product data shall be provided in accordance with Section 01 33 00:
1. A detailed description of the procedure for installation and commissioning of the activated carbon.

PART 3 EXECUTION

3.01 INSTALLATION

- A. The carbon shall be installed in strict accordance with manufacturer's recommendations. Each bed shall be packed uniformly to the density specified with sample probes installed as shown. The packed bed shall contain no void pockets including bed areas around the sampling probes and near the vessel walls. Each bed shall have a smooth surface with uniform bed depth throughout.
- B. Installation shall also adhere to requirements listed in Section 43 41 45.16.

3.02 COMMISSIONING

- A. The commissioning period shall be carried out under the supervision of the manufacturer's representative and shall be continuous for a minimum of 3 days.
- B. Contractor shall demonstrate during commissioning that the airflow rate through the carbon media is consistently within 10% of the design rate (Paragraph 1.02 B).
- C. Contractor shall demonstrate during commissioning that the pressure drop from inlet flange to outlet flange is consistently within 10% of design (Paragraph 2.02 A).

3.03 PERFORMANCE TEST

- A. After completion of the commissioning period, the activated carbon bed shall be subjected to performance tests conducted over the course of one day. Performances test shall be accepted if operating conditions listed in Section 1.02 are met and the H₂S and odor removal rates listed in Section 1.02 are met or exceeded.
- B. Performance tests shall be conducted by the carbon supplier representative, coordinated by the Contractor.
- C. Contractor shall supply a performance testing protocol to the Owner and the protocol shall be accepted prior to commencing performance testing.
- D. Performance testing shall occur during normal operation of the odor control system and during normal operation of the pump station.
- E. Carbon supplier representative shall conduct performance tests 3 times over the course of one day, with the first test occurring before Noon and all tests separated by at least 3 hours.
- F. Performance tests shall be conducted by measuring and collecting air from the inlet sampling port and the exhaust stack sampling port.
- G. During each of the 3 performance tests, carbon supplier representative shall collect field H₂S measurements at each sampling port. For field measurements less than 50 parts per million (ppm) H₂S, carbon supplier representative shall use a hand-held instrument capable of detecting H₂S concentrations to a resolution of 0.001 ppm (Jerome 631-X analyzer or equal). For field measurements greater than 50 parts per million (ppm) H₂S, carbon supplier representative shall use sorbent tubes (Draeger or equal) and a hand pump to measure H₂S concentrations. Field

- measurements shall be collected at the odor control system inlet and outlet stack. The three measurements shall be collected approximately every 15 minutes for 1 hour, providing a total of 4 sets of H₂S concentration measurements for each test. Multiple instrument (Jerome 631-X analyzer or equal) field measurements shall be collected at each sample port so that a reasonable concentration can be recorded. Recorded H₂S concentration shall be the average of measurements that were generally within 10% of each other. Field analyzer (Jerome 631-X analyzer or equal) shall be zeroed after each performance test.
- H. During each of the 3 performance tests, the carbon supplier representative shall collect 2 air samples in Tedlar bags: 1 for the odor control system inlet and 1 for the stack outlet. Samples shall be shipped to a certified odor panel laboratory (St. Croix Sensory or equal) where samples shall be analyzed for odor detection threshold (providing measurements in D/T), odor recognition threshold providing measurements in R/T), and characterization. Contractor shall measure and record the H₂S concentration using the hand-held unit off the sample bag by directly connecting the instrument to the bag. The air samples shall be collected and analyzed for each of the 3 performance tests, for a total of 6 samples. Carbon supplier representative shall follow all protocol items given by the odor panel laboratory for collection and shipping of samples.
- I. Carbon supplier representative shall record field H₂S and laboratory odor panel data in a performance test report that verifies sufficiency of operating conditions per Section 1.02. Laboratory data reports shall be attached to the report. Report shall be reviewed and must be accepted by the Owner and/or designated representative to conclude performance testing.
- J. If operating requirements for H₂S and odor removal efficiency listed in Section 1.02 are not met, Contractor shall make corrections to the odor control system, including media replacement, as needed to meet operating conditions at no cost to the Owner.

END OF SECTION